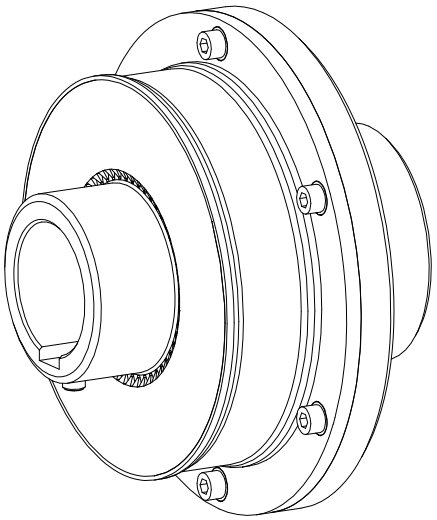
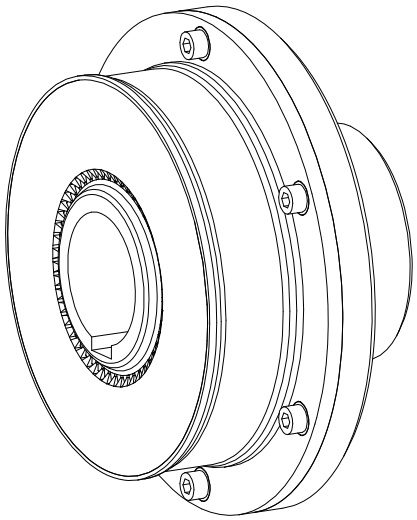
BoWex-ELASTIC®

highly flexible flange couplings types
HEW1, HEW2 and their combinations

according to standard 94/9/EC (ATEX 95)
for finish bored, pilot bored and unbored couplings



Type HEW1

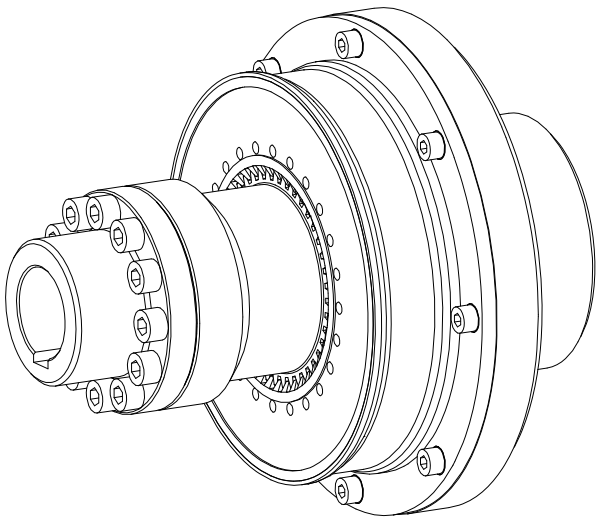


Type HEW2

BoWex-ELASTIC®

highly flexible flange couplings types
HEW-ZS and their combinations

for finish bored, pilot bored and unbored couplings



Type HEW-ZS

The **BoWex-ELASTIC® HEW** is a high flexible plug-in shaft coupling. It dampens torsional oscillations, decreases shocks and is impact sound insulating.
The **BoWex-ELASTIC® HEW** coupling compensates for relatively considerable shaft displacements caused by e. g. inaccuracies in production, heat expansion etc.

Table of Contents

1 Technical Data

2 Hints

2.1 Coupling Selection
2.2 General Hints
2.3 Safety and Advice Hints
2.4 General Hints to Danger
2.5 Proper Use

3 Storage

4 Assembly

4.1 Components of the Couplings
4.2 Hint Regarding the Finish Bore
4.3 Assembly of the Coupling
4.4 Displacements - Alignment of the Couplings
4.5 Spares Inventory, Customer Service Addresses

5 Enclosure A

Hints and instructions regarding the use in Ex hazardous areas

5.1 Use in Ex Hazardous Areas According to the Regulations
5.2 Control intervals for couplings in Ex hazardous areas
5.3 Checking of torsional backlash
5.4 Approximate values of wear
5.5 Ex Marking of coupling for the hazardous area
5.6 Starting
5.7 Breakdowns, causes and elimination
5.8 Certificate of Conformity according to the EG Standards 94/9/EG dated 23 March 1994

1 Technical Data

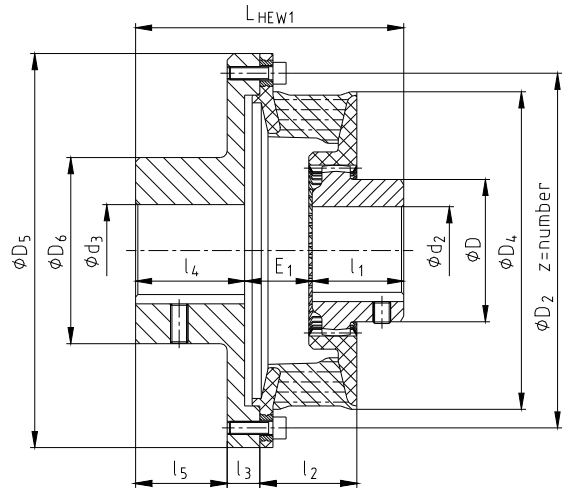


Illustration 1: BoWex-ELASTIC® type HEW1

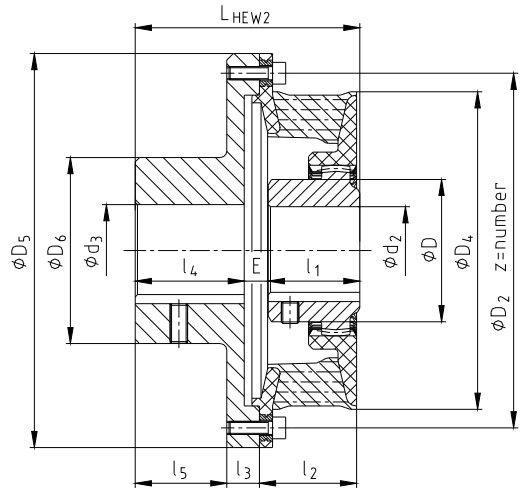


Illustration 2: BoWex-ELASTIC® type HEW2

Table 1: dimensions – type HEW1 and HEW2

Size	Max. finish bore [mm]		Dimensions [mm]								
	d_2	d_3	D	D_2	z x M		D_4	D_5	D_6	l_1	l_2
42	48	50	68	162	6	M6	146	180	85	50	45
48	48	55	68	180	8	M6	164	200	92	50	45
65	65	75	96	224	8	M8	205	245	125	70	55
80	80	80	124	295,27	8	M10	266	318	130	90	70
G 80	85	95	124	333,4	8	M10	302	358	145	90	80
100	100	110	152	438,15	8	M12	350	478	158	110	80
125	125	125	192	438,15	16	M12	416	478	175	140	99
G 125	125	125	192	489	8	M12	440	530	175	140	95
150	150	150	225	542,9	6	M16	470	585	225	150	140

