



[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)**

[3] Type Examination Certificate Number: **IBExU02ATEXB005\_05X**

[4] Equipment / Component: **RADEX®-N Steel lamina couplings**  
of the designs **NN, NANA 1 to 5, NENA 1 and 2, NENE 1,  
NNZ, NNW, MK**  
Sizes each up to 220 and  
each with standard flange hub

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

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

[7] The design of the product mentioned under [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 under [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-02-4-124/2 dated March 7, 2002, IB-02-4-602 dated Nov. 30, 2002, IB-02-4-602/1 dated Dec. 5, 2002, IB-04-4-005 dated Febr. 17, 2004, IB-04-4-016/2 dated Oct. 24, 2005 and IB-06-4-008 dated April 18, 2006.

[9] Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 1127-1:1997, EN 1127-2:2002, 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 under [12], it indicates that the product is subject to special conditions for safe use specified under [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.

[12] The marking of the RADEX®-N Steel lamina couplings of the designs mentioned under [4] can result as follows:

**II 2GD c IIC T X**

**I M2 c X**

or

**II 2G c IIC T6, T5, T4, T3 or T2 X**  
-30 °C ≤ T<sub>a</sub> ≤ +75 °C, +90 °C, +125 °C, +190 °C resp. +280 °C

**II 2D c T 110 °C X**  
-30 °C ≤ T<sub>a</sub> ≤ +100 °C

**I M2 c X**  
-30 °C ≤ T<sub>a</sub> ≤ +140 °C

**IBExU Institut für Sicherheitstechnik GmbH**  
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Freiberg, 18.04.2006

  
(Prof. Dr. Redeker)

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**Schedule**

[13] **Schedule**

[14] to Type Examination Certificate IBExU02ATEXB005\_05 X

[15] **Description**

RADEX®-N steel lamina couplings are backlash-free and torsionally stiff couplings. A laminae set made of stainless spring steel is fixed between two flanges in a way that axial, radial and angular displacements between driving and driven side can be compensated within the specified limits. The different designs of the couplings are mainly distinguished by the number of joints (single or double cardanic), the type of lamina (four-hole or six-hole lamina) and the arrangement of various spacers.

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  $-30\text{ °C}$  to  $+280\text{ °C}$  (permanent load).

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

[16] **Test Report**

The test results which are the basis of this Type Examination Certificate and which take into account the latest results regarding the temperature reaction of the couplings are recorded in the Test Reports IB-04-4-016/2 dated Oct 24, 2005 and IB-06-4-008 dated April 18, 2006.

**Summary of test results:**

The RADEX®-N Steel lamina couplings of the types mentioned under [4] meet the requirements for non-electrical equipment / components

- of the Equipment Group II, Category 2G.

Taking into account the temperature increase of  $\Delta T = 10\text{ K}$  the couplings meet the requirements for Temperature Class T6 (for  $T_a = 75\text{ °C}$ ), for Temperature Class T5 (for  $T_a = 90\text{ °C}$ ), for Temperature Class T4 (for  $T_a = 125\text{ °C}$ ), for Temperature Class T3 (for  $T_a = 190\text{ °C}$ ) and for the Temperature Classes T2 and T1 (for  $T_a = 280\text{ °C}$ , is also the maximum permissible temperature for permanent use) depending on the maximum permissible ambient temperatures resp. operating temperatures  $T_a$ .

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

- of the Equipment Group II, Category 2D.

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

- of the Equipment Group I, Category M2.

With the maximum permissible ambient temperature resp. operating temperature  $T_a$  of  $+140\text{ °C}$  the maximum surface temperature of  $+150\text{ °C}$ , which is permissible for the Category M2, is not exceeded.

The type of protection "c" (Protection by constructional safety) is used as protective measure.

Please note:

This Type Examination Certificate IBExU02ATEXB005\_05 X is a summary of the type examination certificate IBExU02ATEXB051 X dated March 7, 2002, the first addition to the Type Examination Certificate IBExU02B005 X dated Dec. 5, 2002 and the second addition to the Type Examination Certificate IBExU02B005 X dated Febr. 17, 2004.

Compared to the aforementioned certificates the temperature range  $T_a$  was extended; moreover the figure of the temperature rise  $\Delta T$  which has to be taken into account resulting from inherent temperature rise was reduced to 10 K based on new results.

It is not necessary to withdraw the certificates which have been released up to now. Products with markings as per the previous certificates can be distributed now as before.

**[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 take into account a temperature increase of  $\Delta T = 10$  K compared to the ambient temperature resp. operating temperature  $T_a$ .

The RADEX<sup>®</sup>-N Steel lamina couplings may only be used if their materials resist to 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<sup>®</sup>-Steel lamina couplings with stable covers 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 hints for the design of the protective cover are stated 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 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).

Freiberg, 18.04.2006

  
(Prof. Dr. Redeker)



[1] **1<sup>st</sup> Addition to  
TYPE EXAMINATION CERTIFICATE IBExU02ATEXB005\_05 X  
(Translation)**

[2] Equipment / Component: **RADEX<sup>®</sup> -N Steel lamina couplings**

a) Designs and sizes according to IBExU02ATEXB005\_05 X:

Designs NN, NANA 1 to 5, NENA 1 and 2, NENE 1, NNZ, NNW, MK  
Sizes in each case up to 220 and  
in each case with standard flange hub

b) Added designs:

Designs NN, NANA 1 to 4, NENA 1 and 2, NENE 1, NNZ, NNW  
Sizes 138, 158, 168, 208, 248, 288, 338  
in each case with laminae set in 8-bolts-construction und closed ring lamina and assembly with KTR-clamping nuts

[3] Manufacturer: KTR Kupplungstechnik GmbH

[4] Address: Rodder Damm 170  
48432 Rheine  
Germany

[5] **Additions/Modifications**

The RADEX<sup>®</sup> -N Steel lamina couplings mentioned under [2] a) are supplemented with the designs mentioned under [2] b).

[6] **Test Report**

The test results are recorded in the Test Report IB-08-4-019 of 24<sup>th</sup> November 2008.

[7] **Test result**

IBExU certifies that the designs of RADEX<sup>®</sup> -N Steel lamina couplings mentioned under [2] b) fulfil the same requirements like the designs and sizes mentioned under [2] a). They comply with the Essential Health and Safety Requirements given in Annex II to the Directive 94/9/EC for Equipment Group I, Category M2 and Equipment Group II, Category 2G and 2D by compliance with EN 13463-1:2001 and EN 13463-5:2003.

The designs of the RADEX<sup>®</sup> -N Steel lamina couplings mentioned under [2] b) shall be marked like the designs and sizes mentioned in the Type Examination Certificate IBExU02ATEXB005\_05 X.

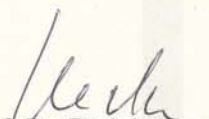
[8] **Confirmation of the deposit of documents according to Annex VIII of Directive 94/9/EC**

It is confirmed that the documents pursuant to Annex VIII of the Directive 94/9/EC for the non-electrical product of Category 2 mentioned under [2] b) are deposited under No IB-08-4-019 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, article 8 (1) b) ii).

**This Addition is only valid in connection with the Type Examination Certificate IBExU02ATEXB005\_05 X of 18<sup>th</sup> April 2006.**

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Freiberg, 26<sup>th</sup> November 2008

  
(Prof. Dr. Redeker)

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