Steel lamina couplings

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RADEX®-N

RIGIFLEX®-N

RIGIFLEX®-HP

STEEL LAMINA COUPLINGS
TYPES AND OPERATING DESCRIPTION

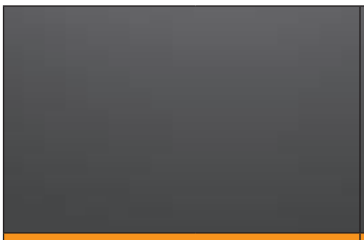
Properties of lamina couplings

Product	**RADEX®-N**	**RIGIFLEX®-N**	**RIGIFLEX®-HP**
Type	Steel lamina coupling		High-performance steel lamina coupling
Properties			
Torsionally rigid	●	●	●
Backlash-free	●	●	●
Maintenance-free	●	●	●
Compensating for misalignment	●	●	●
Special features			
Stock programme	Basic programme available from stock, customized solutions available	Basic programme available from stock, customized solutions available	For customized solutions, applications in high performance ranges and on high-speed drives
Applications/core industries	Pumps, compressors, fans	Pumps, compressors, fans	Pumps, turbo compressors, turbines
API	610	610 & 671	610 & 671
Performance data			
Max. rated torque TKN [Nm]	280.000	280.000	330.000
Max. speed n [rpm]	20.000	23.000	17.300
Max. operating temperature T [°C]	280	280	280
Standard materials			
Hubs			
Steel (S355J2G3)	●	●	
Q & T steel (C45N)	●	●	
Q & T steel (42CrMo4V)			●
Q & T steel (30CrNiMo8)			●
Spacers			
Steel (S355J2G3)	●	●	
Q & T steel (C45N)	●	●	
Q & T steel (42CrMo4V)	with torsion shafts		●
Q & T steel (30CrNiMo8)	with torsion shafts		●
Special materials (corrosion-resistant)			
Hubs			
Steel (1.4305)	●	○	○
Steel (1.4404)	●		
Spacers			
Steeel (1.4305)	●	○	○
Steel (1.4404)	●		
Spacer made of Composite GFK (fibre glass)	●		
Spacer made of Composite CFK (carbon fibre)	●		
Surface coating	Painting, phosphating, zinc-plating and passivating, Geomet, Tenifer Q	Painting, phosphating, zinc-plating and passivating, Geomet, Tenifer Q	Painting, phosphating, zinc-plating and passivating, Geomet, Tenifer Q

● ≈ Standard
○ ≈ on request

STEEL LAMINA COUPLINGS
TYPES AND OPERATING DESCRIPTION

Product finder of lamina couplings



Product	RADEX®-N	RIGIFLEX®-N	RIGIFLEX®-HP
Type	Steel lamina coupling		High-performance steel lamina coupling
Geometries			
Design	Single- and double-cardanic	Double-cardanic	Double-cardanic
Max. shaft diameter [mm]	330	400	380
Radial assembly	●	●	●
Certifications/type examinations			
ATEX	●	●	●
GOST R/ GOST TR	●	●	●
DNV GL	●	●	●

● ≈ Standard

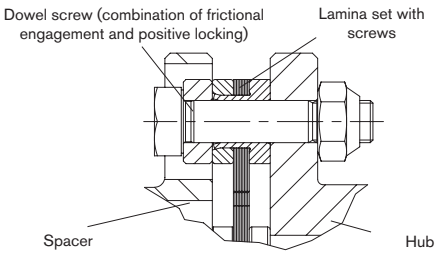
Details on lamina couplings

Laminas - FEM-optimized lamina shape

The steel lamina sets made of highly siff, stainless spring steel based on FEM calculations. Considering the necessary options of displacement of the coupling, the optimum shape with regard to torque transmission and torsional stiffness was aimed at. The waisted shape of the steel laminas on the outside diameter resulted from this optimization calculation.

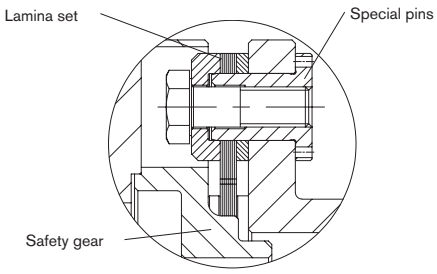
RADEX®-N - Lamina sets with dowel screws

The heart of the steel lamina coupling are the lamina sets and their connection to hubs and 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.



RIGIFLEX®-N - 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. These are connected with the spacers or flanges absolutely backlash-free via positive-locking special pins.

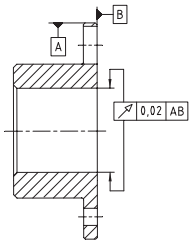


RADEX®-N
Steel lamina couplings

General information

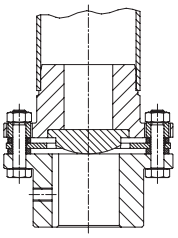
Assembly and operating advice

(See our mounting instructions KTR standard 47110 at www.ktr.com.). With 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 adhered to (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 delivered 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 (consult with KTR, if necessary).

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 us, if necessary.

Safety regulations:

The coupling has to be dimensioned in a way that the permissible coupling load is not exceeded during any operating condition. For this purpose the actual loads have to be compared to the permissible parameters of the coupling. The customer has to 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 fracture of the coupling caused by overload.

Hub designs

Type 1.0 Hub
with feather keyway and setscrew´

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

Type 1.1 Hub
without feather keyway with setscrew

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

Type 1.2 Hub
without feather keyway without setscrew

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

Type 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.

