# Physikalisch-Technische Bundesanstalt

**Braunschweig und Berlin**

(1) # EC-TYPE-EXAMINATION CERTIFICATE

**(Translation)**

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

**PTB 03 ATEX 2214 X**

(4) Equipment: Ultrasonic sensor, type series VEGASON SN6*.C***P/F*** with integrated electronic assembly SN61-63PA/FF

(5) Manufacturer: VEGA Grieshaber KG

(6) Address: Am Hohenstein 113, 77761 Schiltach, 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 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.

The examination and test results are recorded in the confidential report PTB Ex 03-23434.

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

**EN 50014:1997 + A1 + A2** **EN 50020:2002** **EN 50284:1999**

(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, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

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

**Ex II 1 G resp. II 1/2 G resp. II 2 G EEx ia IIC T6**

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, December 05, 2003

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

(13) # S C H E D U L E

(14) ## EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2214 X

(15) Description of equipment

The ultrasonic sensor, type series VEGASON SN6*.C***P/F*** with integrated electronic assembly SN61-63PA/FF, are used for level measurement in potentially explosive atmospheres requiring category-1 or category-1/2 or category-2 equipment. The enclosure may be optionally fitted with the control and display module "A/B module" or "PLICSCOM" for either parametration or visualization.

The ultrasonic sensors consists of an electronics housing with the corresponding electronic evaluation system, the process connectors and the sensor.

Category-1 equipment

The ultrasonic sensors are installed in potentially explosive atmospheres requiring category-1 equipment.

Category-1/2 equipment

The electronics housing is installed in potentially explosive atmospheres requiring category-2 equipment. The process connectors are installed in the partition separating areas requiring category-2 or category-1 equipment. The sensor is installed in potentially explosive atmospheres for category-1 equipment.

Category-2 equipment

The ultrasonic sensors are installed in potentially explosive atmospheres requiring category-2 equipment.

For the relationship between the temperature class and the maximum permissible temperature at the sensor and the maximum permissible ambient temperature for the electronic system, reference is made to the following table.

Category-1 equipment

| temperature class | temperature at the sensor | ambient temperature for the electronic system |
|---|---|---|
| T5 | -20 ... +43 °C | -20 ... +43 °C |
| T4, T3, T2, T1 | -20 ... +60 °C | -20 ... +60 °C |

For applications requiring category-1 equipment, the media process pressure has to be between 0.8 bar and 1.1 bar. The permissible ambient temperatures specified are based on the 80% rule in section 6.4.2 of EN 1127-1. For the process conditions without explosive mixtures, reference shall be made to the specifications provided by the manufacturer.

Category-1/2 equipment

| temperature class | temperature at the sensor | ambient temperature for the electronic system |
|---|---|---|
| T6 | -20 ... +58 °C | -40 ... +47 °C |
| T5 | -20 ... +60 °C | -40 ... +62 °C |
| T4, T3, T2, T1 | -20 ... +60 °C | -40 ... +85 °C |

For applications requiring category-1/2 equipment, the media process pressure has to be between 0.8 bar and 1.1 bar. The permissible ambient temperatures at the sensor specified are based on the 80% rule in section 6.4.2 of EN 1127-1. For the process conditions without explosive mixtures, reference shall be made to the specifications provided by the manufacturer.

Category-2 equipment

| temperature class | temperature at the sensor | ambient temperature for the electronic system |
|---|---|---|
| T6 | -20 ... +74 °C | -40 ... +47 °C |
| T5 | -20 ... +89 °C | -40 ... +62 °C |
| T4, T3, T2, T1 | -20 ... +90 °C | -40 ... +85 °C |

For the permissible operating temperatures and pressures, reference shall be made to the specifications provided by the manufacturer.

Electrical data

Supply and signal circuit
(terminals 1 [+], 2 [-] in the compartment,
for the 2-cell enclosure
version in the terminal compartment)

**category 1 respectively category 1/2**
Type of protection Intrinsic Safety EEx ia IIC/IIB
**category 2**
Type of protection Intrinsic Safety EEx ia IIC/IIB
resp. EEx ib IIC/IIB

For connection to a certified intrinsically safe circuit.
Maximum values:
$U_i$ = 17.5 V
$I_i$ = 500 mA
$P_i$ = 5.5 W
The equipment is suitable for the connection to a field bus system according to FISCO, e.g. PROFIBUS-PA or Foundation Fieldbus
or

$U_i$ = 24 V
$I_i$ = 250 mA
$P_i$ = 1.2 W

| | |
|---|---|
| | $L_i \leq 5\ \mu H$<br>$C_i$ negligibly low |
| Control and display circuit (terminals Nos. 5,6,7,8 in the electronics compartment or plug connector for the 2-cell enclosure version) | Type of protection Intrinsic Safety EEx ia IIC<br>For connection to the intrinsically safe supply and signal circuit of the corresponding external VEGA display unit VEGADIS61 (PTB 02 ATEX 2136 X).<br><br>The rules for interconnection of intrinsically safe circuits between the ultrasonic sensor, type series VEGASON and the external VEGADIS61 display unit are complied with if the total inductance and capacitance of the connecting line between ultrasonic sensor, type series VEGASON and the external VEGADIS61 display unit ($L_{Kabel}$ = 96 µH and $C_{Kabel}$ = 2.8 µF) is not exceeded.<br><br>A control and display module (A/B module or PLICSCOM) installed in the ultrasonic sensor, type series VEGASON and a connected VEGACONNECT3 have been considered. |
| Communication circuit ($I^2C$-bus socket in the electronics compartment, for the 2-cell enclosure version in additionally the terminal compartment) | Type of protection Intrinsic Safety EEx ia IIC<br>For connection to the intrinsically safe signal circuit of a VEGA VEGACONNECT3 interface converter (PTB 01 ATEX 2007). |
| Control and display module circuit (spring contacts in the electronics compartment, for the 2-cell enclosure version in additionally the terminal compartment) | Type of protection Intrinsic Safety EEx ia IIC<br>For connection to the VEGA control and display module (A/B module or PLICSCOM). With the 2-cell-enclosure version the operating and display module may either be fitted in the electronics compartment or in the terminal compartment. |

The metal elements of the ultrasonic sensors are electrically connected to the earth terminals. The intrinsically safe circuits are safely electrically isolated from elements that may be earthed.

