



**RADEX®-N**  
Steel laminae coupling

**RIGIFLEX®-N**  
Steel laminae coupling

Made for Motion



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<b>Steel laminae coupling</b>	
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## Coupling selection steel laminae coupling

Description	Code	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 dynamic load up to $T_{KN}$ .
Maximum torque of coupling	$T_{Kmax}$	Torque which can be transmitted during the entire life of the coupling $\geq 10^8$ times as spike load or $5 \times 10^4$ times as alternating load.

Guidelines for operating factor $S_B$	
Application	$S_B$
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
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

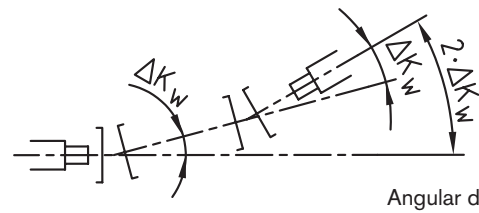
### 1. Permissible displacements:

$\Delta K_a$ : Permissible axial displacement

$\Delta K_w$ : Permissible angular displacement

$\Delta K_r$ : Permissible radial displacement

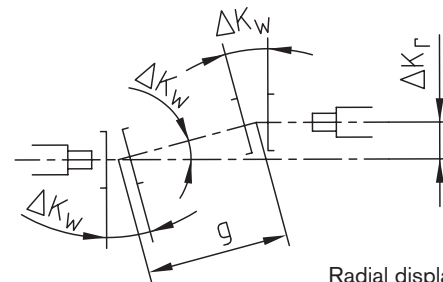
The steel laminae couplings are selected in a way that the maximum permissible angular excursion  $\Delta K_w$  may be compensated by every laminae set. Consequently the maximum permissible angular excursion of two shafts combined with each other is  $2 \cdot \Delta K_w$ . The maximum angular excursion for each laminae set is shown in the table „Technical capacity utilization“.



Angular displacement

The permissible radial displacement  $\Delta K_r$  with distance  $g$  of the coupling elements is

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



Radial displacement

In the table “Technical data” (RADEX®-N page 126/127 and RIGIFLEX®-N page 134/135) you can see the max. permissible radial displacements  $\Delta K_r$  for every size and type based on the given standard lengths of the flange hollow shaft as well as the permissible angular displacement  $\Delta K_w$  of the coupling elements.

The max. permissible axial displacements  $\Delta K_a$  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  $\Delta K_a$  the permissible angular displacement  $\Delta K_w$  decreases and thus the radial displacement  $\Delta K_r$ .

(See our mounting instructions [www.ktr.com](http://www.ktr.com)).

## Coupling selection steel laminae coupling

### Selection of the coupling size

#### 2. Drives without periodic torsional vibrations

For example centrifugal pumps, fans, screw compressors, etc. The coupling selection requires that the rated torque  $T_{KN}$  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 large as the rated torque  $T_N$  of the machine.

The nominal torque  $T_{KN}$  of the coupling is:

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

$T_N$  = Torque of the machine

$S_B$  = Operating factor (see table page 121)

$S_R$  = Factor of direction  
= 1,00 same torque direction  
= 1,70 changing torque direction

$S_t$  = 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 high 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 is valid 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 large masses on the load side we would recommend calculations by our simulation programme (please consult with our Engineering Department).

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

$T_S$  = Peak torque

### Selection of the coupling size

#### 3. Drives with periodic 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 our Engineering Department).

##### 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 large as the rated torque  $T_N$  of the machine.

The nominal torque  $T_{KN}$  of the coupling is:

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

$T_N$  = Torque of the machine

$S_B$  = Operating factor (see table page 121)

$S_R$  = Factor of direction  
= 1,00 same torque direction  
= 1,70 changing torque direction

$S_t$  = 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 periodic vibratory torque of the machine  $T_W$ .

$$T_{KW} \geq T_W$$

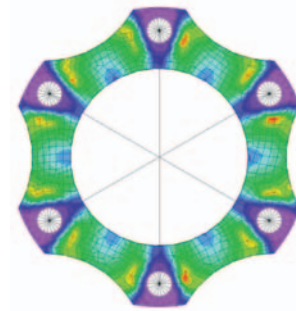
### Description of coupling

The RADEX®-N is a backlash-free, torsionally rigid and maintenance-free all-steel coupling. The laminae that are extremely rigid in sense of rotation are made from 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.



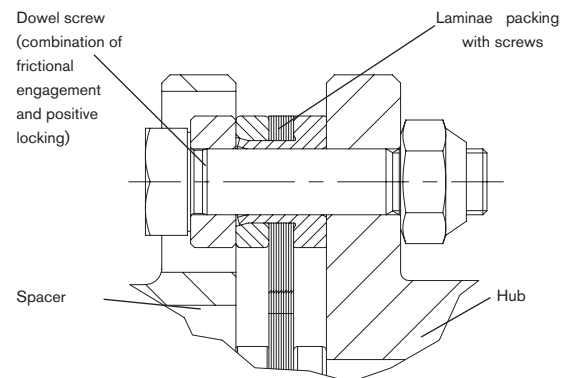
### FEM-optimized laminae form

The steel laminae packings from stainless spring steel were developed on the basis of FEM calculations. Under consideration of the necessary possibilities of displacements of the coupling the optimal form regarding torque transmission and torsional rigidity was aimed for. The fitted form of the steel laminae at the outside diameter is the result of this optimization calculation.