Type 6.5 Clamping ring hub

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

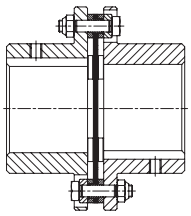
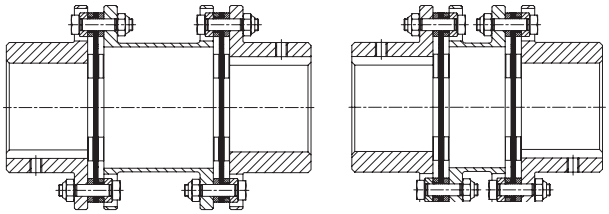
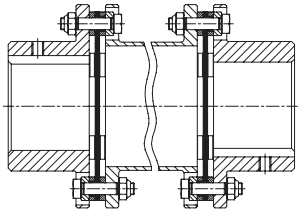
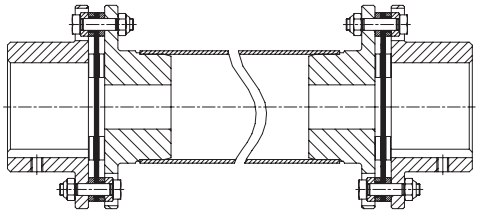
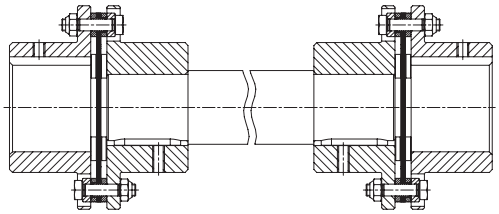
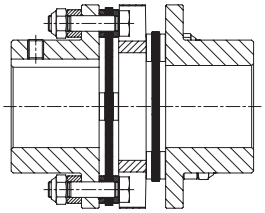
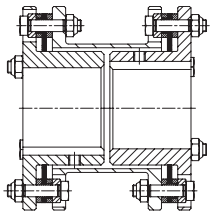
Type 2.5 Clamping hub double slot, without feather keyway

Frictionally engaged, backlash-free shaft-hub-connection-. Transmittable torques depending on bore diameter (For ATEX category 3 only)

Type 2.6 Clamping hub double slot, with feather keyway

Positive shaft-hub connection with additional frictional engagement. The frictionally engaged condition prevents or reduces reverse backlash, respectively.

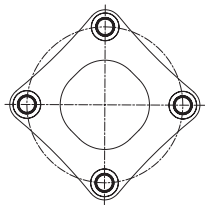
Types and applications

	Properties	Applications
Type NN (see page 170) 	● 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 170) 	● Double-cardanic design ● Compensating for high misalignment with low restoring forces ● Standard spacers available from stock	● Paper machines ● Printing and processing machines ● Material Handling ● Steel mills ● Generators ● Grinding machines
Type NANA 3 (see page 174) 	● 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 172) 	● Spacers can be determined by the customer ● Max. 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 172) 	● 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 171) 	● Compact double-cardanic coupling ● 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 171) 	● 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

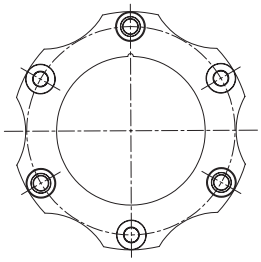
Technical data

The following lamina types are to be distinguished with RADEX®-N

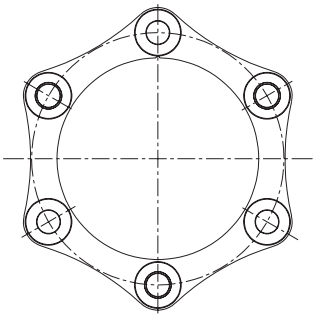
Size 20 – 50
(lamina with 4 holes)



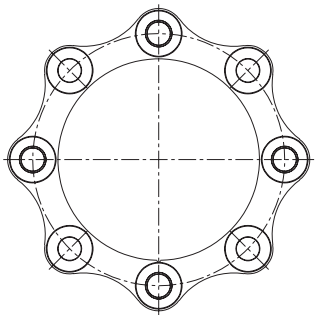
Size 60 – 135
(lamina with 6 holes)



Size 136 – 336
(lamina with 6 holes)



Size 138 – 338
(lamina with 8 holes)



Torques and displacements

Size	Lamina type	Torques [Nm] [1]			Perm. displacements [2]				
		T_{KN}	$T_{K\,max}$	T_{KW}	Angle [°] each lamina	Axial [mm]		Radial [mm]	
						NN	NANA 1/ NANA2/ NNZ	NANA 1	NANA 2/NNZ
20	lamina with 4 holes	15	30	5	1,0	0,60	1,2	1,0	0,2
25		30	60	10	1,0	0,80	1,6	1,0	0,2
35		60	120	20	1,0	1,00	2,0	1,1	0,3
38		120	240	40	1,0	1,20	2,4	1,2	0,3
42		180	360	60	1,0	1,40	2,8	1,2	0,4
50		330	660	110	1,0	1,60	3,2	1,5	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	0,4
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	lamina with 6 holes	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		
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		
188	lamina with 8 holes	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 stiffness x 10^6 [Nm/rad] per lamina set	Size	Max. speed[rpm] (higher speeds on request)	Torsion spring stiffness x 10^6 [Nm/rad] per lamina set
20	20000	0,02	156	3500	17,00
25	16000	0,03	166	3300	19,00
35	13000	0,11	186	3000	25,00
38	12000	0,20	206	2800	31,00
42	10000	0,28	246	2300	55,00
50	8000	0,50	286	2000	79,00
60	6700	0,56	336	1800	125,00
70	5900	0,90	138	3800	20,00
80	5100	1,10	158	3500	26,00
85	4750	1,50	168	3300	30,00
90	4300	2,00	188	3000	39,00
105	4000	2,50	208	2800	49,00
115	3400	3,50	248	2300	83,00
135	3000	6,90	288	2000	125,00
136	3800	13,00	338	1800	200,00

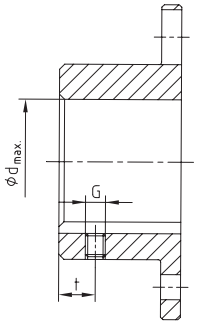
[1] For selection of coupling see page 14 et seqq.
[2] The permissible displacement figures specified are maximum figures which must not arise at the same time. If radial, axial and angular displacements arise in parallel, the figures need to be reduced.