Size	Dimensions [mm]							Weight with max. bore [kg]	Mass moment of inertia [kgm²]	
	l_3	l_4	l_5	E	E_1	L_{HEW1}	L_{HEW2}		J_A	J_L
42	15	50	42	4	32	132	104	4,3	0,0121	0,0015
48	17	55	45	4	32	137	109	5,5	0,0204	0,0019
65	28	75	63	5	42	187	150	13,2	0,0752	0,0071
80	17	80	70	5	45	215	160	19,7	0,1449	0,0285
G 80	22	90	78	5	55	235	185	25,9	0,2748	0,0422
100	16	111,5	110	-	57	278,5	-	50,5	0,8396	0,1068
125	18	170	171	-	47	357	-	75,8	0,9631	0,2777
G 125	15	170	157	-	47	357	-	96,1	1,4491	0,3031
150	18	150	143	20	64	364	320	114,3	2,8644	0,4314

Table 2: torques

Size	Elastomer hardness [Shore A]	Torque [Nm]		Size	Elastomer hardness [Shore A]	Torque [Nm]	
		T_{KN}	$T_{K\,max.}$			T_{KN}	$T_{K\,max.}$
42	40	130	390	100	40	2000	6000
	50	150	450		50	2500	7500
	65	180	540		65	3200	9600
48	40	200	600	125	40	3000	9000
	50	230	690		50	4000	12000
	65	280	840		70	5000	15000
65	40	350	1050	G 125	40	4000	12000
	50	400	1200		50	5200	16000
	65	500	1500		70	6500	20000
80	40	750	2250	150	40	5500	16500
	50	950	2850		50	7000	21000
	65	1200	3600		70	9000	27000
G 80	40	1250	3750				
	50	1600	4800				
	65	2000	6000				

1 Technical Data

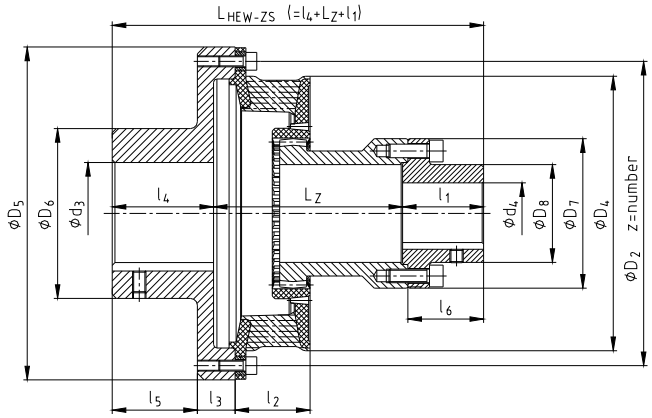


Illustration 3: BoWex-ELASTIC® type HEW-ZS (size 48 to G 80)

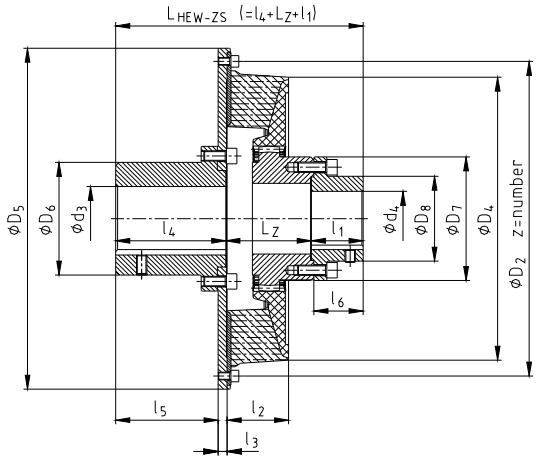


Illustration 4: BoWex-ELASTIC® type HEW-ZS (size 100 to G 125)

Table 3: dimensions – type HEW-ZS[1)]

Size	Max. finish bore [mm]		Dimensions [mm]										
	d_3	d_4	D_2	z x M		D_4	D_5	D_6	D_7	D_8	l_1	l_2	l_3
48	55	28	180	8	M6	164	200	92	78	45	50	45	17
65	75	45	224	8	M8	205	245	125	110	72	55	55	28
80	80	65	295,27	8	M10	266	318	130	145	100	90	70	17
G 80	95	65	333,4	8	M10	302	358	145	145	100	90	80	22
100	110	90	438,15	8	M12	350	478	158	180	135	80	80	16
125	125	120	438,15	16	M12	416	478	175	225	180	80	99	18
G 125	125	120	489	8	M12	440	530	175	225	180	80	95	15

Size	Dimensions [mm]			Removeable part HEW-ZS L_Z [mm]					Weight with max. bore [kg]	Mass moment of inertia [kgm²]	
	l_4	l_5	l_6	100	120	140	180	250		J_A	J_L
48	55	45	45	●	●				6,9	0,0203	0,0050
65	75	63	56		●	●			16,0	0,0747	0,0160
80	80	70	75			●	●		25,5	0,1447	0,0699
G 80	90	78	75				●	●	34,2	0,2752	0,1412
100	111,5	110	76				●	●			
125	170	171	76				●	●			
G 125	170	157	76				●	●			

1) For torques of BoWex-ELASTIC® type HEW-ZS see table 2.

