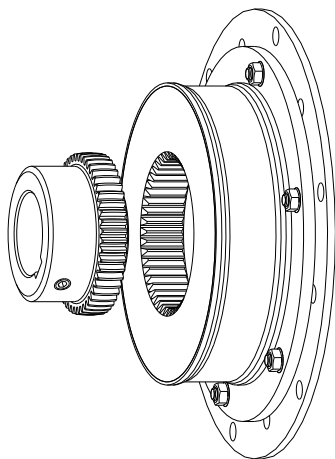




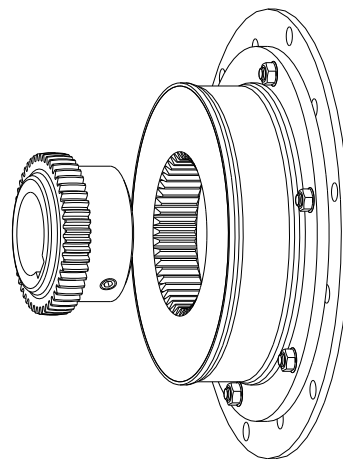
BoWex-ELASTIC®

highly flexible flange coupling types
HE1, HE2, HE3, HE4 and their combinations

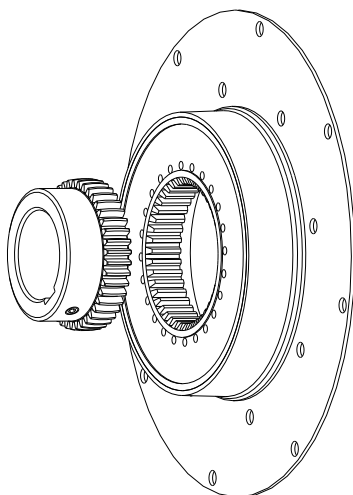
according to directive 2014/34/EU



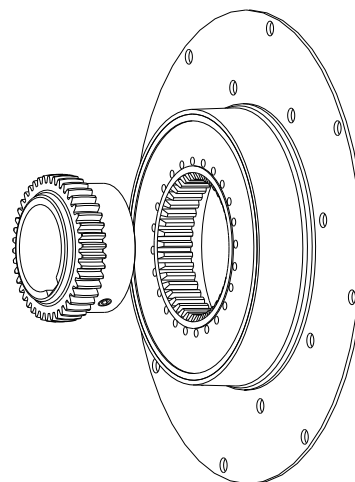
Type HE1



Type HE2



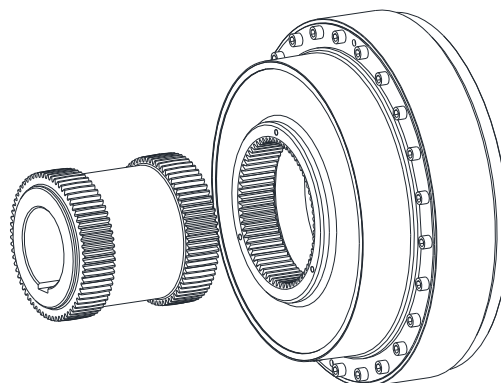
Type HE3




Type HE4

BoWex-ELASTIC®

highly flexible flange coupling type
HE-D and their combinations







Type HE-D

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BoWex-ELASTIC® is a highly flexible flange coupling. It dampens torsional vibrations, reduces shocks and insulates structure-borne noise. The **BoWex-ELASTIC®** coupling compensates for relatively large shaft displacements generated by, as an example, manufacturing inaccuracies, thermal expansion, etc.

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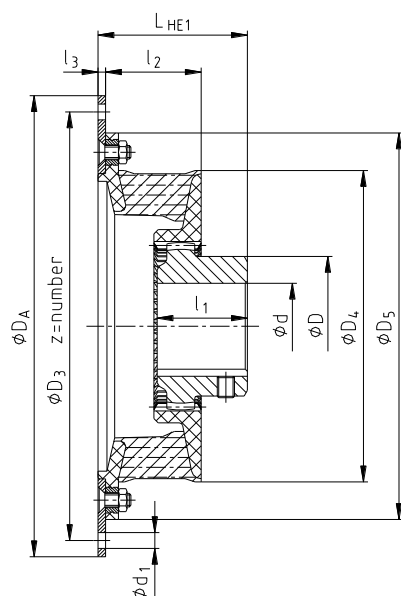

1 Technical data


Illustration 1: BoWex-ELASTIC® type HE1

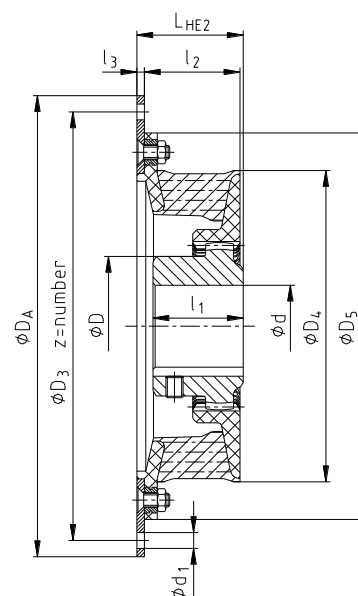


Illustration 2: BoWex-ELASTIC® type HE2

Table 1: Dimensions - type HE1 and HE2

Size	Bore d [mm]		Flange connection acc. to SAE - J620						Dimensions [mm]							
	Pilot bored	Max.	6½"	7½"	8"	10"	11½"	14"	l3	l2	D4	D5	D	l1	LHE1	LHE2
42 HE	-	42	•	•	•				4	45	146	180	65	42	70	50
48 HE	-	48	•	•	•				4	45	164	198	68	50	78	50
65 HE	-	65				•			5	55	205	244	96	55	85	62
80 HE	31	80				•			-	70	266	-	124	90	126	74
							•		6			316			132	80
G 80 HE	31	80					•		-	80	302	-	124	90	136	84
								•	6			356			142	90

