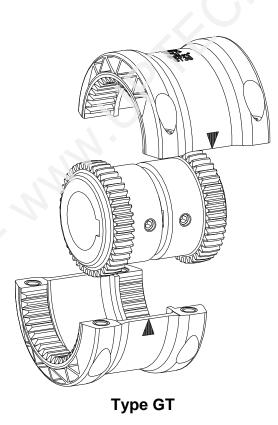




non-failsafe curved-tooth gear couplings type GT and their combinations

according to directive 2014/34/EU for finish bored, pilot bored and unbored couplings



Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	



The **BoWex**[®] curved-tooth gear coupling is a flexible shaft connection. It is able to compensate for shaft misalignment, for example caused by manufacturing inaccuracies, thermal expansion, etc.

Table of contents

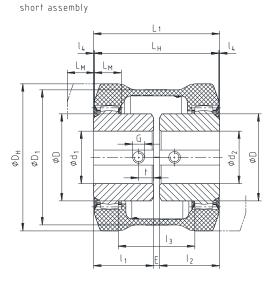
1	Technical data	3
2	Advice	4
	 2.1 Coupling selection 2.2 General advice 2.3 Safety and advice symbols 2.4 General hazard warnings 2.5 Intended use 2.6 Reference to EC Machinery Directive 2006/42/EC 	4 4 5 5 5
3	Storage, transport and packaging	5
	3.1 Storage3.2 Transport and packaging	5 6
4	Assembly	6
	 4.1 Components of the couplings 4.2 Advice for finish bore 4.3 Assembly of the hubs 4.4 Assembly of the GT sleeve 4.5 Displacements - alignment of the couplings 	6 6 7 8 8
5	Start-up	10
6	Breakdowns, causes and elimination	11
7	Disposal	13
8	Spares inventory, customer service addresses	13
9	Enclosure A Advice and instructions regarding the use in key hazardous locations	13
	9.1 Intended use in kazardous locations	13
	 9.2 Inspection intervals for couplings in hazardous locations 9.3 Checking of torsional backlash 9.4 Standard values of wear 	15 16 17
	9.5 Permissible coupling materials in key hazardous locations	18
	 9.6 marking of coupling for hazardous locations 9.7 EC Certificate of conformity 	18 19

Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	



BoWex [®]							
Operating/Assembly instructions							
Type GT							

KTR-N	40118 EN
Sheet:	3 of 19
Edition:	4



long assembly

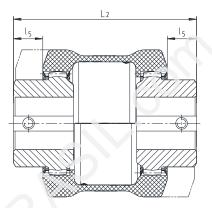


Illustration 1: BoWex®, type GT

Table 1: Technical data

BoWex®	Torque [Nm] Thread for setscrews				Max.					
size	Τ _{κν}	T _{K max.}	G	t	T _A [Nm]	м	Dĸ	SW	T _A [Nm]	speed [rpm]
GT-28	70	210	M8	8	10	M5	82	4	8.5	8500
GT-38	120	360	M8	10	10	M6	101	6	14	6700
GT-48	200	600	M8	10	10	M6	111.5	6	14	5600
GT-65	560	1680	M10	15	17	M8	152	8	35	4000

Table 2: Dimensions

BoWex®	Pilo	t bore	Max. finish						Dime	ensions	[mm]					
size	Un- bored	Pilot bored	bore d ₁ ; d ₂	I ₁ ; I ₂	Е	L ₁	L_2	L _H	L _M ¹⁾	l ₃	I ₄	I_5	D	D ₁	D _H	D_Z ²⁾
GT-28	х	-	28	40	4	84	124	78	15	53	3.0	22	44	74	78	54
GT-38	х	-	38	40	4	84	122	83	18	51	0.5	19.5	58	90	98	69
GT-48	х	-	48	50	4	104	160	104	19.5	69	0	28	68	100	110	78
GT-65	-	21	65	55	4	114	160	110	27	62	2.0	24.5	96	130	150	110

1) Required mounting/dismounting dimension of GT sleeve

2) Tip circle of the hub



BoWex[®] couplings with attachments that can generate heat, sparks and static charging (e. g. combinations with brake drums, brake disks, overload systems such as torque limiters, fans etc.) are <u>not</u> permitted for the use in hazardous locations. A separate analysis must be performed.

Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	



2 Advice

2.1 Coupling selection



For a long-lasting and failure-free operation of the coupling it must be selected according to the selection instructions (according to DIN 740 part 2) for the particular application (see catalogue drive technology "BoWex[®]").

If the operating conditions (performance, speed, modifications on engine and machine) change, the coupling selection must be reviewed.

Please make sure that the technical data regarding torque refer to the sleeve only. The transmittable torque of the shaft-hub-connection must be reviewed by the customer and is subject to his responsibility.

