

**[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 **IBExU11ATEXB016 X** | Issue 2

[4] Product (equipment / component):

GEARex® - Gear couplings

Designs FA, FB and FAB	Sizes 10 to 70
Designs DA, DB and DAB	Sizes 20 to 150
Designs FH and DH	Sizes 10 to 150
Designs FR and DR	Sizes 10 to 150

[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-20-2-0169.




[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 EN ISO/IEC 80079-38:2017
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:

The couplings without insulating coating or with coating or varnish with a thickness < 200 µm can be marked as follows:

	I M2 Ex h I	Mb X			
	II 2G Ex h IIC	T6	...	T4	Gb X
	II 2D Ex h IIIC	T80°C	...	T110°C	Db X
	-30 °C ≤ Ta ≤	+60 °C	...	+90 °C	

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The couplings with insulating coating or varnish with a thickness between 200 µm and 2 mm can be marked as follows:

	I M2 Ex h I	Mb X			
	II 2G Ex h IIB	T6	...	T4	Gb X
	II 2D Ex h IIIC	T80°C	...	T110°C	Db X
	-30 °C ≤ Ta ≤	+60 °C	...	+90 °C	

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- Stamp -

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.

Freiberg, 2021-04-28

[13] **Schedule**

[14] **Certificate number IBExU11ATEXB016 X | Issue 2**

[15] **Description of product**

The GEARex® - Gear couplings mentioned in [4] are form-locking couplings with grease lubrication and round cord ring sealing. They are manufactured from steel. The gear couplings are suitable as flexible shaft connections for a positive torque transmission. They are used for the compensation of axial, radial and angular shaft misalignments within specified tolerances.

The GEARex® - Gear couplings in the designs FA, FB, FAB, DA, DB and DAB consist essentially of two coupling hubs with spiral toothing on the outside and two one-piece or two-piece coupling sleeves with internal toothing.

The coupling sleeve of the FH and DH designs is extended by an intermediate piece.

The FR and DR designs consist of only one coupling hub with toothing on the outside. The second coupling hub has internal toothing.

The *A, *B and *AB designs differ in the arrangement of the otherwise identical coupling hubs.

The F* and D* designs differ in the fastening of the externally toothed coupling hubs in the coupling sleeve or in the internally toothed second coupling hub.

The couplings are held together by screw fastening of the two flanges of the coupling sleeves or the coupling hub with internal toothing. The coupling hubs are fastened onto the shafts by means of feather key groove connections, clamping connections and shrink joints (shrinkage fit).

The toothings are lubricated via the grease depot in the couplings. The grease is filled in through two screwed connections, which are arranged in the connection flanges of the coupling sleeves. Round cord rings serve to seal the grease depot between coupling hubs and coupling sleeves. They are inserted into the grooves of the coupling sleeves. Between the flanges of the coupling sleeves is a flat gasket in order to seal the gap against grease leakage.

The couplings can be delivered as finish-drilled version or as undrilled or pre-drilled version. Undrilled or only pre-drilled couplings are marked by the manufacturer with the symbol U in a hexagon.

Details on the design of the equipment or components can be found in the manufacturer's documentation and the test reports IB-11-4-017, IB-14-4-017, IB-18-2-0020 and IB-20-2-0169.

Variations compared to issue 1 of this certificate:

Variation 1

The FH, FR, DH and DR designs in sizes 10 to 150 have been added.

Variation 2

The specific conditions for safe use have been revised.

[16] **Test report**

The test results are recorded in the confidential test report IB-20-2-0169 of 27.04.2021.

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

Summary of the test results

The equipment or components mentioned in [4] meet(s) the requirements of explosion protection for equipment of Equipment Group II, Categories 2D or 2G or Equipment Group I, Category M2 in type of protection "c" (constructional safety, marking with "Ex h") for use with explosive dust and gas atmospheres and for underground use.

[17] **Specific conditions of use**

1. The temperature marking indicates that for determining the maximum surface temperature occurring on the coupling 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.
2. The couplings may only be used, if their materials are resistant to mechanical and/or chemical effects and corrosion under the respective operating conditions so that the explosion protection is always maintained.

3. *The users must provide the couplings with fixed covers in order to protect the couplings against falling objects. The covers can have openings for the necessary heat dissipation. When used in the mining industry (Equipment Group I), the covers of the couplings must be able to withstand higher mechanical loads than for use in other industries (Equipment Group II). Detailed information on the cover design is given in the operating / assembly instructions. The covers must be electrically conductive and included in the equipotential bonding.*
4. *When using the couplings in potentially explosive dust atmospheres, the users must make sure that no dust in dangerous quantities accumulates between cover and coupling. The coupling must not run in a dust accumulation.*
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 for fixing the hubs must be secured against self-loosening unless self-locking screws are used.*
6. *For use of the couplings in the mining industry, the requirements of the national mining regulations valid for the respective area of application must be observed.*
7. *Undrilled or unfinished drilled couplings (marked with U in a hexagon) are components in the meaning of Directive 2014/34/EU and require a final quality assurance assessment after completion of the drilling.*

[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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