Table 2: Technical data - type HE1 and HE2

Size	Flange connection acc. to SAE - J620						Weight with maximum bore of coupling [kg]	Mass moment of inertia with maximum bore of coupling [kgm²]	
	6½"	7½"	8"	10"	11½"	14"		JA	JL
42 HE	•						1.4	0.0032	0.0016
		•					1.8	0.0074	0.0016
			•				2.8	0.0172	0.0016
48 HE	•						1.5	0.0036	0.0021
		•					2.3	0.0119	0.0021
			•				2.6	0.0170	0.0021
				•			3.4	0.0342	0.0021
65 HE				•			4.9	0.0424	0.0069
					•		5.7	0.0647	0.0069
80 HE				•			8.1	0.0239	0.0307
					•		10.2	0.0765	0.0307
G 80 HE					•		9.7	0.0426	0.0471
						•	14.7	0.2851	0.0471

1 Technical data

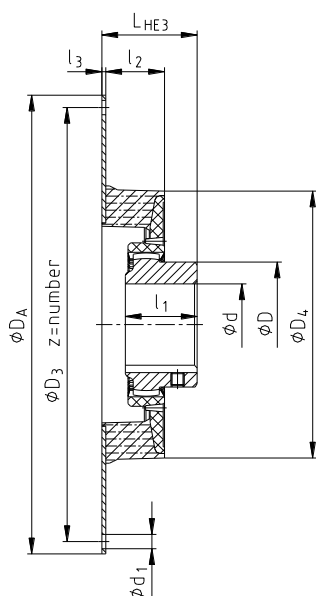


Illustration 3: BoWex-ELASTIC® type HE3

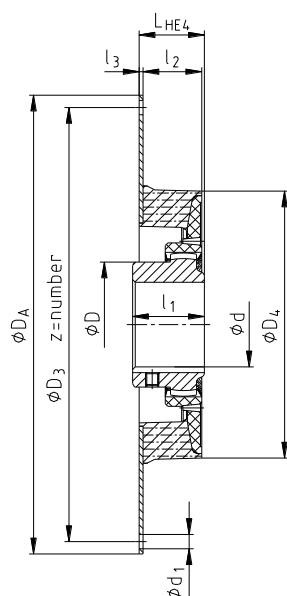


Illustration 4: BoWex-ELASTIC® type HE4

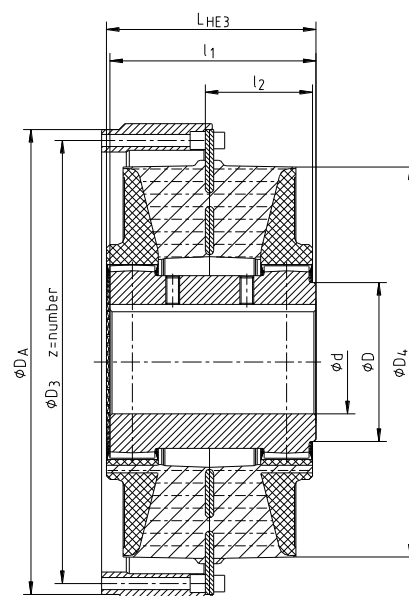



Illustration 5: BoWex-ELASTIC® type HE-D

Table 3: Dimensions - type HE3, HE4 and HE-D

Size	Bore d [mm]		Flange connection acc. to SAE - J620	Dimensions [mm]						
	Pilot bored	Max.		l ₃	l ₂	D ₄	D	l ₁	L _{HE3}	L _{HE4}
42 HE	-	42	6½"	2	33	145	65	42	55	40
			7½"							
48 HE	-	48	7½"	2	37	163	68	50	68	42
			8"							
			10"							
G 65 HE	21	65	10"	3	45	205	96	55	73	50
			11½"							
80 HE	31	80	10"	4	56	265	124	90	112	60
G 80 HE	31	80	11½"	4	66	300	124	90	122	70
100 HE	38	100	14"	4	80	350	152	110	150	82
125 HE	45	125	14"	6	92	416	192	140	186	103
			16"						192	109
G 125 HE	45	125	16"	6	89	440	192	140	179	91
			18"							
150 HE	44	160	18"	6	140	470	225	150	205	160
			21"							
150 HE-D	44	160	18"	-	286	470	225	275	291	-
			21"							
G 150 HE	44	160	18"	6	140	504	225	150	205	160
			21"							
G 150 HE-D	44	160	18"	-	286	504	225	275	291	-
			21"							
200 HE	46	180	21"	6	149	568	250	175	240	160
			24"							
200 HE-D	46	180	21"	-	325	568	250	298	310	-
			24"							
G 200 HE	46	180	21"	6	149	600	250	175	240	160
			24"							
G 200 HE-D	46	180	21"	-	325	600	250	298	310	-
			24"							
240 HE	80	240	Ø800	8	172	772	326	200	270	205
275 HE	80	275	Ø885	10	185	810	372	240	312	215

* Flange connection differing from SAE standard, dimensions in mm.

