RADEX®-N

Steel lamina coupling

RIGIFLEX®-N

Steel lamina coupling

RIGIFLEX®-HP

High-performance steel lamina coupling

Made for Motion KTR

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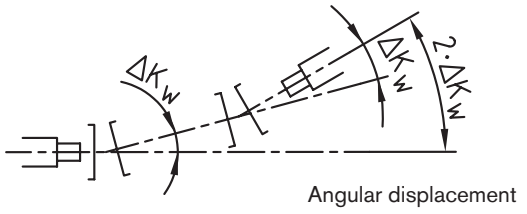
Coupling selection steel lamina coupling

Description	Symbol	Definition or explanation
Rated torque of coupling	T_{KN}	Torque which can be transmitted continuously over the entire speed range of the coupling.
Vibratory torque of coupling	T_{KW}	Torque amplitude of the permissible periodic torque fluctuation with a frequency of 10 Hz and a basic load of T_{KN} or pulsating load up to T_{KN}.
Maximum torque of coupling	T_{Kmax}	Torque which can be transmitted during the entire life of the coupling ≥ 10^5 times as pulsating load or 5 x 10^4 times as alternating load.

Guidelines for operating factor S_B	
Machine	S_B
Construction machinery	2,0
Agitators	1,0 - 2,0
Centrifuges	1,5
Conveyors	2,0
Elevators	2,0
Fans/Blowers	1,5
Generators	1,0
Calanders	2,0
Grinders, crushers	2,5
Textile machinery	2,0
Rolling mills	2,5
Woodworking machinery	1,5
Mixers and extruders	2,0
Stamps, presses	2,5
Machine tools	2,0
Grinders	2,5
Packaging machines	1,0
Roller drives	2,5
Piston pumps	2,5
Centrifugal pumps	1,5
Piston compressors	2,5
Turbo compressors	2,0

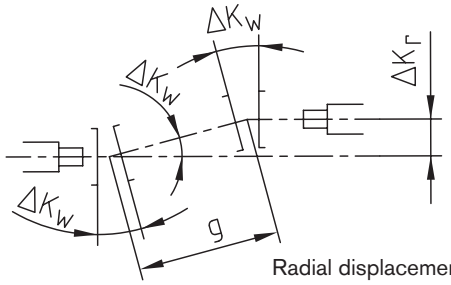
1. Permissible displacements:
ΔK_a: Permissible axial displacement
ΔK_w: Permissible angular displacement
ΔK_r: Permissible radial displacement
Stahllamellenkupplungen sind so ausgelegt, dass die maximal zulässige winkelige Auslenkung ΔK_w in jedem Lamellenpaket aufgenommen werden darf. Die maximal mögliche Winkelauslenkung zweier miteinander verbundener Wellen beträgt also 2 • ΔK_w. Die maximale Winkelauslenkung pro Lamellenpaket sind in der Tabelle “Technische Daten” aufgeführt.



Angular displacement

The permissible radial displacement ΔK_r with distance g of the coupling elements is

$$\Delta K_r = g \bullet \tan(\Delta K_w)$$



Radial displacement

The table “Technical data” (RADEX®-N page 126/127 and RIGIFLEX®-N page 134/135) shows the max. permissible radial displacements ΔK_r for every size and type based on the given standard lengths of the spacers as well as the permissible angular displacement ΔK_w of the coupling elements.
The max. permissible axial displacements ΔK_a for every size and type are also mentioned in the table “Technical data”.
The figures of the permissible displacements indicated are dependent on each other!
With an increasing axial displacement ΔK_a the permissible angular displacement ΔK_w decreases and thus the radial displacement ΔK_r.
(See our mounting instructions at www.ktr.com).

Coupling selection steel lamina coupling

Selection of the coupling size

2. Drives without periodical torsional vibrations

For example centrifugal pumps, fans, screw compressors, etc. The coupling selection requires that the rated torque TK_N and the maximum torque T_{Kmax} are reviewed.

2.1 Loading by rated torque

Taking into account the operating factor S_B, directional factor S_R and temperature factor S_t, the permissible rated speed must be at least as big as the rated torque T_N of the machine.

The rated torque T_{KN} of the coupling is:

$$T_{KN} \geq T_N \bullet S_B \bullet S_t \bullet S_R$$

T_N = Torque of the machine
S_B = Operating factor (see table on page 123)
S_R= Factor of direction = 1,00 same torque direction = 1,70 torque direction switching
S_t = Operating temperature Temperature factor

°C	-30	0	+150	+200	+230	+270
Factor	1,00	1,00	1,00	1,10	1,25	1,43

2.2 Loading by torque shocks

The permissible maximum torque T_{Kmax} of the coupling must be at least as big as the sum of the peak torque T_S and rated torque T_N of the machine taking into account the operating factor S_B, temperature factor S_t and directional factor S_R. This applies in case that the rated torque of the machine is superimposed by a shock (e. g. starting of the engine). For drives with A. C. motors and big masses on the load side we would recommend calculations by our simulation program (please consult with us).

$$T_{Kmax} \geq (T_N + T_S) \bullet S_t \bullet S_R$$

T_S = Peak torque

Selection of the coupling size

3. Drives with periodical torsional vibrations

For drives subject to dangerous torsional vibrations (e. g. diesel engines, piston compressors, piston pumps, generators, etc.) it is necessary to perform a torsional vibration calculation (please consult with us).

3.1 Loading by rated torque

Taking into account the operating factor S_B, directional factor S_R and temperature factor S_t, the permissible rated speed must be at least as big as the rated torque T_N of the machine.

The rated torque T_{KN} of the coupling is:

$$T_{KN} \geq T_N \bullet S_B \bullet S_t \bullet S_R$$

T_N = Torque of the machine
S_B = Operating factor (see table on page 123)
S_R= Factor of direction = 1,00 same torque direction = 1,70 torque direction switching
S_t = Operating temperature Temperature factor

°C	-30	0	+150	+200	+230	+270
Factor	1,00	1,00	1,00	1,10	1,25	1,43

3.2 Passing through resonance

The peak torque T_{SR} arising while passing through resonance must not exceed the permissible maximum torque of the coupling T_{Kmax}.

$$T_{Kmax} \geq T_{SR}$$

3.3 Loading by vibratory torque

The permissible vibratory torque of the coupling T_{KW} must not be exceeded by the maximum periodical vibratory torque of the machine T_W.

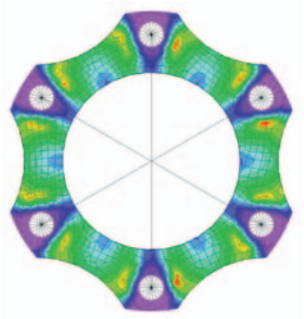
$$T_{KW} \geq T_W$$

Description of coupling

The RADEX®-N is a backlash-free, torsionally rigid and maintenance-free all-steel coupling. The laminas that are extremely rigid in sense of rotation are made of high-strength, stainless spring steel and enable a compensation for high displacements with low restoring forces. By reason of the all-steel design the RADEX®-N can be used in drives with temperatures of up to 280 °C.

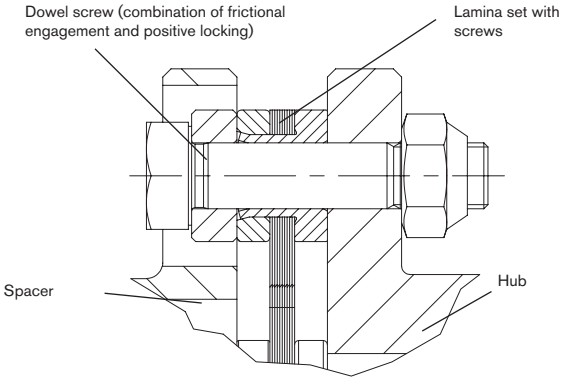
FEM-optimized lamina shape

The steel lamina sets made of stainless spring steel were developed on the basis of FEM calculations. Taking into account the necessary possibilities of displacements of the coupling the optimum shape regarding torque transmission and torsional rigidity was aimed at. The fitted shape of the steel laminas on the outside diameter is the result of this optimization calculation.



Lamina sets with dowel screws

The „heart“ of the steel lamina coupling are the lamina sets and their connection to the hubs or spacers. High-strength, special dowel screws that are alternately screwed to hubs and spacer enable a combination of frictional engagement and positive locking. Thus a high power density with at the same time ease of displacement and low restoring forces is ensured. Due to the special design of the RADEX®-N components the lamina sets are prestressed „artificially“. Hereby the torsional rigidity is increased by approx. 30 % and at the same time the well-known problem regarding the axial vibrations of the spacer is prevented.



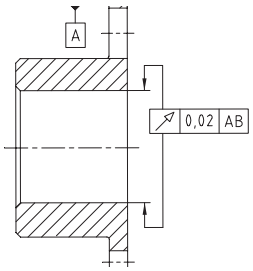
Use in explosive applications

RADEX®-N couplings are suitable for power transmission in drives in hazardous areas. The couplings are certified and confirmed according to EC standard 94/9/EC (ATEX 95) as units of category 2G/2D and thus suitable for the use in hazardous areas of zone 1, 2, 21 and 22. With the use in explosive areas clamping ring hubs (clamping hubs without feather key for category 3 only) have to be selected such that there is a safety factor of s = 2 between the peak torque of the unit including all operating parameters and the friction and rated torque of the coupling. You will find further details about this subject at www.ktr.com.