BoWex-ELASTIC® couplings with attached parts that can generate heat, sparks and static charging (e. g. combinations with brake drums, brake disks, overload systems like torque limiters, impellers etc.) are <u>not</u> allowed for the use in hazardous areas.
A separate checking must be made.

2 Hints

2.1 Coupling Selection

C A U T I O N !
For a continuous and troublefree operation of the coupling it must be designed according to the selection instructions (according to DIN 740 part 2) for the particular application (see BoWex-ELASTIC® catalogue).
If the operating conditions (performance, speed, changes on engine and machine) change, the coupling selection must be checked again.
Please make sure that the technical data regarding torque only refer to the elastomer part. The transmissible torque of the shaft/hub connection must be checked by the orderer, and he is responsible for the same.

For drives with dangerous torsional vibration (drives with periodical load on torsional vibration) it is necessary to make a torsional vibration calculation to ensure a perfect selection. Typical drives with dangerous torsional vibration are e. g. drives with diesel engines, piston pumps, piston compressors etc. On request KTR will perform the coupling selection and the torsional vibration calculation.

2.2 General Hints

Please read through these mounting instructions carefully before you set the coupling into operation.
Please pay special attention to the safety instructions!

The **BoWex-ELASTIC®** coupling is suitable and approved for the use in hazardous areas. When using the coupling in hazardous areas please observe the special hints and instructions regarding safety mentioned in enclosure A.

The mounting instructions are part of your product. Please keep them carefully and close to the coupling.
The copyright for these mounting instructions remains with **KTR** Kupplungstechnik GmbH.

2.3 Safety and Advice Hints

STOP	**D A N G E R !**	**Danger of injury to persons.**
!	**C A U T I O N !**	**Damages on the machine possible.**
☞	**A T T E N T I O N !**	**Pointing to important items.**
Ex	**P R E C A U T I O N !**	**Hints concerning explosion protection.**

2.4 General Hints of Danger

D A N G E R !
With assembly, operation and maintenance of the coupling it has to be made sure that the entire drive train is protected against unintentional engagement. You can be seriously hurt by rotating parts. Please make absolutely sure to read through and observe the following safety instructions.

- All operations on and with the coupling have to be performed taking into account "safety first".
- Please make sure to disengage the power pack before you perform your work.
- Protect the power pack against unintentional engagement, e. g. by providing hints at the place of engagement or removing the fuse for current supply.
- Do not touch the operation area of the coupling as long as it is in operation.
- Please protect the coupling against unintentional touch. Please provide for the necessary protection devices and caps.

2 Hints

2.5 Proper Use

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

- carefully read through the mounting instructions and understood them
- had technical training
- are authorized to do so by your company

The coupling may only be used in accordance with the technical data (see table 1 to 3 in chapter 1).
Unauthorized modifications on the coupling design are not admissible. We do not take any warranty for resulting damages. To further develop the product we reserve the right for technical modifications.
The **BoWex-ELASTIC® type HEW and HEW-ZS** described in here corresponds to the technical status at the time of printing of these mounting instructions.

3 Storage

The coupling hubs are supplied in preserved condition and can be stored at a dry and roofed place for 6 - 9 months.
The features of the elastomer parts remain unchanged for up to 5 years in case of favourable storage conditions.

C A U T I O N !
The storage rooms may 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 there is no condensation. The best relative air humidity is below 65%.

4 Assembly

Basically the coupling is supplied in individual parts. Before assembly the coupling has to be inspected for completeness.

4 Assembly

4.1 Components of the Couplings

Components of BoWex-ELASTIC®, type HEW1 and HEW2

Component	Quantity	Designation
1	1	elastomer part
2	1	hub
4	1	coupling flange
5	see table 1 [1)]	cylinder head screw DIN EN ISO 4762 [1)]
7	2	setscrew DIN EN ISO 4029

[1)] For size 150 nuts according to DIN EN ISO 4014 are required additionally.

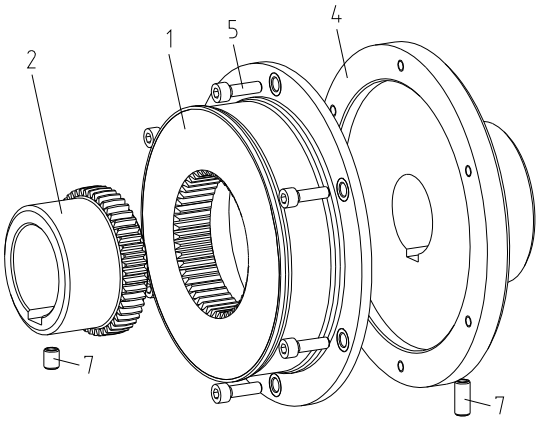


Illustration 5: BoWex-ELASTIC® type HEW1

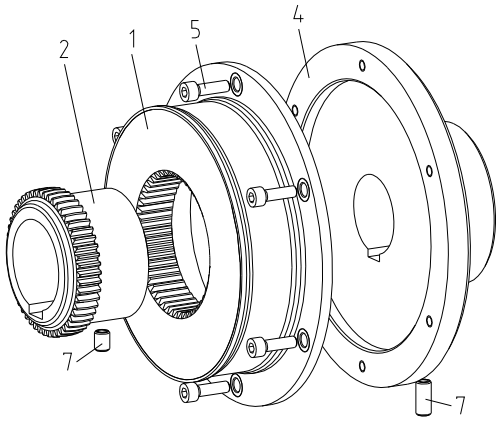


Illustration 6: BoWex-ELASTIC® type HEW2

Components of BoWex-ELASTIC®, type HEW-ZS

Component	Quantity	Designation
1	1	elastomer part
2	1	hub spec.
3	1	ZW-hub
4	1	coupling flange
4.1	1	adaptor flange
4.2	1	flange hub
4.3	see table 4	cylinder head screw DIN EN ISO 4762
5	see table 1	cylinder head screw DIN EN ISO 4762
6	see table 4	cylinder head screw DIN EN ISO 4762
7	2	setscrew DIN EN ISO 4029