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1 Technical data

Table 4: Technical data - type HE3, HE4 and HE-D

Size	Flange connection acc. to SAE - J620	Weight with maximum bore of coupling [kg]	Mass moment of inertia with maximum bore of coupling [kgm ²]	
			J _A	J _L
42 HE	6½"	1.8	0.0071	0.0021
	7½"	1.8	0.0071	0.0021
48 HE	7½"	1.9	0.0070	0.0022
	8"	2.1	0.0103	0.0022
	10"	2.5	0.0201	0.0022
G 65 HE	10"	4.1	0.0281	0.0075
	11½"	4.6	0.0423	0.0075
80 HE	10"	9.1	0.0414	0.0305
G 80 HE	11½"	11.1	0.0713	0.0472
GG 80 HE	11½"	11.9	0.0768	0.0498
100 HE	14"	18.3	0.2028	0.1104
125 HE	14"	33.1	0.3142	0.2750
	16"	34.8	0.4231	0.2750
G 125 HE	16"	36.6	0.4634	0.3264
	18"	39.5	0.6812	0.3264
150 HE	18"	46.8	0.7277	0.5414
	21"	51.5	1.2120	0.5414
150 HE-D	18"	112.8	3.0045	1.0738
	21"	155.2	6.4399	1.0738
G 150 HE	18"	51.9	0.8164	0.6500
	21"	56.6	1.3007	0.6500
G 150 HE-D	18"	122.9	3.1820	1.2910
	21"	165.4	6.6173	1.2910
200 HE	21"	76.8	1.4880	1.2952
	24"	81.2	2.0390	1.2952
200 HE-D	21"	228.2	11.7951	2.4672
	24"	216	10.6618	2.4672
G 200 HE	21"	81.6	1.6272	1.5409
	24"	86.0	2.1782	1.5409
G 200 HE-D	21"	238.4	12.0022	3.0387
	24"	229.8	10.9240	3.0387
240 HE	Ø800 *	138.4	4.2414	4.0410
275 HE	Ø885 *	206.2	7.3696	7.6845

* Flange connection differing from SAE standard, dimensions in mm.

Table 5: Flange dimensions according to SAE J 620

Nominal size	Flange dimensions [mm]											
	6½"	7½"	8"	10"	11½"	14"	16"	18"	21"	24"	Ø800 *	Ø885 *
Dimension D _A	215.90	241.30	263.52	314.32	352.42	466.72	517.50	571.50	673.10	733.42	800	885
Dimension D ₃	200.02	222.25	244.47	295.27	333.37	438.15	489.00	542.90	641.35	692.15	770	855
Number z	6	8	6	8	8	8	8	6	12	12	32	36
Dimension d ₁	9	9	11	11	11	13	13	17	17	17	17	17

* Flange connection differing from SAE standard, dimensions in mm.



BoWex-ELASTIC® 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, fan impellers etc.) are not permitted for the use in potentially explosive atmospheres. A separate analysis must be performed.

Please observe protection note ISO 16016.	Drawn: 2019-08-13 Pz/Wb Verified: 2019-09-13 Pz	Replacing: KTR-N dated 2016-10-05 Replaced by:
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2 Advice

2.1 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-ELASTIC®** coupling is suitable and approved for the use in potentially explosive atmospheres. When using the coupling in potentially explosive atmospheres, 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.

2.2 Safety and advice symbols



Warning of potentially explosive atmospheres

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



Warning of personal injury

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



Warning of product damages

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



General advice

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



Warning of hot surfaces

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

2.3 General hazard warnings



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 operating 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.

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2 Advice

2.4 Intended use

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

- have carefully read through the operating/assembly instructions and understood them
- are technically qualified and specifically trained (e. g. safety, environment, logistics)
- are authorized by your company

The coupling may only be used in accordance with the technical data (see 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-ELASTIC®** described in here corresponds to the technical status at the time of printing of these operating/assembly instructions.

2.5 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-ELASTIC®").

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.

2.6 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 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 roofed place for 6 - 9 months.

With favourable storage conditions the properties of the elastomer part remain unchanged up to 5 years.



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 %.

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3 Storage, transport and packaging

3.2 Transport and packaging



In order to avoid any injuries and any kind of damage always make use of proper transport and 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

The coupling is supplied in the following subassemblies and single parts. Before assembly the coupling has to be inspected for completeness.

4.1 Components of the couplings

Components of type HE1 and HE2

Component	Number	Description
1	1	Elastomer part
2	1	Hub
3	1	Connection flange
4	see table 6	Countersunk screw DIN EN ISO 10642
5	see table 6	Hexagon nut DIN EN ISO 4032
6	1	Setscrew DIN EN ISO 4029

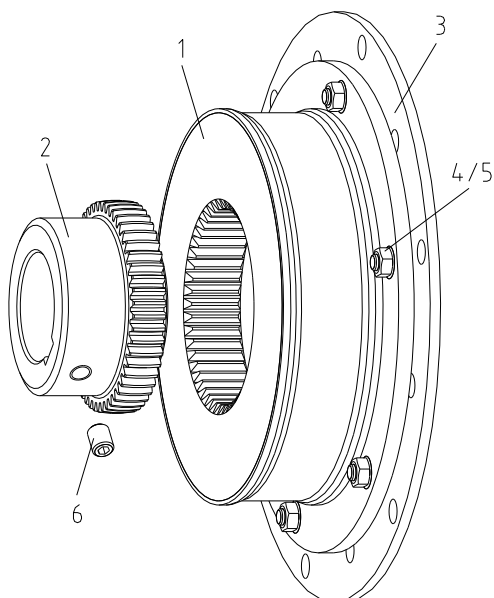


Illustration 6: BoWex-ELASTIC® type HE1

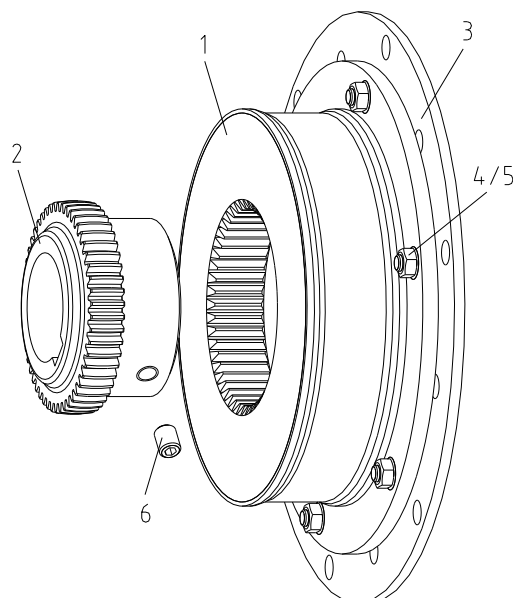


Illustration 7: BoWex-ELASTIC® type HE2

Table 6:

Size	42 HE	48 HE	65 HE	80 HE	G 80 HE
Screw size	M6	M6	M8	M10	M10
Number (screw and nut) z ₁	6	8	8	8	8
Tightening torque T _A [Nm]	14	14	35	69	69

**4 Assembly****4.1 Components of the couplings****Components of type HE3 and HE4**

Component	Number	Description
1	1	Elastomer part
2	1	Hub
6	1	Setscrew DIN EN ISO 4029

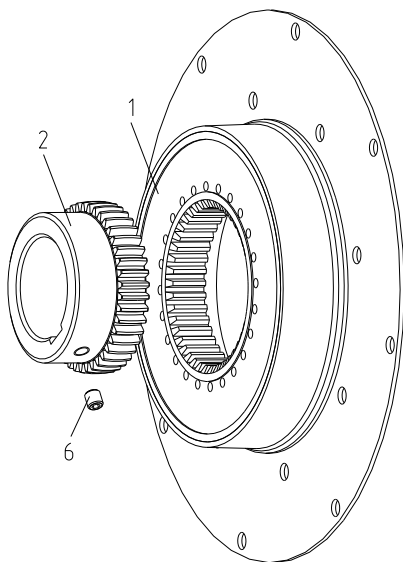


Illustration 8: BoWex-ELASTIC® type HE3

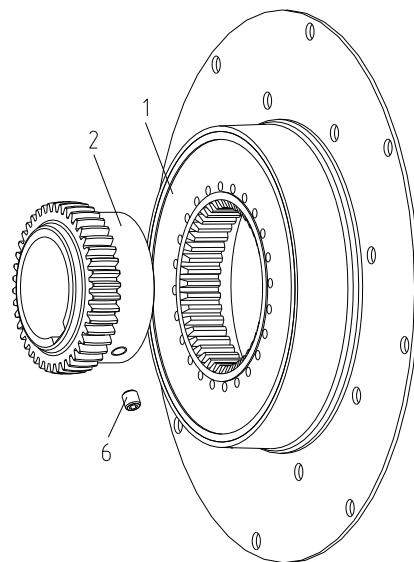


Illustration 9: BoWex-ELASTIC® type HE4

Components of type HE-D

Component	Number	Description
1	2	Elastomer part
2	1	Hub
3	1	Additional flange
6	2	Setscrew DIN EN ISO 4029

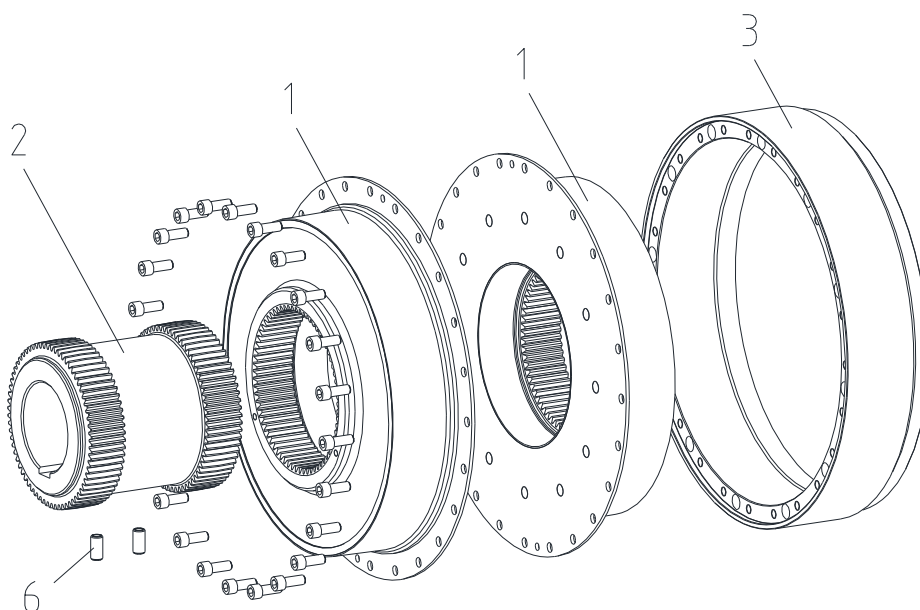


Illustration 10: BoWex-ELASTIC® type HE-D



4 Assembly

4.2 Advice for finish bore



The maximum permissible bore diameters d (see 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 run-out, respectively (see illustration 11).
- Please make absolutely sure to observe the figures for $\varnothing d_{\max}$.
- 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.

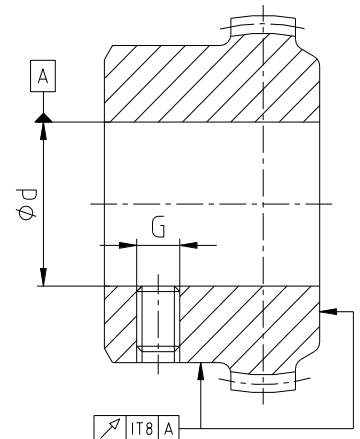


Illustration 11: Concentricity and axial run-out



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.



KTR supplies unbored or pilot bored coupling components and spare parts only upon explicit request of the customer. These parts are additionally marked with the symbol .

Reference to unbored resp. pilot bored coupling components with explosion protection marking:

Basically the company KTR supplies couplings resp. coupling hubs with explosion protection marking as an unbored or pilot bored type only on explicit request of the customer. The prerequisite is a declaration of exemption submitted by the customer assuming any responsibility and liability for remachining performed properly.