(16) Test report PTB Ex 03-23434

(17) Special conditions for safe use

1. If used as a category-1 equipment the ultrasonic sensor, type series VEGASON SN6*.C***P/F*** with integrated electronics assembly SN61-63PA/FF, which include the material aluminium, shall be installed in such a way that sparking as a result of impact or friction between aluminium and steel (with the exception of stainless steel if the presence of rust particles can be excluded) is excluded.
2. The ultrasonic sensor with plastic enclosure and parts of enclosures out of plastic as well as the sensors include surfaces that can become charged electrostatically (note warning label).
3. In case of danger of mechanical damage of the sound transducer the ultrasonic sensors VEGASON shall be installed in such a way that the sound transducer is protected against mechanical damage from the environment.

(18) Essential health and safety requirements

met by compliance with the standards mentioned above

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, December 05, 2003

# Physikalisch-Technische Bundesanstalt

**Braunschweig und Berlin**

## 1. SUPPLEMENT

**according to Directive 94/9/EC Annex III.6**

## to EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2214 X

## (Translation)

Equipment: Ultrasonic sensors type series VEGASON SN6*.C***P/F*** with integrated electronic assemblies SN61-63PA/FF

Marking:  **II 1 G or II 1/2 G oder II 2 G EEx ia IIC T6**

Manufacturer: VEGA Grieshaber KG

Address: Am Hohenstein 113, 77761 Schiltach, Germany

Description of supplements and modifications

The name of the ultrasonic sensor type series VEGASON SN6*.C***P/F*** with integrated electronic assemblies SN61-63 PA/FF is changed into ultrasonic sensor VEGASON type series SN6*.C***P/F*** or SN6*.C_**P/F***.

Other changes concern the internal and the external construction, the electrical data as well as the relationship between the temperature class and the maximum permissible temperature at the sensor and the maximum permissible ambient temperature for the electronic system and the "Special Conditions".

For the relationship between the temperature class and the maximum permissible temperature at the sensor and the maximum permissible ambient temperature for the electronic system, reference is made to the following table.

Category-1 equipment

| temperature class | temperature at the sensor | ambient temperature for the electronic system |
|---|---|---|
| T5 | -20 ... +43 °C | -20 ... +43 °C |
| T4, T3, T2, T1 | -20 ... +60 °C | -20 ... +60 °C |

For applications requiring category-1 equipment, the media process pressure has to be between 0.8 bar and 1.1 bar. The permissible ambient temperatures specified are based on the 80 % rule in section 6.4.2 of EN 1127-1. For the process conditions without explosive mixtures, reference shall be made to the specifications provided by the manufacturer.

# Physikalisch-Technische Bundesanstalt

**Braunschweig und Berlin**

## 1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2214 X

Category-1/2 equipment

| temperature class | temperature at the sensor | ambient temperature for the electronic system |
|---|---|---|
| T6 | -20 ... +58 °C | -40 ... +47 °C |
| T5 | -20 ... +60 °C | -40 ... +62 °C |
| T4, T3, T2, T1 | -20 ... +60 °C | -40 ... +85 °C |

For applications requiring category-1 equipment, the media process pressure has to be between 0.8 bar and 1.1 bar. The permissible ambient temperatures specified are based on the 80 % rule in section 6.4.2 of EN 1127-1.

When the ultrasonic sensor VEGASON type series SN6*.C***P/F*** or SN6*.C_**P/F*** are operated with higher temperatures than indicated in the table above, it shall be guaranteed by suitable measures, taking into account a temperature rise of the sensor of 6 K, that no ignition hazard is caused by such hot surfaces. In this case the temperature at the electronics housing shall not exceed the respective values of the table above.

For the process conditions without explosive mixtures, reference shall be made to the specifications provided by the manufacturer.

Category-2 equipment

| temperature class | temperature at the sensor | ambient temperature for the electronic system |
|---|---|---|
| T6 | -20 ... +74 °C | -40 ... +47 °C |
| T5 | -20 ... +89 °C | -40 ... +62 °C |
| T4, T3, T2, T1 | -20 ... +90 °C | -40 ... +85 °C |

When the ultrasonic sensor VEGASON type series SN6*.C***P/F*** or SN6*.C_**P/F*** are operated with higher temperatures than indicated in the table above, it shall be guaranteed by suitable measures, taking into account a temperature rise of the sensor of 6 K, that no ignition hazard is caused by such hot surfaces. In this case the temperature at the electronics housing shall not exceed the respective values of the table above.

For the permissible operating temperatures and pressures, reference shall be made to the specifications provided by the manufacturer.

Electrical data

Supply and signal circuit
(terminals 1[+] & 2[-] in the electronics compartment, for the 2-cell enclosure version in the terminal compartment)

**Category-1 resp. Category-1/2 equipment**
Type of protection Intrinsic Safety EEx ia IIC/IIB
**Category-2 equipment**
Type of protection Intrinsic Safety EEx ia IIC/IIB
resp. EEx ib IIC/IIB
For connection to a certified intrinsically safe circuit.

