



modular link coupling

with Tenpu fiber



TENBEX-ECO



The SGF TENBEX-ECO coupling system are torsional-elastic, non-shiftable coupling units that can be used in a wide range of torque transmission applications. They provide effective damping of vibration and torque peaks as well as efficient compensation for radial, axial and angular misalignment.



TENBEX-ECO coupling systems utilise a series of strong and durable SGF link elements that are engineered to handle the most rigorous rotational power transmission requirements. Individual SGF link elements are manufactured with extremely strong reinforcement cord inlays (Tenpu fibre technology) and special high grade rubber compounds.

Utilising the SGF tension-force principle, torque is transferred almost exclusively by the vulcanised Tenpu cord reinforcement inlays. The rubber supports and protects the cord inlays whilst effectively dampening noise and vibration during operation.

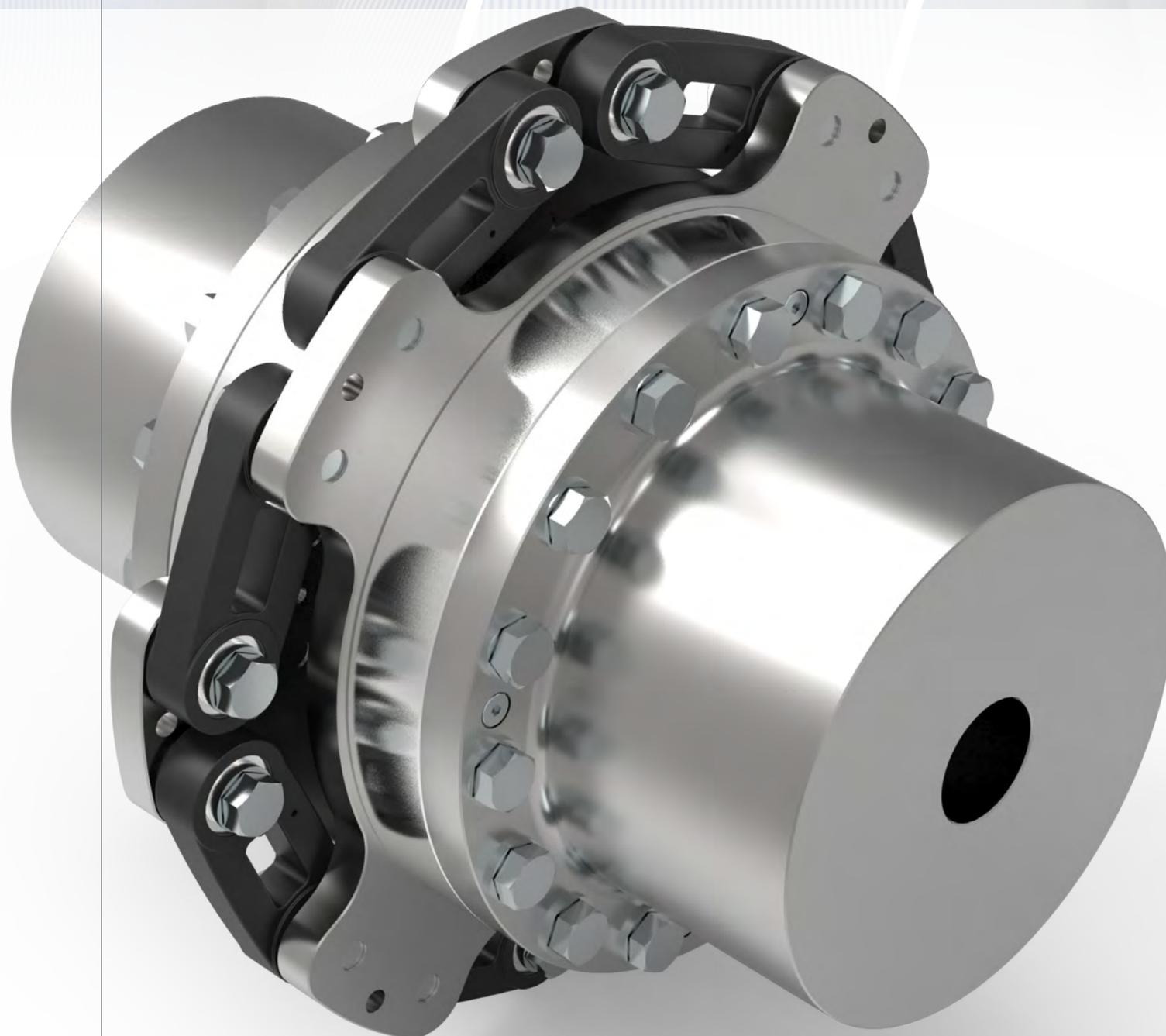
The modular design of the TENBEX-ECO link coupling system is available for two types of application connections. Type F for a direct connection to an combustion engine, and Type D for a shaft to shaft connection. The coupling can be combined with optional hubs, spacer and adapter flanges to provide complete fitment versatility without extensive modifications or further engineering to the equipment.

The high power density ratio of the link elements and their strong, durable and resilient construction are one of the reasons why the SGF TENBEX-ECO coupling system is the best choice for many arduous Industrial, Marine and Transport applications. It is also an ideal solution for Heavy Machinery such as rock crushers, screw conveyors and milling machines.

All metal parts of the coupling system are protected against corrosion by galvanic coating. This ensures excellent protection from aggressive media or harsh environmental influences during operation.

TENBEX-ECO flanges and SGF link elements are connected with a simple screw connection, using high tensile (grade 10.9) bolts and washers (300 HV). This direct connection to the flanges makes installation and replacement quick and easy.

➤➤ Further, each coupling has the flexibility of been easily upgraded or downgraded (within its size limit) to suit the different torque requirements by simply changing to different torque and stiffness rated link elements.





APPLICATIONS, PROPERTIES, BENEFITS

Properties

- » Compensation of radial, axial and angular misalignments
- » Damping of torque peaks and vibration in the power train
- » Robust and simple construction by use of link elements with Tenpu fiber
- » Corrosion resistant due to galvanic coated metal components

Benefits

- » Quick and easy maintenance without removing the drive or driven components
- » Individual adaptations to unique application requirements are easily and economically possible
- » High torque transmission and small installation space
- » Achieve different stiffness properties of the TENBEX-ECO system (soft/middle/hard) within the same installation space
- » Resistant to shock loads