Technical data

Weights and mass moments of inertia						
Size	Hub [1] [kg] / [kgm²]	Lamina set [kg] / [kgm²]	NN [1] compl. [kg] / [kgm²]	NANA 1 [1] compl. [kg] / [kgm²]	NANA 2 [1] compl. [kg] / [kgm²]	NNZ [1] compl. [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			–
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	Depending on	Depending on	–
138	16,2 / 0,145	9,9 / 0,143	42,3 / 0,433	distance dimension E	distance dimension E	–
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			–
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

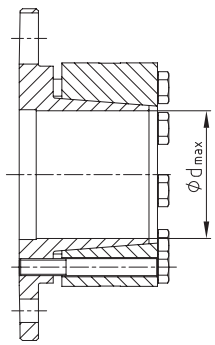


Standard hub 1.0 with feather keyway according to DIN 6885 sheet 1 1.									
Size	$d_{max.}$	G	t	T_A [Nm]	Size	$d_{max.}$	G	t	T_A [Nm]
20	20	M5	6	2,0	105	105	M12	30	40,0
25	25	M5	8	2,0	115	115	M12	30	40,0
35	35	M6	15	4,8	135	135			
38	38	M6	15	4,8	136 / 138	135			
42	42	M8	20	10,0	156 / 158	150			
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			

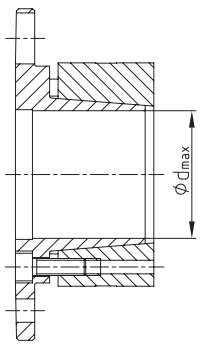
Backlash-free shaft-hub connections without feather key

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.

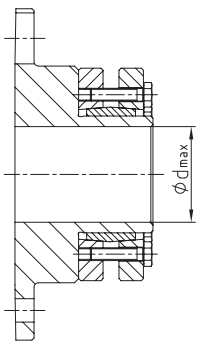
Clamping ring hub type
(clamping screws outside)



Clamping ring hub type 6.0
(clamping screws inside)

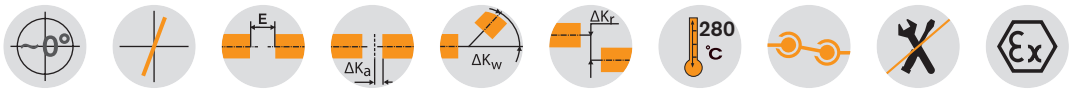


Type with CLAMPEX® element type 603

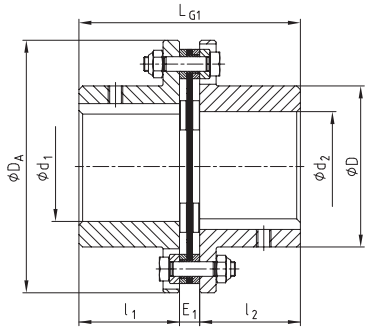


RADEX®-N NN, NANA 1 and NANA 2
Steel lamina couplings

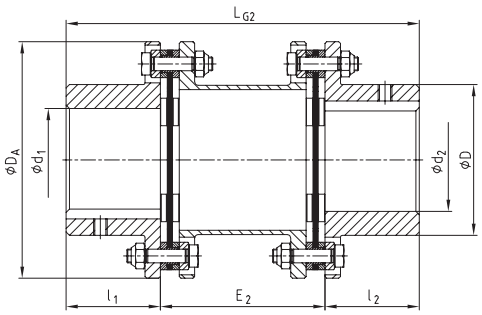
Standard types



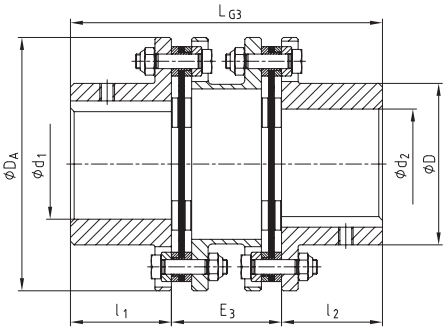
Components



Type NN



Type NANA 1



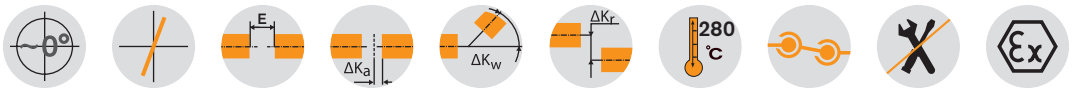
Type NANA 2

RADEX®-N Types NN, NANA 1, NANA 2										
Size	Maximum 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				
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	acc. to customer's request			
138	135	180	300	135	293	23				
158	150	195	325	150	327	27				
168	165	225	350	165	361	31				
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				

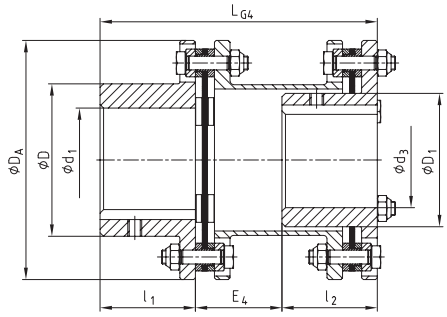
Ordering example:	RADEX®-N 60	NANA 1	Ø50	Ø60
	Coupling size	Type	Finish bore d1	Finish bore d2