For drives subject to torsional vibrations (drives with cyclic stress due to torsional vibrations) it is necessary to perform a torsional vibration calculation to ensure a reliable selection. Typical drives subject to torsional vibrations are e. g. drives with diesel engines, piston pumps, piston compressors etc. If requested, KTR will perform the coupling selection and the torsional vibration calculation.

2.2 General advice

Please read through these operating/assembly instructions carefully before you start up the coupling. Please pay special attention to the safety instructions!



The **BoWex**[®] coupling is suitable and approved for the use in hazardous locations. When using the coupling in hazardous locations, please observe the special advice and instructions regarding safety in enclosure A.

The operating/assembly instructions are part of your product. Please store them carefully and close to the coupling. The copyright for these operating/assembly instructions remains with KTR.

2.3 Safety and advice symbols



Warning of potentially explosive atmospheres



Warning of personal injury



Warning of product damages

General advice



Warning of hot surfaces

This symbol indicates notes which may contribute to preventing bodily injuries or serious bodily injuries that may result in death caused by explosion.

This symbol indicates notes which may contribute to preventing bodily injuries or serious bodily injuries that may result in death.

This symbol indicates notes which may contribute to preventing material or machine damage.

This symbol indicates notes which may contribute to preventing adverse results or conditions.

This symbol indicates notes which may contribute to preventing burns with hot surfaces resulting in light to serious bodily injuries.

Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	



Advice 2

General hazard warnings 2.4



With assembly, operation and maintenance of the coupling it has to be made sure that the entire drive train is secured against accidental switch-on. You may be seriously hurt by rotating parts. Please make absolutely sure to read through and observe the following safety indications.

- All operations on and with the coupling have to be performed taking into account "safety first".
- Please make sure to switch off the power pack before you perform your work on the coupling.
- Secure the power pack against accidental switch-on, e. g. by providing warning signs at the place of switch-on or removing the fuse for current supply.
- Do not reach into the operation area of the coupling as long as it is in operation.
- Please secure the coupling against accidental contact. Please provide for the necessary protection devices and covers.

2.5 Intended use

You may only assemble, operate and maintain the coupling if you

- have carefully read through the operating-/assembly instructions and understood them
- had technical training
- are authorized by your company

The coupling may only be used in accordance with the technical data (see table 1 and 2 in chapter 1). Unauthorized modifications on the coupling design are not admissible. We will not assume liability for any damage that may arise. In the interest of further development we reserve the right for technical modifications. The BoWex® type GT described in here corresponds to the technical status at the time of printing of these operating/assembly instructions.

2.6 Reference to EC Machinery Directive 2006/42/EC

The couplings supplied by KTR should be considered as components, not machines or partly completed machines according to EC Machinery Directive 2006/42/EC. Consequently KTR does not have to issue a declaration of incorporation. For details about safe assembly, start-up and safe operation please refer to the present operating/assembly instructions considering the warnings.

3 Storage, transport and packaging

3.1 Storage

The coupling hubs are supplied in preserved condition and can be stored at a dry and covered place for 6 - 9 months.

The features of the coupling sleeves remain unchanged for up to 5 years with favourable stock conditions.



The storage rooms must not include any ozone-generating devices like e. g. fluorescent light sources, mercury-vapour lamps or electrical high-voltage appliances. Humid storage rooms are not suitable.

Please make sure that condensation is not generated. The best relative air humidity is less than 65 %.

Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	



3 Storage, transport and packaging

3.2 Transport and packaging



In order to avoid any injuries and any kind of damage please always make use of proper lifting equipment.

The couplings are packed differently each depending on size, number and kind of transport. Unless otherwise contractually agreed, packaging will follow the in-house packaging specifications of KTR.

4 Assembly

Generally the coupling is supplied in pre-assembled condition. Before assembly the coupling has to be inspected for completeness.

4.1 Components of the couplings

Components of BoWex[®], type GT

Component	Quantity	Description
1	2	Hub
2 ¹⁾	2	GT sleeve (semi shell)
3 ¹⁾	4	Dowel screws
4	2	Setscrews DIN EN ISO 4029

1) The GT sleeves and fit bolts are mounted for dispatch.

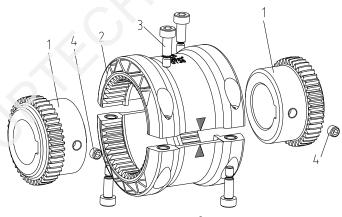


Illustration 2: BoWex®, type GT

4.2 Advice for finish bore



The maximum permissible bore diameters d (see table 1 in chapter 1 - technical data) must not be exceeded. If these figures are disregarded, the coupling may tear. Rotating particles may cause danger to life.