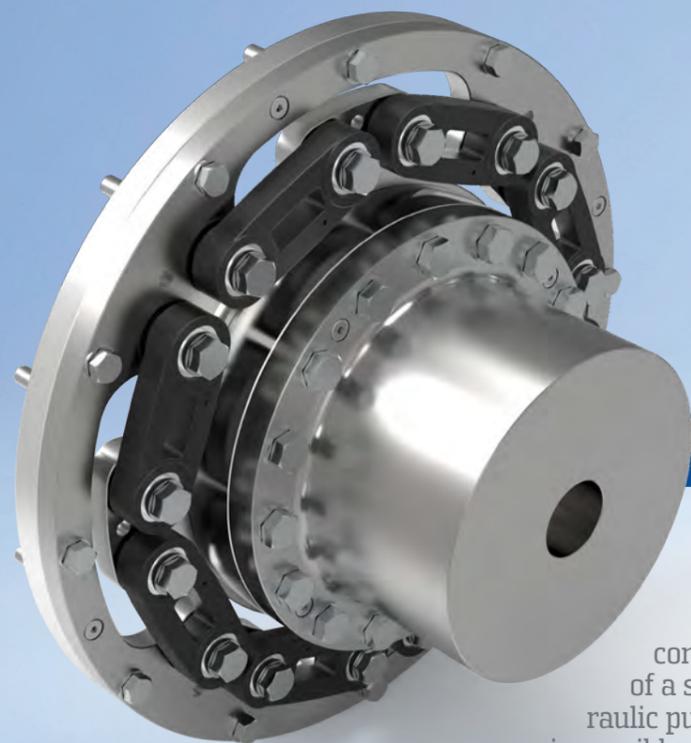
Common Applications

- » Damping of torque peaks between power unit and generator
- » Damping of vibration in the drive shaft e.g. in material handling or in test benches
- » For connecting combustion engines and generators, including any related drive equipment in power plants and power stations
- » As a flexible connecting element in mixers, pumps and agricultural machinery
- » For connection between gears and drive shaft in marine applications, e.g. ship propulsion

You can find videos to our application solutions on our **Youtube Kanal**



TENBEX-ECO



TENBEX-ECO-F

for flywheel-shaft-connections

TENBEX-ECO-F couplings are designed to connect a combustion engine with a drive shaft of a system like a gear box, a generator or a hydraulic pump. A connection to different flywheel sizes is possible, depending on the dimension of the coupling. Optionally available spacer flanges and adapter flanges enable the coupling to be installed and removed without moving any parts of the machinery.

Available add-ons



Link Couplings

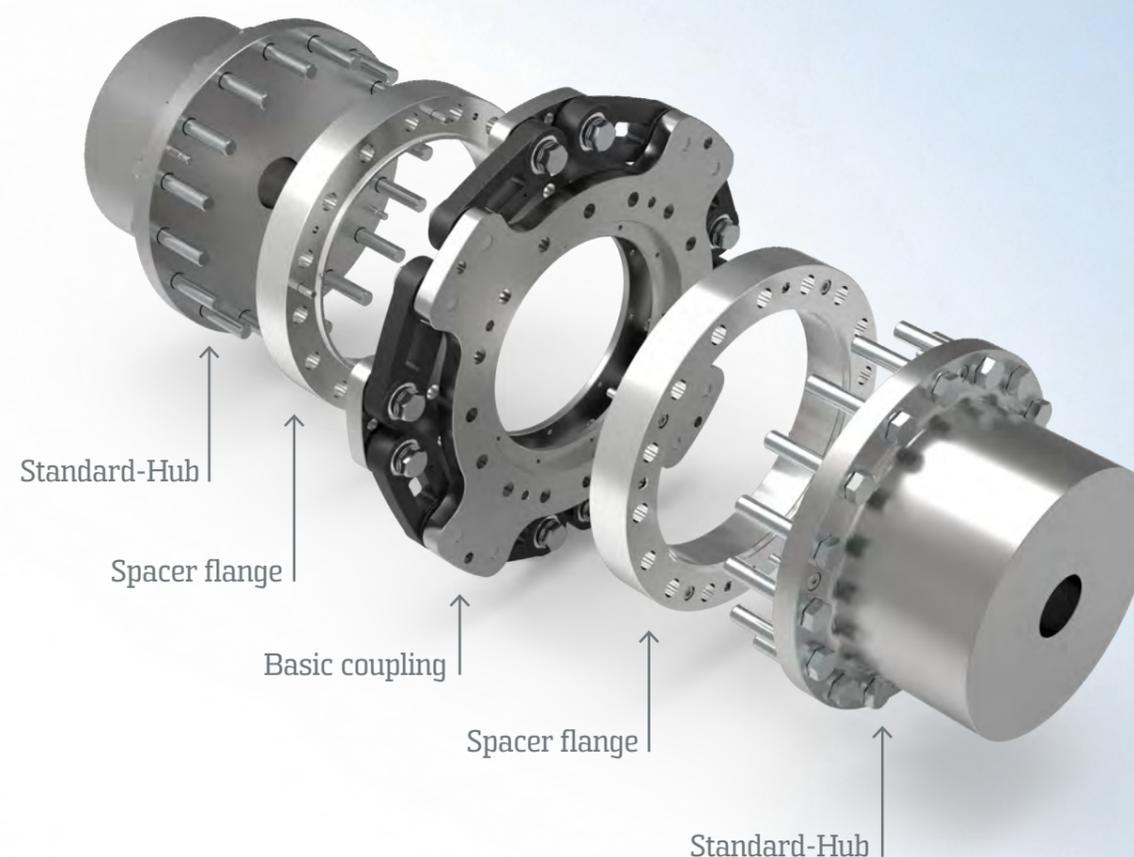


TENBEX-ECO-D

for shaft-shaft-connections

TENBEX-ECO-D couplings are designed for connecting two shafts of a drivetrain. The connecting geometry is standardized, but can be adapted to customers requirements if necessary. For special requirements, please contact our experts: Industry@sgf.com.

Available add-ons



NOMINAL TORQUE OF LINK COUPLINGS

For choosing the right coupling size, you have to calculate the nominal torque T_N of your system:

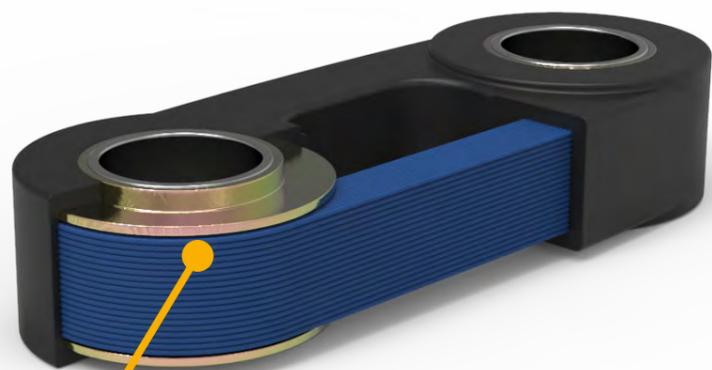
$$T_N = \frac{9550 \times P \text{ [kW]}}{n \text{ [rpm]}}$$

$$T_{KN} \geq T_N$$

T_N	Nominal torque of the system	Nm
T_{KN}	Max permissible nominal torque of flexible coupling	Nm
P	Power	kW
n	Speed	rpm

Be careful with the following aspects:

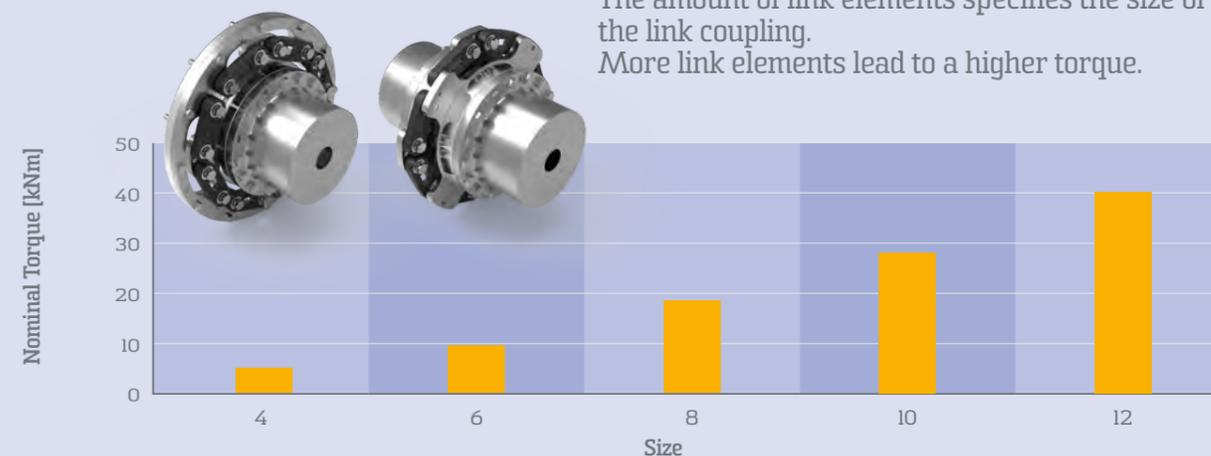
- » In addition to static loads, the dynamic characteristics of the drive train should be considered as well in order to avoid resonance activity. Resonance activity can damage parts of the machinery within a few minutes of operation and must be avoided.
- » Required data for a torsional vibration calculation can be taken from the drawings and the technical sheets of the couplings. An explanation of the technical data can be found in the document SGF-TL-001 (available on request or on www.sgf.com).
- » In case of oscillating loads, please consider the maximum power loss P_{KW} of the coupling system.
- » When a TENBEX-ECO link coupling replaces other couplings with, it is possible that bearing loads can change because of different stiffness values.



Tenpu fiber

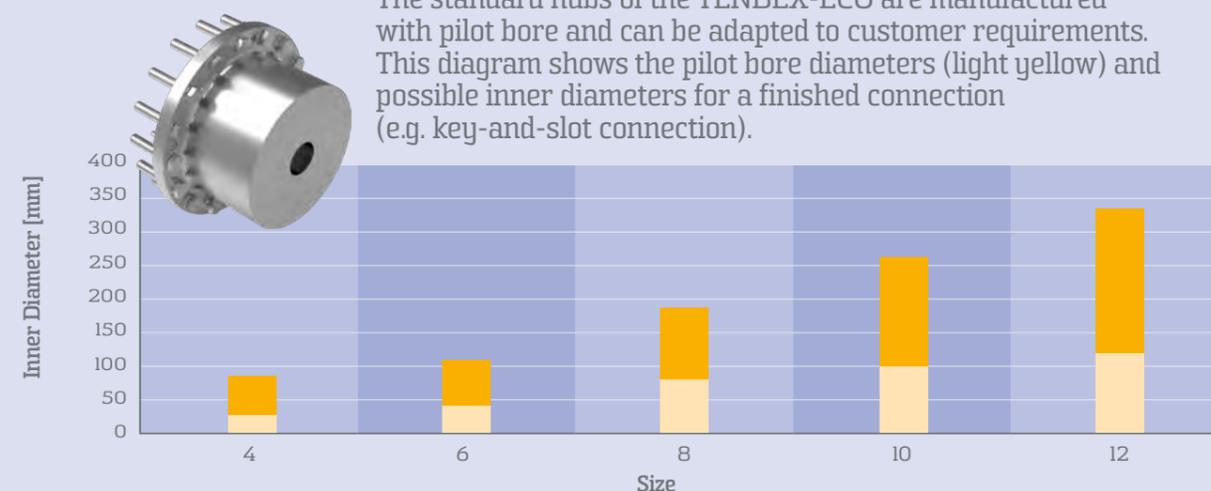
NOMINAL TORQUE OF TENBEX-ECO-COUPLINGS

The amount of link elements specifies the size of the link coupling. More link elements lead to a higher torque.



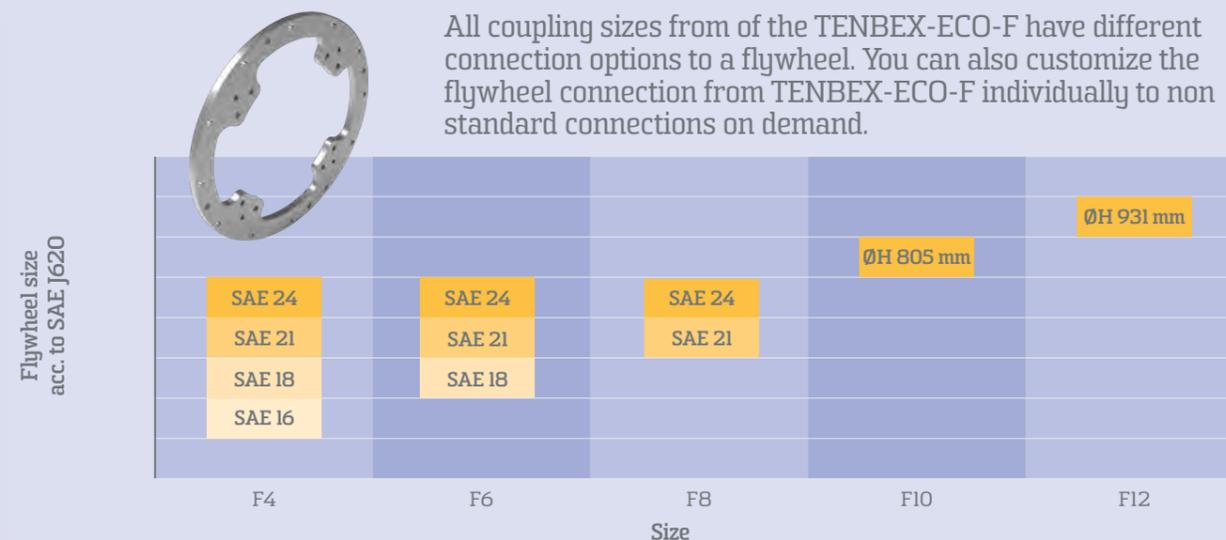
POSSIBLE INNER DIAMETER OF HUBS

The standard hubs of the TENBEX-ECO are manufactured with pilot bore and can be adapted to customer requirements. This diagram shows the pilot bore diameters (light yellow) and possible inner diameters for a finished connection (e.g. key-and-slot connection).



FLYWHEEL SIZE FOR TENBEX-ECO-F-SERIES

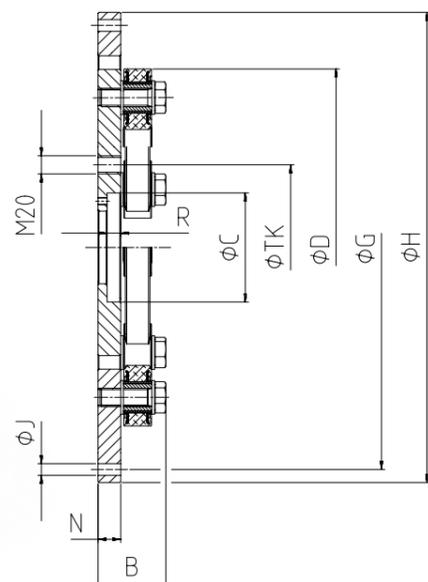
All coupling sizes from of the TENBEX-ECO-F have different connection options to a flywheel. You can also customize the flywheel connection from TENBEX-ECO-F individually to non standard connections on demand.