## 1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2214 X

| | |
|---|---|
| | Maximum values:<br>$U_i$ = 17.5 V<br>$I_i$ = 500 mA<br>$P_i$ = 5.5 W<br>$C_i$ negligibly low<br>$L_i \leq 5$ µH<br>The equipment is suitable for the connection to a fieldbus system according to FISCO (IEC 60079-27), e.g. PROFIBUS-PA or Foundation Fieldbus.<br><br>or<br>$U_i$ = 24 V<br>$I_i$ = 250 mA<br>$P_i$ = 1.2 W<br>$C_i$ negligibly low or in the version VEGASON type series SN6*.C***P/F3/4/5*** or SN6*.C_**P/F3/4/5***<br>$C_i'_{core/core}$ = 58 pF/m, $C_i'_{core/screen}$ = 270 pF/m<br>$L_i \leq 5$ µH, in the version VEGASON type series SN6*.C***P/F3/4/5*** or SN6*.C_**P/F3/4/5***<br>additional $L_i'$ = 55 µH/m |
| Control and display circuit<br>(terminals No. 5,6,7,8 in the electronics compartment or plug connector for the 2-cell version) | type of protection Intrinsic Safety EEx ia IIC<br>For connection to the intrinsically safe supply and signal circuit of the external VEGADIS61 display unit (PTB 02 ATEX 2136 X).<br><br>The rules for interconnection of intrinsically safe circuits between the ultrasonic sensor VEGASON type series SN6*.C***P/F*** or SN6*.C_**P/F*** and the external VEGADIS61 display unit are complied with if the total inductance and capacitance of the connecting line between the ultrasonic sensor VEGASON type series SN6*.C***P/F*** or SN6*.C_**P/F*** and VEGADIS61 $L_{cable}$ = 100 µH and $C_{cable}$ = 2.8 µF is not exceeded.<br>A control and display module (A/B module or PLICSCOM) installed in the VEGASON type series SN6*.C***P/F*** or SN6*.C_**P/F*** and a connected VEGACONNECT3 have been considered. |
| Communication circuit<br>($I^2C$-bus socket in the electronics compartment, and additionally for the 2-cell housing version in the terminal compartment) | type of protection Intrinsic Safety EEx ia IIC<br>Only for connection to the intrinsically safe signal circuit of a VEGACONNECT3 interface converter (PTB 01 ATEX 2007). |

# Physikalisch-Technische Bundesanstalt

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## 1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2214 X

| | |
|---|---|
| Control and display module circuit (spring contacts in the electronics compartment, additionally for the 2-cell housing version in the terminal compartment.) | type of protection Intrinsic Safety EEx ia IIC<br>Only for connection to the VEGA control and display module (A/B module or PLICSCOM).<br>With the 2-cell housing version, the control and terminal display module may be housed either in the electronics compartment or the terminal compartment. |

The metal elements of the ultrasonic sensors are electrically connected to the earth terminals.

The intrinsically safe supply and signal circuit is safely electrically isolated from elements that may be earthed.

Special conditions for safe use

1. If used as a category-1 equipment, the ultrasonic sensor VEGASON type series SN6*.C***P/F*** or SN6*.C_**P/F***, which include the material aluminium, shall be installed in such a way that sparking as a result of impact or friction between aluminium and steel (with the exception of stainless steel if the presence of rust particles can be excluded) is excluded.
2. The ultrasonic sensor with plastic enclosure and parts of enclosures out of plastic as well as the sensors include surfaces that can become charged electrostatically (note warning label).
3. In case of danger of mechanical damage of the sound transducer the ultrasonic sensors shall be installed in such a way that the sound transducer is protected against mechanical damage from the environment.

Test report: PTB Ex 05-25335

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Braunschweig, January 18, 2006

# Physikalisch-Technische Bundesanstalt

**Braunschweig und Berlin**

## 2. SUPPLEMENT

**according to Directive 94/9/EC Annex III.6**

## to EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2214 X

## (Translation)

Equipment: Ultrasonic sensors type series VEGASON SN6*.C***P/F*** or SN6*.C_**P/F***

Marking: ⟨Ex⟩ **II 1 G or II 1/2 G or II 2 G EEx ia IIC T6**

Manufacturer: VEGA Grieshaber KG

Address: Am Hohenstein 113, 77761 Schiltach, Germany

Description of supplements and modifications

Applied standards

**EN 60079-0:2006** **EN 60079-11:2007** **EN 60079-26:2007**

The ultrasonic sensors type series VEGASON SN6*.C***P/F*** or SN6*.C_**P/F*** may also be manufactured and operated in accordance with the test results mentioned under section 3 of the test report.

The modifications concern the application of the above mentioned standards, the electrical data, the external and internal construction and the marking.

The marking is changed as follows:

⟨Ex⟩ **II 1 G oder II 1/2 G oder II 2 G Ex ia IIC T6**

All other specifications remain valid without changes.

Electrical data

| | |
|---|---|
| Supply and signal circuit (terminals 1[+] & 2[-] in the electronics compartment, for the 2-cell enclosure version in the terminal compartment) | **Category-1 resp. Category-1/2 equipment**<br>Type of protection Intrinsic Safety Ex ia IIC/IIB<br>**Category-2 equipment**<br>Type of protection Intrinsic Safety Ex ia IIC/IIB resp. Ex ib IIC/IIB<br>For connection to a certified intrinsically safe circuit. |