- Hub bores (steel hubs) machined by the customer have to observe concentricity or axial runout, respectively (see illustration 9).
- Please make absolutely sure to observe the figures for $\emptyset d_{max}$.
- Carefully align the hubs when the finish bores are drilled.
- Please provide for a setscrew according to DIN EN ISO 4029 with a cup point or an end plate to fasten the hubs axially.

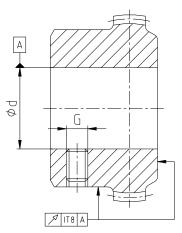


Illustration 3: Concentricity and axial runout

Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	



Assembly 4

Advice for finish bore 4.2



The customer bears the sole responsibility for all machining processes performed subsequently on unbored or pilot bored as well as finish machined coupling components and spare parts. KTR does not assume any warranty claims resulting from insufficient remachining.

Table 3: Setscrews DIN EN ISO 4029

BoWex [®] size	GT-28	GT-38	GT-48	GT-65
Dimension G	M8	M8	M8	M10
Tightening torque T _A [Nm]	10	10	10	17

Table 4: Recommended fit pairs acc. to DIN 748/1

Bore [mm]		Shaft tolerance	Bara talaranga
above	up to	Shall tolerance	Bore tolerance
	50	k6	H7
50		m6	(KTR standard)

If a feather keyway is intended to be used in the hub, it should correspond to the tolerance ISO JS9 (KTR standard) with normal operating conditions or ISO P9 with difficult operating conditions (frequently alternating torsional direction, shock loads, etc.).

The transmittable torque of the shaft-hub-connection must be reviewed by the customer and is subject to his responsibility.

4.3 Assembly of the hubs



We recommend to inspect bores, shaft, keyway and feather key for dimensional accuracy before assembly.



Heating the hubs lightly (approx. 80 °C) allows for an easier mounting on the shaft.



Please pay attention to the ignition risk in hazardous locations!



Touching the heated hubs causes burns. Please wear safety gloves.



With the assembly please make sure that the distance dimension E (see table 2) is observed to allow for axial clearance of the GT sleeve when in operation. Disregarding this advice may cause damage to the coupling.

- Mount the hubs on the shaft of driving and driven side.
- Shift the power packs in axial direction until the distance dimension E is achieved.
- If the power packs are already firmly assembled, shifting the hubs axially on the shafts allows for adjusting the distance dimension E.
- Fasten the hubs by tightening the setscrews DIN EN ISO 4029 with cup point (tightening torque see table 1 or 3). The setscrews have to be secured against working loose, e.g. congutinating with Loctite (average strength).

Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	



4 Assembly

4.4 Assembly of the GT sleeve



For mounting or replacing the GT sleeves it is not necessary to disassemble the power packs or shift them axially, respectively.

- Remove the fit bolts from the GT sleeve.
- Put the GT sleeve (each semi shell) axially over the spline of the hubs from the left and right side (see illustration 4).



With the assembly please make sure that the arrows of the GT sleeve are pointing at one another (see illustration 5).



If this hint is not observed the sleeve may move axially and cause damage on the machine.

- Screw the fit bolts hand-tight in the GT sleeve reciprocally at first.
- Tighten the screws to the tightening torques T_A mentioned in table 1 by means of a suitable torque key. The setscrews have to be secured against working loose, e. g. congutinating with Loctite (average strength).

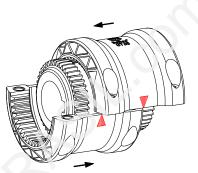


Illustration 4: Assembly of the GT sleeve



Illustration 5: Alignment of the GT sleeve

4.5 Displacements - alignment of the couplings

The displacement figures specified in table 5 provide for sufficient safety to compensate for external influences like, for example, thermal expansion or foundation settling.



In order to ensure a long service life of the coupling and avoid dangers with the use in hazardous locations, the shaft ends must be accurately aligned. Please absolutely observe the displacement figures specified (see table 5). If the figures are exceeded, the coupling will be damaged.

The more accurate the alignment of the coupling, the longer is its service life. If used in hazardous locations for the explosion group IIC (marking II 2GD c IIC T X), only half of the displacement figures (see table 5) are permissible.

Please note:

• The displacement figures specified in table 5 are maximum figures which must not arise in parallel. If radial and angular displacement arises at the same time, the permissible radial displacements of the coupling halves have to be reduced as follows:

$$\Delta Kr_{perm} = \Delta Kr - \frac{\Delta Kr}{2\Delta Kw} \bullet \Delta Ww$$

 $\Delta Ww = angular shaft displacement$

- The displacement figures mentioned are general standard figures that apply up to an ambient temperature of 80 °C, ensuring a sufficient service life of the **BoWex**[®] coupling.
 Displacement figures between the speeds specified have to be interpolated accordingly. If necessary, please ask about the displacement for the corresponding coupling type.
- Please inspect with a dial gauge, ruler or feeler gauge whether the permissible displacement figures specified in table 5 can be observed.

Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	

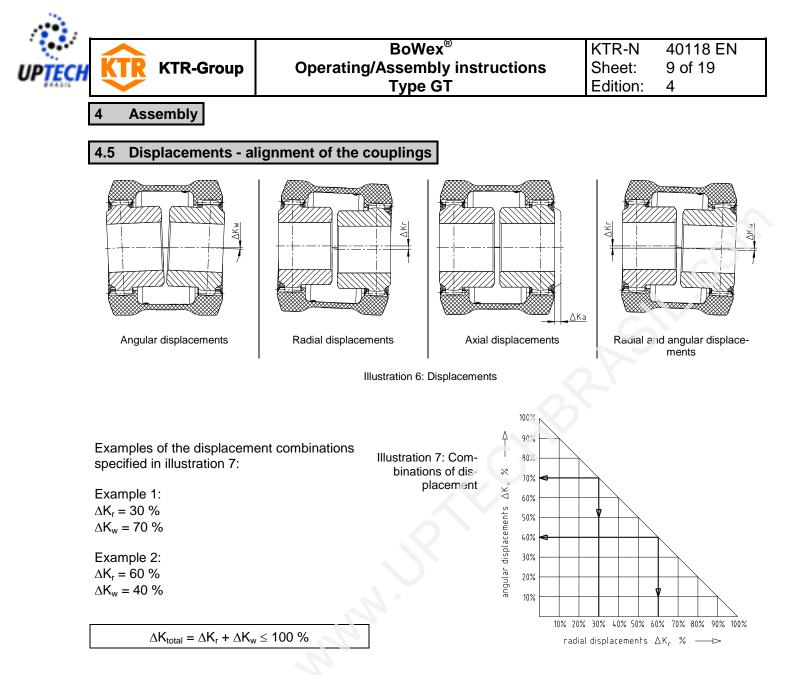


Table 5: Displacement figures

BoWex [®] size	GT-28	GT-38	GT-48	GT-65
Max. axial displacement ΔK _a [mm]	± 1.0	± 1.0	± 1.0	± 1.0
Max. radial displacement with n=1500 rpm ΔK _r [mm]	± 1.0	± 1.0	± 1.0	± 1.0
Max. radial displacement with $n=3000$ rpm ΔK_r [mm]	± 0.7	± 0.7	± 0.7	± 0.7
Max. angular displacement with n=1500 rpm ΔK _w [degree]	0.9	0.9	0.9	0.7
Max. angular displacement with n=3000 rpm ΔK _w [degree]	0.6	0.6	0.6	0.5

Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	



5 Start-up

Before start-up of the coupling, please inspect the tightening of the setscrews in the hubs, the alignment and the distance dimension E and adjust, if necessary, and also inspect all screw connections for the tightening torques specified, dependent on the type of coupling.



If used in hazardous locations the setscrews to fasten the hubs as well as all screw connections must be secured against working loose additionally, e. g. conglutinating with Loctite (average strength).

Finally the coupling protection against accidental contact must be fitted.

The cover must be electrically conductive and included in the equipotential bonding. Bellhousings (magnesium share below 7.5 %) made of <u>aluminium</u> and damping rings (NBR) can be used as connecting element between pump and electric motor. The cover may only be taken off with standstill of the unit.

During operation of the coupling, please pay attention to

- different operating noise
- vibrations occurring.

If the couplings are used in locations subject to dust explosion and in mining the user must make sure that there is no accumulation of dust in a dangerous volume between the cover and the coupling. The coupling must not operate in an accumulation of dust.

For covers with unlocked openings on the top face no light metals must be used if the couplings are used as equipment of equipment group II (if possible, from stainless steel).

If the couplings are used in mining (equipment group i M2), the cover must not be made of light metal. In addition, it must be resistant to higher mechanical loads than if it is used as equipment of equipment group II.

The minimum distance "Sr" between the protective device and the rotating parts must at least correspond to the figures specified below.

If the protective device is used as cover, regular openings can be arranged from the point of view explosion protection that must not exceed the following dimensions:

Opopingo	Cover [mm]			
Openings	Top side	Lateral components	Distance "Sr"	
Circular - max. diameter	4	8	≥ 10	
Rectangular - max. lateral length	4	8	≥ 10	
Straight or curved slot - max. lateral length/height	not permissible	8	≥ 20	



If you note any irregularities with the coupling during operation, the drive unit must be switched off immediately. The cause of the breakdown must be specified by means of the table "Breakdowns" and, if possible, be eliminated according to the proposals. The potential breakdowns mentioned can be hints only. To find out the cause all operating factors and machine components must be considered.