TECHNICAL DATA - BASIC COUPLING

TENBEX-ECO-F

for flywheel-shaft-connection



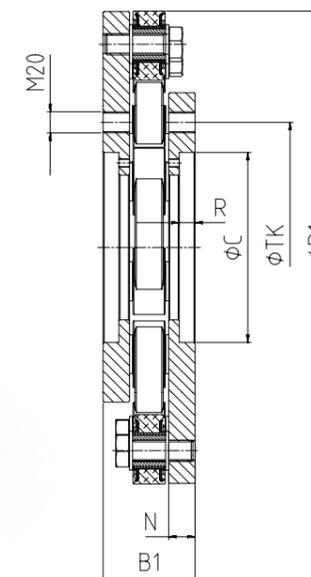
Size	Power data					Geometry data											Order number	
	T _{KN} *	T _{KW} *	T _{KMAX1} *	C _{Tdyn} **	n _{MAX}	Flywheel	ØG	ØH	ØJ	number holes	ØO	B	N	ØTK	ØC	R	Description	Part number
	[kNm]	[kNm]	[kNm]	[kNm/rad]	[rpm]	Size	[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		
F4	5,2	1,7	7,0	630	2.800	SAE 16	488,95	517,50	13	8	405	74,7	25	182	120 ^{H7}	102	TENBEX-ECO-F4-1	GK-10188-Z1
						SAE 18	542,92	571,50	17	6							TENBEX-ECO-F4-1	GK-10177-Z1
						SAE 21	641,35	673,10	17	12							TENBEX-ECO-F4-1	GK-10178-Z1
						SAE 24	692,15	733,42	21	12							TENBEX-ECO-F4-1	GK-10179-Z1
	4,8	1,6	6,4	260	2.800	SAE 16	488,95	517,50	13	8	405	74,7	25	182	120 ^{H7}	102	TENBEX-ECO-F4-1	GK-10188-Z2
						SAE 18	542,92	571,50	17	6							TENBEX-ECO-F4-1	GK-10177-Z2
						SAE 21	641,35	673,10	17	12							TENBEX-ECO-F4-1	GK-10178-Z2
						SAE 24	692,15	733,42	21	12							TENBEX-ECO-F4-1	GK-10179-Z2
	5,5	1,8	7,3	370	2.800	SAE 16	488,95	517,50	13	8	405	74,7	25	182	120 ^{H7}	102	TENBEX-ECO-F4-1	GK-10188-Z3
						SAE 18	542,92	571,50	17	6							TENBEX-ECO-F4-1	GK-10177-Z3
						SAE 21	641,35	673,10	17	12							TENBEX-ECO-F4-1	GK-10178-Z3
						SAE 24	692,15	733,42	21	12							TENBEX-ECO-F4-1	GK-10179-Z3
F6	9,4	3,1	12,0	1.300	2.600	SAE 18	542,92	571,50	17	6	460	74,7	25	237	180 ^{H7}	160	TENBEX-ECO-F6-1	GK-10189-Z1
						SAE 21	641,35	673,10	17	12							TENBEX-ECO-F6-1	GK-10181-Z1
						SAE 24	692,15	733,42	21	12							TENBEX-ECO-F6-1	GK-10182-Z1
						SAE 18	542,92	571,50	17	6							TENBEX-ECO-F6-1	GK-10189-Z2
	8,6	2,8	11,0	560	2.600	SAE 21	641,35	673,10	17	12	460	74,7	25	237	180 ^{H7}	160	TENBEX-ECO-F6-1	GK-10181-Z2
						SAE 24	692,15	733,42	21	12							TENBEX-ECO-F6-1	GK-10182-Z2
						SAE 18	542,92	571,50	17	6							TENBEX-ECO-F6-1	GK-10189-Z3
						SAE 21	641,35	673,10	17	12							TENBEX-ECO-F6-1	GK-10181-Z3
	9,8	3,2	13,0	800	2.600	SAE 24	692,15	733,42	21	12	460	74,7	25	237	180 ^{H7}	160	TENBEX-ECO-F6-1	GK-10182-Z3
						SAE 18	542,92	571,50	17	6							TENBEX-ECO-F6-1	GK-10189-Z3
						SAE 21	641,35	673,10	17	12							TENBEX-ECO-F6-1	GK-10181-Z3
						SAE 24	692,15	733,42	21	12							TENBEX-ECO-F6-1	GK-10182-Z3
F8	17,0	5,6	22,0	3.300	2.300	SAE 21	641,35	673,10	17	12	585	74,7	25	362	310 ^{H7}	285	TENBEX-ECO-F8-1	GK-10190-Z1
	SAE 24	692,15	733,42	21	12	TENBEX-ECO-F8-1	GK-10183-Z1											
	SAE 21	641,35	673,10	17	12	585	74,7	25	362	310 ^{H7}	285	TENBEX-ECO-F8-1	GK-10190-Z2					
	SAE 24	692,15	733,42	21	12	TENBEX-ECO-F8-1	GK-10183-Z2											
F10	17,0	5,9	23,0	1.900	2.300	SAE 21	641,35	673,10	17	12	585	74,7	25	362	310 ^{H7}	285	TENBEX-ECO-F8-1	GK-10190-Z3
	SAE 24	692,15	733,42	21	12	TENBEX-ECO-F8-1	GK-10183-Z3											
	26,0	8,9	35,0	6.600	2.100	-	766,00	805,00	21	12	710	74,7	25	487	430 ^{H7}	408	TENBEX-ECO-F10-1	GK-10184-Z1
	24,0	8,2	33,0	2.700	2.100	-	766,00	805,00	21	12	710	74,7	25	487	430 ^{H7}	408	TENBEX-ECO-F10-1	GK-10184-Z2
F12	28,0	9,3	37,0	3.900	2.100	-	766,00	805,00	21	12	710	74,7	25	487	430 ^{H7}	408	TENBEX-ECO-F10-1	GK-10184-Z3
	38,0	12,0	51,0	11.500	1.900	-	891,00	931,00	21	20	835	74,7	25	612	555 ^{H7}	532	TENBEX-ECO-F12-1	GK-10185-Z1
	35,0	11,0	47,0	4.700	1.900	-	891,00	931,00	21	20	835	74,7	25	612	555 ^{H7}	532	TENBEX-ECO-F12-1	GK-10185-Z2
	40,0	13,0	53,0	6.700	1.900	-	891,00	931,00	21	20	835	74,7	25	612	555 ^{H7}	532	TENBEX-ECO-F12-1	GK-10185-Z3

* nominal torque, for more informations to technical data see SGF-TL-001, ** theoretical/calculated values, deviations possible