| | |
|---|---|
| | Maximum values:<br>$U_i$ = 17.5 V<br>$I_i$ = 500 mA<br>$P_i$ = 5.5 W<br>$C_i$ negligibly low<br>$L_i \leq 5$ µH<br>The equipment is suitable for the connection to a fieldbus system according to FISCO (IEC 60079-27), e.g. PROFIBUS-PA or Foundation Fieldbus.<br><br>or<br>$U_i$ = 24 V<br>$I_i$ = 250 mA<br>$P_i$ = 1.2 W<br>The effective internal capacitance $C_i$ is negligibly low. In the version with permanent mounted connecting cable $C_i'_{core/core}$ = 58 pF/m and $C_i'_{core/screen}$ = 270 pF/m is to be taken into consideration.<br>The effective internal inductivity $L_i$ is $\leq 5\mu H$. In the version with permanent mounted connecting cable additional $L_i'$ = 55 µH/m is to be taken into consideration. |
| Control and display circuit (terminals No. 5,6,7,8 in the electronics compartment or plug connector for the 2-cell version) | type of protection Intrinsic Safety Ex ia IIC<br>For connection to the intrinsically safe supply and signal circuit of the external VEGA display unit VEGADIS61 (PTB 02 ATEX 2136 X).<br><br>The rules for interconnection of intrinsically safe circuits between the ultrasonic sensor VEGASON type series SN6*.C*** and the external VEGADIS61 display unit are complied with if the total inductance and capacitance of the connecting line between the ultrasonic sensor VEGASON type series SN6*.C*** and VEGADIS61 $L_{cable}$ = 100 µH and $C_{cable}$ = 2.8 µF is not exceeded.<br>A control and display module (PLICSCOM) installed in the VEGASON type series SN6*.C*** and a connected VEGACONNECT have been considered.<br>By using of the provided VEGA connecting cable between VEGASON type series SN6*.C*** and the external display unit VEGADIS61 the following cable inductance and cable capacitance are taken into consideration from a length > 50 m: |

# Physikalisch-Technische Bundesanstalt

**Braunschweig und Berlin**

## 1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2214 X

| | |
|---|---|
| | $L_i'$ = 0,62 µH/m<br>$C_{i'core/core}$ = 132 pF/m<br>$C_{i'core/screen}$ = 208 pF/m<br>$C_{i'screen/screen}$ = 192 pF/m |
| Communication circuit<br>($I^2C$-bus socket in the electronics compartment, and additionally for the 2-cell housing version in the terminal compartment) | type of protection Intrinsic Safety Ex ia IIC<br>For connection to the intrinsically safe signal circuit of a VEGACONNECT interface converter<br>(PTB 01 ATEX 2007, PTB 07 ATEX 2013 X). |
| Control and display module circuit<br>(spring contacts in the electronics compartment, additionally for the 2-cell housing version in the terminal compartment.) | type of protection Intrinsic Safety Ex ia IIC<br>For connection to the VEGA control and display module (PLICSCOM). With the 2-cell housing version, the control and terminal display module may be housed either in the electronics compartment or the terminal compartment. |

The metal elements of the ultrasonic sensors are electrically connected to the earth terminals.

The intrinsically safe supply and signal circuit is safely electrically isolated from elements that may be earthed.

Test report: PTB Ex 08-28118

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Braunschweig, July 3, 2008

# Physikalisch-Technische Bundesanstalt

**Braunschweig und Berlin**

(1) # EC-TYPE-EXAMINATION CERTIFICATE

**(Translation)**

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

**PTB 03 ATEX 2213 X**

(4) Equipment: Ultrasonic sensor, type series VEGASON SN6*.C***H*** with integrated electronic assemblies SN61-63H

(5) Manufacturer: VEGA Grieshaber KG

(6) Address: Am Hohenstein 113, 77761 Schiltach, 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 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.

The examination and test results are recorded in the confidential report PTB Ex 03-23417.

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

EN 50014:1997 + A1 + A2 EN 50020:2002 EN 50284:1999

(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, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

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

**II 1 G resp. II 1/2 G resp. II 2 G EEx ia IIC T6**

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, November 11, 2003

(13) # SCHEDULE

(14) ## EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2213 X

(15) Description of equipment

The ultrasonic sensor, type series VEGASON SN6*.C***H*** with integrated electronic assemblies SN61-63H, are used for level measurement in potentially explosive atmospheres requiring category-1 or category-1/2 or category-2 equipment. The enclosure may be optionally fitted with the control and display module "A/B module" or "PLICSCOM" for either parameterization or visualization.

The ultrasonic sensor consists of an electronics housing with the corresponding analyzing electronic system, the process connectors and the sensor.

Category-1 equipment
The ultrasonic sensors are installed in potentially explosive atmospheres requiring category-1 equipment.

Category-1/2 equipment
The electronics housing is installed in potentially explosive atmospheres requiring category-2 equipment. The process connectors are installed in the partition separating areas requiring category-2 or category-1 equipment. The sensor is installed in the potentially explosive atmosphere for category-1 equipment.

Category-2 equipment
The ultrasonic sensors are installed in potentially explosive atmospheres requiring category-2 equipment.

For the relationship between the temperature class and the maximum permissible temperature at the sensor and the maximum permissible ambient temperature for the electronic system, reference is made to the following table.

Category-1 equipment

| temperature class | temperature at the sensor | ambient temperature for the electronic system |
|---|---|---|
| T6 | -20 ... +41 °C | -20 ... +41 °C |
| T5 | -20 ... +53 °C | -20 ... +53 °C |
| T4, T3, T2, T1 | -20 ... +60 °C | -20 ... +60 °C |

For applications requiring category-1 equipment, the media process pressure has to be between 0.8 bar and 1.1 bar. The permissible ambient temperatures specified are based on the 80% rule in section 6.4.2 of EN 1127-1. For the process conditions without explosive mixtures, reference shall be made to the specifications provided by the manufacturer.

Category-1/2 equipment

| temperature class | temperature at the sensor | ambient temperature for the electronic system |
|---|---|---|
| T6 | -20 ... +58 °C | -40 ... +57 °C |
| T5 | -20 ... +60 °C | -40 ... +72 °C |
| T4, T3, T2, T1 | -20 ... +60 °C | -40 ... +85 °C |

For applications requiring category-1 equipment, the media process pressure has to be between 0.8 bar and 1.1 bar. The permissible ambient temperatures specified are based on the 80% rule in section 6.4.2 of EN 1127-1. For the process conditions without explosive mixtures, reference shall be made to the specifications provided by the manufacturer.