Table 7: Setscrew DIN EN ISO 4029

Size	42 HE	48 HE	65 HE G 65 HE GG 65 HE	80 HE G 80 HE GG 80 HE	100 HE	125 HE G 125 HE	150 HE G 150 HE	200 HE G 200 HE	240 HE	275 HE
Dimension G	M8	M8	M10	M10	M12	M16	M16	M16	M20	M24
Tightening torque T_A [Nm]	10	10	17	17	40	80	80	80	140	240

4 Assembly

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 potentially explosive atmospheres!



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



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

- Mount the hub onto the shaft of the driven machine.
- Fasten the hub by tightening the setscrew DIN EN ISO 4029 with a cup point or an end plate.
- Mount the flange into the flywheel centering.
- Hand-tighten the components first.
- Tighten the screws at the tightening torques T_A specified in table 8 by means of a suitable torque key.
- Secure the screwing by means of a suitable screw glue.



Please observe the manufacturer's instructions regarding the use of adhesives.
Do not apply glue on the rubber surfaces.

Table 8: Screw tightening torques for screwing the external flange to the engine flywheel

Size of flywheel acc. to SAE - J620	-	6 ½"	7 ½"	8"	10"	11 ½"	14"	16"	18"	21"	24"
Screw size	M6	M8		M10			M12		M16		
Tightening torque [Nm]	10	25		49			120		295		
Minimum screw strength	8.8						10.9				
Inch screw	-	5/16 - 18		3/8 - 16			1/2 - 13		5/8 - 11		
Tightening torque [Nm]	-	24		42			150		286		
Minimum screw strength	5						8				

- Shift the machine components in axial direction until the distance dimension L_{HE1} , L_{HE2} , L_{HE3} bzw. L_{HE4} is achieved.



With the assembly please make sure that the spline of the hub is fully covered by the internal spline of the elastomer. (Please observe mounting dimensions L_{HE1} , L_{HE2} , L_{HE3} or L_{HE4} .) Disregarding this advice may cause damage to the coupling.

- If the position of the machine components is already fixed, the mounting dimension can be set by shifting the hub axially on the shaft.



4 Assembly

4.4 Displacements - alignment of the couplings

The **BoWex-ELASTIC®** flange couplings compensate for positional deviations of the machine components to be connected up to the data specified in table 9.

With alignment, the radial and angular displacement should be kept as small as possible, because the service life is increased in this way if the operating conditions are otherwise maintained.

The **BoWex-ELASTIC®** flange coupling has to be aligned from the coupling hub on the shaft side towards one of the machined surfaces of the flywheel or machine.



In order to ensure a long service life of the coupling and avoid dangers with the use in potentially explosive atmospheres, the shaft ends must be accurately aligned.

Please absolutely observe the displacement figures specified (see table 9).

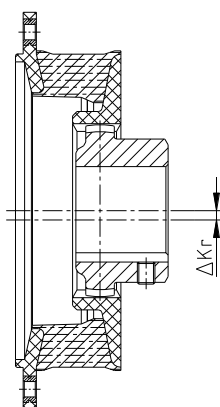


If the figures are exceeded, the coupling will be damaged.

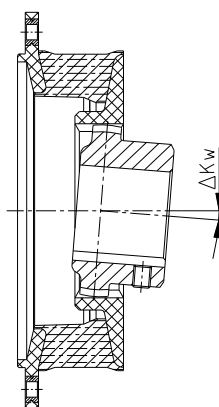
The more accurate the alignment of the coupling, the longer is its service life.

Please note:

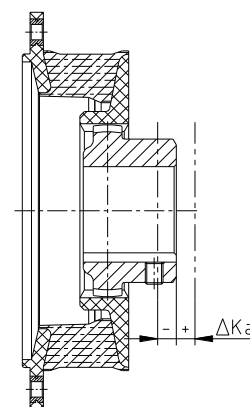
- The displacement figures specified in table 9 are maximum figures which must not arise in parallel. If radial and angular displacements arise at the same time, the permissible displacement values may only be used proportionally (see illustration 13).
- The displacement figures specified are general standard figures that apply up to an ambient temperature of 80 °C, ensuring a sufficient service life of the **BoWex-ELASTIC®** coupling. Displacement figures between the speeds specified have to be interpolated accordingly. If necessary, 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 9 can be observed.



Radial displacement



Angular displacement



Axial displacement

Illustration 12: Displacements

Examples of the displacement combinations specified in illustration 13:

Example 1:

$\Delta K_r = 30 \%$

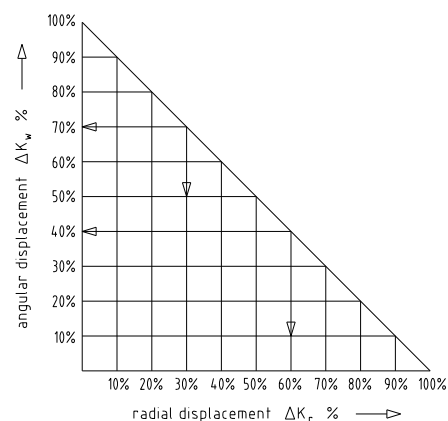
$\Delta K_w = 70 \%$

Example 2:

$\Delta K_r = 60 \%$

$\Delta K_w = 40 \%$

Illustration 13:
Combinations of
displacement



$$\Delta K_{\text{total}} = \Delta K_r + \Delta K_w \leq 100 \%$$



4 Assembly


4.4 Displacements - alignment of the couplings

Table 9: Displacement figures

Displacement figures	Elastomer hardness [Shore A]	Size				
		42 HE	48 HE	65 HE	80 HE	100 HE
				G 65 HE GG 65 HE	G 80 HE GG 80 HE	
Perm. radial displacement ΔK_r [mm] with $n = 1500$ rpm	T40	1.1	1.2	1.6	1.8	2.2
	T50	1.0	1.1	1.5	1.7	2.0
	T65	0.5	0.5	0.7	0.8	1.0
Perm. radial displacement ΔK_r [mm] with $n = 3000$ rpm	T40	0.8	1.1	1.4	1.6	2.0
	T50	0.7	1.0	1.3	1.5	1.8
	T65	0.4	0.4	0.5	0.6	0.8
Max. radial displacement ΔK_r [mm] ¹⁾	T40	3.6	3.8	5.1	5.7	6.5
	T50	3.3	3.5	4.7	5.3	6.0
	T65	1.5	1.7	2.2	2.4	3.0
Perm. angular displacement ΔK_w [degree] with $n = 1500$ rpm	T40	1.00	1.00	1.00	1.00	1.00
	T50	0.75	0.75	0.75	0.75	0.75
	T65	0.50	0.50	0.5	0.50	0.50
Perm. angular displacement ΔK_w [degree] with $n = 3000$ rpm	T40	0.50	0.50	0.50	0.50	0.50
	T50	0.40	0.40	0.40	0.40	0.40
	T65	0.25	0.25	0.25	0.25	0.25
Max. angular displacement ΔK_w [degree] ¹⁾	T40/T50/T65	1.5	1.5	1.5	1.5	1.5
Perm. axial displacement ΔK_a [mm]	T40/T50/T65	± 2	± 2	± 2	± 2	± 3

Displacement figures	Elastomer hardness [Shore A]	Size				
		125 HE	150 HE	200 HE	240 HE	275 HE
		G 125 HE	G 150 HE	G 200 HE		
Perm. radial displacement ΔK_r [mm] with $n = 1500$ rpm	T40	2.5	2.8	3.0	3.2	3.4
	T50	2.3	2.5	2.7	2.9	3.1
	T70	1.1	1.3	1.5	1.6	1.8
Perm. radial displacement ΔK_r [mm] with $n = 3000$ rpm	T40	2.2	2.5	2.8	-	-
	T50	2.0	2.2	2.5	-	-
	T70	0.8	1.0	1.2	-	-
Max. radial displacement ΔK_r [mm] ¹⁾	T40	7.5	8.0	8.5	9.0	9.5
	T50	6.9	7.5	8.0	8.5	9.0
	T70	3.3	4.0	4.5	5.0	5.5
Perm. angular displacement ΔK_w [degree] with $n = 1500$ rpm	T40	1.00	1.00	1.00	1.0	1.0
	T50	0.75	0.75	0.75	0.75	0.75
	T70	0.50	0.50	0.50	0.5	0.5
Perm. angular displacement ΔK_w [degree] with $n = 3000$ rpm	T40	0.50	0.50	0.50	-	-
	T50	0.40	0.40	0.40	-	-
	T70	0.25	0.25	0.25	-	-
Max. angular displacement ΔK_w [degree] ¹⁾	T40/T50/T70	1.5	1.5	1.5	1.5	1.5
Perm. axial displacement ΔK_a [mm]	T40/T50/T70	± 3	± 4	± 4	± 4	± 4

1) For short-term start-up operation

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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 L_{HE1} , L_{HE2} , L_{HE3} or L_{HE4} and adjust, if necessary, and also inspect all screw connections for the tightening torques specified.



If used in potentially explosive atmospheres 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. It is required in accordance with DIN EN ISO 12100 (Safety of Machinery) and directive 2014/34/EU and must protect against

- access with the little finger
- falling down of solid foreign objects.

The cover may provide for openings intended for necessary heat dissipation. These openings have to comply with DIN EN ISO 13857.

The cover must be electrically conductive and included in the equipotential bonding. Bell housings (magnesium share below 7.5 %) made of aluminium 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.



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*).

During operation of the coupling, please pay attention to

- different operating noise
- vibrations occurring.



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 specified 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 potentially explosive atmospheres, the requirements on conductivity and coating thickness must be considered. With paintings up to 200 µm electrostatic load does not have to be expected. Paintings and coatings exceeding a thickness of 200 µm are generally impermissible for potentially explosive atmospheres. It also applies for multiple coatings exceeding an overall thickness of 200 µm. Make sure with painting or coating that the coupling components are conductively connected with the device/devices to be connected so that the equipotential bonding is not impeded by the paint or coat applied. In addition, make sure that the marking of the coupling remains legible. Painting or coating of the elastomer part is generally not admitted.

Please observe protection note ISO 16016.	Drawn: 2019-08-13 Pz/Wb Verified: 2019-09-13 Pz	Replacing: KTR-N dated 2016-10-05 Replaced by:
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6 Breakdowns, causes and elimination

The below-mentioned failures can result in a use of the **BoWex-ELASTIC®** coupling other than intended. In addition to the specifications given in these operating/assembly instructions 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 are not forwarded.
- The calculation of the shaft-hub-connection is not considered.
- Coupling components with damage occurred during transport are assembled.
- If the heated hub is 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 elastomer parts or those stored for too long are used.
- Maintenance intervals are not observed.