RADEX®-N NENA 1, NENA 2, NENE 1 and NNZ
Steel lamina couplings

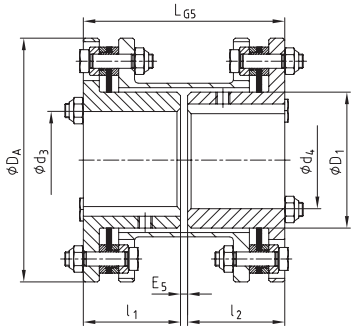
Standard types



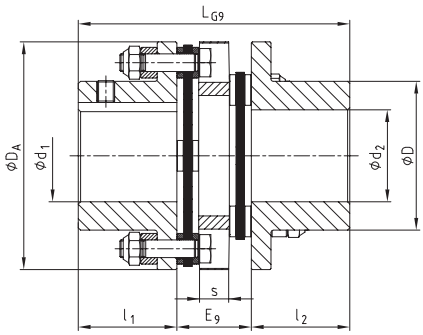
Components



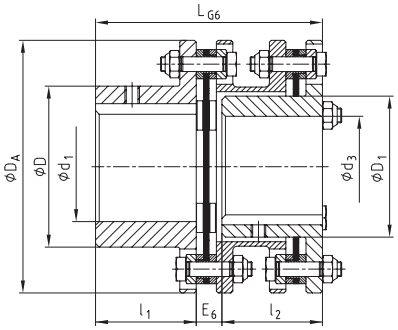
Type NENA 1



Type NENE 1



Type NNZ



Type NENA 2

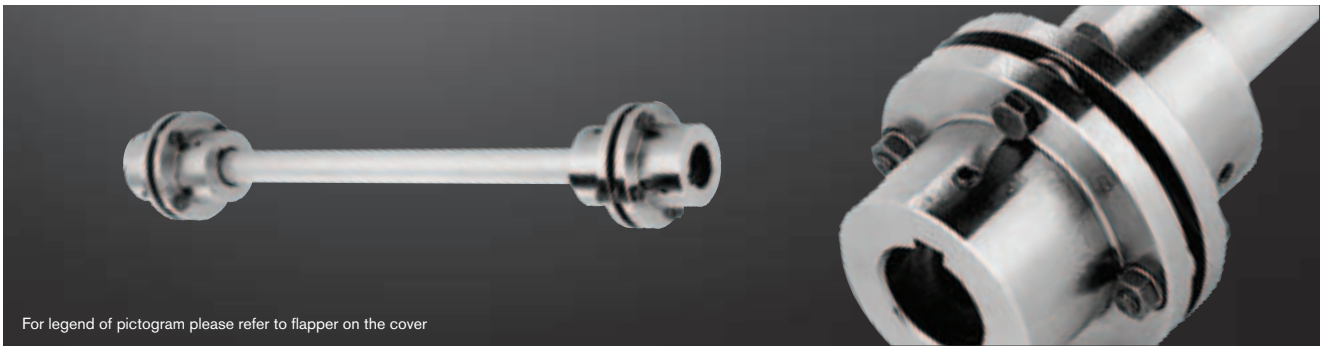
RADEX®-N Types NENA 1, NENE 1, NENA 2, NNZ														
Size	Maximum finish bore		Dimensions [mm]											
	d_1/d_2	d_3/d_4	D	D_1	D_A	l_1/l_2	L_{G4}	E_4	L_{G5}	E_5	L_{G6}	E_6	L_{G9}	E_9
20	20	–	32	–	56	20	–	–	–	–	–	–	58	18
25	25	–	40	–	68	25	–	–	–	–	–	–	70	20
35	35	–	54	–	82	40	–	–	–	–	–	–	102	22
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	–	–

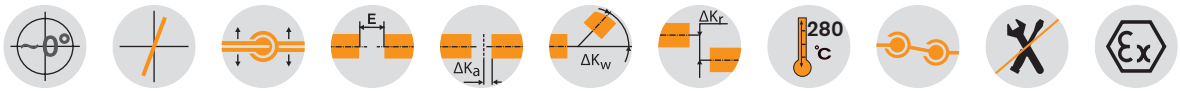
Ordering example:

RADEX®-N 60	NENA 1	Ø50	Ø60
Coupling size	Type	Finish bore d1	Finish bore d2

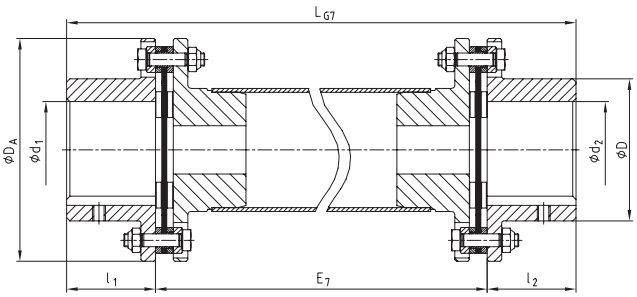
RADEX®-N NANA 4 and NNW
Steel lamina couplings

Customized types

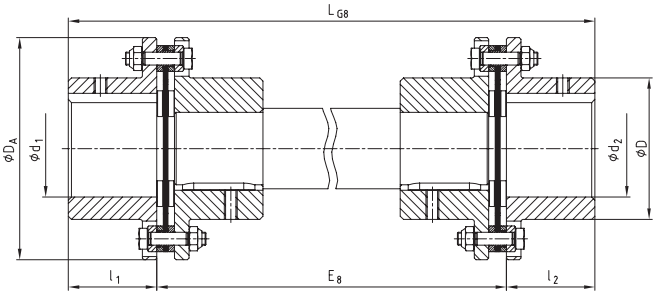




Components



Type NANA 4



Type NNW

RADEX®-N Types NANA 4, NNZ and NNW								
Size	Maximum 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				
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				
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's specification

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

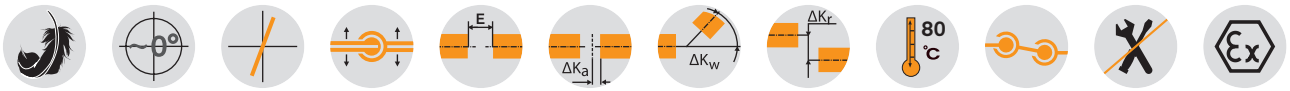
Intermediate shaft dimension according to customer's specification