Category-2 equipment

| temperature class | temperature at the sensor | ambient temperature for the electronic system |
|---|---|---|
| T6 | -20 ... +74 °C | -40 ... +57 °C |
| T5 | -20 ... +89 °C | -40 ... +72 °C |
| T4, T3, T2, T1 | -20 ... +90 °C | -40 ... +85 °C |

For the permissible operating temperatures and pressures, reference shall be made to the specifications provided by the manufacturer.

Electrical data

| | |
|---|---|
| Supply and signal circuit (terminals 1 [+], 2 [-] in the compartment, for the 2-cell enclosure version in the terminal compartment) | Type of protection Intrinsic Safety EEx ia IIC For connection to a certified intrinsically-safe circuit.<br>Maximum values:<br>$U_i$ = 30 V<br>$I_i$ = 131 mA<br>$P_i$ = 983 mW<br>$C_i$ negligibly low<br>$L_i$ negligibly low |
| Control and display circuit (terminals Nos. 5,6,7,8 in the electronics compartment or plug connector for the 2-cell enclosure version) | Type of protection Intrinsic Safety EEx ia IIC For connection to the intrinsically safe supply and signal circuit of the corresponding external VEGA display unit VEGADIS61 (PTB 02 ATEX 2136 X). |

| | |
|---|---|
| | The rules for interconnection of intrinsically safe circuits between the ultrasonic sensor, type series VEGASON and the external VEGADIS61 display unit are complied with if the total inductance and capacitance of the connecting line between ultrasonic sensor, type series VEGASON and the external VEGADIS61 display unit ($L_{Kabel}$ = 96 µH and $C_{Kabel}$ = 2.8 µF) is not exceeded.<br><br>A control and display module (A/B module or PLICSCOM) installed in the ultrasonic sensor, type series VEGASON and a connected VEGACONNECT3 have been considered. |
| Communication circuit ($I^2C$-bus socket in the electronics compartment, for the 2-cell enclosure version in additionally the terminal compartment) | Type of protection Intrinsic Safety EEx ia IIC For connection to the intrinsically safe signal circuit of a VEGA VEGACONNECT3 interface converter (PTB 01 ATEX 2007). |
| Control and display module circuit (spring contacts in the electronics compartment, for the 2-cell enclosure version in additionally the terminal compartment) | Type of protection Intrinsic Safety EEx ia IIC For connection to the VEGA control and display module (A/B module or PLICSCOM). With the 2-cell-enclosure version the operating and display module may either be fitted in the electronics compartment or in the terminal compartment. |

The metal elements of the ultrasonic sensors are electrically connected to the earth terminals. The intrinsically safe circuits are safely electrically isolated from elements that may be earthed.

(16) Test report PTB Ex 03-23417

(17) Special conditions for safe use

1. If used as a category-1 equipment the ultrasonic sensor, type series VEGASON SN6*.C***H*** with integrated electronic assemblies SN61-63H, which include the material aluminium, shall be installed in such a way that sparking as a result of impact or friction between aluminium and steel (with the exception of stainless steel if the presence of rust particles can be excluded) is excluded.

2. The ultrasonic sensor with plastic enclosure and parts of enclosures out of plastic as well as the sensors include surfaces that can become charged electrostatically (note warning label).
3. In case of danger of mechanical damage of the sound transducer the ultrasonic sensors VEGASON shall be installed in such a way that the sound transducer is protected against mechanical damage from the environment.

(18) Essential health and safety requirements

met by compliance with the standards mentioned above

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, November 11, 2003

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

# Physikalisch-Technische Bundesanstalt

**Braunschweig und Berlin**

## 1. SUPPLEMENT

**according to Directive 94/9/EC Annex III.6**

## to EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2213 X

## (Translation)

Equipment: Ultrasonic sensors type series VEGASON SN6*.C***H*** with integrated electronic assemblies SN61-63H

Marking:  **II 1 G or II 1/2 G or II 2 G EEx ia IIC T6**

Manufacturer: VEGA Grieshaber KG

Address: Am Hohenstein 113, 77761 Schiltach, Germany

Description of supplements and modifications

The name of the ultrasonic sensors type series VEGASON SN6*.C***H*** with integrated electronic assemblies SN61-63H is changed into ultrasonic sensor VEGASON type series SN6*.C***H*** or SN6*.C_**H***.

Other changes concern the internal and the external construction, the electrical data as well as the relationship between the temperature class and the maximum permissible temperature at the sensor and the maximum permissible ambient temperature for the electronic system and the "Special Conditions".

For the relationship between the temperature class and the maximum permissible temperature at the sensor and the maximum permissible ambient temperature for the electronic system, reference is made to the following table.

Category-1 equipment

| temperature class | temperature at the sensor | ambient temperature for the electronic system |
|---|---|---|
| T6 | -20 ... +41 °C | -20 ... +41 °C |
| T5 | -20 ... +53 °C | -20 ... +53 °C |
| T4, T3, T2, T1 | -20 ... +60 °C | -20 ... +60 °C |

For applications requiring category-1 equipment, the media process pressure has to be between 0.8 bar and 1.1 bar. The permissible ambient temperatures specified are based on the 80 % rule in section 6.4.2 of EN 1127-1. For the process conditions without explosive mixtures, reference shall be made to the specifications provided by the manufacturer.