General information

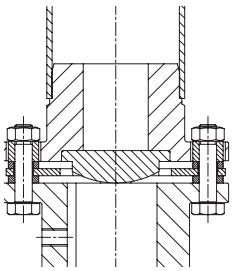
Assembly and operating advice

(Please see our mounting instructions KTR standard 47110 at www.ktr.com.) For the assembly it is important to make sure that the lamina sets are assembled free from distortion in axial direction. If the finish bore is machined by the customer, the concentric and axial running tolerances have to be observed (see sketch).



Installation:

RADEX®-N couplings are designed for horizontal installation. For vertical installation the spacer might have to be supported (see sketch). Please consult with us.



Delivery condition

RADEX®-N couplings are supplied as individual parts (can be delivered assembled on request). The hubs can be supplied unbored or with finish bore and feather keyway or with a frictionally engaged shaft-hub-connection. The shaft-hub-connection needs to be inspected by the customer (if necessary, please consult with KTR).

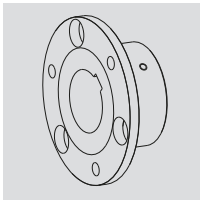
Balancing:

On request of the customer the RADEX®-N couplings can be balanced. For usual applications this is not necessary due to the accurate machining of the coupling. Please consult with KTR, if necessary.

Safety regulations:

The coupling must be selected in a way that the permissible coupling load is not exceeded in any operating condition. For that purpose a comparison between the actual loads and the permissible coupling characteristics has to be performed. The customer must protect rotating parts from accidental contact (Safety of Machines DIN EN 292 part 2). Please take precautions that there is a sufficient coupling protection in case of a fracture of the coupling caused by overload.

Hub designs



Design 1.0 Hub with feather keyway and thread for setscrews

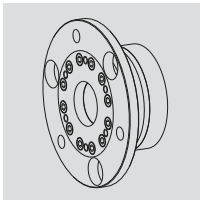
Positive locking torque transmission, permissible torque depending on the permissible surface pressure. Not suitable as backlash-free torque transmission with heavily reversing operation.

Design 1.1 hub without keyway, with fixing screw

Non-positive torque transmission for crimped and bonded connections (no ATEX release)

Design 1.2 Hub without feather keyway, without thread for setscrews

Non-positive torque transmission for crimped and bonded connections (no ATEX release)

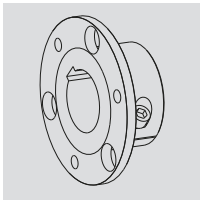


Design 6.0 clamping ring hub

Integrated frictionally engaged shaft-hub-connection for the transmission of higher torques. Clamping screws on lamina side. Transmittable torques depending on bore diameter. Suitable for high speeds.

Design 6.5 clamping ring hub

Integrated frictionally engaged shaft-hub-connection for the transmission of higher torques. Clamping screws externally. Transmittable torques depending on bore diameter. Suitable for high speeds.



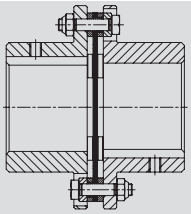
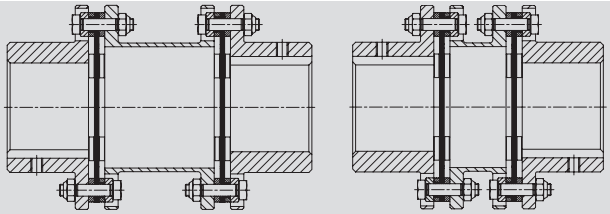
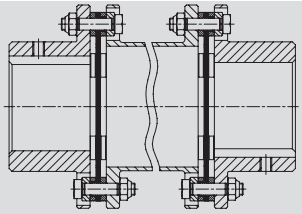
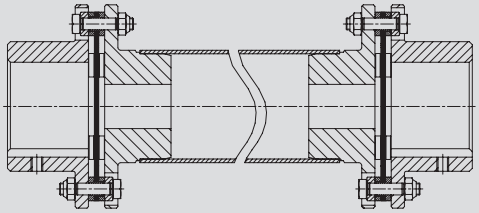
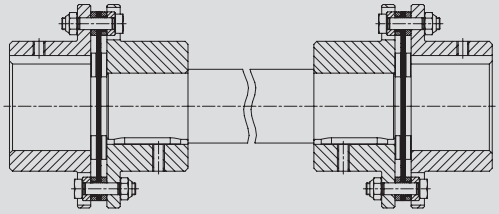
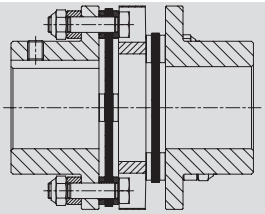
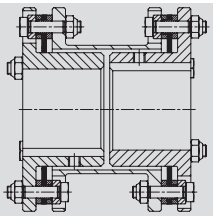
Design 2.5 clamping hub with two slots without feather keyway

Frictionally engaged, backlash-free shaft-hub-connection. Transmittable torques depending on bore diameter. Only permissible for ATEX cat. 3.

Design 2.6 clamping hub with two slots with feather keyway

Positive locking shaft-hub-connection with additional frictionally engaged operation. The frictionally engaged operation prevents or reduces reverse backlash.

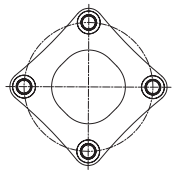
Types and applications

Type	Characteristics	Applications
 Type NN (see page 130)	● Single cardanic design ● Only angular and axial displacement permissible ● High torsional rigidity ● Compact dimensions	● Mixers ● Agitators ● Immersion pumps ● Fans ● Applications with high radial load
 Type NANA 1 / NANA 2 (see page 132)	● Double cardanic design ● Compensating for high misalignment with low restoring forces ● Standard spacers available from stock	● Paper machines ● Printing and processing machines ● Conveyors ● Steel mills ● Generators ● Grinding machines
 Type NANA 3 (see page 133)	● Double cardanic design ● Spacers adapted to standard dimensions of pumps ● Radial assembly, no shifting of the machine required ● Available according to API 610	● Process pumps ● Water pumps ● Pumps according to API standard ● Turbines ● Compressors
 Type NANA 4 (see page 134)	● Spacers can be determined by the customer ● Maximum shaft distance dimension up to approx. 6 m ● Welded intermediate pipes for high torsional rigidity	● Foil and paper machines ● Pallet and conveyor systems ● Robotic palletizers ● Test benches ● Cooling towers/blowers
 Type NNW (see page 132)	● Spacers can be determined by the customer ● Coupling consisting of 2 times type NN with intermediate shaft ● For drives with relatively low speeds	● Low speed drives with big shaft distance dimensions ● Agitators ● Crushers ● Presses ● Packaging machines
 Type NNZ (see page 131)	● Compact double cardanic design ● Cannot be radially assembled ● With intermediate disk ● Ideal for replacement of curved-tooth gear couplings from steel ● Standard type up to size 70	● Robotics ● Paper machines and inserters ● Machine tools ● Packaging machines ● Test benches
 Type NENE 1 (see page 131)	● With reduced hubs ● Compact double cardanic design ● Spacer cannot be radially assembled ● Variable spacer length	● Applications with short shaft distance dimensions ● Replacement for curved-tooth gear couplings from steel

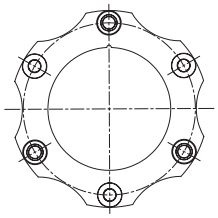
Technical data

The following lamina types are distinguished with RADEX®-N

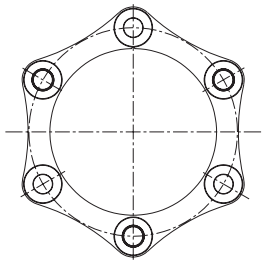
Size 20 – 50
(4 hole lamina)



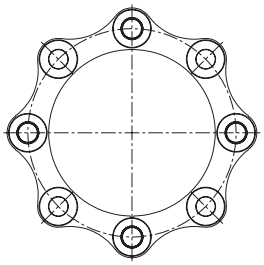
Size 60 – 135
(6 hole lamina)



Size 136 – 336
(6 hole lamina)



Size 138 – 338
(8 hole lamina)



Torques and displacements

Size	Lamina type	Torques [Nm][1]			Permissible displacements [2]				
					Angular [°] each lamina	Axial [mm]		Radial [mm]	
		T_{KN}	TK max	T_{KW}		NN	NANA 1/ NANA2/ NNZ	NANA 1	NANA 2/NNZ
20		15	30	5	1,0	0,60	1,2	0,5	0,1
25		30	60	10	1,0	0,80	1,6	0,5	0,2
35	4 hole lamina	60	120	20	1,0	1,00	2,0	0,5	0,2
38		120	240	40	1,0	1,20	2,4	0,6	0,3
42		180	360	60	1,0	1,40	2,8	0,6	0,3
50		330	660	110	1,0	1,60	3,2	0,8	0,4
60		690	1380	230	1,0	1,00	2,0	1,5	0,8
70		1100	2200	370	1,0	1,10	2,2	1,8	1,0
80		1500	3000	500	1,0	1,30	2,6	2,1	1,2
85		2400	4800	800	1,0	1,30	2,6	2,2	1,2
90		4500	9000	1500	1,0	1,00	2,0	2,2	1,1
105		5100	10200	1700	1,0	1,20	2,4	2,4	1,4
115		9000	18000	3000	1,0	1,40	2,8	2,5	1,5
135	6 hole lamina	12000	24000	4000	1,0	1,75	3,5	3,8	–
136		17500	35000	8750	0,7	1,85	3,7		
156		25000	50000	12500	0,7	2,10	4,2		
166		35000	70000	17500	0,7	2,25	4,5		
NEW 186		42000	84000	21000	0,7	2,40	4,8		
206		52500	105000	26250	0,7	2,60	5,2		
246		90000	180000	45000	0,7	3,00	6,0		
286		150000	300000	75000	0,7	3,35	6,7		
336		210000	420000	105000	0,7	3,75	7,5	Depending on	
138		23000	46000	11500	0,5	1,30	2,6	distance dimension E	
158		33000	66000	16500	0,5	1,40	2,8		
168		45000	90000	22500	0,5	1,50	3,0		
NEW 188	8 hole lamina	56000	112000	28000	0,5	1,60	3,2		
208		70000	140000	35000	0,5	1,75	3,5		
248		120000	240000	60000	0,5	2,00	4,0		
288		200000	400000	100000	0,5	2,40	4,5		
338		280000	560000	140000	0,5	2,50	5,0		