Coating of coupling:



If coated (priming, paintings, etc.) couplings are used in hazardous locations, the requirements on conductibility and coating thickness must be considered. In case of paintings up to 200 μ m electrostatic load does not have to be expected. Multiple coatings that are thicker than 200 μ m are prohibited for explosion group IIC.

Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	



6 Breakdowns, causes and elimination

The below-mentioned failures can result in a use of the **BoWex**[®] coupling other than intended. In addition to the specifications given in these operating and assembly instructions please make sure to avoid such failures. The errors listed can only be clues to search for the failures. When searching for the failure the adjacent components must generally be considered.



If used other than intended the coupling can become a source of ignition. EU directive 2014/34/EU requires special care by the manufacturer and the user.

General failures with use other than intended:

- Important data for the coupling selection were not forwarded.
- The calculation of the shaft-hub-connection was not considered.
- Coupling components with damage occurred during transport are assembled.
- If the heated hubs are assembled, the permissible temperature is exceeded.
- The clearance of the components to be assembled is not coordinated with one another.
- Tightening torques have been fallen below/exceeded.
- Components are mixed up by mistake/assembled incorrectly.
- No original KTR components (purchased parts) are used.
- Old/already worn out GT sleeves or GT sleeves stored for too long are used.
- Maintenance intervals are not observed.

Breakdowns	Causes	Hazard notes for haz- ardous locations	Elimination
Different operating noise and/or vibra- tions occuring	Misalignment Micro friction on the spline of the nylon sleeve Verschraubung der geteilten Hülse lose	Danger of ignition due to hot surfaces	 Set the unit out of operation Eliminate the reason for the misalignment (e. g. loose foundation bolts, breaking of the engine mount, heat expansion of unit components, modification of the installation dimension E of the coupling) For inspection of wear see item inspection Set the unit out of operation Inspect the direction of the sleeve and secure against working loose For inspection of wear see item inspection
3	Screws for axial fastening of hubs working loose		 Set the unit out of operation Inspect alignment of coupling Tighten the screws to fasten the hubs and secure against working loose For inspection of wear see item inspec- tion

Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	



KTR-N 40118 EN Sheet: 12 of 19 Edition: 4

6 Breakdowns, causes and elimination

		Hazard notes for	
Breakdowns	Causes	hazardous loca-	Elimination
		tions	
			 Set the unit out of operation Disassemble the coupling and remove
	Breaking of the ny- lon sleeve/spline	none	remainders of the nylon sleeve 3) Inspect coupling components and replace
	due to high shock energy/overload		coupling components that are damaged4) Insert nylon sleeve, assemble coupling components
			5) Find out the reason for overload1) Set the unit out of operation
Breaking of the nylon sleeve/spline	Operating parame- ters do not meet with the perfor- mance of the cou-	none	 2) Review the operating parameters and select a bigger coupling (consider mounting space)
	pling		3) Assemble new coupling size4) Inspect alignment
			1) Set the unit out of operation
			2) Disassemble the coupling and remove remainders of the nylon sleeve
	Operating error of the unit	none	 Inspect coupling components and replace coupling components that are damaged
			4) Insert nylon sleeve, assemble coupling components
			5) Instruct and train the service staff
			 Set the unit out of operation Disassemble the coupling and remove
	Vibrations of drive		remainders of the nylon sleeve3) Inspect coupling components and replace coupling components that are damaged
			 4) Insert nylon sleeve, assemble coupling components
		Danger of ignition	 Inspect alignment, adjust if necessary Find out the reason for vibrations
	ambient/contact	due to hot surfaces	 Set the unit out of operation Disassemble the coupling and remove
	temperatures which are too high for the		remainders of the nylon sleeve3) Inspect coupling components and replace
Excessive wear on the spline of sleeve	sleeve, max. per- missible		coupling components that are damaged4) Insert nylon sleeve, assemble coupling
8	e. g. T4 = - 30 °C/+ 100 °C		components5) Inspect alignment, adjust if necessary
10			6) Inspect and adjust ambient/contact tem- perature
	e. g. contact with		 Set the unit out of operation Disassemble the coupling and remove
5	aggressive liq- uids/oils, ozone		remainders of the nylon sleeve3) Inspect coupling components and replace
	influence, too high ambient tempera- ture etc. causing a	none	coupling components that are damaged4) Insert nylon sleeve, assemble coupling components
	physical change of the nylon sleeve		5) Inspect alignment, adjust if necessary6) Make sure that further physical modifica-
			tions of the sleeve are excluded



If you operate with a worn sleeve (see chapter 5.2) a proper operation meeting the explosion protection requirements and the directive 2014/34/EU is not ensured.

Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	



7 Disposal

In respect of environmental protection we would ask you to dispose of the packaging or products on termination of their service life in accordance with the legal regulations and standards that apply, respectively.

