

Translation

# EU-Type Examination Certificate

Equipment intended for use in potentially explosive atmospheres  
Directive 2014/34/EU

EU-Type Examination Certificate Number: **BVS 19 ATEX E 006 X**

Product: **Flameproof electric motor type D\* Ex 280 \*\*/\* \***

Manufacturer: **Herforder Elektromotoren-Werke GmbH & Co. KG**

Address: **Goebenstraße 106, 32051 Herford, Germany**

This product and any acceptable variations thereto are specified in the appendix to this certificate and the documents referred to therein.

DEKRA Testing and Certification GmbH, Notified Body number 0158, 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 the confidential Report No. BVS PP 19.2007 EU.

The Essential Health and Safety Requirements are assured in consideration of:

|                         |                                    |
|-------------------------|------------------------------------|
| <b>IEC 60079-0:2017</b> | <b>General requirements</b>        |
| <b>EN 60079-1:2014</b>  | <b>Flameproof enclosure "d"</b>    |
| <b>EN 60079-7:2015</b>  | <b>Increased Safety "e"</b>        |
| <b>EN 60079-31:2014</b> | <b>Protection by Enclosure "t"</b> |

Except in respect of those requirements listed under item 18 of the appendix.

If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Special Conditions for Use specified in the appendix to this certificate.

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.

The marking of the product shall include the following:

|   |                               |    |                                 |    |
|---|-------------------------------|----|---------------------------------|----|
|  | <b>II 2G Ex db IIC T* Gb</b>  | or | <b>II 2G Ex db eb IIC T* Gb</b> | or |
|   | <b>II 2G Ex db IIB T* Gb</b>  | or | <b>II 2G Ex db eb IIB T* Gb</b> | or |
|   | <b>II 2D Ex tb IIIC T* Db</b> |    |                                 |    |

\*) see parameters

DEKRA Testing and Certification GmbH  
Bochum, 2019-02-04

Signed: Jörg-Timm Kilisch

Managing Director



13 **Appendix**

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15 **Product description**

15.1 **Subject and type**

Flameproof electric motor type D<sup>\*1)</sup> Ex 280 <sup>\*2)\*3) / \*4) \*5)</sup>

Asterisk      Description

- |       |  |
|-------|--|
| 1     | Explosion Group:<br>C IIC<br>B IIB<br>D IIIC                                   |
| 2 - 3 | Without influence on explosion protection (Packet length / Efficiency)         |
| 4 - 5 | Without influence on explosion protection (Number of poles / motor protection) |

15.2 **Description**

The enclosures of the flameproof electric motors are made of cast iron and have a mounting place for terminal boxes.

The shaft will be fixed with ball bearings or cylindrical roller bearings.

A terminal compartment in type of protection Flameproof Enclosure "d" or Increased Safety "e" or a direct cable entry is used for electrical connection of the motor. For electric power input into the motor compartment, separately certified cable glands or bushings are used.

The cooling of the motor is realised by an external fan that is made of steel (Group I and Group II) or aluminium (Group II and Group III) or a separately tested and certified auxiliary fan. The fan is driven by the electrical machine itself.

The fan is fixed on the shaft using a key and a circlip.

Optionally a space heater can be mounted inside the stator housing.

For direct temperature monitoring the winding of the motor is equipped with temperature sensors (thermistors according DIN 44081 or DIN 44082). The sensors are connected in series. Additional PtO or Pt100 can be installed in winding.

Optionally the temperature at the bearings could be monitored separately certified resistance thermometers (Pt100).

The sensors or the thermometers will be connected to a trigger unit which is certified for this purpose.

The maximum permissible ambient temperatures are -50 °C to +60 °C. This temperature range may be limited as a result of the selected terminal boxes and components, or the electrical design.

If the motor is converter-fed the converter must be of type voltage-source converter with pulse width modulation.