TECHNICAL DATA - BASIC COUPLING

TENBEX-ECO-D

for shaft-shaft-connection



Size	Power data					Geometry data						Order number	
	T _{KN} *	T _{KW} *	T _{KMAX1} *	C _{Tdyn} **	n _{MAX}	ØD1	B1	N	ØTK	ØC	R	Description	Part number
	[kNm]	[kNm]	[kNm]	[kNm/rad]	[rpm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		
D4	5,2	1,7	7,0	630	2.800	392	87,2	25	182	120 ^{H7}	15	TENBEX-ECO-D4-1	GK10197-Z1
	4,8	1,6	6,4	260	2.800	392	87,2	25	182	120 ^{H7}	15	TENBEX-ECO-D4-1	GK10197-Z2
	5,5	1,8	7,3	370	2.800	392	87,2	25	182	120 ^{H7}	15	TENBEX-ECO-D4-1	GK10197-Z3
D6	9,4	3,1	12,0	1.300	2.600	447	87,2	25	237	180 ^{H7}	15	TENBEX-ECO-D6-1	GK-10191-Z1
	8,6	2,8	11,0	560	2.600	447	87,2	25	237	180 ^{H7}	15	TENBEX-ECO-D6-1	GK-10191-Z2
	9,8	3,2	13,0	800	2.600	447	87,2	25	237	180 ^{H7}	15	TENBEX-ECO-D6-1	GK-10191-Z3
D8	17,0	5,6	22,0	3.300	2.300	572	87,2	25	362	310 ^{H7}	15	TENBEX-ECO-D8-1	GK-10192-Z1
	15,0	5,2	20,0	1.900	2.300	572	87,2	25	362	310 ^{H7}	15	TENBEX-ECO-D8-1	GK-10192-Z2
	17,0	5,9	23,0	1.900	2.300	572	87,2	25	362	310 ^{H7}	15	TENBEX-ECO-D8-1	GK-10192-Z3
D10	26,0	8,9	35,0	6.600	2.100	697	87,2	25	487	430 ^{H7}	15	TENBEX-ECO-D10-1	GK-10186-Z1
	24,0	8,2	33,0	2.700	2.100	697	87,2	25	487	430 ^{H7}	15	TENBEX-ECO-D10-1	GK-10186-Z2
	28,0	9,3	37,0	3.900	2.100	697	87,2	25	487	430 ^{H7}	15	TENBEX-ECO-D10-1	GK-10186-Z3
D12	38,0	12,0	51,0	11.500	1.900	822	87,2	25	612	555 ^{H7}	15	TENBEX-ECO-D12-1	GK-10187-Z1
	35,0	11,0	47,0	4.700	1.900	822	87,2	25	612	555 ^{H7}	15	TENBEX-ECO-D12-1	GK-10187-Z2
	40,0	13,0	53,0	6.700	1.900	822	87,2	25	612	555 ^{H7}	15	TENBEX-ECO-D12-1	GK-10187-Z3

* nominal torque, for more informations to technical data see SGF-TL-001, ** theoretical/calculated values, deviations possible

Order example:

The coupling and the extensions must be ordered separately.
Following an example for an order of TENBEX-ECO-D8-1 and the matching hubs.

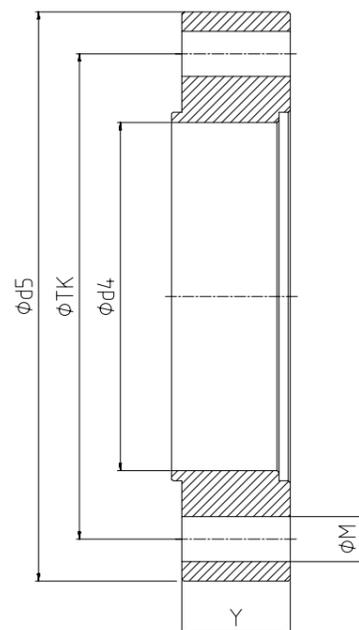
	Amount	Description	Part number
Basic coupling	1x	TENBEX-ECO-D8-1	GK-10192-Z1
Hubs	2x	Hub - Set	BI-10012

TECHNICAL DATA - EXTENSIONS

SPACER FLANGES

The spacer flanges are protected against corrosion by galvanic coating. Required screws are included.

Size	ØTK	Ød4	Ød5	ØM	number of holes	Y	Order number	
							Description	Part number
4	182	112	226	Ø22	8	53	Spacer set size 4	BI-10015
6	237	170	278	Ø22	12	53	Spacer set size 6	BI-10016
8	362	300	406	Ø22	16	53	Spacer set size 8	BI-10017
10	487	420	531	Ø22	20	53	Spacer set size 10	BI-10018
12	612	545	656	Ø22	24	53	Spacer set size 12	BI-10019



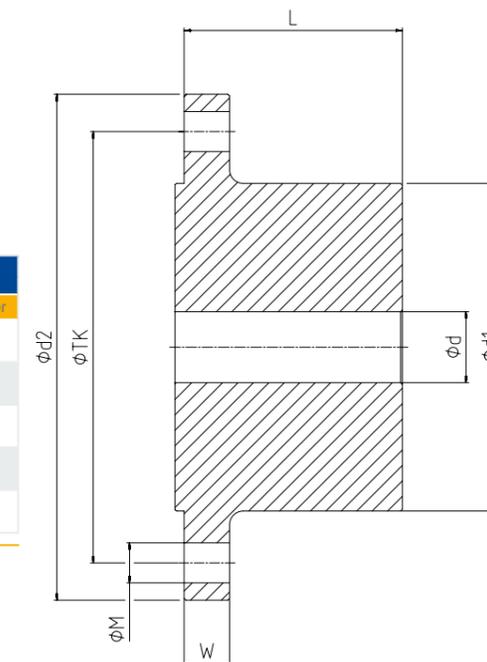
TECHNICAL DATA - EXTENSIONS

HUBS

TENBEX-ECO hubs are available in standard sizes and are delivered with pilot bore. The hubs are protected against corrosion by a galvanic coating. A set consists of one hub and the required screws.

Size	ØTK	Ød		Ød1	Ød2	L	W	ØM	numbers of holes	Order number	
		Pilot	Max***							Description	Part number
4	182	29	80	130	226	100	25	22	8	Hub set size 4	BI-10010
6	237	39	110	180	278	120	25	22	12	Hub set size 6	BI-10011
8	362	69	185	300	406	200	30	22	16	Hub set size 8	BI-10012
10	487	99	260	420	530	300	30	22	20	Hub set size 10	BI-10013
12	612	119	335	540	656	340	30	22	24	Hub set size 12	BI-10014

*** maximum inner diameter for feather-key-connection

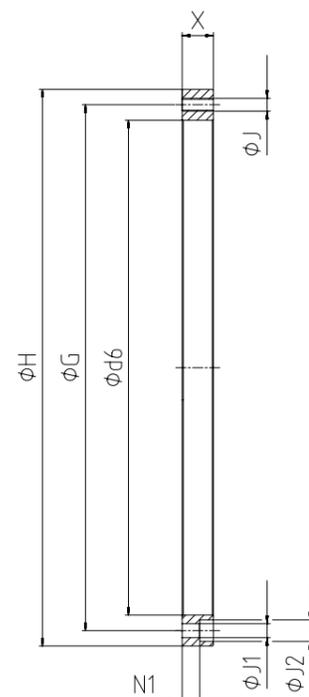


ADAPTER FLANGES

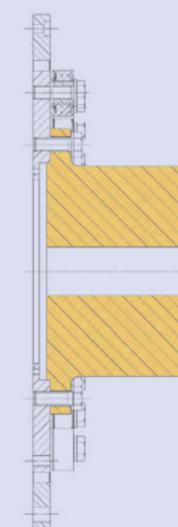
The adapter flanges are protected against corrosion by galvanic coating. Required screws are included.