Ordering example:

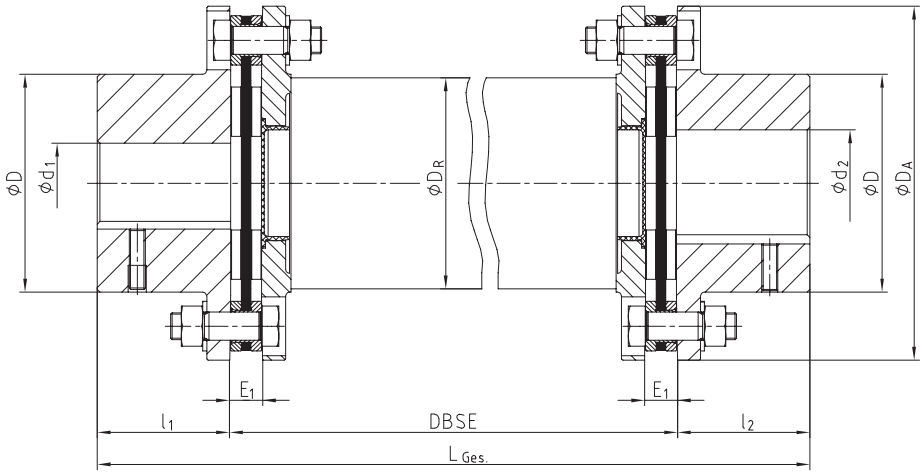
RADEX®-N 60	NANA 4	Ø50	Ø60	2500
Coupling size	Type	Finish bore d1	Finish bore d2	Shaft distance dimension

RADEX®-N Composite
Steel lamina couplings

Corrosion-resistant type for big shaft distance dimensions



Components



RADEX®-N Type NANA 4 CFK											
Size	Torque 1) [Nm]		Dimensions [mm]								
	T_{KN}	$T_{K\,max}$	D_A	d_1/d_2 max.	D	l_1/l_2	E_1	DBSE	L_{tptal}	Composite tube D_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 14 et seqq.
[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, if necessary.

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 d1	Finish bore d2	Shaft distance dimension

RADEX®-N NANA 3
Steel lamina couplings

Pump drives according to API 610

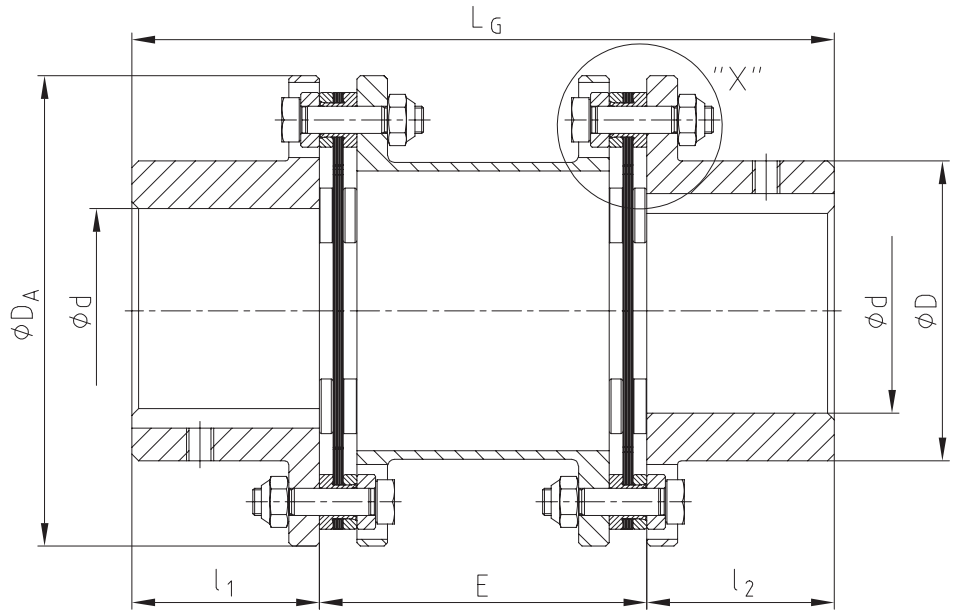
RADEX®-N Type NANA 3							
Size	Max. finish bore	Dimensions [mm]				Perm. displacements	
	d	D	D_A	$E_{Standard}$ [1]	l_1/l_2	Angle [°] each lamina	Axial [mm]
42	42	68	104	100	45	1,0	2,8
50	50	78	126	140/180	55	1,0	3,2
60	60	88	138	100/140/180/250	55	1,0	2,0
70	70	102	156	100/140/180	65	1,0	2,2
80	80	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
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	acc. to customer's specifications	280	0,7	6,7
336	330	445	660		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
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.

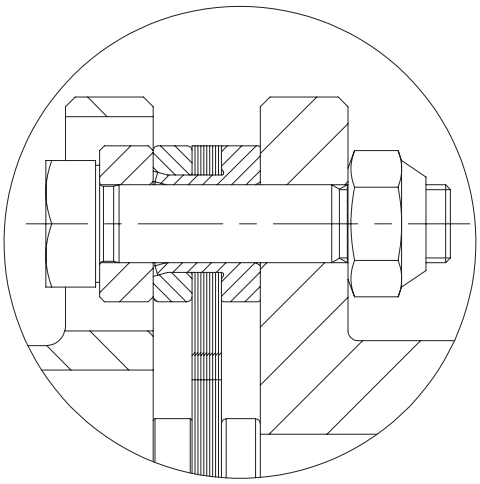
Ordering example:

RADEX®-N 60	NANA 3	Ø50	Ø60	140
Coupling size	Type	Finish bore d1	Finish bore d2	Shaft distance dimension

Components



Detail “X”

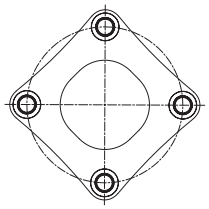


Safety gear of the spacer:
The lamina sets have a sleeve in order to secure the spacer if the lamina breaks.