Permissible speeds and torsional stiffness figures

Size	Max. speed [rpm] (higher speeds on request)	Torsion spring rigidity x 10^6 [Nm/rad] per lamina set	Size	Max. speed [rpm] (higher speeds on request)	Torsion spring rigidity x 10^6 [Nm/rad] per lamina set
20	20000	0,017	156	3500	9,20
25	16000	0,028	166	3300	13,8
35	13000	0,092	186	3000	18,4
38	12000	0,198	206	2800	23,8
42	10000	0,282	246	2300	28,4
50	8000	0,501	286	2000	41,4
60	6700	0,560	336	1800	48,5
70	5900	0,900	138	3800	13,2
80	5100	1,140	158	3500	18,3
85	4750	1,520	168	3300	26,2
90	4300	1,940	188	3000	31,0
105	4000	2,540	208	2800	52,0
115	3400	3,480	248	2300	71,0
135	3000	6,850	288	2000	108,0
136	3800	7,64	338	1800	156,0

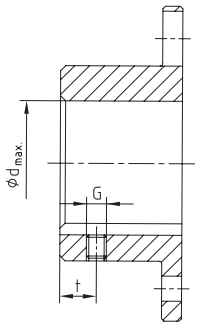
[1] For selection of coupling see page 123/124.
[2] The permissible displacement figures mentioned are maximum figures which must not arise at the same time. If radial, axial and angular displacements arise in parallel, the figures need to be reduced.

Technical data

Weights and mass moments of inertia						
Size	Hub [1] [kg] / [kgm²]	Lamina set [kg] / [kgm²]	NN [1] complete [kg] / [kgm²]	NANA 1 [1] complete [kg] / [kgm²]	NANA 2 [1] complete [kg] / [kgm²]	NNZ [1] complete [kg] / [kgm²]
20	0,13 / 0,000043	0,04 / 0,00002	0,3 / 0,00011	0,6 / 0,000204	–	0,4 / 0,000166
25	0,2 / 0,000116	0,08 / 0,00005	0,56 / 0,00028	0,9 / 0,000522	–	0,8 / 0,000414
35	0,6 / 0,00042	0,10 / 0,00010	1,2 / 0,00094	1,9 / 0,00158	–	1,6 / 0,00129
38	0,8 / 0,00073	0,20 / 0,00026	1,8 / 0,0017	2,8 / 0,00303	–	2,4 / 0,00247
42	1,1 / 0,00123	0,25 / 0,00040	2,4 / 0,0029	3,6 / 0,00482	–	3,1 / 0,00409
50	1,7 / 0,00291	0,46 / 0,0010	4,0 / 0,0068	6,2 / 0,0118	–	5,1 / 0,00932
60	1,9 / 0,00378	0,40 / 0,0012	4,2 / 0,0087	6,0 / 0,0141	5,8 / 0,0138	5,3 / 0,0120
70	2,8 / 0,00714	0,42 / 0,0016	6,0 / 0,016	8,6 / 0,0253	8,2 / 0,0242	7,5 / 0,0214
80	4,1 / 0,0134	0,72 / 0,0037	9,0 / 0,031	12,6 / 0,0476	12,0 / 0,0458	11,1 / 0,0410
85	5,1 / 0,0195	1,0 / 0,0065	11,2 / 0,046	16,2 / 0,0734	15,5 / 0,0711	14,8 / 0,0650
90	6,2 / 0,0282	2,3 / 0,0162	14,7 / 0,073	22,0 / 0,121	21,3 / 0,119	20,1 / 0,108
105	7,6 / 0,0414	2,2 / 0,0180	17,4 / 0,101	25,8 / 0,165	24,6 / 0,159	23,1 / 0,145
115	12,0 / 0,0899	4,0 / 0,0433	27,9 / 0,223	42,8 / 0,381	41,2 / 0,372	38,3 / 0,333
135	19,0 / 0,187	7,3 / 0,105	45,1 / 0,478	71,3 / 0,835	–	–
136	16,8 / 0,153	7,9 / 0,113	41,4 / 0,419			–
156	20,2 / 0,217	11,9 / 0,200	52,2 / 0,634			–
166	30,0 / 0,373	12,3 / 0,255	72,3 / 1,001			–
NEW 186	42,0 / 0,629	12,7 / 0,318	96,7/ 1,576			–
206	55,1 / 1,004	18,2 / 0,548	128,3 / 2,556			–
246	85,9 / 2,229	31,2 / 1,304	203,1 / 5,762			–
286	145,1 / 4,977	44,4 / 2,495	334,4 / 12,449			–
336	223,9 / 10,486	64,2 / 4,74	512,0 / 25,712	Mounting dimension E as	Mounting dimension E as	–
138	16,2 / 0,145	9,9 / 0,143	42,3 / 0,433	indicated by the customer	indicated by the customer	–
158	19,5 / 0,205	14,9 / 0,252	54,0 / 0,662			–
168	29,4 / 0,360	15,2 / 0,318	74,0 / 1,038			–
NEW 188	41,7/ 0,611	15,6 / 0,396	99,0 / 1,618			–
208	54,1 / 0,971	22,4 / 0,680	130,5 / 2,622			–
248	84,0 / 2,144	38,2 / 1,605	206,2 / 5,893			–
288	142,5 / 4,823	53,8 / 3,056	338,8 / 12,702			–
338	220,1 / 10,18	78,0 / 5,817	518,2 / 26,177			–

[1] Hubs with max. bore

Cylindrical bores

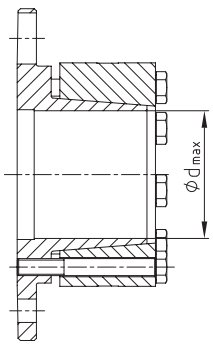


Standard hub 1.0 with keyway according to DIN 6885 sheet 1									
Size	$d_{max.}$	G	t	T_A [Nm]	Size	$d_{max.}$	G	t	T_A [Nm]
20	20	M5	6	2,0	105	105	M12	30	40,0
25	25	M5	8	2,0	115	115	M12	30	40,0
35	35	M6	15	4,8	135	135			
38	38	M6	15	4,8	136 / 138	135			
42	42	M8	20	10,0	156 / 158	150			
50	50	M8	20	10,0	166 / 168	165			
60	60	M8	20	10,0	186 / 188	180	On request of customer		
70	70	M10	20	17,0	206 / 208	200			
80	80	M10	20	17,0	246 / 248	240			
85	85	M10	25	17,0	286 / 288	280			
90	90	M12	25	40,0	336 / 338	330			

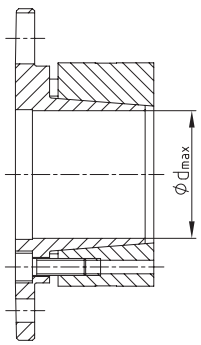
Backlash-free shaft-hub connections without feather key

Selection: In case of use in hazardous areas the clamping ring hubs must be selected in a way that there is a minimum safety factor of s = 2 between the peak torque (including all operating parameters) and the nominal torque and frictional torque of engagement of the coupling.

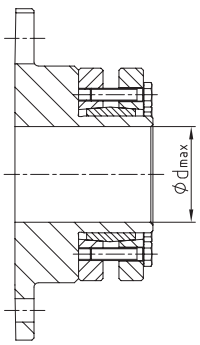
Clamping ring hub type 6.5
(clamping screws externally)



Clamping ring hub type 6.0
(clamping screws internally)

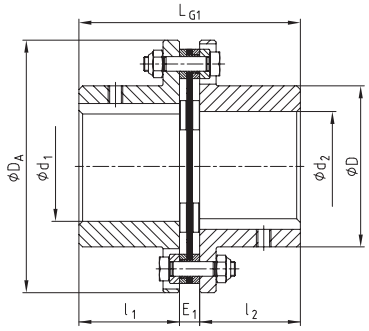


Design with CLAMPEX®
element type 603

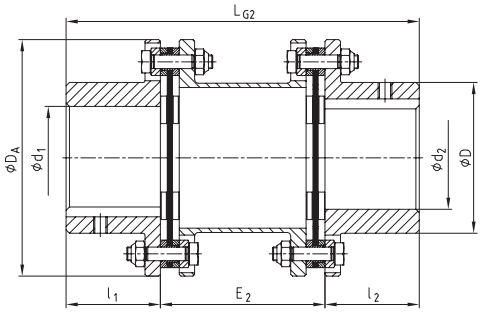


Standard types

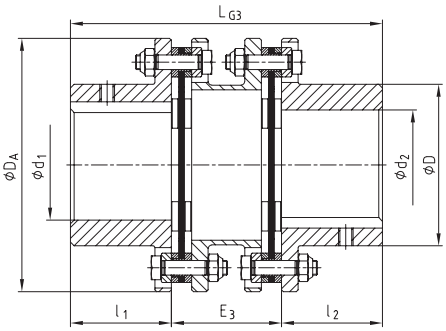
- Standard types available from stock
- Single and double cardanic types
- Optionally available with frictionally engaged shaft-hub-connection
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9
- Ex-Approved and certified according to EC Standard 94/9/EC
- From size 136 screwing of laminas by means of clamping nut (see assembly instructions KTR-N 47112)