SAE	ØH	ØG	Ød6	X	N1	ØJ	number of holes	ØJ1	ØJ2	Order number	
										Description	Part number
16	517,52	488,95	460	29	16,4	12	8	13	20	Adapter set size SAE16	BI-10020
18	571,5	542,92	514	29	12,4	16	6	17	26	Adapter set size SAE18	BI-10021
21	673,1	641,35	610	29	12,4	16	12	17	26	Adapter set size SAE21	BI-10022
24	733,42	692,15	650	29	8,4	20	12	21	33	Adapter set size SAE24	BI-10023

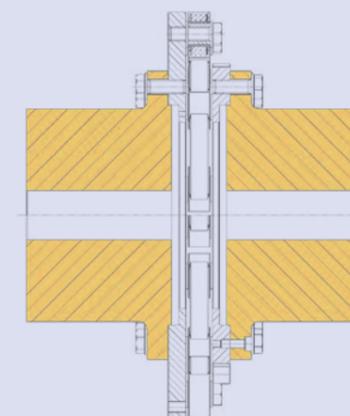
special sizes on demand



BASIC COUPLING WITH STANDARD-HUBS



TENBEX-ECO-F



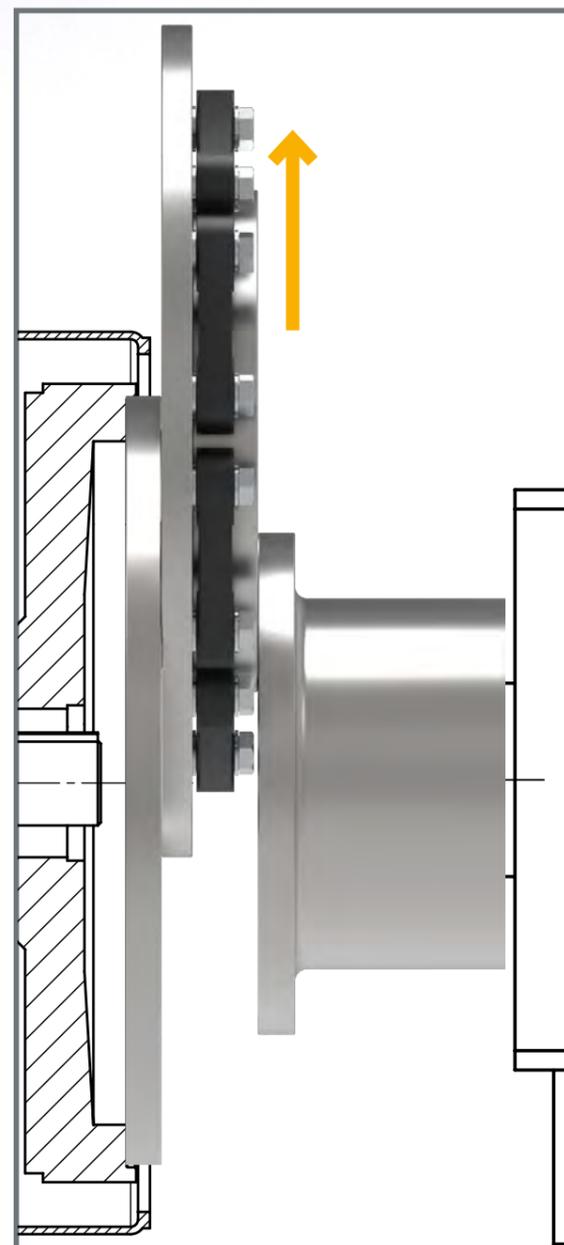
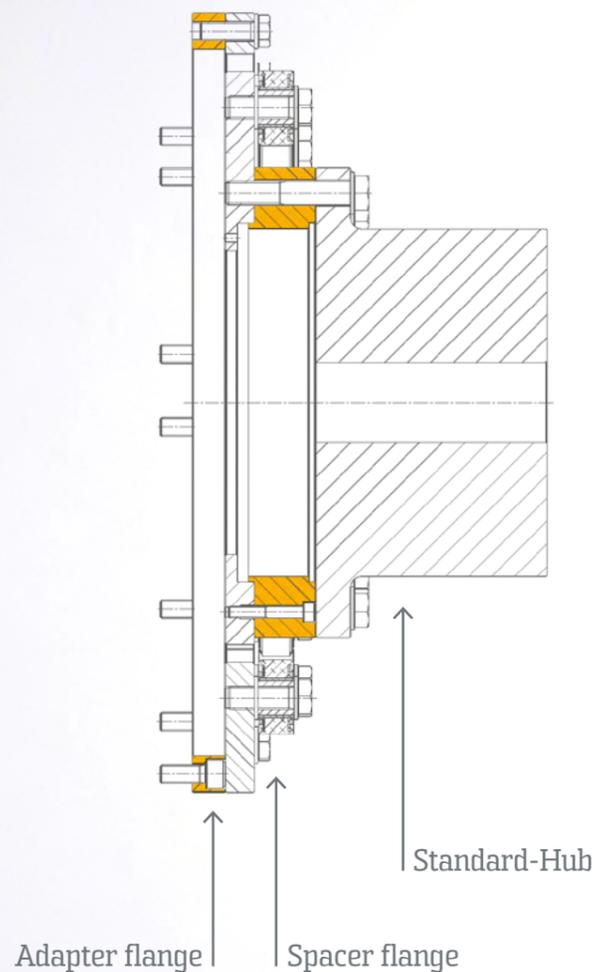
TENBEX-ECO-D

Radial disassembly

TENBEX-ECO-F

WITH SPACER- AND ADAPTER FLANGE

The TENBEX-ECO-F system can be expanded with one spacer flange and one adapter flange. The adapter flange is connected to the flywheel and the spacer flange is connected to the basic coupling. With these optional parts, the basic coupling can be installed and removed very quickly without moving the drivetrain units.