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Category-1/2 equipment

| temperature class | temperature at the sensor | ambient temperature for the electronic system |
|---|---|---|
| T6 | -20 ... +58 °C | -40 ... +57 °C |
| T5 | -20 ... +60 °C | -40 ... +72 °C |
| T4, T3, T2, T1 | -20 ... +60 °C | -40 ... +85 °C |

For applications requiring category-1 equipment, the media process pressure has to be between 0.8 bar and 1.1 bar. The permissible ambient temperatures specified are based on the 80 % rule in section 6.4.2 of EN 1127-1.

When the ultrasonic sensor VEGASON type series SN6*.C***H*** or SN6*.C_**H*** are operated with higher temperatures than indicated in the table above, it shall be guaranteed by suitable measures, taking into account a temperature rise of the sensor of 6 K, that no ignition hazard is caused by such hot surfaces. In this case the temperature at the electronics housing shall not exceed the respective values of the table above.

For the process conditions without explosive mixtures, reference shall be made to the specifications provided by the manufacturer.

Category-2 equipment

| temperature class | temperature at the sensor | ambient temperature for the electronic system |
|---|---|---|
| T6 | -20 ... +74 °C | -40 ... +57 °C |
| T5 | -20 ... +89 °C | -40 ... +72 °C |
| T4, T3, T2, T1 | -20 ... +90 °C | -40 ... +85 °C |

When the ultrasonic sensor VEGASON type series SN6*.C***H*** or SN6*.C_**H*** are operated with higher temperatures than indicated in the table above, it shall be guaranteed by suitable measures, taking into account a temperature rise of the sensor of 6 K, that no ignition hazard is caused by such hot surfaces. In this case the temperature at the electronics housing shall not exceed the respective values of the table above.

For the permissible operating temperatures and pressures, reference shall be made to the specifications provided by the manufacturer.

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Electrical data

| | |
|---|---|
| Supply and signal circuit<br>(terminals 1[+] & 2[-] in the electronics compartment, for the 2-cell enclosure version in the terminal compartment) | Type of protection Intrinsic Safety EEx ia IIC<br>For connection to a certified intrinsically safe circuit.<br><br>Maximum values:<br>$U_i$ = 30 V<br>$I_i$ = 131 mA<br>$P_i$ = 983 mW<br>$C_i$ negligibly low or in the version VEGASON type series SN6*.C***H3/4/5*** or SN6*.C_**H3/4/5***<br>$C_i'_{core/core}$ = 58 pF/m, $C_i'_{core/screen}$ = 270 pF/m<br>$L_i$ negligibly low or in the version VEGASON type series SN6*.C***H3/4/5*** oder SN6*.C_**H3/4/5***<br>$L_i'$ = 55 µH/m |
| Control and display circuit<br>(terminals No. 5,6,7,8 in the electronics compartment or plug connector for the 2-cell version) | type of protection Intrinsic Safety EEx ia IIC<br>For connection to the intrinsically safe supply and signal circuit of the external VEGADIS61 display unit (PTB 02 ATEX 2136 X).<br><br>The rules for interconnection of intrinsically safe circuits between the ultrasonic sensor VEGASON type series SN6*.C***H*** or SN6*.C_**H*** and the external VEGADIS61 display unit are complied with if the total inductance and capacitance of the connecting line between the ultrasonic sensor VEGASON type series SN6*.C***H*** or SN6*.C_**H*** and VEGADIS61 $L_{cable}$ = 100 µH and $C_{cable}$ = 2.8 µF is not exceeded.<br>A control and display module (A/B module or PLICSCOM) installed in the VEGASON type series SN6*.C***H*** or SN6*.C_**H*** and a connected VEGACONNECT3 have been considered. |
| Communication circuit<br>($I^2C$-bus socket in the electronics compartment, and additionally for the 2-cell housing version in the terminal compartment) | type of protection Intrinsic Safety EEx ia IIC<br>Only for connection to the intrinsically safe signal circuit of a VEGACONNECT3 interface converter (PTB 01 ATEX 2007). |

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| | |
|---|---|
| Control and display module circuit (spring contacts in the electronics compartment, additionally for the 2-cell housing version in the terminal compartment.) | type of protection Intrinsic Safety EEx ia IIC<br>Only for connection to the VEGA control and display module (A/B module or PLICSCOM).<br>With the 2-cell housing version, the control and terminal display module may be housed either in the electronics compartment or the terminal compartment. |

The metal elements of the ultrasonic sensors are electrically connected to the earth terminals.

The intrinsically safe supply and signal circuit is safely electrically isolated from elements that may be earthed.

Special conditions for safe use

1. If used as a category-1 equipment, the ultrasonic sensor VEGASON type series SN6*.C***H*** or SN6*.C_**H***, which include the material aluminium, shall be installed in such a way that sparking as a result of impact or friction between aluminium and steel (with the exception of stainless steel if the presence of rust particles can be excluded) is excluded.
2. The ultrasonic sensor with plastic enclosure and parts of enclosures out of plastic as well as the sensors include surfaces that can become charged electrostatically (note warning label).
3. In case of danger of mechanical damage of the sound transducer the ultrasonic sensors shall be installed in such a way that the sound transducer is protected against mechanical damage from the environment.

Test report: PTB Ex 05-25334

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Braunschweig, January 18, 2006

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## 2. SUPPLEMENT

**according to Directive 94/9/EC Annex III.6**

## to EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2213 X

## (Translation)

Equipment: Ultrasonic sensors VEGASON type series SN6*.C***H*** or SN6*.C_**H***

Marking: ⟨Ex⟩ **II 1 G or II 1/2 G or II 2 G EEx ia IIC T6**

Manufacturer: VEGA Grieshaber KG

Address: Am Hohenstein 113, 77761 Schiltach, Germany

Applied standards

**EN 60079-0:2006** **EN 60079-11:2007** **EN 60079-26:2007**

Description of supplements and modifications

The Ultrasonic sensors VEGASON type series SN6*.C***H*** or SN6*.C_**H*** are used for level measurement in potentially explosive atmospheres requiring category-1 or category-1/2 or category-2 equipment. They may be also installed and used according to the test documents mentioned in the test report.