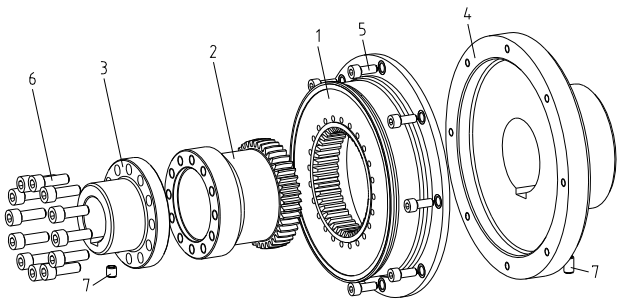


Illustration 7: BoWex-ELASTIC® type HEW-ZS (size 48 to G 80)

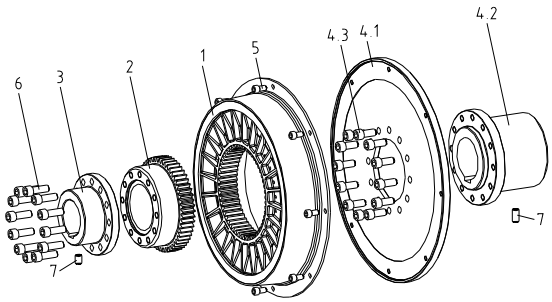


Illustration 8: BoWex-ELASTIC® type HEW-ZS (size 100 to G 125)

Table 4: cylinder head screws DIN EN ISO 4762

Size	48	65	80	G 80	100	125	G 125
Quantity z (component 4.3)	-	-	-	-	15	12	12
Quantity z (component 6)	8	12	12	12	12	12	12

4 Assembly

4.2 Hint Regarding the Finish Bore

D A N G E R !
The maximum permissible bore diameters d (see table 1 to 3 in chapter 1 - Technical Data) must not be exceeded. If these figures are disregarded, the coupling may tear. Rotating particles may cause serious danger.

- Hub bores or coupling flange bores machined by the customer have to observe concentric running or axial running, respectively (see illustration 9).
- Please make absolutely sure to observe the figures for d_{max}.
- Carefully align the hubs or coupling flange when the finish bores are brought in.
- Please use a setscrew according to DIN EN ISO 4029 or an end plate to fasten the hubs or coupling flange axially.

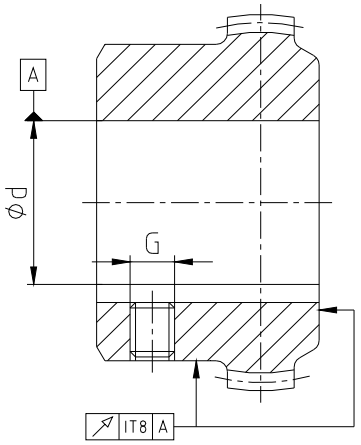


Illustration 9: concentric running and axial running

C A U T I O N !
The orderer is responsible for all subsequently made machinings to unbored or pilot bored and to finish machined coupling parts and spare parts. KTR does not assume any warranty claims resulting from insufficient remachining.

P R E C A U T I O N !
KTR supplies unbored or pilot bored coupling parts and spare parts on explicit customer´s request. These parts are additionally labelled with the symbol Ⓤ.

Table 5: setscrews DIN EN ISO 4029

Size	42	48	65	80	G 80	100	125	G 125	150
Screw size	M8	M8	M10	M10	M10	M12	M16	M16	M20
Tightening torque T_A [Nm]	10	10	17	17	17	40	80	80	140

Table 6: Recommended combinations of fit acc. to DIN 748/1

Bore [mm]		Shaft tolerance	Bore tolerance
above	to		
	50	k6	H7 (KTR-Standard)
50		m6	

If a feather key 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 heavy operating conditions (frequently alternating torsional direction, shock loads, etc.).

The transmissible torque of the shaft/hub connection must be checked by the orderer, and he is responsible for the same.

4 Assembly

4.3 Assembly of the Coupling

A T T E N T I O N !
We recommend to check bores, shaft, keyway and feather key for dimensional accuracy before assembly.

Heating the hub, flange hub or coupling flange slightly (approx. 80 °C) allows for an easier installation onto the shaft.

P R E C A U T I O N !
Please pay attention to the danger of ignition in hazardous areas.

D A N G E R !
Touching the heated hubs causes burns.
We would recommend to wear safety gloves.

C A U T I O N !
For the assembly please make sure that the distance dimension E or L_Z (see table 1 and 3) is kept to ensure that the elastomer part can be moved axially.
Disregarding this hint may cause damage on the coupling.

- **Applying for type HEW-ZS only (size 100 to G 125)!**
  Screw the flange hub (component 4.2) to the additional flange (component 4.1) at the tightening torques T_A mentioned in table 7.

Table 7: cylinder head screws DIN EN ISO 4762

Size	100	125	G 125
Tightening torque T_A [Nm]	355	355	355

- Assemble the hub, flange hub or adaptor flange onto the shaft of driving and driven side.
- Shift the power packs in axial direction until the installation dimension L_{HEW1}, L_{HEW2} or L_{HEW-ZS} has been achieved.
- If the power packs have already been firmly mounted, the mounting dimension has to be adjusted by shifting the hub, flange hub or coupling flange axially on the shafts.
- Fasten the hub, flange hub or coupling flange by tightening the setscrews DIN EN ISO 4029 with cup point (tightening torque see table 5).
- **Applying for type HEW-ZS only!**
  Put the hub spec. (component 2) in front of the hub ZW (component 3) and screw the components at the tightening torques T_A mentioned in table 8.

Table 8: cylinder head screws DIN EN ISO 4762

Size	48	65	80	G 80	100	125	G 125
Tightening torque T_A [Nm]	41	69	120	120	190	295	295

4 Assembly

4.3 Assembly of the Coupling

- Put the elastomer part (component 1) in front of the flange hub with additional flange or coupling flange.
- Screw the parts hand-tight for the time being. Afterwards tighten the screws at the tightening torque T_A mentioned in table 9.

C A U T I O N !
For the assembly please make sure that the hub toothing is covered completely by the internal toothing of the elastomer part. (Please observe the assembly dimensions L_{HEW1}, L_{HEW2} or L_{HEW-ZS}.)
Disregarding this hint may cause damage on the coupling.