of the Basic Coupling

TENBEX-ECO-D

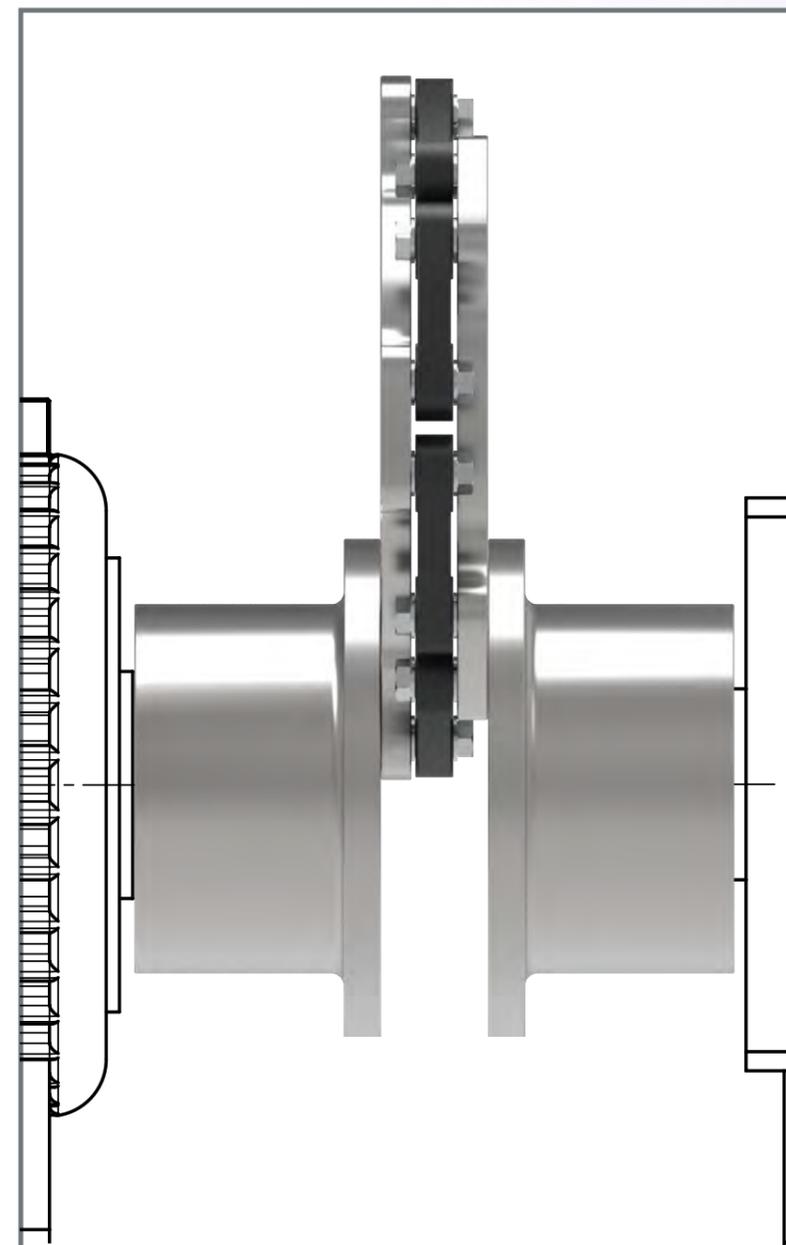
WITH HUB WITHOUT CENTERING COLLAR

The TENBEX-ECO-D can be installed and removed without moving the drivetrain units.

For this feature, the hubs must be machined at the centering collar. In this case, the exact positioning of hub and basic coupling will be done by fitting screws.

FEATURES

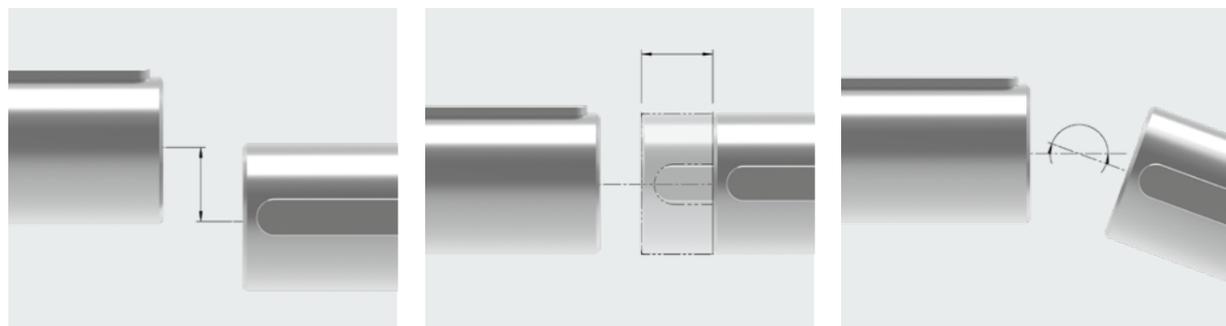
The TENBEX-ECO-D can be expanded by using at least with one spacer flange, in case the standard design of the coupling does not fit to the distance between the hubs. Spacer flanges with customized width are available on demand.



TECHNICAL DATA

Displacement

The TENBEX-ECO link coupling is able to compensate displacement between the drive shaft and the driven shaft, as described as follows. The specified maximum values apply, however, only to the specific aspect. In case displacement occurs in different directions simultaneously, reduced durability can be expected.



Max. radial displacement ΔK_r

Max. axial displacement ΔK_a

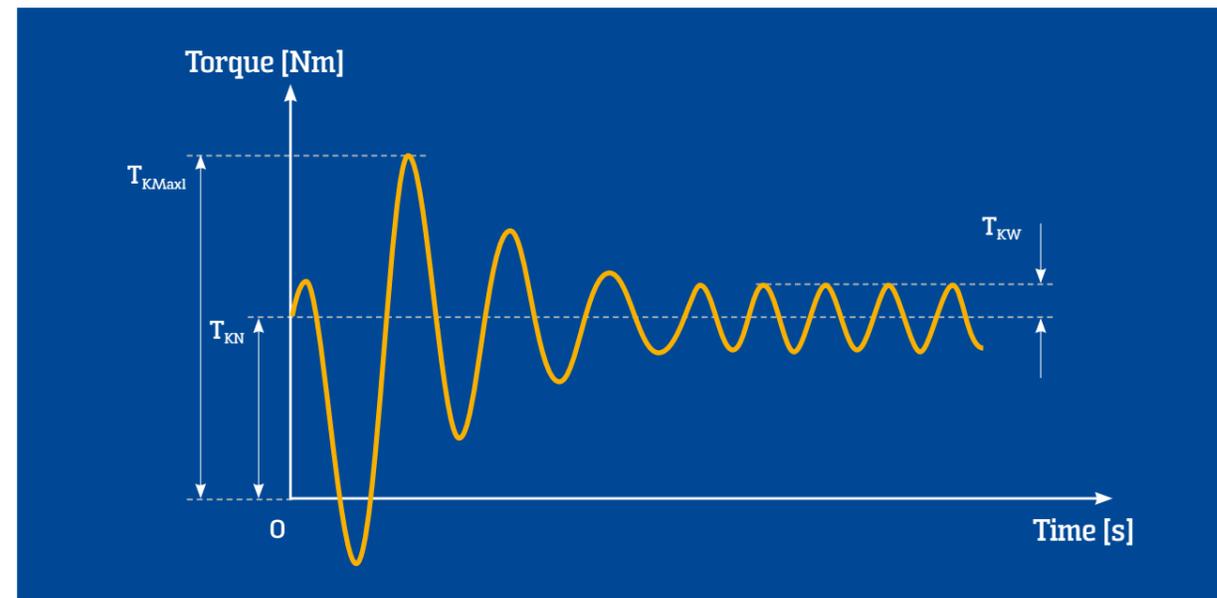
Max. angular displacement ΔK_w

The maximum values below are mostly regardless to the size and depends on the stiffness of the link elements.