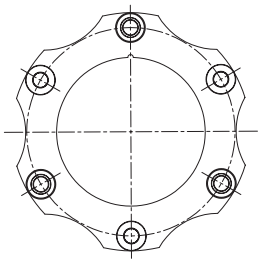
Technical data

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

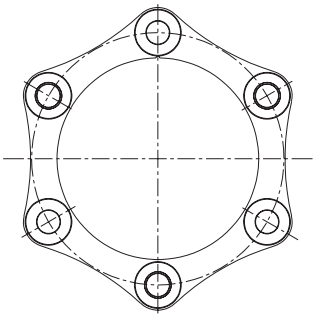
Size 35 – 65
(lamina with 4 holes)



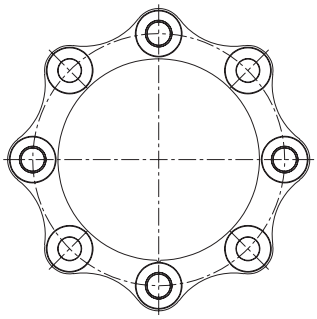
Size 75 – 160
(lamina with 6 holes)



Size 166 – 406
(lamina with 6 holes)



Size 168 – 408
(lamina with 8 holes)



Torques and displacements

Size	Lamina type	Torques [Nm]			Perm. displacements						
		T_{KN}	$T_{K\ max.}$	T_{KW}	Angular displacement ± Kw [1] [°]	Axial displacement ± Ka [mm]	Radial ± Kr [mm]				
							E=100	E=140	E=180	E=200	E=250
35		130	260	65	0,7	1,2	0,90	1,40	–	–	–
50	lam. w. 4 holes	270	540	135	0,7	1,4	0,77	1,26	–	–	–
65		550	1100	275	0,7	1,5	0,75	1,23	1,72	–	–
75		1100	2200	550	0,7	1,8	0,73	1,22	1,71	–	–
85		1900	3800	950	0,7	2,1	–	1,14	1,62	1,87	2,48
110		3500	7000	1750	0,7	2,4	–	1,05	1,54	1,78	2,39
120		5750	11500	2875	0,7	2,6	–	1,00	1,49	1,73	2,35
140		10500	21000	5250	0,7	3,3	–	–	–	1,55	2,16
160		16000	32000	8000	0,7	3,8	–	–	–	–	1,99
166	lamina with	19000	38000	9500	0,7	3,7					
196	l6 holes	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		25000	50000	12500	0,5	2,6					
198		30000	60000	15000	0,5	2,8					
218		42500	85000	21500	0,5	3,0					
258	lamina with	70000	140000	35000	0,5	3,5					
308	8 holes	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 set

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

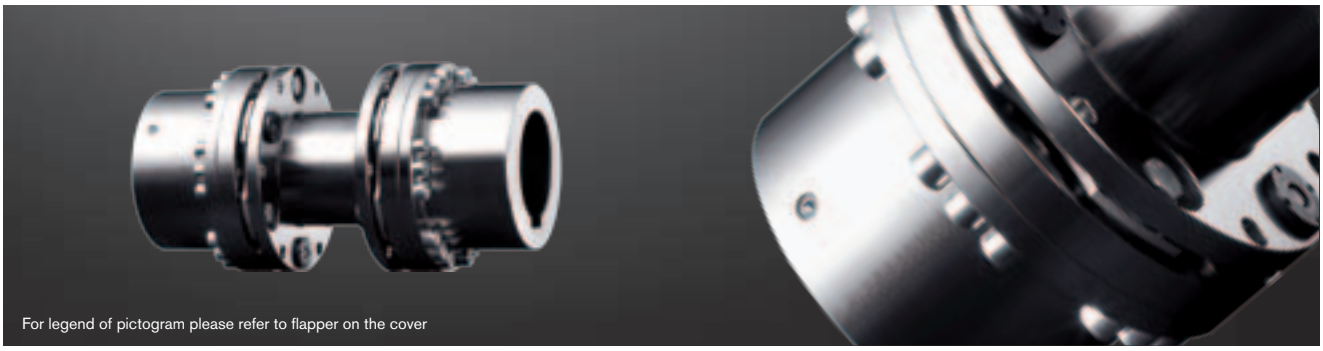
Permissible speeds and stiffness								
Size	Max. speed [rpm]	Each lamina set		ct [Nm/rad] for complete coupling with mounting length E				
		cw [Nm/rad]	ct x 10^6 [Nm/rad]	E=100	E=140	E=180	E=200	E=250
35	23000	170	0,056	65020	56700	–	–	–
50	18000	490	0,27	73953	63990	–	–	–
65	13600	260	0,5	146022	129938	117046	–	–
75	12400	1000	0,67	306145	278381	255234	–	–
85	11000	1500	0,9	–	406641	369429	353265	318433
110	9000	1500	1,5	–	664284	637587	625028	595693
120	8000	3000	2,0	–	1798018	1637553	1567602	1416348
140	6400	10000	3,5	–	–	–	2363340	2226630
160	5600	10350	6,9	–	–	–	–	2654894
166	5600	26800	13,0					
196	5200	35800	17,0					
216	4600	41500	19,0					
256	3900	65000	31,0					
306	3300	112000	55,0					
346	2900	205000	79,0					
406	2500	276000	125,0	Mounting dimension E as indicated by the customer				
168	5600	44300	20,0					
198	5200	82200	26,0					
218	4600	90000	30,0					
258	3900	138000	49,0					
308	3300	234000	83,0					
348	2900	416000	125,0					
408	2500	562000	200,0					