Table 9: cylinder head screws DIN EN ISO 4762

Size	42	48	65	80	G 80	100	125	G 125	150
Tightening torque T_A [Nm]	14	14	35	69	69	120	120	120	295

P R E C A U T I O N !
If used in hazardous areas the grub screws to fix the hub as well as all screw connections must be additionally secured against self-loosening, e. g. glue with Loctite (medium strength).

C A U T I O N !
Please observe the manufacturer´s instructions when using the glue.
Do not put any glue onto the rubber surfaces.

4.4 Displacements - Alignment of the Couplings

The **BoWex-ELASTIC® HEW** couplings accept a deviation of position of the machine parts to be connected up to the data indicated in table 10.
In case of the alignment, the radial and angular displacement should be as small as possible, because the lifetime is increased hereby under the same operating conditions.

The alignment of the **BoWex-ELASTIC® HEW** coupling has to be effected from the shaft-sided coupling hub to one of the processed surfaces of the flange hub.

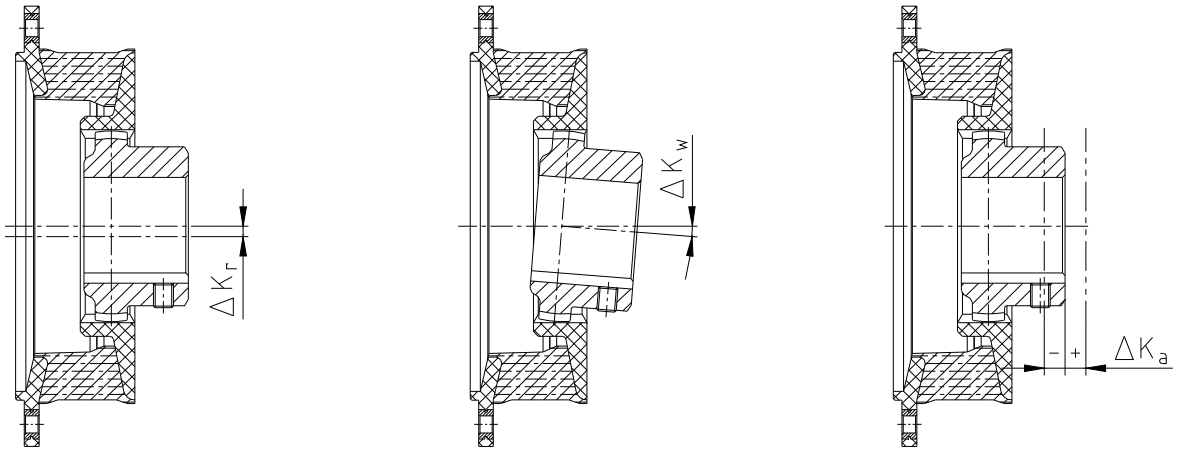
C A U T I O N !
In order to ensure a long service life of the coupling and to avoid dangers regarding the use in hazardous areas, the shaft ends must be accurately aligned.
Please absolutely observe the displacement figures indicated (see table 10). If the figures are exceeded, the coupling is damaged.
The more accurate the alignment of the coupling, the higher is its lifetime.
In case of a use in hazardous areas for the explosion group IIC (marking II 2GD c IIC T X), only half of the displacement figures (see table 10) are permissible.

4 Assembly

4.4 Displacements - Alignment of the Couplings

Please note:

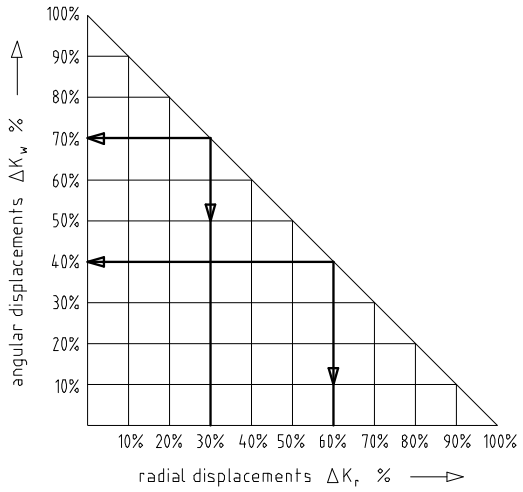
- The displacement figures mentioned in table 10 are maximum figures which must not arise in parallel. If radial and angular displacement arises in parallel, the permissible displacement figures may only be used proportionately (see illustration 11).
- The displacement figures mentioned are general figures 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 indicated have to be interpolated accordingly. If necessary, please ask about the displacement for the corresponding coupling type.
- Please check with a dial gauge, ruler or feeler whether the permissible displacement figures of table 10 can be observed.



Radial displacement | Angular displacement | Axial displacement

Illustration 10: displacements

Illustration 11: combinations of displacement



Example for the misalignment combinations given in illustration 11:

Example 1:
$\Delta K_r = 30\ \%$
$\Delta K_w = 70\ \%$

Example 2:
$\Delta K_r = 60\ \%$
$\Delta K_w = 40\ \%$

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

4 Assembly

4.4 Displacements - Alignment of the Couplings

Table 10: displacement figures

Displacement figures	Elastomer hardness [Shore A]	Size					
		42	48	65	80	G 80	100
perm. radial displacement with n=1500 1/min. ΔK_r (mm)	40	1,1	1,2	1,6	1,8	2,0	2,2
	50	1,0	1,1	1,5	1,7	1,9	2,0
	65	0,5	0,5	0,7	0,8	0,9	1,0
perm. radial displacement with n=3000 1/min. ΔK_r (mm)	40	0,8	1,1	1,4	1,6	1,8	1,9
	50	0,7	1,0	1,3	1,5	1,7	1,7
	65	0,4	0,4	0,5	0,6	0,8	0,9
max. radial displacement $\Delta K_{r\,max.}$ (mm) [1]	40	3,6	3,8	5,1	5,7	6,0	6,5
	50	3,3	3,5	4,7	5,3	5,7	6,0
	65	1,5	1,7	2,2	2,4	2,7	3,0
perm. angular displacement with n=1500 1/min. ΔK_w (°)	40	1,0	1,0	1,0	1,0	1,0	1,0
	50	0,75	0,75	0,75	0,75	0,75	0,75
	65	0,5	0,5	0,5	0,5	0,5	0,5
perm. angular displacement with n=3000 1/min. ΔK_w (°)	40	0,5	0,5	0,5	0,5	0,5	0,5
	50	0,4	0,4	0,4	0,4	0,4	0,4
	65	0,25	0,25	0,25	0,25	0,25	0,25
max. angular displacement $\Delta K_{w\,max.}$ (°) [1]	40 / 50 / 65	1,5	1,5	1,5	1,5	1,5	1,5
perm. axial displacement ΔK_a (mm)	40 / 50 / 65	±2	±2	±2	±2	±2	±3