The changes concern the application of the above mentioned standards, the external construction (stainless steel forming housing and a second pressure compensation element), the internal construction, the electrical data and the marking.

The marking changes as follows: ⟨Ex⟩ **II 1 G or 1/2 G or II 2 G Ex ia IIC T6**

Electrical data

| | |
|---|---|
| Supply and signal circuit (terminals 1[+] & 2[-] in the electronics compartment, for the 2-cell enclosure version in the terminal compartment) | Type of protection Intrinsic Safety Ex ia IIC For connection to a certified intrinsically safe circuit.<br><br>Maximum values:<br>$U_i$ = 30 V<br>$I_i$ = 131 mA<br>$P_i$ = 983 mW |

| | |
|---|---|
| | $C_i$ negligibly low or in the version VEGASON type series SN6*.C***H3/4/5/9*** or SN6*.C_**H3/4/5/9*** $C_i'_{core/core}$ = 58 pF/m, $C_i'_{core/screen}$ = 270 pF/m<br>$L_i$ negligibly low or in the version VEGASON type series SN6*.C***H3/4/5/9*** oder SN6*.C_**H3/4/5/9*** $L_i'$ = 55 µH/m |
| Control and display circuit (terminals No. 5,6,7,8 in the electronics compartment or plug connector for the 2-cell version) | type of protection Intrinsic Safety Ex ia IIC<br>For connection to the intrinsically safe supply and signal circuit of the external VEGADIS61 display unit (PTB 02 ATEX 2136 X).<br><br>The rules for interconnection of intrinsically safe circuits between the ultrasonic sensor VEGASON type series SN6*.C***H*** or SN6*.C_**H*** and the external VEGADIS61 display unit are complied with if the total inductance and capacitance of the connecting line between the ultrasonic sensor VEGASON type series SN6*.C***H*** or SN6*.C_**H*** and VEGADIS61 $L_{cable}$ = 100 µH and $C_{cable}$ = 2.8 µF is not exceeded.<br>A control and display module (A/B module or PLICSCOM) installed in the VEGASON type series SN6*.C***H*** or SN6*.C_**H*** and a connected VEGACONNECT have been considered. |
| Communication circuit ($I^2C$-bus socket in the electronics compartment, and additionally for the 2-cell housing version in the terminal compartment) | type of protection Intrinsic Safety Ex ia IIC<br>Only for connection to the intrinsically safe signal circuit of a VEGACONNECT interface converter (PTB 01 ATEX 2007, PTB 07 ATEX 2013 X). |
| Control and display module circuit (spring contacts in the electronics compartment, additionally for the 2-cell housing version in the terminal compartment.) | type of protection Intrinsic Safety Ex ia IIC<br>Only for connection to the VEGA control and display module (A/B module or PLICSCOM).<br>With the 2-cell housing version, the control and terminal display module may be housed either in the electronics compartment or the terminal compartment. |

The metal elements of the ultrasonic sensors are electrically connected to the earth terminals.

The intrinsically safe supply and signal circuit is safely electrically isolated from elements that may be earthed.

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## 2. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2213 X

All other specifications remain without changes.

Test report: PTB Ex 08-27378

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, February 22, 2008

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

34853-EN-080305

# Physikalisch-Technische Bundesanstalt

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## 3rd S U P P L E M E N T

**according to Directive 94/9/EC Annex III.6**

## to EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2214 X

## (Translation)

Equipment: Ultrasonic sensors type of VEGASON SN6*.C***P/F*** or SN6*.C_**P/F***

Marking:  **II 1 G oder II 1/2 G or II 2 G Ex ia IIC T6**

Manufacturer: VEGA Grieshaber KG

Address: Hohenstein 113
77761 Schiltach, Germany

Description of supplements and modifications

The ultrasonic sensors type series VEGASON SN6*.C***P/F***(*)(*) or SN6*.C_**P/F***(*)(*) may also be manufactured and operated in accordance with the test documentation mentioned under section 3.

The ultrasonic sensors type series VEGASON SN6*.C***P/F*** or SN6*.C_**P/F*** may also be marked with two additional not ex-relevant designators. The new type designation is VEGASON SN6*.C***P/F***(*)(*) or SN6*.C_**P/F***(*)(*).

The marking is extended to the temperature classes T1-T5..

 **II 1 G or II 1/2 G or II 2 G Ex ia IIC T6...T1 Ga, Ga/Gb, Gb**

Further modifications concern the application of the above mentiond standards, the internal construction and the relationship between the temperature class and the maximum permissible temperature at the sensor and the maximum permissible ambient temperature for the electronic system.

All other specifications remain valid without changes.

For the relationship between the temperature class and the maximum permissible temperature at the sensor and the maximum permissible ambient temperature for the electronic system, reference is made to the following table.

*Category-1 equipment, EPL Ga*

| temperature class | temperature at the sensor | ambient temperature for the electronic system |
|---|---|---|
| T4, T3, T2, T1 | -20 ... +60 °C | -20 ... +60 °C |

For applications requiring category-1 equipment, the media process pressure has to be between 0.8 bar and 1.1 bar. The permissible ambient temperatures specified are based on the 80% rule in section 6.4.2 of EN 1127-1. For the process conditions without explosive mixtures, reference shall be made to the specifications provided by the manufacturer.

