

IBExU Institut für Sicherheitstechnik GmbH

An-Institut der TU Bergakademie Freiberg

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



[2] Equipment intended for use in Potentially Explosive Atmospheres,
Directive 94/9/EC

[3] Type Examination Certificate Number: **IBExU03ATEXB002 X**

[4] Equipment: **ROTEX® GS backlash-free shaft couplings**
designs:

- 1.0 Hub with feather keyway and set thread
- 2.1 Clamping hub with feather keyway and 1 slot
- 2.6 Clamping hub with feather keyway and 2 slots
- 4.0 with CLAMPEX® - clamping set KTR 250
- 5.0 with CLAMPEX® - clamping set KTR 200
- 6.0 Clamping ring hub
- 6.0 P Precision-Clamping ring hub
- 6.5 Clamping ring hub

inclusively design DKM with hubs acc. to the above mentioned designs

[5] Manufacturer: KTR Kupplungstechnik GmbH

[6] Address: Rodder Damm 170
D-48432 Rheine

[7] This equipment as well as any acceptable variation thereto is specified in the schedule to this Type Examination Certificate.

[8] IBExU Institut für Sicherheitstechnik GmbH certifies that this equipment has been found to comply with the Essential Health and Safety Requirements of the Annex II of the Directive relating to the design and construction of equipment intended for use in potentially explosive atmospheres. The test results are recorded in the confidential test report IB-02-4-815 of 14 April 2003.

[9] Compliance with Essential Health and Safety Requirements has been assured by compliance with EN 1127-1:1997, EN 13463-1:2001, prEN 13463-5:2002.

[10] If the sign "X" is placed after the certificate number, it indicates that the equipment 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 equipment. Further requirements of this Directive apply to the manufacture and supply of this equipment.

[12] The marking of the ROTEX® GS backlash-free shaft couplings of the designs mentioned in [4] shall include the following, in dependence on the metallic materials of which the coupling or parts of the coupling are manufactured:

- a) Couplings made of steel (S355J2G3, 42CrMo4V, St-H), aluminium semi-finished material (EN AW 2007) or semi-finished materials with comparable physical properties ($R_{p0,2} \geq 250$ N/mm²) respectively manufactured as a combination of parts of the mentioned materials



II 2G c IIC T4, T5 respectively T6
 $-30\text{ °C} \leq T_a \leq +80\text{ °C}$, 60 °C resp. 45 °C



II 2D c T 110 °C
 $-30\text{ °C} \leq T_a \leq +80\text{ °C}$

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- b) Couplings, whose parts are manufactured exclusively from steel (S355J2G3, 42CrMo4V, St-H), can be marked additionally as follows:



I M2 c

$-30\text{ °C} \leq T_a \leq +80\text{ °C}$

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Freiberg, 14 April 2003

Authorized for certifications Explosion Protection

(Prof. Dr. Redeker)



- Seal -

Certificates without signature and seal 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 IBExU03ATEXB002 X

[15]

Description

ROTEX® GS backlash-free shaft couplings are axial plug-in couplings, which transform torques in a form-fitting way. They are fail-safe ROTEX® GS backlash-free shaft couplings can compensate for axial, radial and angular misalignments of the shafts to be connected.

Two congruent coupling parts, which are inside equipped with claws, stand staggered in circumferential direction by a half pitch. They are designed in a way, that in the intermediate space an involute spider can be inserted. The spiders are radially supported in the diameter by an inside fillet. Thereby, a too large deformation by a high acceleration or high speed is prevented to the inside or outside. The spiders are available in several degrees of hardness. The temperature for permanent use of the elastomers used for the spiders, is between -50 °C and +120 °C, depending on the material.

The designs of the ROTEX® GS backlash-free shaft couplings mentioned in [4] are manufactured in the following sizes:

Design	Size	Material)*	Comments
1.0	size 7 – size 75	to size 38 aluminium semi-finished materials EN AW 2007 from size 42 steel S355J2G3	hub with feather keyway and set screw
2.1 and 2.6	size 7 - size 75	to size 38 aluminium semi-finished materials EN AW 2007 from size 42 steel S355J2G3	clamping hub with feather keyway and cylindrical screw to size 19 1 slot (design 2.1) from size 24 (design 2.6) 2 slots
6.0 and 6.5	size 14 - size 75	to size 38 hub of aluminium semi-finished materials EN AW 2007; clamping ring of 42CrMo4V from size 42 hub of S355J2G3 / 42CrMo4V; clamping ring of 42CrMo4V	<i>clamping ring hub</i> - screwed from the elastomer-side (design 6.0) - clamping screws from the outside (design 6.5)
6.0 P	size 14 - size 75	hubs of S355J2G3/42CrMo4V clamping ring spacer of 42CrMo4V	P-clamping ring hub according to DIN 69002
DKM	size 5 - size 55	to size 38 hubs and spacer of aluminium semi-finished materials EN AW 2007 from size 42 hubs of steel (St-H) and spacer of aluminium semi-finished materials EN AW 2007	hubs (as above mentioned)
4.0	size 42 - size 180	coupling: steel S355J2G3 clamping set: steel S355J2G3 and C45	with clamping set CLAMPEX® KTR 250
5.0	size 42 - size 180	coupling: steel S355J2G3 clamping set: steel S355J2G3 and C45	with clamping set CLAMPEX® KTR 200

*) Note: The aluminium semi-finished material EN AW 2007 mentioned in the table can be replaced by other semi-finished materials with comparable physical properties ($R_{p0.2} \geq 250 \text{ N/mm}^2$).

Details of stipulations regarding the torque of frictional connections and the permissible transmittable torques in dependence on the designs of the couplings, regarding the allowable loads of temperature and construction, inclusive requirements for materials, are contained in the documentation of the manufacturer, which are part of the test report IB-02-4-815 of 14 April 2003.

[16]

Test Report

The test results are recorded in the confidential test report IB-02-4-815 of 14 April 2003.

Summary of the Test Results:

The ROTEX® GS backlash-free shaft couplings of the designs and series mentioned in [4], manufactured of the materials (mentioned in the table of item [15]), or of a combination of parts of the mentioned materials fulfil the requirements for non-electrical devices of the type of protection c (protection by constructional safety) of the equipment group II, category 2G, temperature class T4 (for an ambient temperature T_a of -30 °C up to $+80\text{ °C}$), T5 ($-30\text{ °C} \leq T_a \leq 60\text{ °C}$) and T6 ($-30\text{ °C} \leq T_a \leq 45\text{ °C}$). They fulfil the requirements for use in the explosion group IIC. Thus, they fulfil the requirements of the temperature class T3 up to T1 as well as of the explosion group IIB and IIA. They meet the requirements of the equipment group II, category 2D, maximum surface temperature 110 °C at a maximum ambient temperature T_a of 80 °C , too.

The ROTEX® GS backlash-free shaft couplings of the designs mentioned in [4], which are exclusively manufactured of steel or a combination of parts of steel, fulfil the requirements of the equipment group I, category M2.

Note

The manufacturer has to guarantee, that each manufactured ROTEX® GS backlash-free shaft couplings corresponds to the conditions which are laid down in the Type Examination Certificate. The manufacturer has to guarantee that the appropriate requirements of the directive 94/9/EC are fulfilled.

[17] Special Conditions for safe use

The ROTEX® GS backlash-free shaft couplings may be used only, if their materials under the respective operation conditions resist to the mechanical and/or chemical influences respectively corrosion in a way, that the explosion protection is always guaranteed.

For the assembly of screw connections screws provided by the manufacturer only have to be used. The torque stipulated by the manufacturer has to be adhered to when tightening the screws.

All screw connections for the fixing of the hub on the shafts have to be protected against self-loosening.

The user has to equip the ROTEX® GS backlash-free shaft couplings with safety devices. The safety devices have to protect the couplings against the impact of falling objects. The materials of the covers have to be selected according to EN 13463-1:2001.

The distance between the cover and rotating parts must be at least 5 mm.

The cover must be electrically conductive and must be included in the compensation of potential.

When using the couplings in potentially dust-explosive atmospheres as well as in the mining industry the user has to make sure, that no dust accumulates between the cover and the coupling.

The coupling must not operate in a dust layer.

If the safety device is designed as a cover, then regular openings may be arranged, which must not exceed the following dimensions:

	Circular openings diameter in mm	Rectangular openings lateral length in mm
Top side of cover	4	4
Side part of cover	8	8

When using the couplings as equipment in equipment group II, light metal should not be used for covers with openings, of which the top side is not locked.

When using the couplings in the mining industry (equipment group I) the cover must not consist of light metal. It must resist to higher mechanical loads than at use as equipment in equipment group II.

The removing of the cover is only allowed at standstill.

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The user is obliged to observe the operating instructions for each coupling. This is indispensable especially for the instructions for use of the couplings in explosive atmosphere.

[18] Essential Health and Safety Requirements

Confirmed by observance of standards (see [9]).

Freiberg, 14 April 2003



(Prof. Dr. Redeker)