Stiffness	ΔK_r	ΔK_a	ΔK_w				
			4-1	6-1	8-1	10-1	12-1
	[mm]	[mm]	[°]	[°]	[°]	[°]	[°]
soft - Z2	1,8	2,1	0,7	0,6	0,4	0,3	0,3
medium - Z1	1,5	2,1	0,7	0,6	0,4	0,3	0,3
hard - Z3	0,6	2,1	0,7	0,6	0,4	0,3	0,3

e.g. **GK-10192-Z1**
 ↑
 Stiffness

DESCRIPTION TECHNICAL DATA



Nominal torque T_{KN}

T_{KN} is the nominal torque of the flexible coupling. This torque can be permanently transferred in full by the flexible coupling.

Maximum torque T_{KMax1}

Torques at values of T_{KMax1} occur regularly in the normal operation of a machine or plant and can be transferred by the flexible coupling without damage as long as the load develops for a short time only and with a frequency not greater than 50,000 load cycles.

Torque peaks at the value of T_{KMax1} typically occur when starting or stopping, shifting, accelerating or braking.

Maximum torque T_{KMax2}

Torques at a value of T_{KMax2} do not occur in normal operation of a machine or plant, but can still be transferred by the flexible coupling without destroying it. Massive damage to the flexible coupling as well as damage to the screw connections may result, so that only emergency operation of the flexible coupling may be possible following the application of the T_{KMax2} load. Torques at a value of T_{KMax2} seldom occur, e.g. in cases of damage to the machine, emergency shut-down or abuse.

Following the occurrence of torques at a value of T_{KMax2} we generally recommend replacing the flexible coupling as well as screw connection parts.

Permissible continuously oscillating torque T_{KW}

The permissible continuously oscillating torque T_{KW} is the maximum permissible torque superimposed on the nominal torque. The specification of T_{KW} is given as

vibratory amplitude (peak value).

Torsional stiffness C_t and C_{tdyn}

The torsional stiffness of the elastic coupling is specified as static and dynamic stiffness.

The static torsional stiffness C_t here applies to all static or semi-static processes and is determined by slowly twisting the elastic coupling ($T=20^\circ\text{C}$).

The dynamic torsional stiffness C_{tdyn} applies to dynamic processes and is determined for a certain operating point. The boundary conditions of these operating point for the evaluated values are shown in SGF-TL-001.

Outside this operating point the actual stiffness values of the elastic coupling may significantly deviate from the specified values!

Maximum permissible speed n_{max}

The maximum permissible speed n_{max} can be completely utilized continuously. The specified rpm value applies irrespective of the operating temperature as long as the indicated limit values for the operating temperature are complied with.

Refer to the operating and assembly instructions SGF-TL-002 (flexible couplings and flex coupling assemblies) for the operating temperature limits.

Further applicable documents:

- » SGF-TL-001 Explanation of technical data
- » SGF-TL-003 Manual and Installation instruction for Link Assemblies and Link Couplings
- » Drawing and technical data sheets of Link Couplings

EXAMPLE FOR CUSTOMIZED SOLUTIONS



SGFlex-3FD-CONNECT

WITH UNIQUE CENTERING SYSTEM

Nominal torque up to 3.200 Nm



SGFlex-3F

CORD REINFORCED COUPLING SYSTEM

Nominal torque up to 3.200 Nm



Technical changes & technical data

We reserve the right to make technical changes in the course of further development.

The technical data in the tables as well as on the drawings and datasheets only serve to describe the product and are not to be understood as a guaranteed characteristic in legal terms. All illustrations are only provided as examples.

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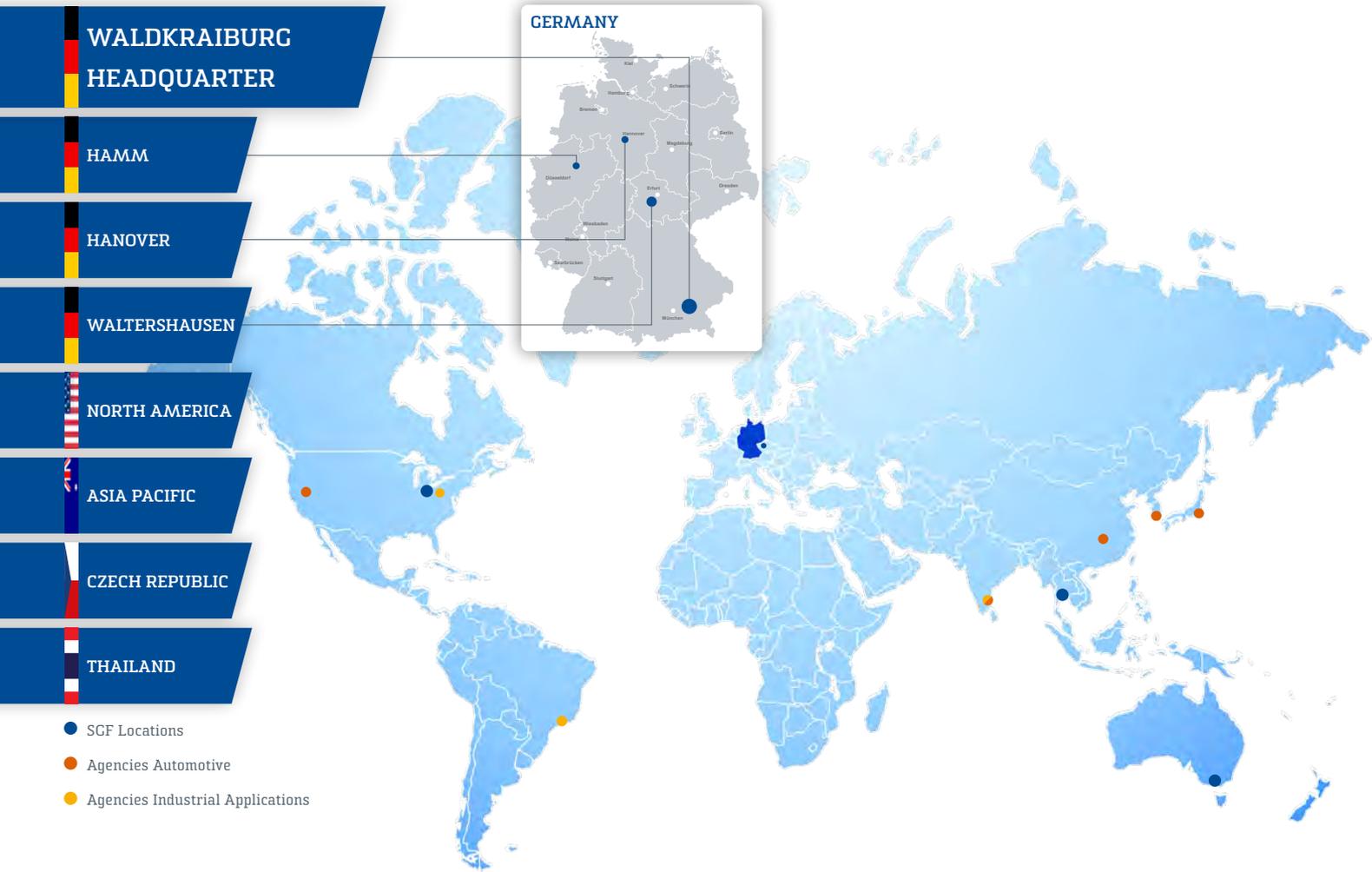
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Contact

For additional information about the product range and special designs or services (vibratory behaviour of a total system calculations for screw connections, etc.), please contact

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