Type NN



Type NANA 1



Type NANA 2

RADEX®-N Types NN, NANA 1, NANA 2

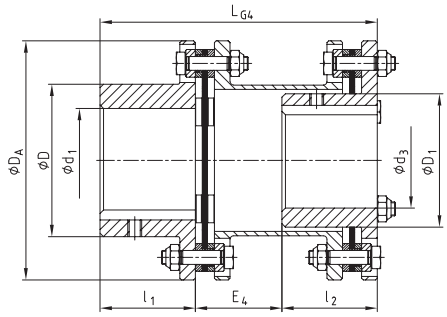
Size	Max. finish bore	Dimensions [mm]								
	d_1/d_2	D	D_A	l_1/l_2	L_{G1}	E_1	L_{G2}	E_2	L_{G3}	E_3
20	20	32	56	20	45	5	100	60	–	–
25	25	40	68	25	56	6	110	60	–	–
35	35	54	82	40	86	6	150	70	–	–
38	38	58	94	45	98	8	170	80	–	–
42	42	68	104	45	100	10	170	80	–	–
50	50	78	126	55	121	11	206	96	–	–
60	60	88	138	55	121	11	206	96	170	60
70	70	102	156	65	141	11	246	116	200	70
80	80	117	179	75	164	14	286	136	233	83
85	85	123	191	80	175	15	300	140	246	86
90	90	132	210	80	175	15	300	140	251	91
105	105	147	225	90	200	20	340	160	281	101
115	115	163	265	100	223	23	370	170	309	109
135	135	184	305	135	297	27	520	250	–	–
136	135	180	300	135	293	23				
156	150	195	325	150	327	27				
166	165	225	350	165	361	31				
NEW 186	180	250	380	185	401	31				
206	200	275	420	200	437	37				
246	240	320	500	240	524	44				
286	280	383	567	280	612	52				
336	330	445	660	330	718	58	Indicated by the customer			
138	135	180	300	135	293	23				
158	150	195	325	150	327	27				
168	165	225	350	165	361	31				
NEW 188	180	250	380	185	401	31				
208	200	275	420	200	437	37				
248	240	320	500	240	524	44				
288	280	383	567	280	612	52				
338	330	445	660	330	718	58				

Ordering example

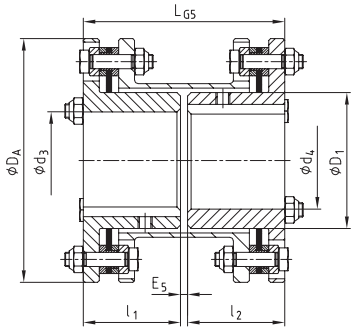
RADEX®-N 60	NANA 1	Ø50	Ø60
Coupling size	Type	Finish bore d_1	Finish bore d_2

Standard types

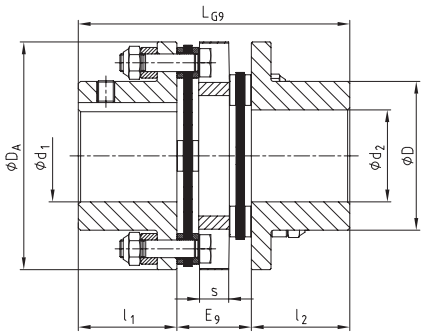
- Standard types available from stock
- Single and double cardanic designs
- Furthermore available with frictionally engaged shaft-hub-connection
- Type NNZ (double-cardanic) for very short shaft distance dimensions
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9
- Ⓔx-Approved and certified according to EC Standard 94/9/EC



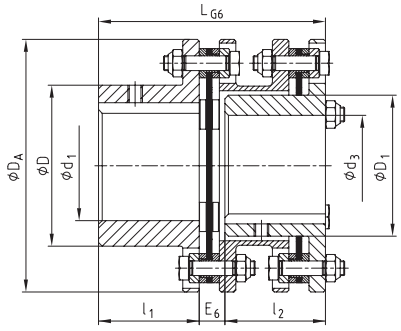
Type NENA 1



Type NENE 1



Type NNZ



Type NENA 2

RADEX®-N Types NENA 1, NENE 1, NENA 2, NNZ

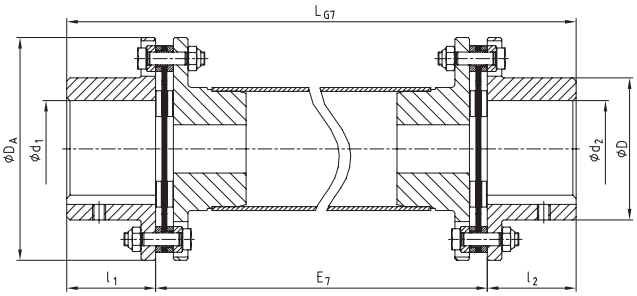
Size	Max. finish bore		Dimensions [mm]											
	d_1/d_2	d_3/d_4	D	D_1	D_A	l_1/l_2	L_{G4}	E_4	L_{G5}	E_5	L_{G6}	E_6	L_{G9}	E_9
20	20	–	32	–	56	20	–	–	–	–	–	–	58	18
25	25	–	40	–	68	25	–	–	–	–	–	–	70	20
35	35	–	54	–	82	40	–	–	–	–	–	–	102	22
38	38	–	58	–	94	45	–	–	–	–	–	–	118	28
42	42	–	68	–	104	45	–	–	–	–	–	–	124	34
50	50	–	78	–	126	55	–	–	–	–	–	–	144	34
60	60	55	88	77	138	55	160	50	114	4	124	14	144	34
70	70	65	102	90	156	65	190	60	134	4	144	14	166	36
80	80	75	117	104	179	75	220	70	154	4	167	17	–	–
85	85	80	123	112	191	80	232	72	164	4	178	18	–	–
90	90	85	132	119	210	80	233	73	166	6	184	24	–	–
105	105	90	147	128	225	90	263	83	186	6	204	24	–	–
115	115	100	163	145	265	100	288	88	206	6	227	27	–	–

Ordering example:

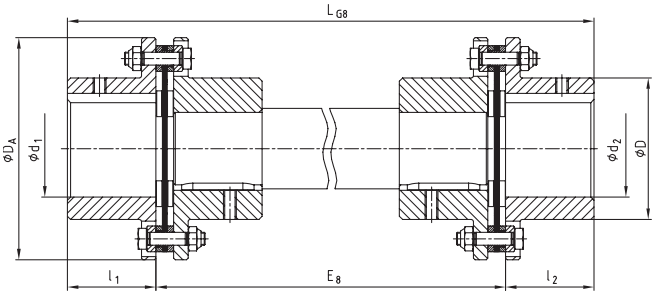
RADEX®-N 60	NENA 1	Ø50	Ø60
Coupling size	Type	Finish bore d_1	Finish bore d_2

Customized types

- Types as per customer requirements
- Type NANA 4 for shaft distance dimensions up to 6 m (please note the critical whirling speed)
- Type NNW with solid shaft (please note the critical whirling speed)
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9
- ⟨Ex⟩-Approved and certified according to EC Standard 94/9/EC
- From size 136 screwing of laminas by means of clamping nut (see assembly instructions KTR-N 47112)



Type NANA 4



Type NNW

RADEX®-N Types NANA 4, NNZ and NNW								
Size	Max. finish bore	Dimensions [mm]						
	d_1/d_2	D	D_A	l_1/l_2	L_{G7}	E_7	L_{G8}	E_8
20	20	32	56	20				
25	25	40	68	25				
35	35	54	82	40				
38	38	58	94	45				
42	42	68	104	45				
50	50	78	126	55				
60	60	88	138	55				
70	70	102	156	65				
80	80	117	179	75				
85	85	123	191	80				
90	90	132	210	80				
105	105	147	225	90				
115	115	163	265	100				
135	135	184	305	135				
136	135	180	300	135				
156	150	195	325	150				
166	165	225	350	165				
NEW 186	180	250	380	185				
206	200	275	420	200				
246	240	320	500	240				
286	280	383	567	280				
336	330	445	660	300				
138	135	180	300	135				
158	150	195	325	150				
168	165	225	350	165				
NEW 188	180	250	380	185				
208	200	275	420	200				
248	240	320	500	240				
288	280	383	567	280				
338	330	445	660	300				

$L_{G7} = E_7 + l_1 + l_2$

Intermediate shaft dimension according to customer specification

$L_{G8} = E_8 + l_1 + l_2$

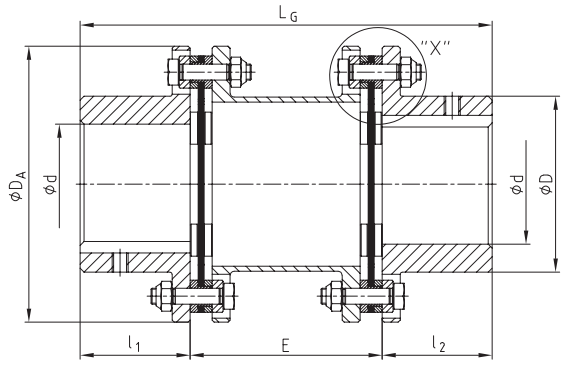
Intermediate shaft dimension according to customer specification

Ordering example:

RADEX®-N 60	NANA 4	Ø50	Ø60	2500
Coupling size	Type	Finish bore d_1	Finish bore d_2	Shaft distance dimension