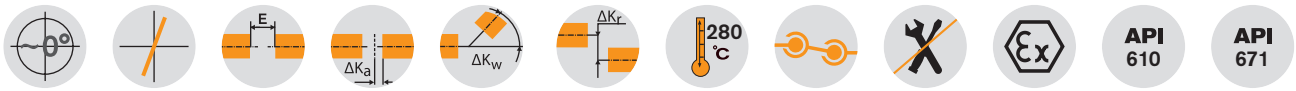
cw = angular stiffness
ct = torsion spring stiffness

Weights and mass moments of inertia												
Size	Hub (max. bore)		Spacer complete [kg]					Spacer complete [x10^3 kgm^2]				
	[kg]	[kgm^2]	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										

RIGIFLEX®-N
Steel lamina coupling

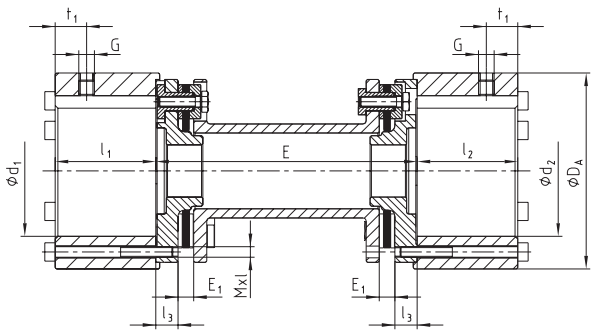
Standard type A



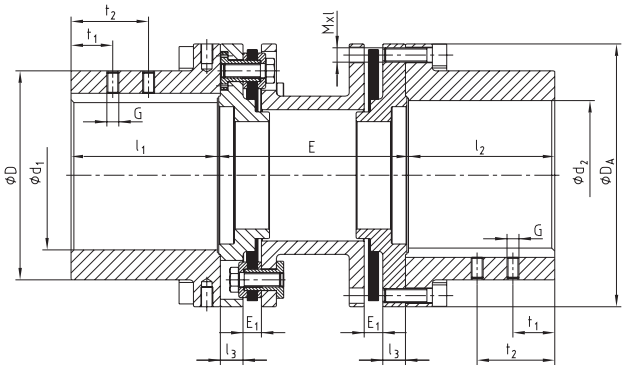


Components

Size 35



Size 50 - 408



RIGIFLEX®-N Type A																			
Size	Torques [Nm]			Max. finish bore	Dimensions [mm]													Screws DIN EN ISO 4762	
	T_{KN}	$T_{K\,max.}$	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	130	260	65	50	–	75	38,5	8,5	M6	15	–	6	100	140	–	–	–	M4x45	4,1
50	270	540	135	50	70	95	50	12	M6	10	–	9	100	140	–	–	–	M6x22	14
65	550	1100	275	65	100	126	63	12	M8	20	–	11	100	140	180	–	–	M6x25	14
75	1100	2200	550	75	105	138	62,5	12	M8	20	–	11	100	140	180	–	–	M8x30	35
85	1900	3800	950	85	120	156	72,5	15	M10	20	–	12	–	140	180	200	250	M8x30	35
110	3500	7000	1750	110	152	191	87	18	M10	25	–	12	–	140	180	200	250	M10x35	69
120	5750	11500	2875	120	165	213	102	20	M12	25	–	12	–	–	180	200	250	M12x40	120
140	10500	21000	5250	140	200	265	126	25	M12	30	–	15	–	–	–	200	250	M16x50	295
160	16000	32000	8000	160	230	305	145	31	M12	30	–	15	–	–	–	–	250	M16x55	295
166	19000	32000	9500	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 specifications					M36x130	3300
168	25000	50000	12500	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

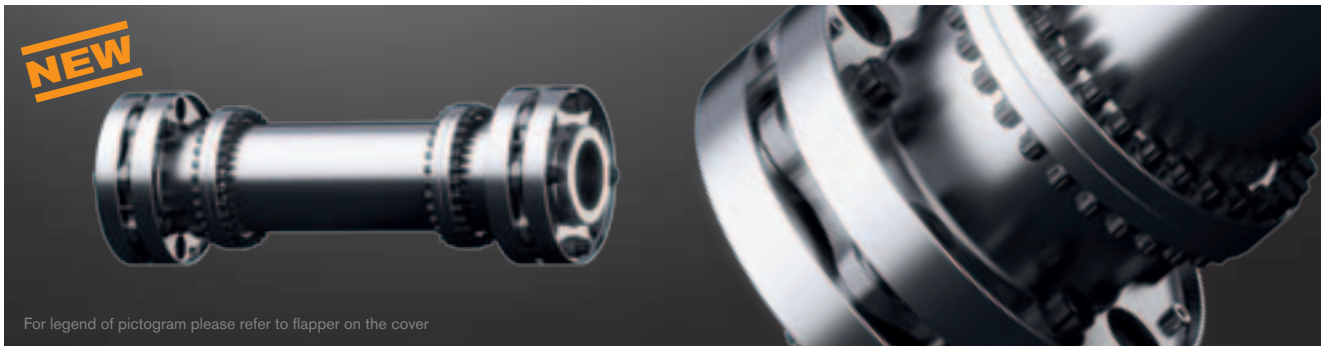
[1] Other shaft distance dimensions available on request.
For selection of coupling see page 14 et seqq. Mounting instructions No. 47410 available at www.ktr.com.