Breakdowns	Causes	Hazard notes for potentially explosive atmospheres	Elimination
Different operating noise and/or vibrations occurring	Micro friction by faulty alignment on the spline of the elastomer part	Danger of ignition due to hot surfaces	1) Set the unit out of operation 2) 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) 3) For inspection of wear see chapter 9.2
	Screws for axial fastening of hubs working loose	Danger of ignition due to hot surfaces	1) Set the unit out of operation 2) Inspect alignment of coupling 3) Tighten the screws to fasten the hubs and secure against working loose 4) For inspection of wear see chapter 9.2
Fracture of elastomer part/spline	Fracture of elastomer part/spline caused by high dynamic energy/overload	none	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the elastomer part 3) Inspect coupling components and replace coupling components that are damaged 4) Insert elastomer part, assemble coupling components 5) Find out the reason for overload
	Operating parameters do not meet with the performance of the coupling	none	1) Set the unit out of operation 2) Review the operating parameters and select a bigger coupling (consider mounting space) 3) Assemble new coupling size 4) Inspect alignment
	Operating error of the unit	none	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the elastomer part 3) Inspect coupling components and replace coupling components that are damaged 4) Insert elastomer part, assemble coupling components 5) Instruct and train the service staff

6 Breakdowns, causes and elimination

Breakdowns	Causes	Hazard notes for potentially explosive atmospheres	Elimination
Excessive wear on the spline of the elastomer part, fracture of elastomer	Vibrations of drive	Danger of ignition due to hot surfaces	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the elastomer part 3) Inspect coupling components and replace coupling components that are damaged 4) Insert elastomer part, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Find out the reason for vibrations
	ambient/contact temperatures which are too high for the elastomer part, max. permissible -30 °C/+80 °C	Danger of ignition due to hot surfaces	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the elastomer part 3) Inspect coupling components and replace coupling components that are damaged 4) Insert elastomer part, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Inspect and adjust ambient/contact temperature
	e. g. contact with aggressive liquids/oils, influence by ozone, too high ambient temperature etc. causing a physical change of the elastomer part	none	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the elastomer part 3) Inspect coupling components and replace coupling components that are damaged 4) Insert elastomer part, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Make sure that other physical modifications of the elastomer part are excluded



When operating with a worn elastomer part (see chapter 9.3 and 9.4) proper operation is not ensured.

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

We recommend to store major spare parts on site to ensure the readiness for use of the machine in case if a coupling fails.


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.

Please observe protection note ISO 16016.	Drawn:	2019-08-13 Pz/Wb	Replacing:	KTR-N dated 2016-10-05
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9 Enclosure A

Advice and instructions regarding the use in  potentially explosive atmospheres

Types available:

HE1, HE2, HE3 and HE4 up to size G200 each

9.1 Intended use in potentially explosive atmospheres

Conditions of operation in potentially explosive atmospheres

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

Industry (with the exception of mining)

- Equipment group II of category 2 and 3 (*coupling is not approved/not suitable for equipment group 1*)
- Substance group G (*gases, fogs, vapours*), zone 1 and 2 (*coupling is not approved/not suitable for zone 0*)
- Substance group D (*dusts*), zone 21 and 22 (*coupling is not approved/not suitable for zone 20*)
- Explosion group IIB (*gases, fogs, vapours*) (*explosion group IIA is included in IIB*) and explosion group IIIC (*dusts*) (*explosion group IIIA and IIIB are included in IIIC*)

Temperature class:

Temperature class	Ambient or operating temperature T _a ¹⁾	Max. surface temperature ²⁾
T4	-30 °C to +80 °C	+115 °C
T5	-30 °C to +60 °C	+95 °C
T6	-30 °C to +45 °C	+80 °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 35 K to be considered. For the temperature class a safety margin subject to standard of 5 K is added.


- 1) The ambient or operating temperature T_a is limited to +80 °C due to the permissible permanent operating temperature of the BoWex-ELASTIC® elastomer parts used.
- 2) The maximum surface temperature of +115 °C applies for the use in locations which are potentially subject to dust explosion.

In potentially explosive atmospheres

- the ignition temperature of dusts generated must at least be 1.5 times the surface temperature to be considered
- the glow temperature must at least be the surface temperature to be considered plus a safety distance of 75 K.
- the gases and vapours generated must amount to the temperature class specified.



9 Enclosure A

Advice and instructions regarding the use in  potentially explosive atmospheres

9.2 Inspection intervals for couplings in potentially explosive atmospheres

Equipment category	Inspection intervals
2G 2D Gases and vapours of explosion group IIA and IIB	<p>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 standstill of the drive causes explosion hazard.</p> <p>We recommend a preventive inspection of torsional backlash and a visual inspection of the elastomer part. This should be performed after 1,000 operating hours for the first time, at the latest 6 months after start-up of the coupling.</p> <p>If you note insignificant or no wear on the elastomer part upon this initial inspection, further inspections can each be performed after 2,000 operating hours or at the latest after 18 months, provided that the operating parameters remain the same.</p> <p>If you note significant wear with the initial inspection so that it would be advisable to replace the elastomer part, please find out the cause according to the table „Breakdowns“, if possible.</p> <p>The maintenance intervals must be adjusted to the modified operating parameters without fail.</p>

BoWex-ELASTIC®

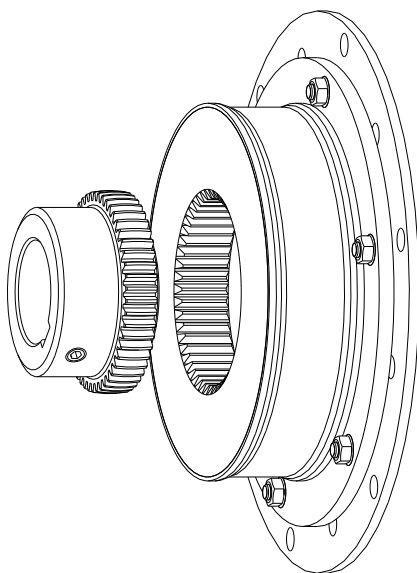



Illustration 14: BoWex-ELASTIC® type HE

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 elastomer part must be replaced.

When reaching the torsional backlash $\Delta S_{max.}$, the elastomer part must be replaced immediately, irrespective of the inspection intervals.

Visual inspection of the elastomer part (cracks, holes or anything similar).

**9 Enclosure A**Advice and instructions regarding the use in  potentially explosive atmospheres**9.3 Inspection of torsional backlash**

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

- Turn the hub opposite the direction of drive.



Here the elastomer part must not be axially displaced from its position of wear.