Standard series NANA 3 for pump drives according to API 610

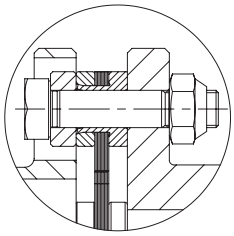
- Series NANA 3 for pump drives, coupling according to API 610
- High balancing quality due to accurate manufacturing (AGMA class 9)
- Device to protect the spacer if the lamina breaks (see detail “X”)
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9
- Ex-Approved and certified according to EC Standard 94/9/EC
- From size 136 screwing of laminas by means of clamping nut (see assembly instructions KTR-N 47112)



RADEX®-N Type NANA 3							
Size	Max. finish bore	Dimensions [mm]				Perm. displacements	
	d	D	D_A	$E_{Standard}$ [1]	l_1/l_2	Angle each lamina [°]	Axial [mm]
42	42	68	104	100	45	1,0	2,8
50	50	78	126	140/180	55	1,0	3,2
60	60	88	138	100/140/180/250	55	1,0	2,0
70	70	102	156	100/140/180	65	1,0	2,2
80	80	117	179	100/140/180/250	75	1,0	2,6
85	85	123	191	100/140/180/250	80	1,0	2,3
90	90	132	210	140/180/250	80	1,0	2,0
105	105	147	225	250	90	1,0	2,4
115	115	163	265	250	100	1,0	2,8
135	135	184	305	250	135	1,0	3,5
136	135	180	300		135	0,7	3,7
156	150	195	325		150	0,7	4,2
166	165	225	350		165	0,7	4,5
NEW 186	180	250	380		185	0,7	4,8
206	200	275	420		200	0,7	5,2
246	240	320	500		240	0,7	6,0
286	280	383	567		280	0,7	6,7
336	330	445	660	acc. to customer's specifications	330	0,7	7,5
138	135	180	300		135	0,5	2,6
158	150	195	325		150	0,5	2,8
168	165	225	350		165	0,5	3,0
NEW 188	180	250	380		185	0,5	3,2
208	200	275	420		200	0,5	3,5
248	240	320	500		240	0,5	4,0
288	280	383	567		280	0,5	4,5
338	330	445	660		330	0,5	5,0

[1] Other distance dimensions E available on request.

Detail “X”

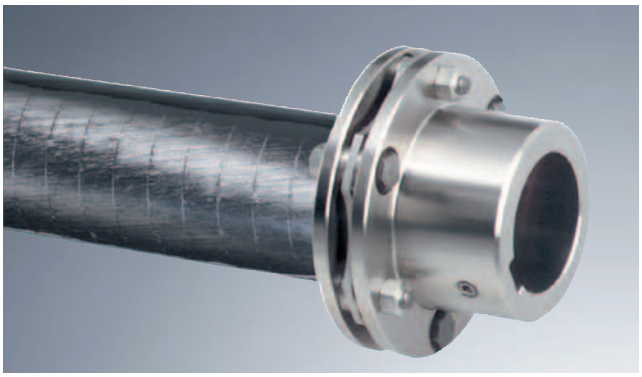


Safety gear of the spacer:
The lamina sets have a sleeve in order to secure the spacer if the lamina breaks.

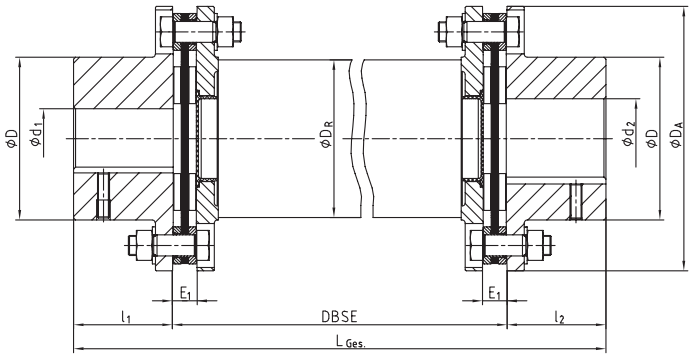
Ordering example:

RADEX®-N 60	NANA 3	Ø50	Ø60	140
Coupling size	Type	Finish bore d_1	Finish bore d_2	Shaft distance dimension

Corrosion-resistant type for big shaft distance dimensions



- All steel parts made of stainless material
- Composite tubes are conglutinated with the flanges and radially bolted in addition
- Spacer sealed against environmental influences (e. g. penetration of moisture into the glued joint)
- On request also available with brake disk made of stainless material
- ATEX release possible



RADEX®-N Type NANA 4 CFK											
Size	Torque [Nm] [1]		Dimensions [mm]								
	T_{KN}	TK_{max}	D_A	d_1/d_2 max.	D	l_1/l_2	E_1	DBSE	$L_{Ges.}$	Composite $tube_R$	max. DBSE[2] with 1500 rpm
70	800	1600	149	70	102	65	11	acc. to customer's specifications	$l_1 + l_2$ + DBSE	95	3500
85	1800	3600	184	85	123	80	15			117	3900
90	2500	5000	200	90	135	80	15			128	4100
115	4500	9000	253	115	163	100	23			160	4600

[1] For selection of coupling see page 123/124.
[2] For higher speeds or bigger shaft distance dimensions please consult with KTR's engineering department (+49 5971 798-484). The above-mentioned characteristic figures (e. g. max. DBSE) can be varied by Composite tubes optimized for the application.

Particularly the steel lamina couplings are well suited for applications with especially large distance dimensions between the drive and the driven side (e. g. cooling towers, ventilators etc.) due to their design. In order to be able to realize high speeds with large distance dimensions, RADEX®-N couplings with intermediate shafts made of glass fiber or carbon fiber reinforced nylon (GRP or CFRP) are used, if necessary.

Ordering example:

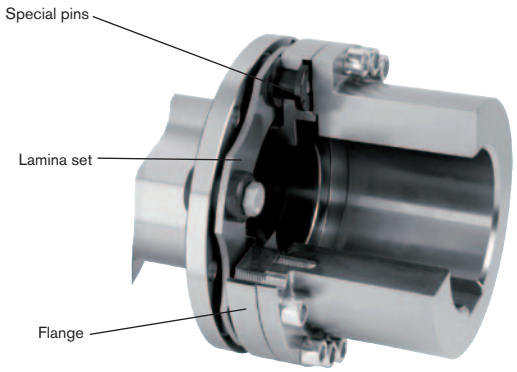
RADEX®-N 85	NANA 4 CFK	Ø60	Ø70	3000
Coupling size	Type	Finish bore d_1	Finish bore d_2	Shaft distance dimension

Description of coupling

RIGIFLEX®-N couplings are used on such applications which require a reliable and maintenance-free torque transmission with shaft displacement at the same time.
RIGIFLEX®-N was developed specifically for pump drives. This coupling system corresponds to the regulations of API 610 and may be supplied in accordance with API 671 optionally. (API = American Petroleum Institute)
Torques from 60 Nm to 280.000 Nm are available in 23 sizes for an optimum adjustment to the different applications.

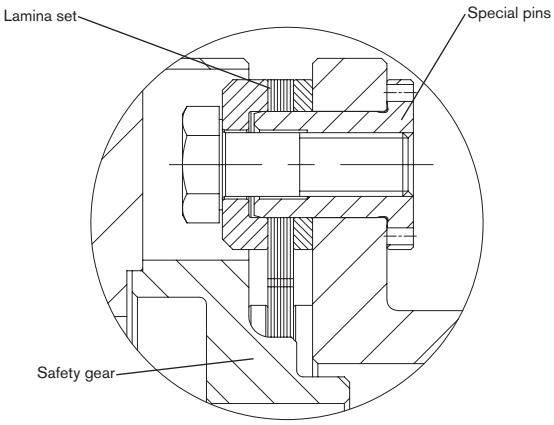
RIGIFLEX®-N laminas

RIGILFEX®-N laminas are waisted lamina sets arranged in layers. They are connected to the hubs or flanges, respectively, in an absolutely backlash-free fit by means of positive-locking set screws.
The number of the layers of individual laminas allows to vary torques, displacement figures and stiffness for special designs.



Protecting the spacer

Since our main idea with the development of RIGIFLEX®-N was to comply with the standards of API 610 and API 671, the spacer is secured by a safety catch, too. In case that the laminas break the spacer remains within the coupling. In general the removable part is supplied along with a lamina set preassembled by the manufacturer.



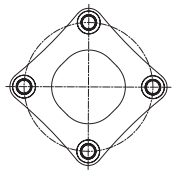
Explosion protection use

RIGIFLEX®-N couplings are suitable for the use in drives in hazardous areas. The couplings are certified and confirmed according to EC standard 94/9/EC (ATEX 95) as units of category 2G/2D and thus suitable for the use in hazardous areas of zone 1, 2, 21 and 22. Please read through our information included in the respective Type Examination Certificate and the operating and mounting instructions at www.ktr.com.