## 15.3 Parameters

### 15.3.1 Electrical parameters

#### 15.3.1.1 Circuits of the flameproof electric motors

|   |     |       |         |                   |
|---|-----|-------|---------|-------------------|
| Rated voltage <sup>1</sup>              |     | up to | 1100    | V AC              |
| Rated rotational speed                  | 500 | up to | 3600    | min <sup>-1</sup> |
| Rated rotational speed (with converter) | 150 | up to | 5800    | min <sup>-1</sup> |
| Frequency (mains)                       |     |       | 50 / 60 | Hz                |
| Frequency (converter)                   | 5   | up to | 87      | Hz                |
| Duty type                               | S1  | to    | S9      |                   |

|                    |  |       |     |    |
|--------------------|--|-------|-----|----|
| <u>Rated power</u> |  |       |     |    |
| Frame size         |  |       |     |    |
| 280                |  | up to | 110 | kW |

<sup>1</sup> In case of converter-fed: Voltage of the fundamental wave measured at the motor terminals. This voltage must not be decreased by 10 %, taken into account the minimum converter input voltage and the voltage drop caused by the supply line and an optional sinus filter.

#### 15.3.1.2 Electrical parameters (voltage-source converter)

|   |                            |  |                      |
|---|----------------------------|--|----------------------|
| Maximum permitted input voltage   | Rated voltage of the motor |  | V                    |
| Minimum switching frequency   |                            |  | 1.2 kHz              |
| Current limiting value  |                            |  | 1.5 × I <sub>N</sub> |
| Maximum overload time / Time for operation below minimum frequency <sup>2</sup> |                            |  | 60 s                 |
| Output frequency  |                            |  | up to 87 Hz          |

<sup>2</sup> The maximum overload time and the permitted time for operation below the minimum output frequency are in relation with a period of 10 minutes.

#### 15.3.1.3 Monitoring circuit

|  |   |
|--|---|
| Temperature sensors (ptc thermistors)          | According to the specifications given in the certificate of the trigger unit and the electrical design. |
| Circuits of the resistance thermometer (Pt100) | According to the specifications given in the certificate of the trigger unit and the electrical design. |

### 15.3.2 Thermal ratings

|                                     |                                  |                                  |
|-------------------------------------|----------------------------------|----------------------------------|
| Permitted ambient temperature range |                                  |                                  |
| Group II<br>Ex db                   | Group II<br>Ex db eb             | Group III<br>Ex tb               |
| -50 °C ≤ T <sub>a</sub> ≤ +60 °C    | -20 °C ≤ T <sub>a</sub> ≤ +60 °C | -25 °C ≤ T <sub>a</sub> ≤ +60 °C |

The temperature class and the surface temperature are determined by a routine test of the manufacturer considering the ambient temperature range and the electrical variant.

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## 17 Special Conditions for Use

- 17.1 The lengths of the flameproof joints are in parts longer and the gaps of the flameproof joints are in parts smaller than the values of table 2 and 3 of EN 60079-1:2014. For information of the dimensions of the flameproof joints contact the manufacturer.
- 17.2 Fasteners with a minimum yield stress of  $640 \text{ N/mm}^2$  must be used for the closing of the flameproof enclosure.
- 17.3 Motors which have to be equipped with a direct temperature control must be monitored by a separate certified trigger unit.
- 17.4 Before setting-up operation it has to be ensured that no inadmissible overvoltage caused by converter supply may occur at the terminals of the motor.  
Clearances and creepage distances inside the terminal box do not permit an overvoltage cause by the converter which increase:
- $3.1 \times U_N$  for rated voltages  $\leq 600 \text{ V}$
  - $2.04 \times U_N$  for rated voltages  $> 600 \text{ V}$  and  $\leq 1100 \text{ V}$

The insulating system of the motor may require an additional limitation of a periodic overvoltage.

- 17.5 In case the motor is equipped with cable glands for interconnection with the terminal compartment they have to be integrated into the periodical inspections and maintenance routines in accordance with EN 60079-17:2013.
- 17.6 If the electrical machine will be cooled by forced ventilation, it has to be assured that the electrical machine can only run if the ventilation is running.

## 18 Essential Health and Safety Requirements

The Essential Health and Safety Requirements are covered by the standards listed under item 9.

The IEC 60079-0:2017 Ed. 7.0 is used for this product, which is equivalent in terms of safety to the harmonized standard EN 60079-0:2012 + A11:2013.

## 19 Drawings and Documents

Drawings and documents are listed in the confidential report.

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We confirm the correctness of the translation from the German original.  
In the case of arbitration only the German wording shall be valid and binding.

DEKRA Testing and Certification GmbH  
Bochum, 2019-02-04  
BVS-Wlo/Mu A 20180825



Managing Director