Category-1/2 equipment, EPL Ga/Gb

| temperature class | temperature at the sensor | ambient temperature for the electronic system |
|---|---|---|
| T6 | -20 ... +58 °C | -40 ... +38 °C |
| T5 | -20 ... +60 °C | -40 ... +53 °C |
| T4, T3, T2, T1 | -20 ... +60 °C | -40 ... +85 °C |

For applications requiring category-1 equipment, the media process pressure has to be between 0.8 bar and 1.1 bar. The permissible ambient temperatures specified are based on the 80 % rule in section 6.4.2 of EN 1127-1.

When the ultrasonic sensor VEGASON type series SN6*.C***P/F***(*)(*) or SN6*.C_**P/F***(*)(*) are operated with higher temperatures than indicated in the table above, it shall be guaranteed by suitable measures, taking into account a temperature rise of the sensor of 6 K, that no ignition hazard is caused by such hot surfaces. In this case the temperature at the electronics housing shall not exceed the respective values of the table above.

For the process conditions without explosive mixtures, reference shall be made to the specifications provided by the manufacturer.

Category-2 equipment, EPL Gb

| temperature class | temperature at the sensor | ambient temperature for the electronic system |
|---|---|---|
| T6 | -20 ... +74 °C | -40 ... +38 °C |
| T5 | -20 ... +89 °C | -40 ... +53 °C |
| T4, T3, T2, T1 | -20 ... +90 °C | -40 ... +85 °C |

When the ultrasonic sensor VEGASON type series SN6*.C***P/F***(*)(*) or SN6*.C_**P/F***(*)(*) are operated with higher temperatures than indicated in the table above, it shall be guaranteed by suitable measures, taking into account a temperature rise of the sensor of 6 K, that no ignition hazard is caused by such hot surfaces. In this case the temperature at the electronics housing shall not exceed the respective values of the table above.

For the permissible operating temperatures and pressures, reference shall be made to the specifications provided by the manufacturer.

Electrical data

| | |
|---|---|
| Supply and signal circuit<br>(terminals 1[+] & 2[-] in the electronics compartment, for the 2-cell enclosure version in the terminal compartment) | **Category-1 resp. Category-1/2 equipment**<br>Type of protection Intrinsic Safety Ex ia IIC/IIB<br>**Category-2 equipment**<br>Type of protection Intrinsic Safety Ex ia IIC/IIB<br>resp. Ex ib IIC/IIB<br>For connection to a certified intrinsically safe circuit.<br>Maximum values:<br>$U_i$ = 17.5 V<br>$I_i$ = 500 mA<br>$P_i$ = 5.5 W<br>$C_i$ negligibly low<br>$L_i \leq 5$ µH<br><br>The equipment is suitable for the connection to a fieldbus system according to FISCO (EN 60079-27), e.g. PROFIBUS-PA or Foundation Fieldbus.<br><br>or<br>$U_i$ = 24 V<br>$I_i$ = 250 mA<br>$P_i$ = 1.2 W<br><br>The effective internal capacitance $C_i$ is negligibly low. In the version with permanent mounted connecting cable $C_i'_{core/core}$ = 150 pF/m and $C_i'_{core/screen}$ = 270 pF/m is to be taken into consideration.<br><br>The effective internal inductivity $L_i$ is ≤ 5µH. In the version with permanent mounted connecting cable additional $L_i'$ = 0.55 µH/m is to be taken into consideration. |
| Control and display circuit<br>(terminals No. 5,6,7,8 in the electronics compartment or plug connector for the 2-cell version) | Type of protection Intrinsic Safety Ex ia IIC<br>For connection to the intrinsically safe supply and signal circuit of the external VEGA display unit VEGADIS61/81 (PTB 02 ATEX 2136 X). |

| | |
|---|---|
| | The rules for interconnection of intrinsically safe circuits between the ultrasonic sensor VEGASON type series SN6*.C*** and the external VEGADIS61/81 display unit are complied with if the total inductance and capacitance of the connecting line between the ultrasonic sensor VEGASON type series SN6*.C*** and VEGADIS61/81 $L_{cable}$ = 100 µH and $C_{cable}$ = 2.8 µF is not exceeded.<br>A control and display module (PLICSCOM or PLICSCOM2 ) installed in the VEGASON type series SN6*.C*** and a connected VEGACONNECT have been considered.<br>By using of the provided VEGA connecting cable between VEGASON type series SN6*.C*** and the external display unit VEGADIS61/81 the following cable inductance and cable capacitance are taken into consideration from a length ≥50 m:<br><br>$L_i'$ = 0,62 µH/m<br>$C_{i\ core/core}'$ = 132 pF/m<br>$C_{i\ core/screen}'$ = 208 pF/m<br>$C_{i\ screen/screen}'$ = 192 pF/m |
| Communication circuit<br>(I²C-bus socket in the electronics compartment, and additionally for the 2-cell housing version in the terminal compartment) | Type of protection Intrinsic Safety Ex ia IIC<br>For connection to the intrinsically safe signal circuit of a VEGACONNECT interface converter<br>(PTB 01 ATEX 2007, PTB 07 ATEX 2013 X). |
| Control and display module circuit<br>(spring contacts in the electronics compartment, additionally for the 2-cell housing version in the terminal compartment.) | Type of protection Intrinsic Safety Ex ia IIC<br>For connection to the VEGA control and display<br>module (PLICSCOM or PLICSCOM2). With the 2-cell housing version, the control and terminal display module may be housed either in the electronics compartment or the terminal compartment. |

The metal elements of the ultrasonic sensors are electrically connected to the earth terminals.

The intrinsically safe supply and signal circuit is safely electrically isolated from elements that may be earthed.

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## 3rd SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2214 X

Applied standards

**EN 60079-0:2012** **EN 60079-11:2012** **EN 60079-26:2007**

Test report: PTB Ex 13-23094

Zertifizierungssektor Explosionsschutz
On behalf of PTB:

Braunschweig, August 7, 2013

Dr.-Ing. U. Johannsmeyer
Direktor und Professor