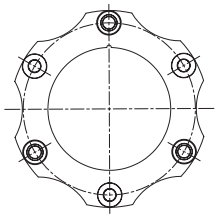
Technical data

The following lamina types are distinguished with RIGIFLEX®-N:

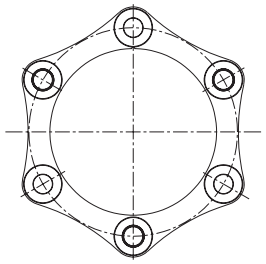
Size 35 – 65
(4 hole lamina)



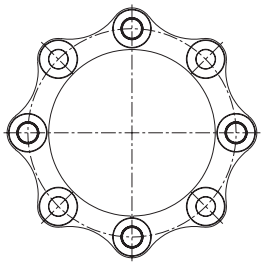
Size 75 – 160
(6 hole lamina)



Size 166 – 406
(6 hole lamina)



Size 168 – 408
(8 hole lamina)



Torques and displacements

Size	Lamina type	Torques [Nm]			Permissible displacements						
		T_{KN}	TK max.	T_{KW}	Angular ± Kw [1] [°]	Axial ± Ka [mm]	Radial ± Kr [mm]				
							E=100	E=140	E=180	E=200	E=250
35		120	240	60	0,7	1,2	0,90	1,40	–	–	–
50	4 hole lamina	240	480	120	0,7	1,4	0,77	1,26	–	–	–
65		450	900	225	0,7	1,5	0,75	1,23	1,72	–	–
75		940	1880	470	0,7	1,8	0,73	1,22	1,71	–	–
85		1700	3400	850	0,7	2,1	–	1,14	1,62	1,87	2,48
110		2700	5400	1350	0,7	2,4	–	1,05	1,54	1,78	2,39
120		4500	9000	2250	0,7	2,6	–	1,00	1,49	1,73	2,35
140		9000	18000	4500	0,7	3,3	–	–	–	1,55	2,16
160		13000	26000	6500	0,7	3,8	–	–	–	–	1,99
166	6 hole	17500	35000	8750	0,7	3,7					
196	lamina	22500	45000	11250	0,7	4,2					
216		32000	64000	16000	0,7	4,5					
256		52500	105000	26250	0,7	5,2					
306		86000	172000	43000	0,7	6,0					
346		135000	270000	67500	0,7	6,7					
406		210000	420000	105000	0,7	7,5	Mounting dimension E as indicated by the customer				
168		23000	46000	11500	0,5	2,6					
198		30000	60000	15000	0,5	2,8					
218		42500	85000	21500	0,5	3,0					
258	8 hole	70000	140000	35000	0,5	3,5					
308	lamina	115000	230000	57500	0,5	4,0					
348		180000	360000	90000	0,5	4,5					
408		280000	560000	140000	0,5	5,0					

[1] Angular displacement each lamina

If axial, angular and radial shaft displacement arises in parallel please note the following table:

Size	Permissible angular displacement							
	0	0,1	0,2	0,3	0,4	0,5	0,6	0,7
	Permissible axial displacement							
35	1,20	1,00	0,85	0,74	0,60	0,40	0,20	0,00
50	1,40	1,20	1,00	0,80	0,60	0,40	0,20	0,00
65	1,50	1,29	1,07	0,86	0,64	0,43	0,22	0,00
75	1,80	1,54	1,29	1,03	0,77	0,52	0,26	0,00
85	2,10	1,80	1,50	1,20	0,90	0,60	0,30	0,00
110	2,40	2,06	1,71	1,37	1,03	0,69	0,34	0,00
120	2,60	2,23	1,86	1,48	1,11	0,74	0,37	0,00
140	3,30	2,83	2,36	1,88	1,41	0,94	0,47	0,00
160	3,80	3,26	2,71	2,17	1,63	1,09	0,54	0,00
166	3,70	3,17	2,64	2,12	1,59	1,06	0,53	0,00
196	4,20	3,60	3,00	2,40	1,80	1,20	0,60	0,00
216	4,50	3,86	3,21	2,57	1,93	1,29	0,64	0,00
256	5,20	4,46	3,71	2,97	2,23	1,49	0,74	0,00
306	6,00	5,14	4,29	3,43	2,57	1,72	0,86	0,00
346	6,75	5,79	4,82	3,86	2,89	1,93	0,96	0,00
406	7,50	6,43	5,36	4,28	3,21	2,14	1,07	0,00
168	2,60	2,08	1,56	1,04	0,52	0,00	–	–
198	2,80	2,24	1,68	1,12	0,56	0,00	–	–
218	3,00	2,40	1,80	1,20	0,60	0,00	–	–
258	3,50	2,80	2,10	1,40	0,70	0,00	–	–
308	4,00	3,20	2,40	1,60	0,80	0,00	–	–
348	4,50	3,60	2,70	1,80	0,90	0,00	–	–
408	5,00	4,00	3,00	2,00	1,00	0,00	–	–

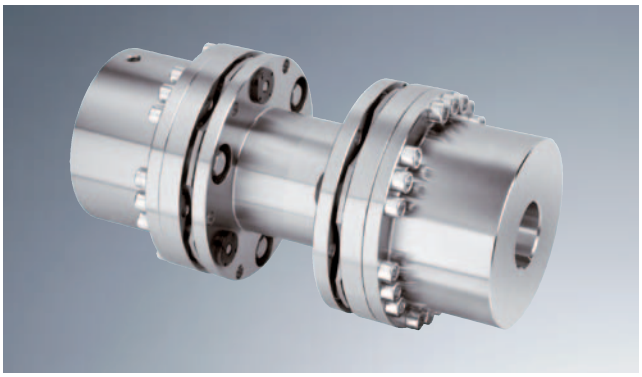
Technical data

Permissible speeds and stiffness								
Size	Max. speed [rpm]	Each lamina set		ct [Nm/rad] for complete coupling with mounting length E				
		cw [Nm/rad]	ct [Nm/rad]	E=100	E=140	E=180	E=200	E=250
35	23000	107	170000	65020	56700	–	–	–
50	18000	470	198000	73953	63990	–	–	–
65	13600	860	360000	146022	129938	117046	–	–
75	12400	1500	720000	306145	278381	255234	–	–
85	11000	2300	1062000	–	406641	369429	353265	318433
110	9000	2800	1460000	–	664284	637587	625028	595693
120	8000	4100	4500000	–	1798018	1637553	1567602	1416348
140	6400	6400	5600000	–	–	–	2363340	2226630
160	5600	9800	6850000	–	–	–	–	2654894
166	5600	10200	7640000					
196	5200	17130	9200000					
216	4600	32300	13800000					
256	3900	47060	23800000					
306	3300	64700	28400000					
346	2900	85300	41400000					
406	2500	161000	48500000	Mounting dimension E as indicated by the customer				
168	5600	34000	13200000					
198	5200	58000	18300000					
218	4600	110000	26200000					
258	3900	160000	52000000					
308	3300	220000	71000000					
348	2900	290000	108000000					
408	2500	550000	156000000					

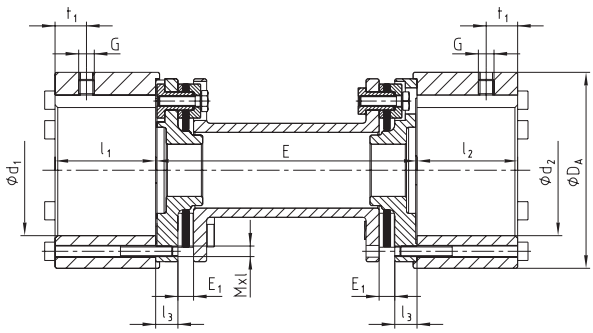
cw = angular stiffness
ct = torsion spring stiffness

Weights and mass moments of inertia												
Size	Hub (max. bore)		Spacer complete [kg]					Spacer complete [x10³ kgm²]				
	[kg]	[kgm²]	E=100	E=140	E=180	E=200	E=250	E=100	E=140	E=180	E=200	E=250
35	0,60	0,0007	1,030	1,120	–	–	–	0,00040	0,00050	–	–	–
50	0,92	0,001019	2,262	2,442	–	–	–	0,00256	0,00263	–	–	–
65	2,7	0,00541	3,922	4,183	4,445	–	–	0,00810	0,00830	0,00828	–	–
75	2,4	0,00566	4,482	4,842	5,202	–	–	0,01143	0,01191	0,01239	–	–
85	3,7	0,01135	–	7,154	7,548	7,746	8,239	–	0,02364	0,02427	0,02459	0,02538
110	6,7	0,03222	–	12,492	13,478	13,972	15,205	–	0,06291	0,06540	0,06665	0,06976
120	9,2	0,05238	–	–	17,324	17,842	19,137	–	–	0,10314	0,10458	0,10818
140	18,2	0,15175	–	–	–	32,530	34,325	–	–	–	0,31901	0,32845
160	29,9	0,33890	–	–	–	–	52,458	–	–	–	–	0,68640
166	28,0	0,32										
196	37,0	0,554										
216	50,0	0,85										
256	95,0	2,35										
306	138,0	4,55										
346	215,0	9,75										
406	310,0	18,95	Mounting dimension E as indicated by the customer									
168	30,0	0,33										
198	40,0	0,56										
218	52,0	0,88										
258	99,0	2,43										
308	142,0	4,78										
348	222,0	9,83										
408	325,0	19,22										

Type A



- Series for pump drives
- Coupling in accordance with API 610, API 671 optionally.
- Available with large hub for bigger bore diameters
- Spacers are supplied assembled by the manufacturer
- Finish bore according to ISO fit H7, feather key according to DIN 6885 sheet 1 - JS9
- High balancing quality due to accurate machining (AGMA Class 9)
- Ⓔx-Approved and certified according to EC Standard 94/9/EC



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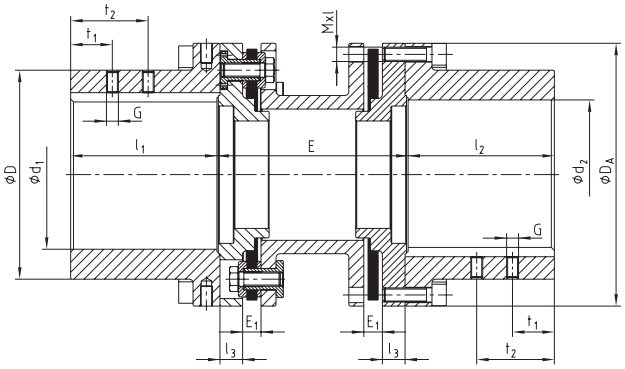