Displacement figures	Elastomer hardness [Shore A]	Size		
		125	G125	150
perm. radial displacement with n=1500 1/min. ΔK_r (mm)	40	3,3	3,3	3,5
	50	2,5	2,5	2,5
	70	1,1	1,1	1,3
perm. radial displacement with n=3000 1/min. ΔK_r (mm)	40	2,9	2,9	3,0
	50	2,1	2,1	2,2
	70	1,0	1,0	1,1
max. radial displacement $\Delta K_{r\,max.}$ (mm) [1]	40	7,5	7,5	8,0
	50	6,9	6,9	7,5
	70	3,3	3,3	4,0
perm. angular displacement with n=1500 1/min. ΔK_w (°)	40	1,0	1,0	1,0
	50	0,75	0,75	0,75
	70	0,5	0,5	0,5
perm. angular displacement with n=3000 1/min. ΔK_w (°)	40	0,5	0,5	0,5
	50	0,4	0,4	0,4
	70	0,25	0,25	0,25
max. angular displacement $\Delta K_{w\,max.}$ (°) [1]	40 / 50 / 70	1,5	1,5	1,5
perm. axial displacement ΔK_a (mm)	40 / 50 / 70	±3	±3	±5

[1] for short-term start

4.5 Spares Inventory, Customer Service Addresses

A basic requirement to guarantee 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.

5 Enclosure A

Hints and Instructions Regarding the Use in Ex Hazardous Areas

Type HEW1and HEW2: Hub / Elastomer part / Coupling flange

Attachment A only applies for BoWex-ELASTIC HEW1 and HEW2.

5.1 Use in Ex Hazardous Areas According to the Regulations

Conditions of operation in Ex hazardous locations

BoWex-ELASTIC® couplings are suitable for the use according to EC standard 94/9/EC.

1. Industry (with the exception of mining)

- device class II of category 2 and 3 (*coupling is not approved for device class 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 not approved for zone 20)***
- explosion class IIC (*explosion class IIA and IIB are included in IIC*)

Temperature class:

Temperature class	Ambient or operating temperature	Max. surface temperature [1]
T4, T3, T2, T1	- 30 °C to + 80 °C	115 °C [2]
T5	- 30 °C to + 65 °C	100 °C
T6	- 30 °C to + 50 °C	85 °C

Explanation:
The maximum surface temperatures each result from the permissible ambient or operating temperature T_a plus the maximum temperature increase ΔT of 35 K which has to be taken into account.

1) The ambient or operating temperature T_a is limited to + 80° C by 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, too.

5 Enclosure A

Hints and Instructions Regarding the Use in Ex Hazardous Areas

5.2 Control Intervals for Couplings in Ex Hazardous Areas

Explosion group	Control 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 analysis of danger of ignition the couplings are free from any ignition source. Merely the temperature increase produced by proper heating and depending on the coupling type has to be considered: for BoWex-ELASTIC®: $\Delta T = 35$ K
II 2GD c IIB T4, T5, T6	A review of the circumferential backlash and a visual inspection of the flexible elastomer part must be effected after 1,000 operating hours for the first time, after 6 months at the latest. Except for centered, stiff connecting flanges (e. g. bellhousings). If you note unconsiderable or no wear on the elastomer part after this first inspection, the future inspections can be effected, in case of the same operating parameters, respectively after 2,000 operating hours or after 18 months at the latest. If you note considerable wear during the first inspection, so that a change of the elastomer part would be recommended, please find out the cause according to the table „Breakdowns“, as far as possible. The maintenance intervals must be adjusted according to the changed operating parameters.

BoWex-ELASTIC®

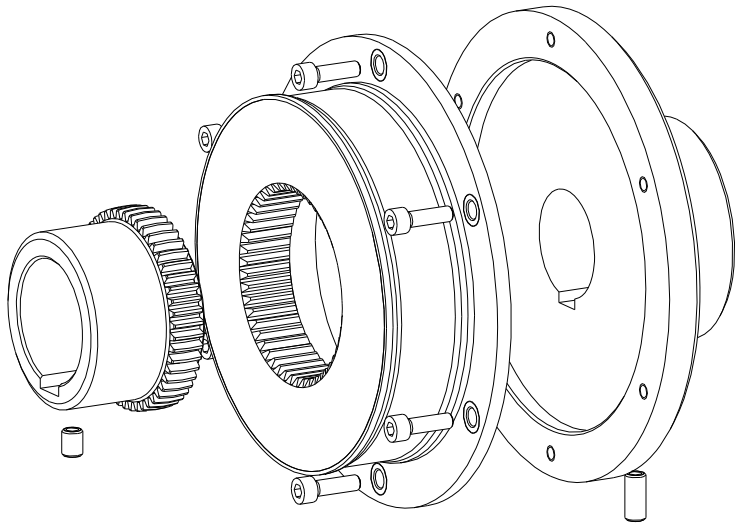


Illustration 12: BoWex-ELASTIC® (type HEW1)

- Here the backlash between the hub and the nylon toothing must be checked by a torsional backlash, separately from the drive and the driven end.
  The friction / wear may only be $X_{max.}$ of the original toothing strength before the elastomer part must be replaced.
  When reaching the torsional backlash ΔS_{max}. the elastomer part must be replaced immediately, irrespective of the inspection intervals.
- Visual inspection of the elastomer part (fractures, holes or similar).

