

[1] **TYPE EXAMINATION CERTIFICATE**



[2] **for non-electrical equipment and components
of the Equipment Groups I and II, Categories M2 and 2 as well as 3
(Translation of 23 April 2010)**

[3] Type Examination Certificate Number: **IBExU05ATEXB002 X**

[4] Equipment / Component: **RADEX® - NC Servo laminae couplings
of the designs DK and EK
Sizes each up to 42**

a) Hubs with feather keyway or clamping ring hubs

- 1.0 Hub with feather keyway and locking screw
- 2.6 Clamping hub with groove
- 6.0 and 6.5 Hub with clamping ring

b) Hubs without feather keyway

- 2.5 Clamping hub without groove

[5] Manufacturer: **KTR Kupplungstechnik GmbH**

[6] Address: **Rodder Damm 170
48432 Rheine
Germany**

[7] The design of the product mentioned in [4] and any acceptable variations thereto are specified in the schedule to this Type Examination Certificate.

[8] IBExU Institut für Sicherheitstechnik GmbH certifies that the product mentioned in [4] has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of the product intended for use in potentially explosive atmospheres given in Annex II to the Directive 94/9/EC.

The test results are recorded in the Test Reports IB-04-4-016/2 of 24 October 2005 and IB-06-4-008 of 18 April 2006.

[9] Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 1127-1:1997, EN 13463-1:2001 and EN 13463-5:2003.

[10] If the sign "X" is placed after the certificate number and / or the marking mentioned in [12], it indicates that the product is subject to special conditions for safe use specified in [17] in the schedule to this Type Examination Certificate.

[11] This Type Examination Certificate relates only to the design and construction of the specified product. If applicable, further requirements of this Directive apply to the manufacture and supply of this product (see for example [19]).

[12] The marking of the RADEX® - NC Servo laminae couplings of the designs mentioned in [4] can be as follows in dependence of the materials used for the couplings:

a1) Couplings according to [4] a), constructed of steel, semiproducts of aluminium or semi-products with comparable physical properties resp. made from a combination of parts constructed of the mentioned materials



II 2GD c IIC T X

or



II 2G c IIC T6, T5, T4, T3 resp. T2 X

-30 °C ≤ T_a ≤ +75 °C, +90 °C, +125 °C, +190 °C resp. +200 °C



II 2D c T 110 °C X
-30 °C ≤ T_a ≤ +100 °C

- a2) Couplings according to [4] a), whose parts are constructed exclusively of steel, can be marked in addition:



I M2 c X

or



I M2 c X
-30 °C ≤ T_a ≤ +140 °C

- b) Couplings according to [4] b) can be marked as follows:



II 3GD c IIC T X

or



II 3G c IIC T6, T5, T4, T3 resp. T2 X
-30 °C ≤ T_a ≤ +75 °C, +90 °C, +125 °C, +190 °C resp. +200 °C

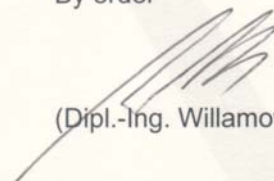


II 3D c T 110 °C X
-30 °C ≤ T_a ≤ +100 °C

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Freiberg, 12 May 2006

By order


(Dipl.-Ing. Willamowski)

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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.

Schedule

[13]

Schedule

[14]

to **TYPE EXAMINATION CERTIFICATE IBExU05ATEXB002 X**

[15]

Description

RADEX[®] - NC Servo laminae couplings are backlash-free and torsionally rigid couplings. One laminae set made of stainless spring (design EK) or two laminae sets made of stainless spring steel (design DK) is/are fixed between two flange hubs constructed of semiproducts of aluminium (EN AW 6023 T6) or steel, in a way, that axial, radial and angular displacements between driving and driven side can be compensated within the specified limits. The hubs are constructed according to [4] with or without feather keyway in the designs "hub with feather keyway and locking screw" (design 1.0), "clamping hub" (designs 2.5 and 2.6) or "hub with clamping ring" (designs 6.0 and 6.5).

The coupling hubs are finish-bored as per the manufacturer's documents.

The couplings are designed by the manufacturer for use in the temperature range T_a of -30 °C to +200 °C (permanent load).

Details are included in the documents of the manufacturer which are part of the Test Reports mentioned in [8] and [16].