Metal

Any metal components have to be cleaned and disposed of by scrap metal.

Nylon materials

Nylon materials have to be collected and disposed of by a waste disposal company.

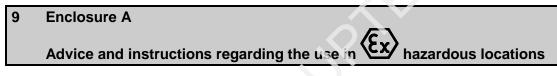
8 Spares inventory, customer service addresses

A basic requirement to ensure the operational readiness of the coupling is a stock of the most important spare parts on site.

Contact addresses of the KTR partners for spare parts and orders can be obtained from the KTR homepage at www.ktr.com.

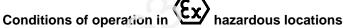


KTR does not assume any liability or warranty for the use of spare parts and accessories which are not provided by KTR and for the damages which may incur as a result.



Type GT: hub / GT sleeve / hub

9.1 Intended use in kazardous locations

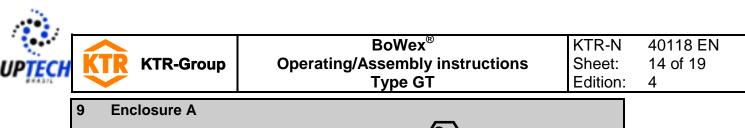


BoWex[®] couplings are suitable for the use according to EU directive 2014/34/EU.

1. Industry (with the exception of mining)

- Equipment group II of category 2 and 3 (coupling is <u>not</u> approved for equipment group 1)
- Media class G (gases, fogs, steams), zone 1 and 2 (coupling is not approved for zone 0)
- Media class D (*dusts*), zone 21 and 22 (*coupling is <u>not</u> approved for zone 20*)
- Explosion group IIC (explosion class IIA and IIB are included in IIC)

Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	



Advice and instructions regarding the use in kazardous locations



Temperature class:

Temperature class	Ambient or operating temperature T _a	Max. surface temperature
T4, T3, T2, T1	- 30 °C to + 100 °C ¹⁾	120 °C ²⁾
T5	- 30 °C to + 80 °C	100 °C
T6	- 30 °C to + 65 °C	85 °C

Explanation:

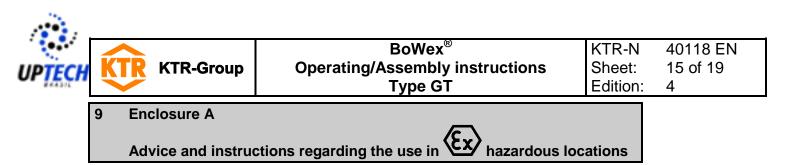
The maximum surface temperatures each result from the maximum permissible ambient or operating temperature T_a plus the maximum temperature increase ΔT of 20 K which has to be taken into account.

- The ambient or operating temperature T_a is limited to + 100 °C due to the permissible permanent operating temperature of the BoWex[®] GT sleeves used.
- 2) The maximum surface temperature of + 120 °C applies for the use in locations which are potentially subject to dust explosion, too.

2. Mining

Equipment group I of category M2 (coupling is <u>not</u> approved for equipment group M1). Permissible ambient temperature - $30 \degree C$ to + $100 \degree C$.

Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	



9.2 Inspection intervals for couplings in hazardous locations

Explosion group	Inspection intervals
3G 3D	For couplings which are classified in category 3G or 3D the operating and assembly instructions that are usual for standard operation apply. During the standard operation which has to be subject to the ignition risk analysis the couplings are free from any ignition source. Merely the temperature increase produced by self-heating and depending on the coupling type has to be considered: for BoWex [®] : $\Delta T = 20$ K
II 2GD c IIB T4, T5, T6	The torsional backlash of the coupling (see chapter 9.3 and 9.4) according to directive 2014/34/EU only has to be inspected if a failure of the coupling and consequently a stand- still of the drive causes danger of explosion. We recommend a preventing inspection of circumferential backlash and visual inspection of the GT sleeve. This should be performed after 3,000 operating hours for the first time, at the latest after 6 months after start-up of the coupling. If you note insignificant or no wear on the GT sleeve upon this initial inspection, further inspections can each be performed after 6,000 operating hours or at the latest after 18 months, provided that the operating parameters remain the same. If you note significant wear during the initial inspection, so that it would be recommendable to replace the GT sleeve, please find out the cause according to the table "Breakdowns", if possible. The maintenance intervals must be adjusted to the modified operating parameters without fail.
II 2GD c IIC T4, T5, T6	The torsional backlash of the coupling (see chapter 9.3 and 9.4) according to directive 2014/34/EU only has to be inspected if a failure of the coupling and consequently a stand- still of the drive causes danger of explosion. We recommend a preventing inspection of circumferential backlash and visual inspection of the GT sleeve. This should be performed after 2,000 operating hours for the first time, at the latest after 3 months after start-up of the coupling. If you note insignificant or no wear on the GT sleeve upon this initial inspection, further inspections can each be performed after 4,000 operating hours or at the latest after 12 months, provided that the operating parameters remain the same. If you note significant wear during the initial inspection, so that it would be recommendable to replace the GT sleeve, please find out the cause according to the table "Breakdowns", if possible. The maintenance intervals must be adjusted to the modified operating parameters without fail.

