[1] **TYPE EXAMINATION CERTIFICATE** - Translation

[2] for non-electrical products of equipment-groups I and II,
equipment-categories M2 and 2 plus products of equipment-category 3

[3] Type examination certificate number **IBExU04ATEXB023 X** | Issue 2

[4] Product (component): **Magnetic couplings MINEX®-S**
Sizes 22 to 250

Design with containment shroud made of stainless steel or Hastelloy®
Design with containment shroud made of zirconium oxide, coated with titanium nitride
Design with containment shroud made of VICTREX® PEEK 450CA30

[5] Manufacturer: KTR Systems GmbH

[6] Address: Carl-Zeiss-Straße 25
48432 Rheine
GERMANY

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

[8] IBExU Institut für Sicherheitstechnik GmbH 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 Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014.

The examination and test results are recorded in the confidential test report IB-20-2-0145.

[9] Compliance with the essential health and safety requirements has been assured by compliance with:
EN ISO 80079-36:2016 EN ISO 80079-37:2016
except in respect of those requirements listed at item [18] of the schedule.

[10] If the sign "X" or "U" 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 type examination certificate relates only to the design of the specified equipment and not to specific items of equipment subsequently manufactured or supplied.

[12] The marking of the product shall include the following:

Design with containment shroud made of stainless steel or Hastelloy®

Magnetic material Sm2Co17

II 2G Ex h IIC T6 ... T2 Gb
-40°C ≤ Ta ≤ +60°C ... +200°C

Magnetic material NdFeB

II 2G Ex h IIC T6 ... T3 Gb
-40°C ≤ Ta ≤ +60°C ... +150°C

Design with containment shroud made of zirconium oxide, coated with titanium nitride

II 2G Ex h IIC T6 ... T2 Gb
-40°C ≤ Ta ≤ +60°C ... +200°C

Design with containment shroud made of VICTREX® PEEK 450CA30

Ⓔx II 2G Ex h IIC T6 ... T4 Gb
-40°C ≤ Ta ≤ +60°C ... +110°C

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Certificates without signature and stamp are not valid. Certificates may only be duplicated completely and unchanged. In case of dispute, the German text shall prevail.

Dipl.-Ing. Willamowski

Freiberg, 2020-11-30

[13] **Schedule**

[14] **Certificate number IBExU04ATEXB023 X** | Issue 2

[15] **Description of product**

The magnetic couplings mentioned in [4] consist essentially of the components

- External rotor
- Containment shroud
- Internal rotor.

Permanent magnets are installed in the internal rotor and external rotor, whose magnetic forces transmit the rotary motion.

The containment shroud is equipped with a flange which is screwed to the machine. A gasket is inserted between the flange and the machine. The internal rotor is usually attached to the shaft of the machine to be driven by means of a hub with keyway/groove connection. In the smaller sizes (up to SB 60/8), the external rotor is equipped with a directly attached hub with keyway/groove connection. From size SA 75/10, the external rotor is prepared for the attachment of a flange hub for fastening to the shaft of the driving machine.

Details on the design of the components can be found in the manufacturer's documentation and the test reports IB-04-4-027, IB-10-4-019, IB-13-4-015, IB-15-4-020, IB-18-2-0020 and IB-20-2-0145.

Variations compared to issue 1 of this certificate:

Variation 1
The permissible sizes have been extended to nominal size 250.

[16] **Test report**

The test results are recorded in the confidential test report IB-20-2-0145 of 2020-11-26.

The test documents are part of the test report and they are listed there.

Summary of the test results
The components mentioned in [4] meet the requirements of explosion protection for components of Equipment Group II, Category 2G in type of protection "c" (constructional safety, marking with "Ex h") for use with explosive gas atmospheres.

[17] **Specific conditions of use**

1. The magnetic couplings may only be used, if their materials resist, under the respective operating conditions, the mechanical and/or chemical effects and corrosion, so that the explosion protection is always maintained.

2. When operated in explosion-endangered areas, the magnetic couplings with containment shroud made of stainless steel or Hastelloy® must be provided with a temperature monitoring system that automatically switches off the drive when a specified switch-off temperature is reached.

   The temperature monitoring system must trigger the shutdown of the drive at the following temperature differences:

   - **Temperature measurements with resistance thermometers (such as PT 100) in a blind hole in the flange of the containment shroud**
     ΔT = 15 K below the maximum surface temperature permitted for the respective explosion-endangered area

   - **Temperature measurements with resistance thermometers (such as PT 100) directly on the surface of the containment shroud**
     ΔT = 10 K below the maximum surface temperature permitted for the respective explosion-endangered area

- **Temperature measurements with thermocouples directly on the surface of the containment shroud**
  ΔT = 5 K below the maximum surface temperature permitted for the respective explosion-endangered area

The temperature monitoring system must meet the requirements of the Directive 2014/34/EU.

In relation to the maximum permissible surface temperatures according to the temperature classes, the following switch-off temperatures result, taking into account the above specification:

Temperature Class	Max. permissible surface temperature (°C)	Switch-off temperature (°C)		
		at temperature measurement with resistance thermometers		at temperature measurement with thermocouples directly on the surface of the containment shroud
		in a blind hole in the flange of the containment shroud	directly on the surface of the containment shroud	
T2	300	250)[1]	250)[1]	250)[1]
T3	200	185)[2]	190)[2]	195)[2]
T4	135	120	125	130
T5	100	85	90	95
T6	85	70	75	80

Explanations:
)[1] When using the magnetic material Sm_2Co_{17}, the switch-off temperature is +250 °C due to the constructive design.
)[2] When using the magnetic material NdFeB, the switch-off temperature is +150 °C due to the constructive design.

3. For magnetic couplings with containment shroud made of zirconium oxide coated with titanium nitride and with containment shroud made of VICTREX® PEEK 450CA30, the maximum surface temperature occurring on the coupling depends on the ambient or operating temperature T_a. A temperature increase ΔT to the ambient or operating temperature T_a must be considered. The temperature increase ΔT is stated in the operating instructions.

4. The magnetic coupling must be cooled by a partial flow of the conveying medium or a sealing liquid.

5. Only screws specified by the manufacturer may be used for the screw connections. When tightening the screws, the torque specified by the manufacturer must be observed. The screws must be secured against self-loosening unless self-locking screws are used.

6. The user must provide the magnetic couplings with fixed covers which, from the point of view of explosion protection, are intended to protect the magnetic couplings in particular against the impact of falling objects.
   The cover must be electrically conductive and included in the equipotential bonding.

7. The containment shrouds used must be included in the equipotential bonding.

[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 test report:

Clause	*Subject*
-	-

[19] **Drawings and Documents**

Number	*Sheet*	*Issue*	*Date*	*Description*
-	-	-	-	-

The documents are listed in the test report.

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By order

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Freiberg, 2020-11-30