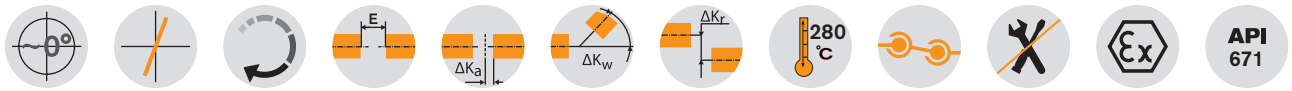
Ordering example:

RIGIFLEX®-N 120	A	Ø 100	Ø 120	200
Coupling size	Type	Bore d1	Bore d_2	Shaft distance dimension E

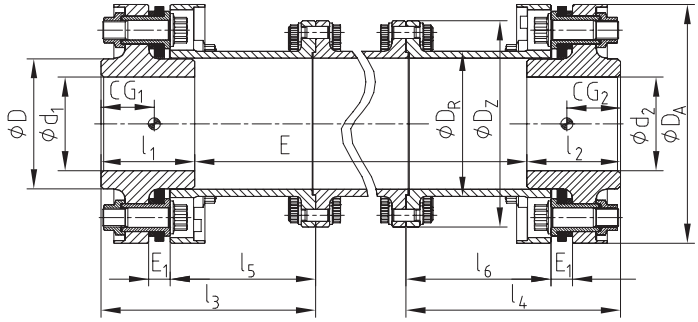
RIGIFLEX®-HP C
High Performance - steel lamina couplings

Flange connection





Components



RIGIFLEX®-HP Type C

Size	Torques [Nm]		Maximum finish bore	Dimensions [mm]											
	T_{KN}	$T_{K\,max.}$	d_1/d_2	D	DA	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	acc. to customer's specifications	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		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 displ.[1]	Axial	Radial displ.[1]	Each lamina set	Spacer	Coupling complete[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

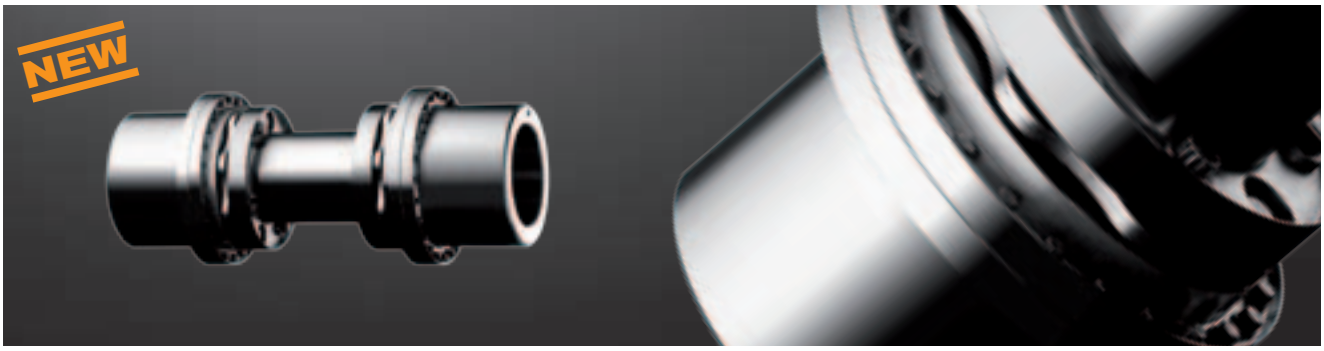
[1] Each lamina set [2] with E=457.2 mm and cylindrical maximum finish bore

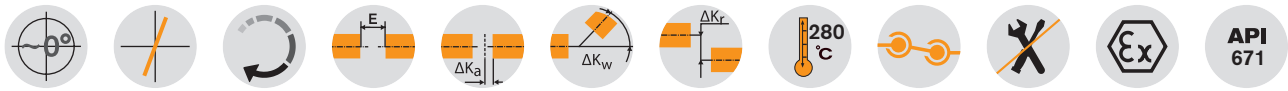
Size	Coupling[1]		Spacer	
	m [kg]	J [kgm²]	m_R [kg/mm]	J_R [kgm²/mm]
158	45	0,274	20,28·10⁻³	81·10⁻⁶
168	69	0,577	27,282·10⁻³	149·10⁻⁶
188	78	0,711	30,975·10⁻³	191·10⁻⁶
208	97	1,081	35,118·10⁻³	279·10⁻⁶
228	123	1,561	44,397·10⁻³	400·10⁻⁶
248	144	2,109	48,614·10⁻³	524·10⁻⁶
278	190	3,542	58,694·10⁻³	833·10⁻⁶
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

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

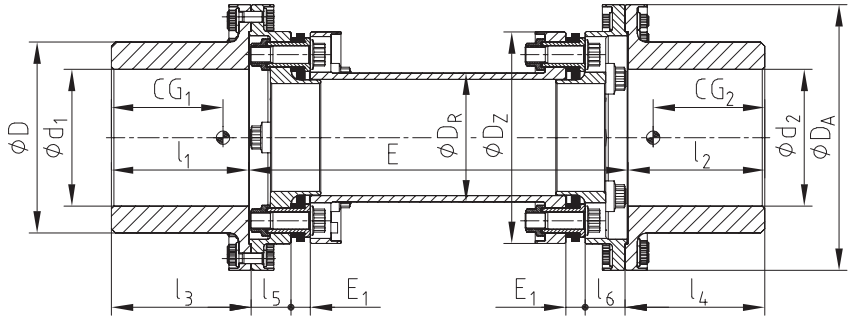
RIGIFLEX®-HP L
High Performance - steel lamina couplings

Type with flange hubs





Components



RIGIFLEX®-HP Type L

Size	Torques [Nm]		Maximum 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	acc. to customer's spec.	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 displ.[1]	Axial displ.	Radial displ.[1]	Each lamina set	Spacer	Coupling complete[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 cylindrical maximum finish bore

Size	Coupling[1]		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 d1	Bore d_2	Shaft distance dimension E

Technical data of RIGIFLEX®-HP

Balancing:

Usually RIGIFLEX®-HP-couplings are balanced according to the balancing methods recommended by 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 as defined by the customer are possible.

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:

With 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 start-up of the coupling 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 thermal 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 with 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