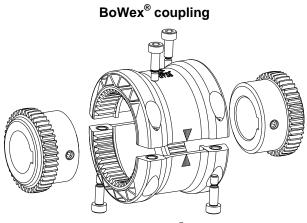
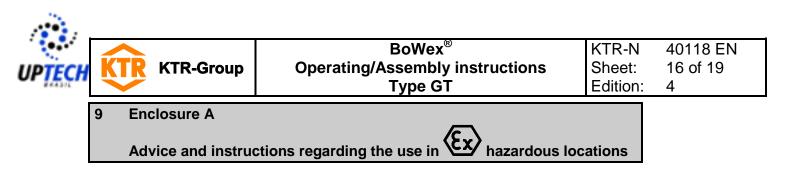


Illustration 8: BoWex®, type GT

Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	



9.2 Inspection intervals for couplings in kazardous locations

Here the backlash between the hub and the nylon spline must be inspected via torsional backlash, each separately from the driving and the driven side.

The friction/wear may only be X_{max} of the original spline thickness before the nylon sleeves must be replaced. When reaching the torsional backlash ΔS_{max} , the nylon sleeve must be replaced immediately, irrespective of the inspection intervals.

9.3 Checking of torsional backlash



The fit bolts of the GT sleeves must not be dismounted, since the torsional backlash must be checked while the coupling is mounted.



To check the torsional backlash the power pack which is switched off needs to be secured against accidental switch-on.

Driving side

• Turn the hub opposite the direction of drive.



Here the GT sleeve must not be axially displaced from its wear position.

- Mark GT sleeve and hub (see illustration 9).
- Turn the hub in the direction of drive and measure the torsional backlash $\Delta S_{max.}$
- When reaching the torsional backlash ΔS_{max} , the GT sleeve must be replaced.

Driven side

• Turn the hub in the direction of the drive.

Here the GT sleeve must not be axially displaced from its wear position.

- Mark GT sleeve and hub (see illustration 9).
- Turn the hub in opposite direction to the direction of drive and measure the torsional backlash ΔS_{max} .
- When reaching the torsional backlash $\Delta S_{max.}$ the GT sleeve must be replaced.

Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	

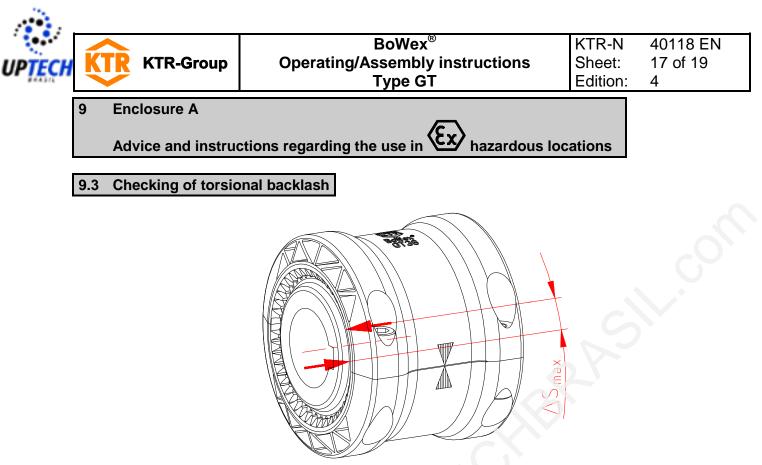


Illustration 9: Marking of the GT sleeve and the hub

9.4 Standard values of wear

If the torsional backlash is ³ $DS_{max.}$ [mm] / friction $\ge X_{max.}$ [mm], (see table 6) the nylon GT sleeves must be replaced.

Reaching the limits for replacing depends on the operating conditions and the existing operating parameters.



In order to ensure a long service life of the coupling and avoid dangers with the use in hazardous locations, the shaft ends must be accurately aligned. Please absolutely observe the displacement figures specified (see table 5). If the figures are exceeded, the coupling will be damaged.