5 Enclosure A

Hints and Instructions Regarding the Use in Ex Hazardous Areas

5.3 Checking of Torsional Backlash

C A U T I O N !
To check the torsional backlash the driving power pack turned off must be secured against unintended switching on.

Drive end

- Turn the hub in opposite direction to the direction of drive.

C A U T I O N !
Here the elastomer part may not be axially displaced from its wear position.

- Mark elastomer part and hub (see illustration 13).
- Turn the hub in the direction of drive and measure the torsional backlash $\Delta S_{max.}$
- When reaching the torsional backlash ΔS_{max} the elastomer part must be replaced.

Driven end

- Turn the hub in the direction of drive.

C A U T I O N !
Here the elastomer part may not be axially displaced from its wear position.

- Mark elastomer part and hub (see illustration 13).
- Turn the hub in opposite direction to the direction of drive and measure the torsional backlash ΔS_{max}.
- When reaching the torsional backlash ΔS_{max} the elastomer part must be replaced.

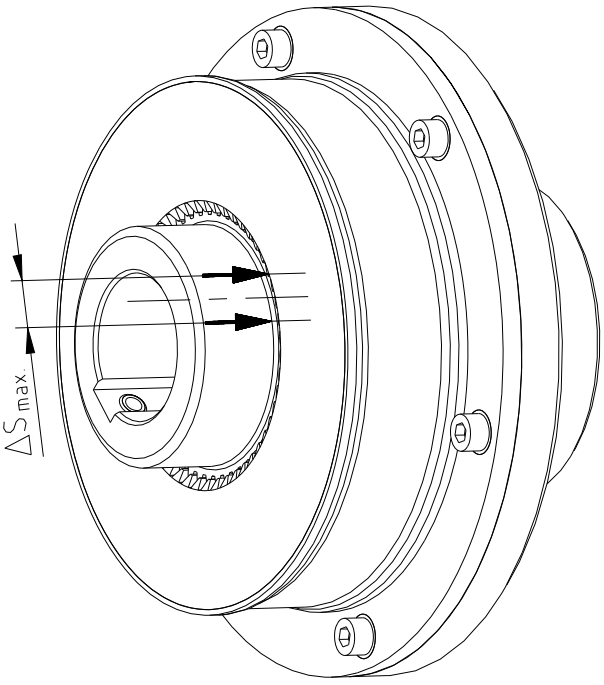


Illustration 13: marking of the elastomer part and the hub

5 Enclosure A

Hints and Instructions Regarding the Use in Ex Hazardous Areas

5.4 Approximate Values of Wear

If the torsional backlash is ≥ $\Delta S_{max.}$ [mm] / friction ≥ $X_{max.}$ [mm], the elastomer part must be replaced.

Reaching the exchange values depends on the operating conditions and the existing operating parameters.

C A U T I O N !
In order to ensure a long lifetime of the coupling and to avoid dangers regarding the use in hazardous areas, the shaft ends must be accurately aligned.
Please absolutely observe the displacement figures indicated (see table 10). If the figures are exceeded, the coupling is damaged.

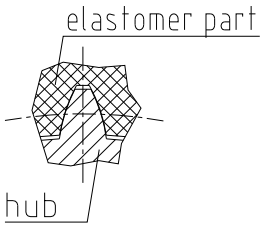


Illustration 14: elastomer part in new condition

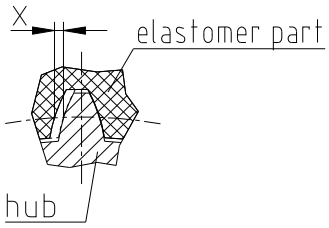


Illustration 15: wear of elastomer part

Table 11:

Size	Limits of wear each hub		Size	Limits of wear each hub	
	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	G 125	2,0	3,5
80	1,6	2,7	150	2,0	3,5
G 80	1,6	2,7			

5.5 Ex Marking of Coupling for the Hazardous Area

The ATEX marking of the BoWex-ELASTIC® coupling is performed on the polyamide flange of the elastomer indicating the following details:

Short labelling:
(standard)

Ex II 2GD c IIB T X

Complete labelling:

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

The labelling with Explosion Group llB included the Explosion Group llA.

C A U T I O N !
The orderer is responsible for all subsequently made machinings to unbored or pilot bored and to finish machined coupling parts and spare parts. KTR does not assume any warranty claims resulting from insufficient remachining.

5 Enclosure A

Hints and Instructions Regarding the Use in Ex Hazardous Areas

5.6 Starting

Before putting the coupling into operation, check the tightness of the setscrews in the hubs, the alignment and the distance dimensions L_{HEW1}, L_{HEW2} bzw. L_{HEW-ZS} and correct, if necessary, and also check all screw connections regarding the stipulated tightening torques dependent on the type of coupling.

Ex If used in hazardous areas the grub screws to fix the hub as well as all screw connections must be additionally secured against self-loosening, e. g. glue with Loctite (medium strength).

Last but not least, the coupling protection against unintended contact must be fixed.

The cover must be electrically conductive and be included in the equipotential bonding. Bellhousings (magnesium part below 7,5 %) made from aluminium and damping rings (NBR) can be used as connecting element between pump and electric motor. The cover may only be taken off after having stopped the unit.

During operation, please pay attention to

- strange running noises
- occurring vibrations.

If the couplings are used in dust explosive areas and in mining the operator must make sure that there is no accumulation of dust in a critical quantity between the cover and the coupling. The coupling must not operate in an accumulation of dust.

For covers with unlocked openings on the upper side no light metals may be used if the couplings are used as appliances of appliance group II (*if possible, from stainless steel*).
If the couplings are used in mining (appliance group I M2), the cover must not be made from light metal. In addition, it must be resistant to higher mechanical loads than if it is used as appliance of appliance group II.

The minimum distance „Sr“ between the protection device and the rotating parts must at least correspond to the figures mentioned below.

If the protection device is used as cover, regular openings complying with the explosion protection demands can be made that must not exceed the following dimensions:

Openings	Cover [mm]		
	Top side	Lateral parts	Distance „Sr“
Circular - max. diameter	4	8	≥ 10
Rectangular - max. lateral length	4	8	≥ 10
Straight or curved slot - max. lateral length/height	prohibited	8	≥ 20

! **C A U T I O N !**
If you note any irregularities with the coupling during operation, the drive unit must be turned off immediately. The cause of the breakdown must be found out with 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.