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RIGIFLEX®-N Type A																			
Size	Torque [Nm]			Max. finish bore	Dimensions [mm]													Screws DIN EN ISO 4762	
	T_{KN}	TK max.	T_{KW}	d_1/d_2	D	D_A	$l_1/l2$	l_3	G	t_1	t_2	E_1	E [1]					Mxl	T_A [Nm]
35	120	240	60	50	–	75	38,5	8,5	M6	15	–	6	100	140	–	–	–	M4x45	4,1
50	240	480	120	50	70	95	50	12	M6	10	–	9	100	140	–	–	–	M6x22	14
65	450	900	225	65	100	126	63	12	M8	20	–	11	100	140	180	–	–	M6x25	14
75	940	1880	470	75	105	138	62,5	12	M8	20	–	11	100	140	180	–	–	M8x30	35
85	1700	3400	850	85	120	156	72,5	15	M10	20	–	12	–	140	180	200	250	M8x30	35
110	2700	5400	1350	110	152	191	87	18	M10	25	–	12	–	140	180	200	250	M10x35	69
120	4500	9000	2250	120	165	213	102	20	M12	25	–	12	–	–	180	200	250	M12x40	120
140	9000	18000	4500	140	200	265	126	25	M12	30	–	15	–	–	–	200	250	M16x50	295
160	13000	26000	6500	160	230	305	145	31	M12	30	–	15	–	–	–	–	250	M16x55	295
166	17500	35000	8750	160	230	305	155	31	M16	30	70	17						M20x50	560
196	22500	45000	11250	190	260	330	185	32	M16	40	90	24						M20x50	560
216	32000	64000	16000	210	285	370	205	32	M20	50	110	26						M20x65	560
256	52500	105000	26250	250	350	440	245	38	M20	70	130	31						M24x80	970
306	86000	172000	43000	300	400	515	295	43	M24	70	130	36						M27x100	1450
346	135000	270000	67500	340	460	590	335	55	M24	95	175	45						M30x110	1950
406	210000	420000	105000	400	530	675	395	58,5	M24	95	175	50	acc. to customer's request					M36x130	3300
168	23000	46000	11500	160	230	305	155	31	M16	30	70	17						M20x50	560
198	30000	60000	15000	190	260	330	185	32	M16	40	90	24						M20x50	560
218	42500	85000	21500	210	285	370	205	32	M20	50	110	26						M20x65	560
258	70000	140000	35000	250	350	440	245	38	M20	70	130	31						M24x80	970
308	115000	230000	57500	300	400	515	295	43	M24	70	130	36						M27x100	1450
348	180000	360000	90000	340	460	590	335	55	M24	95	175	45						M30x110	1950
408	280000	560000	140000	400	530	675	395	58,5	M24	95	175	50						M36x130	3300

[1] Other shaft distance dimensions available on request.
For selection of coupling see page 123/124. Mounting instrucitons No. 47410 available at www.ktr.com.

Ordering example:

RIGIFLEX®-N 120	A	Ø 100	Ø 120	200
Coupling size	Type	Bore d_1	Bore d_2	Shaft distance dimension E

Coupling selection of RIGIFLEX®-HP

Coupling selection of RIGIFLEX®-HP

Usually the coupling selection is not defined by the load of the rated torque, but by extreme loads (starting shocks, etc.). They definitely have to be taken into account with the coupling selection. For applications with extremely high torque fluctuations a separate calculation of the coupling is necessary. Our KTR engineers will be pleased to support you!

1. Load by rated torque

Taking into account the operating factor S_B the permissible rated torque of the coupling T_{KN} has to be at least as high as the rated torque T_N.of the machine.

$$T_{KN} \geq T_N \bullet S_B$$

2. Load by torque shocks

Taking into account the factor of extreme loads SK the maximum torque of the coupling T_{Kmax} has to be at least as high as the maximum torque of the machine.

$$T_{Kmax} \geq T_N \bullet S_K$$

(T_{Kmax} applies for a maximum of 10^5 load cycles)
T_{KN} = rated torque of the coupling
T_{Kmax} = maximum torque of the coupling
T_N = rated torque of the machine
S_B = operating factor (see table below)
S_K = factor of extreme load (e. g. with short circuit of motor or start of motor S_K = 6)

Application	Operating performance	Operating factor S_B
Turbines	Continuous torque	1,5
Centrifugal compressors	Continuous torque	1,5
Tank feed pumps	Continuous torque	1,5
API 671	Continuous torque	1,5
Large blowers	Low torque fluctuations	2
Screw compressors	Low torque fluctuations	2
Piston compressors / Piston pumps	Average to high torque fluctuations	2,5 - 3

Please note: The aforementioned factors apply for drives with soft start only! Drives with high starting stocks or heavy torque fluctuations need a separate calculations. Please consult with KTR.

Example of calculation:

Data given
Drive of turbine - gearbox (application API 671)

Power of turbine = 15.000 kW
Speed of turbine = 9.500 rpm
Operating factor S_B = 1,5
Extreme load $T_{max.}$ = 5 x T_N

Coupling selection:
Rated torque of machine

$$T_N = 9550 \bullet P\,[kW] / n\,[1/min]$$

T_N = 9550 • 15000 [kW] / 9500 [1/min] = 15079 Nm

Load by rated torque:

$T_{KN} \geq$ 15079 Nm • 1,5 = 22618 Nm

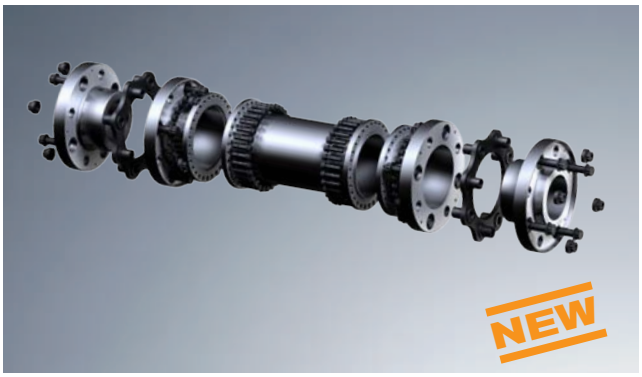
therefore T_{KN} of the coupling needs to be ≥ 22618 Nm

T_{max} = 22618 Nm • 5 = 113090 Nm

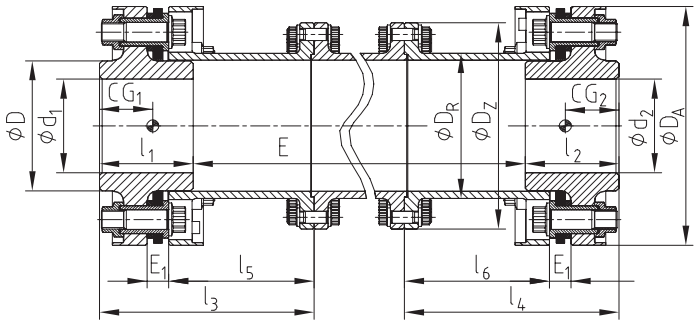
therefore T_{Kmax} of the coupling needs to be ≥ 113090 Nm

Coupling selection:
RIGIFLEX®-HP 278
T_{KN} = 115000 Nm
T_{Kmax} = 149000 Nm

Type C



- Coupling for high-speed and demanding drives
- Applications e. g. turbo compressors and turbines
- Smooth running due to accurate balancing
- Coupling design as per API 671
- Compact design C with high power density
- Hubs are supplied assembled by the manufacturer
- Spacer to be assembled and disassembled radially
- Low-ventilation design
- Variable lengthes of spacers
- Torsional stiffness optimised for applications



RIGIFLEX®-HP type C

Size	Torques [Nm]		Max. finish bore	Dimensions [mm]										
	T_{KN}	$T_{K\,max.}$	d_1/d_2	D	D_A	D_Z	D_R	E_1	E	E_{min}	CG_1/CG_2[2]	l_1/l_2	l_3/l_4	l_5/l_6
158	20000	26000	85	119	220	195	135	17		335	46	85	189	130
168	30000	39000	100	139	255	220	155	23		395	55	100	229	155
188	38000	49400	105	147	265	235	165	23		375	55	105	229	155
208	50000	65000	120	168	298	245	186	23		350	57	120	229	155
228	59000	76700	125	178	315	270	199	33		425	65	125	265	175
248	72000	93600	140	196	335	300	217	33		395	67	140	265	175
278	115000	149500	160	225	380	335	248	33	nach Kundenvorgabe	355	70	160	265	175
318	180000	234000	180	252	445	370	280	48		495	88	180	348	225
358	253000	328900	210	295	500	415	326	48		435	93	210	348	225
388	330000	429000	235	330	545	464	362	48		400	97	235	348	225