Illustration 10: Sleeve in new condition

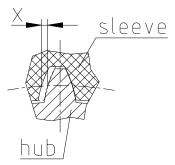
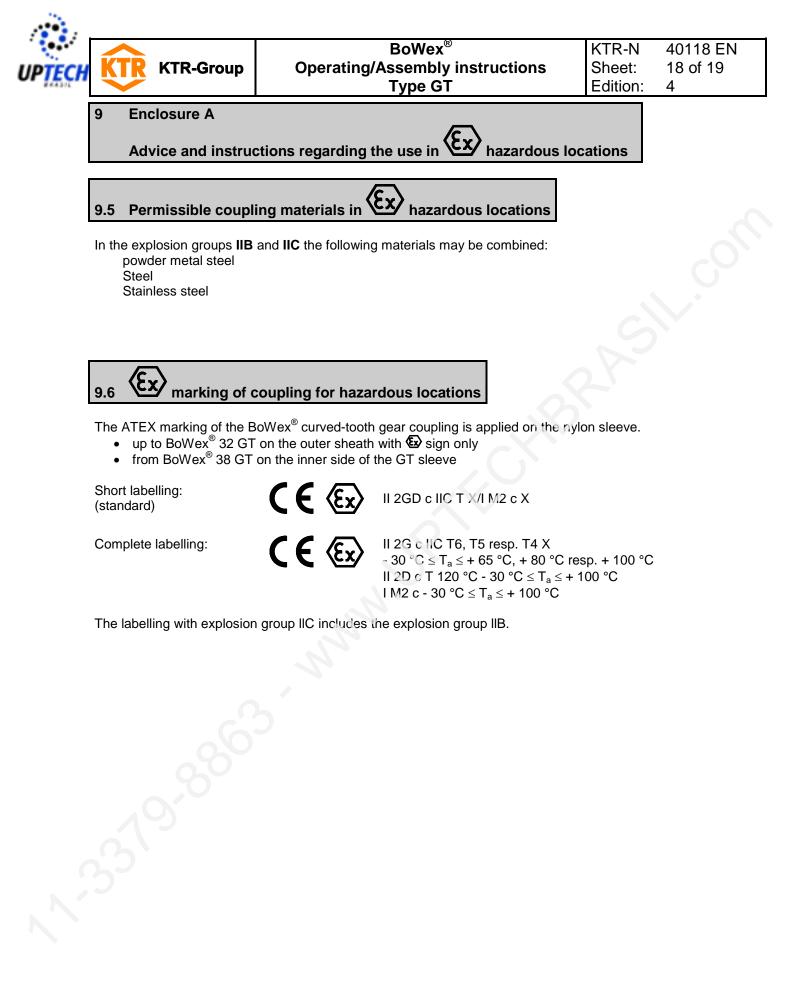


Illustration 11: Wear of sleeve

Table 6:

Limits of wear each hub				Limits of wear each hub		
BoWex [®] size	Friction X _{max.}	Torsional back-	BoWex [®] size	Friction X _{max.}	Torsional back-	
	[mm]	lash $\Delta S_{max.}$ [mm]		[mm]	lash $\Delta S_{max.}$ [mm]	
28	1.0	1.6	48	1.0	1.8	
38	1.0	1.7	65	1.4	2.5	

Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	



Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	

	KTR-Group	Opera	BoWex [®] ting/Assembly ins Type GT	structions	KTR-N Sheet: Edition:	40118 E 19 of 19 4
	osure A ce and instruc	tions regarc	ding the use in Ex	hazardous lo	ocations	
9.7 EU C	ertificate of co	onformity				
		EU Co	ertificate of co	onformity		
	oonding to EU dii the legal regulati		34/EU dated 26 Februa	r <u>y 2014</u>		
The ma	anufacturer - KTI	R Systems Gr	nbH, D-48432 Rheine -	states that the		
	Во	oWex [®] - cu	rved-tooth gear co	ouplings, type	e GT	
spondi	ng to article 1 (3)	a) of directive	ed in these operating/as e 2014/34/EU and com of directive 2014/34/EU	ply with the gene		
The co	upling described	in here comp	lies with the specification	ons of the followi	ng standards	/guidelines:
			DIN EN 1127-1 DIN EN 1127-2 DIN EN 13463-1 DIN EN 13463-5			
One or IBExU(KTR S	several directive 01ATEXB004_05 ystems GmbH be	es mentioned X were in pa eing the manu	blings [®] meet with the sp in the corresponding ty int replaced by updated ifacturer confirms that t w directives, too.	pe examination c versions.	ertificate	
	ling to article 13 (titution:	(1) b) ii) of dire	ective 2014/34/EU the t	echnical docume	entation is de	posited with
			ExU titut für Sicherheitstech chsmühlenweg 7	nik GmbH		
		095	599 Freiberg			
Rheine	e, 2017-0			i. A. //	. 21	il
Place	Date		nhard Wibbeling gineering/R&D	Andreas H Product M		

Please observe protection	Drawn:	2017-01-02 Shg/Eh	Replacing:	KTR-N dated 2013.01.29
note ISO 16016.	Verified:	2017-01-02 Shg	Replaced by:	