- Mark elastomer part and hub (see Illustration 15).
- Turn the hub in the driving direction and measure the torsional backlash ΔS_{\max} .
- When reaching the torsional backlash ΔS_{\max} the elastomer part must be replaced.

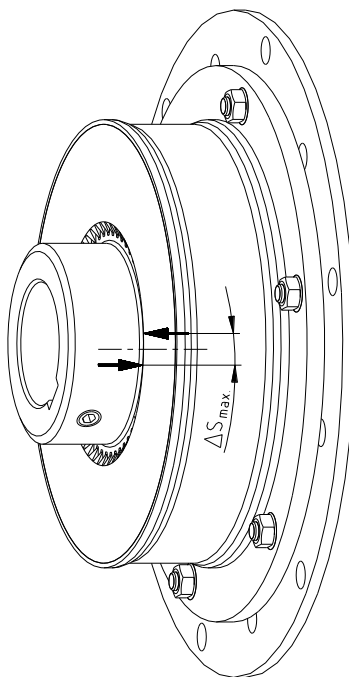



Illustration 15: Marking of the elastomer part and the hub



9 Enclosure A

Advice and instructions regarding the use in  potentially explosive atmospheres

9.4 Standard values of wear

If the torsional backlash is $\geq \Delta S_{\max.}$ [mm] / friction $\geq X_{\max.}$ [mm], the elastomer part 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 potentially explosive atmospheres, the shaft ends must be accurately aligned. Please absolutely observe the displacement figures specified (see table 9). If the figures are exceeded, the coupling will be damaged.

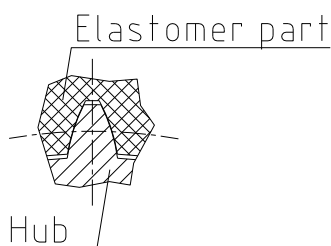


Illustration 16: Elastomer part in new condition

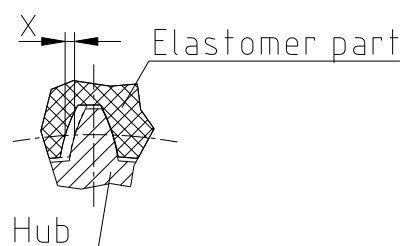



Illustration 17: Wear of elastomer part

Table 10:

Size	Limits of wear		Size	Limits of wear	
	Friction $X_{\max.}$ [mm]	Torsional backlash $\Delta S_{\max.}$ [mm]		Friction $X_{\max.}$ [mm]	Torsional backlash $\Delta S_{\max.}$ [mm]
42	1.0	1.7	100	1.8	3.1
48	1.0	1.8	125	2.0	3.5
65	1.4	2.5	150	2.5	4.0
80	1.6	2.7	200	2.5	4.0

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9 Enclosure A

Advice and instructions regarding the use in  potentially explosive atmospheres



9.5 marking of coupling for potentially explosive atmospheres

The ATEX marking of the BoWex-ELASTIC® coupling is applied on the polyamide flange of the elastomer part.

For the complete marking refer to the operating/assembly instructions and/or the delivery note/package.

Marking is as follows:

BoWex-ELASTIC®
<Year>



 II 2G Ex h IIB T6 ... T4 Gb
 II 2D Ex h IIIC T80 °C ... T115 °C Db
 -30 °C ≤ T_a ≤ +45 °C ... +80 °C
 KTR Systems GmbH, Carl-Zeiss-Straße 25, D-48432 Rheine

Short marking:

(A short marking is only made if not possible differently for reason of space or functioning.)

BoWex-ELASTIC®
<Year>






Deviating marking applies until 31st October 2019:

Short marking:


 II 2GD c IIB T X

Complete marking:




 II 2G c IIB T6, T5 resp. T4
 -30 °C ≤ T_a ≤ +50 °C, +65 °C resp. +80 °C
 II 2D c T 115 °C -30 °C ≤ T_a ≤ +80 °C

Substance group - gases, fogs and vapours:

The labelling with explosion group IIB includes the explosion group IIA.

Substance group - dusts:


The marking with explosion group IIIC includes the explosion groups IIIA and IIIB.

If the symbol  was punched in addition to marking , the coupling component was supplied by KTR as an unbored or pilot bored version (see chapter 4.2 of the present operating/assembly instructions).

Please observe protection note ISO 16016.	Drawn: 2019-08-13 Pz/Wb Verified: 2019-09-13 Pz	Replacing: KTR-N dated 2016-10-05 Replaced by:
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9 Enclosure A

Advice and instructions regarding the use in  potentially explosive atmospheres

9.6 EU Certificate of conformity

EU Certificate of conformity

corresponding to EU directive 2014/34/EU dated 26 February 2014
and to the legal regulations

The manufacturer - KTR Systems GmbH, D-48432 Rheine - states that the

BoWex-ELASTIC® highly flexible flange couplings

in an explosion-proof design described in these operating/assembly instructions are devices corresponding to article 2, 1. of directive 2014/34/EU and comply with the general safety and health requirements according to enclosure II of directive 2014/34/EU.

The coupling described in here complies with the specifications of the following standards/rules:

DIN EN ISO 80079-36
 DIN EN ISO 80079-37
 DIN EN ISO 80079-38
 IEC/TS 60079-32-1

The BoWex-ELASTIC® complies with the specifications of directive 2014/34/EU.


According to article 13 (1) b) ii) of directive 2014/34/EU the technical documentation is deposited with the notified body (type examination certificate IBExU13ATEXB007 X:

IBExU
 Institut für Sicherheitstechnik GmbH
 Identification number: 0637
 Fuchsmühlenweg 7

09599 Freiberg

Rheine,

2019-08-13
 Date

i. V. 
 Reinhard Wibbeling
 Engineering/R&D

i. A. 
 Andreas Hücker
 Product Manager