Technical data

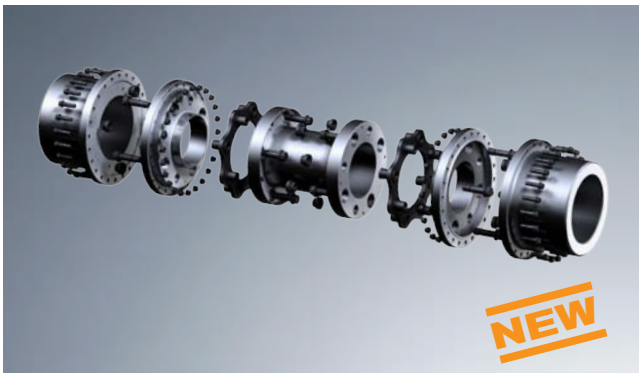
Size	Max. speed [rpm]	Perm. displacements			Stiffness figures		
		Angular[1]	Axial displ.	Radial displ.[2]	Each lamina set	Spacer	Complete coupling[2]
		± K_W [°]	± K_A [mm]	± K_r [mm]	c_t [Nm/rad]	c_{tR} [Nm·mm/rad]	$c_{tE = 457,2}$ [Nm/rad]
158	17300	0,25	3,0	2,30	13,0·10⁶	839·10⁶	1,04·10⁶
168	14900	0,25	3,0	2,32	18,0·10⁶	1535·10⁶	1,79·10⁶
188	14400	0,25	3,3	2,37	28,0·10⁶	1974·10⁶	2,23·10⁶
208	12800	0,25	3,8	2,50	35,0·10⁶	2876·10⁶	3,15·10⁶
228	12100	0,25	4,0	2,44	39,5·10⁶	4123·10⁶	5,06·10⁶
248	11400	0,25	4,2	2,58	60,0·10⁶	5410·10⁶	5,51·10⁶
278	10000	0,25	4,5	2,75	80,0·10⁶	8592·10⁶	7,94·10⁶
318	8500	0,25	5,2	2,70	105,0·10⁶	14724·10⁶	13,00·10⁶
358	7600	0,25	6,0	2,96	155,0·10⁶	26258·10⁶	20,30·10⁶
388	7000	0,25	6,5	3,18	225,0·10⁶	37596·10⁶	27,70·10⁶

[1] je Lamellenpaket [2] bei E=457,2 mm und zylindrischer maximaler Fertigbohrung

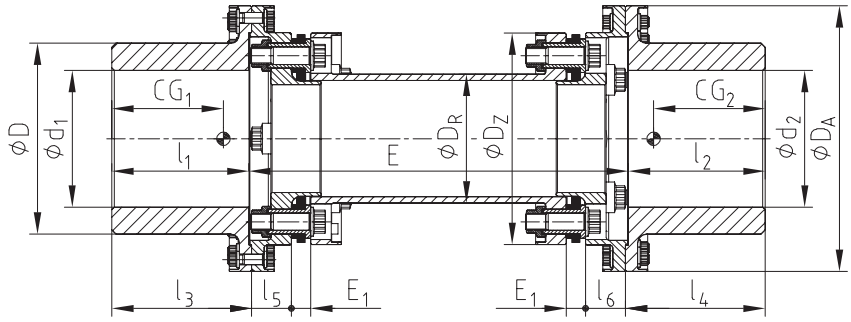
Size	Coupling [2]		Spacer	
	m [kg]	J [kgm²]	m_R [kg/mm]	J_R [kgm²/mm]
158	45	0,274	20,28·10⁻³	81·10⁻⁶
168	69	0,577	27,282·10⁻³	149·10⁻⁶
188	78	0,711	30,975·10⁻³	191·10⁻⁶
208	97	1,081	35,118·10⁻³	279·10⁻⁶
228	123	1,561	44,397·10⁻³	400·10⁻⁶
248	144	2,109	48,614·10⁻³	524·10⁻⁶
278	190	3,542	58,694·10⁻³	833·10⁻⁶
318	306	7,792	79,311·10⁻³	1427·10⁻⁶
358	405	12,869	104,041·10⁻³	2545·10⁻⁶
388	525	19,257	120,151·10⁻³	3644·10⁻⁶

$c_{t\,ges} = 1 / ((1/c_{tE = 457,2}) + ((E - 457,2\ mm) / c_{tR}))$
$m_{ges} = m + m_R \cdot (E - 457,2\ mm)$
$J_{ges} = J + J_R \cdot (E - 457,2\ mm)$

Type L



- Coupling for high-speed and demanding drives
- Applications e. g. on turbo compressors and turbines
- Smooth running due to accurate balancing
- Coupling design as per API 671
- Design L for large shaft diameters
- Spacers supplied assembled by the manufacturer
- Spacer to be assembled and disassembled radially
- Low-ventilation design
- Variable lengthes of spacers
- Torsional stiffness optimised for applications



RIGIFLEX®-HP Bauart L

Size	Torques [Nm]		Max. finish bore	Dimensions [mm]										
	T_{KN}	$T_{K\,max.}$	d_1/d_2	D	D_A	D_Z	D_R	E_1	E	E_{min}	CG_1/CG_2[2]	l_1/l_2	l_3/l_4	l_5/l_6
158	20000	26000	150	210	310	220	135	17	as requested by the customer	265	140	150	163,5	37,5
168	30000	39000	165	230	320	255	155	23		340	148	165	168,5	48,0
188	38000	49400	180	250	335	265	165	23		340	156	180	183,5	48,0
208	50000	65000	200	280	362	298	186	23		340	165	200	203,5	48,0
228	59000	76700	220	310	390	315	199	33		390	179	220	223,5	54,5
248	72000	93600	240	340	420	334	217	33		390	185	235	238,5	54,5
278	115000	149500	270	380	455	380	248	33		390	202	270	273,5	54,5
318	180000	234000	315	445	550	445	280	48		510	246	315	318,5	71,5
358	253000	328900	350	490	600	500	326	48		510	263	350	353,5	71,5
388	330000	429000	380	535	650	545	362	48		510	277	380	383,5	71,5

Technical data

Size	Max. speed [rpm]	Perm. displacements			Stiffness figures		
		Angular[1]	Axial displ.	Radial displ.[2]	Each lamina set	Spacer	Complete coupling[2]
		± K_W [°]	± K_A [mm]	± K_r [mm]	c_t [Nm/rad]	c_{tR} [Nm·mm/rad]	c_{tE} = 457,2 [Nm/rad]
158	13800	0,25	3,0	1,56	13,0·10⁶	839·10⁶	1,70·10⁶
168	12300	0,25	3,0	1,45	18,0·10⁶	1535·10⁶	3,00·10⁶
188	11400	0,25	3,3	1,45	28,0·10⁶	1974·10⁶	4,08·10⁶
208	10500	0,25	3,8	1,45	35,0·10⁶	2876·10⁶	5,61·10⁶
228	9700	0,25	4,0	1,34	39,5·10⁶	4123·10⁶	7,77·10⁶
248	9000	0,25	4,2	1,34	60,0·10⁶	5410·10⁶	10,70·10⁶
278	8300	0,25	4,5	1,34	80,0·10⁶	8592·10⁶	15,60·10⁶
318	6900	0,25	5,2	1,13	105,0·10⁶	14724·10⁶	26,90·10⁶
358	6300	0,25	6,0	1,13	155,0·10⁶	26258·10⁶	41,20·10⁶
388	5800	0,25	6,5	1,13	225,0·10⁶	37596·10⁶	61,30·10⁶

[1] each lamina set, [2] with E=457,2 mm and max. cylindrical finish bore

Size	Coupling [2]		Spacer	
	m [kg]	J [kgm²]	m_R [kg/mm]	J_R [kgm²/mm]
158	80	0,717	20,28·10⁻³	81·10⁻⁶
168	115	1,327	27,282·10⁻³	149·10⁻⁶
188	135	1,759	30,975·10⁻³	191·10⁻⁶
208	175	2,771	35,118·10⁻³	279·10⁻⁶
228	235	4,525	44,397·10⁻³	400·10⁻⁶
248	285	6,417	48,614·10⁻³	524·10⁻⁶
278	375	10,381	58,694·10⁻³	833·10⁻⁶
318	642	24,810	79,311·10⁻³	1427·10⁻⁶
358	812	38,404	104,041·10⁻³	2545·10⁻⁶
388	1016	57,062	120,151·10⁻³	3644·10⁻⁶

Ordering example:	RIGIFLEX®-HP 188	L	Ø 160	Ø 180	457,2
	Coupling size	Type	Bore d_1	Bore d_2	Shaft distance dimension E

Technical description of RIGIFLEX®-HP

Balancing:
Usually RIGIFLEX®-HP-couplings are balanced according to the balancing methods recommended in API 671. The usual methods are as follows:

- Balancing of individual components
- Summation balancing for verifying the balancing of individual components. It has to be made sure that adjustments may be performed on individual components only.
- Summation balancing with amendment of the balancing quality on the complete coupling.
- It goes without saying that different balancing methods are possible as defined by the customer.

Axial natural frequency:
With the coupling selection the axial natural frequency has to be reviewed (critical speed). According to API 671 the critical speed should be +_ 10% beyond one time and two times the operating speed of the drive. .

Screwing during transport and mounting:
For balancing, transporting and mounting of the coupling the lamina sets are firmly clamped axially via transport screws and distance washers (to protect the lamina sets from damaging). Please note: Before the coupling is set into operation it is absolutely necessary to remove the screwings!

Axial pre-stress of lamina sets:
If modifications of the shaft distance dimension (e. g. caused by heat expansion) have to be expected, the lamina sets can be axially prestressed. As a result the coupling operates in neutral position (zero position) of the lamina sets during normal operation.

Spacer disks for couplings with taper bores:
With the use of taper shafts the shaft distance dimension may lightly vary due to displacement. To compensate for spacer disks are added to the coupling on request. The disks are mounted on site, if necessary.

Shaft-hub-connections:
Usually RIGIFLEX®-HP is supplied with taper bores for an oil press fit. As an alternative feather key connections, flange connections or mechanical clamping connections, e. g. via KTR CLAMPEX® clamping sets, are available.

Delivery condition:
Depending on the customer's request, the RIGIFLEX®-HP couplings can be delivered either fully assembled or as individual assemblies. The lamina sets are basically assembled and may only be disassembled on consultation with the manufacturer.

Mounting instructions:
See: www.ktr.com