[16]

Test Report

The test results, which are the basis of this Type Examination Certificate, are recorded in the Test Reports IB-04-4-016/2 of 24 October 2005 and IB-06-4-008 of 18 April 2006.

Summary of test results:

The RADEX[®] - NC Servo laminae couplings of the designs mentioned in [4] a) meet the requirements for non-electrical equipment / components

- of the Equipment Group II, Category 2G.

Taking into account the temperature increase of $\Delta T = 10$ K the couplings fulfil (depending on the maximum permissible ambient temperatures resp. operating temperatures T_a) the requirements for Temperature Class T6 (for $T_a = 75$ °C), Temperature Class T5 (for $T_a = 90$ °C), Temperature Class T4 (for $T_a = 125$ °C), Temperature Class T3 (for $T_a = 190$ °C) and Temperature Classes T2 and T1 (for $T_a = 200$ °C, is also the maximum permissible temperature for permanent use).

They fulfil the requirements for use in the Explosion Group IIC. Thus it, the couplings meet also the requirements of the Explosion Groups IIB and IIA.

- of the Equipment Group II, Category 3D.

For the maximum permissible ambient temperature resp. operating temperature T_a of, for example +100 °C, the maximum surface temperature is +110 °C.

In addition, the RADEX[®] - NC Servo laminae couplings of the designs mentioned in [4] a), whose parts are constructed exclusively of steel, fulfil the requirements for non-electrical equipment / components

- of the Equipment Group I, Category M2.

At a maximum permissible ambient temperature resp. operating temperature T_a of +140 °C the maximum surface temperature of +150 °C, which is permissible for the Category M2, is not exceeded.

The RADEX[®] - NC Servo laminae couplings of the designs mentioned in [4] b) fulfil the requirements for non-electrical equipment / components of the Equipment Group II, Categories 3G and 3D.

Regarding the Temperature Class, maximum surface temperature and Explosion Class the couplings mentioned in [4] b) fulfil the same requirements as the couplings mentioned in [4] a).

The couplings are protected by the type of protection "c" (Protection by constructional safety).

[17] Special conditions for safe use

The marking with "T X" means, that for the specification of the maximum surface temperature at the coupling the user has to add a temperature increase of $\Delta T = 10 \text{ K}$ to the ambient temperature resp. operating temperature T_a .

The RADEX[®] - NC Servo laminae couplings may only be used if their materials resist the mechanical and/or chemical influences resp. corrosion under the current operating conditions, in such a way, that the explosion protection is always guaranteed.

The user has to provide the RADEX[®] - NC Servo laminae couplings with stable covers in order to protect the couplings against falling objects. Openings for necessary heat discharging can be arranged in these protective covers. Protective covers of couplings intended for use in the mining industry (Equipment Group I) have to accept higher mechanical loads than the protective covers of couplings intended for use in other industries (Equipment Group II). Detailed notes for the design of the protective cover are given in the Operating-/Installation Instructions. The protective cover must be electrically conductive. It must be included in the compensation of potential.

If the couplings are used in dust explosion hazardous areas, the operator has to observe that no dusts in dangerous quantities can accumulate between protective cover and coupling. The coupling must not run in a dust deposit.

Only screws specified by the manufacturer are allowed for the assembly of screw connections. When tightening the screws, the torque specified by the manufacturer has to be observed. All screw connections to fasten the hubs on the shafts have to be protected against self-loosening.

For the use of the couplings in the mining industry, the user is obliged to observe the specifications of the national regulations for mining industry, which are valid for the respective operating area.

[18] Essential safety and health requirements

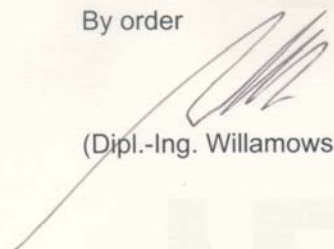
Confirmed by compliance with standards (see [9]).

[19] Confirmation of the deposit of documents according to Annex VIII of Directive 94/9/EC

It is confirmed, that the documents pursuant to Annex VIII of the Directive 94/9/EC for the non-electrical product of the Category 2 mentioned under [4] are deposited under No. IB-06-4-008 at the NOTIFIED BODY IBExU (EC-Identification No 0637). The deposit of the documents is carried out according to the regulations of Directive 94/9/EC, item 8 (1) b) ii).

By order

Freiberg, 12 May 2006


(Dipl.-Ing. Willamowski)