Coupling layer:

Ex If coated (priming, painting etc.) couplings are used in hazardous areas, the requirements to conductability and layer thickness must be considered. In case of paintings up to 200 µm no electrostatic load can be expected. Multiple coatings exceeding a thickness of 200 µm are prohibited for explosion group IIC.

5 Enclosure A

Hints and Instructions Regarding the Use in Ex Hazardous Areas

5.7 Breakdowns, Causes and Elimination

The below-mentioned errors can lead to an incorrect use of the **BoWex-ELASTIC®** coupling. In addition to the stipulations in these operating and mounting instructions please make sure to avoid these errors.
The errors listed can only be clues to search for the errors. When searching for the error the adjacent components must be generally included.

Ex Due to incorrect use the coupling may become a source of ignition.
EC Standard 94/9/EC requires a special care from the manufacturer and the user.

General errors of incorrect use

- Important data for the coupling selection were not forwarded.
- The calculation of the shaft/hub connection was not considered.
- Coupling parts with damage occurred during transport are assembled.
- If the heated hubs are assembled, the permissible temperature is exceeded.
- The fits of the parts to be assembled are not coordinated with each other.
- Tightening torques are fallen below/exceeded.
- Components are replaced by mistake/put together incorrectly.
- No original KTR parts (purchased parts) are used.
- Old elastomer parts/already worn out elastomer parts or elastomer parts that were stored too long are used.
- The coupling used/the coupling protection used is not suitable for the operation in hazardous areas and does not correspond to EC Standard 94/9/EC, respectively.
- Maintenance intervals are not observed.

breakdowns	causes	hints to danger for hazardous areas	elimination
change of the running noises and / or occurring vibrations	misalignment micro friction at the toothing of the elastomer part	danger of ignition due to hot surfaces	1) put the unit out of operation 2) eliminate the reason for the misalignment (e. g. loose foundation bolts, fracture of the engine fixing, heat expansion of unit components, change of the assembly dimension E of the coupling) 3) checking of wear see under point 5.4
	loose screws for axial securement of hubs	danger of ignition due to hot surfaces	1) put the unit out of operation 2) check alignment of coupling 3) tighten the screws to secure the hubs and secure against self-loosening 4) checking of wear see under point 5.4
break of the elastomer part / toothing	break of the elastomer part / toothing due to high shock energy / overload	---	1) put the unit out of operation 2) disassemble the coupling and remove remainders of the elastomer part 3) check coupling parts and replace damaged coupling parts 4) insert elastomer part, assemble coupling parts 5) find out the reason for overload

5 Enclosure A

Hints and Instructions Regarding the Use in Ex Hazardous Areas

5.7 Breakdowns, Causes and Elimination

breakdowns	causes	hints to danger for hazardous areas	elimination
break of the elastomer part / toothing	operating parameters do not correspond to the performance of the coupling	---	1) put the unit out of operation 2) check the operating parameters and select a larger coupling (consider installation space) 3) assemble new coupling size 4) check alignment
	mistake in service of the unit	---	1) put the unit out of operation 2) disassemble the coupling and remove remainders of the elastomer part 3) check coupling parts and replace damaged coupling parts 4) insert elastomer part, assemble coupling parts 5) instruct and train the service staff
excessive wear at the elastomer part / toothing	drive vibrations	danger of ignition due to hot surfaces	1) put the unit out of operation 2) disassemble the coupling and remove remainders of the elastomer part 3) check coupling parts and replace damaged coupling parts 4) insert elastomer part, assemble coupling parts 5) check alignment, correct if necessary 6) find out the reason for the vibrations
	ambient / contact temperatures which are too high for the elastomer part, max. permissible e. g. T4 = -30 °C / +100 °C	danger of ignition due to hot surfaces	1) put the unit out of operation 2) disassemble the coupling and remove remainders of the elastomer part 3) check coupling parts and replace damaged coupling parts 4) insert elastomer part, assemble coupling parts 5) check alignment, correct if necessary 6) check and regulate ambient / contact temperature
	e. g. contact with aggressive liquids / oils, ozone-influence, too high ambient temperatures etc. effecting a physical change of the elastomer part	---	1) put the unit out of operation 2) disassemble the coupling and remove remainders of the elastomer part 3) check coupling parts and replace damaged coupling parts 4) insert elastomer part, assemble coupling parts 5) check alignment, correct if necessary 6) make sure that further physical changes of the elastomer part are excluded

Ex If you operate with a worn elastomer part (see item 5.2) a proper operation meeting the explosion protection requirements and acc. to Standard 94/9/EC is not ensured.

☞ **A T T E N T I O N !**
KTR does not assume any liabilities or warranties regarding the use of spare parts and accessories which are not provided by KTR and for the damages resulting herefrom.

5 Enclosure A

Hints and Instructions Regarding the Use in Ex Hazardous Areas

5.8 EC Certificate of Conformity

EC Certificate of Conformity

corresponding to EC Standard 94/9/EC dated 23 March 1994
and to the legal regulations

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

BoWex-ELASTIC® - highly flexible flange couplings

described in these mounting instructions and designed for explosion protection correspond to Article 1 (3) b) of Standard 94/9/EC and comply with the general Safety and Health Requirements according to enclosure II of Standard 94/9/EC.

The BoWex-ELASTIC® is in accordance with the specifications of the standard 94/9/EC. One or several standards mentioned in the corresponding EC type test certificate IBExU01ATEXB004_05 X were in part replaced by updated versions.
KTR Kupplungstechnik GmbH as the manufacturer confirms that the product mentioned above is in accordance with the specifications of the new standards, too.

According to article 8 (1) of Standard 94/9/EC the technical documentation is deposited with the:

IBExU
Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7

09599 Freiberg

Rheine, 08.11.11
Date

i. V.
Reinhard Wibbeling
Engineering Manager

i. V.
Josef Schürhörster
Product Manager