### Laminae packings with dowel screws

The „heart“ of the steel laminae coupling are the laminae packings and their connection to the hubs or spacers. High-strength, special dowel screw that are alternately screwed with hubs and spacer enable a combination of frictional engagement and positive locking. Thus a high power density with simultaneous easy displacement and low restoring forces is guaranteed. Due to the special constructive design of the RADEX®-N components the laminae packings are „artificially“ prestressed. Hereby the torsional rigidity of approx. 30 % is enabled and at the same time the known problem regarding the axial vibrations of the spacer is avoided.



### Explosion protection use

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. Please read through our information included in the respective Type Clamping ring hubs (clamping hub without dowel screw only for category 3) used in hazardous areas must be selected in a way that there is a safety of  $s = 2$  from the peak torque of the unit including all operating parameters to the torque of frictional engagement and to the nominal torque of the coupling. Examination Certificate and the operating and mounting instructions at [www.ktr.com](http://www.ktr.com).



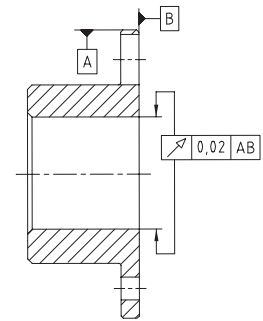
### General information

#### Assembly and operating advice

(Please see our mounting instructions KTR standard 47110 see [www.ktr.com](http://www.ktr.com).)

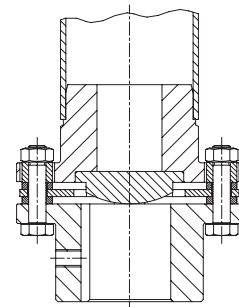
For the assembly it is important to make sure that the laminae sets are assembled free from distortion in axial direction.

If the finish bore is machined by the customer, the concentric and axial running tolerances have to be observed (see sketch below).



#### Installation:

RADEX®-N couplings are designed for horizontal installation. For vertical installation the spacer has to be supported (see sketch below). Please contact.



#### Delivery condition

RADEX®-N are delivered as individual parts (can be delivered assembled on request). The hubs can be supplied unbored or with finish bore and 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 most applications this is not necessary due to the accurate machining of the coupling. Please consult with KTR for any further questions.

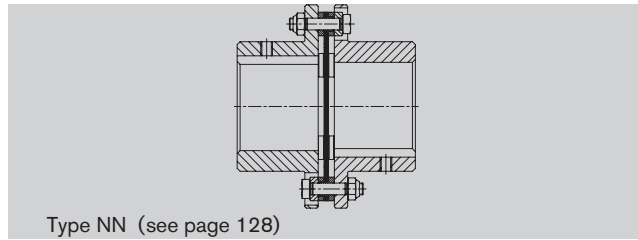
#### Safety regulations:

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 with the permissible coupling characteristics has to be performed.

The customer must protect rotating parts against unintended touch (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.

### Types and applications

#### Types



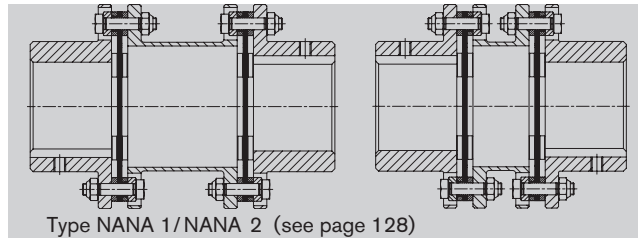
Type NN (see page 128)

#### Characteristics

- Single cardanic design
- Only angular and axial displacement permissible
- High torsional rigidity
- Compact dimensions

#### Applications

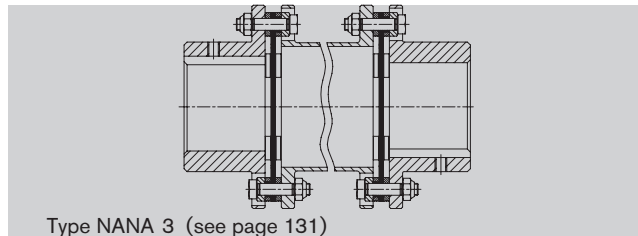
- Mixers
- Agitating machines
- Immersion pumps
- Fans
- Applications with high radial load



Type NANA 1/NANA 2 (see page 128)

- Double cardanic design
- Compensation of high misalignment with low restoring forces
- Standard spacers available from stock

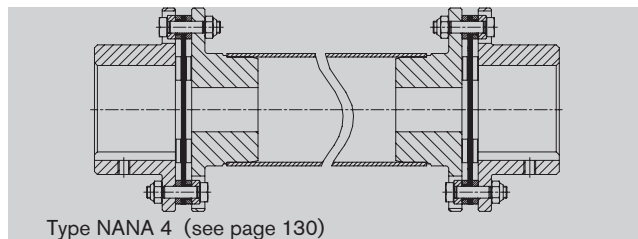
- Paper machines
- Printing and processing machines
- Conveyors
- Steel mills
- Generators
- Grinding machines



Type NANA 3 (see page 131)

- Double cardanic design
- Spacers adapted to standard dimensions of pumps
- Radial assembly, no movement of the machine required
- **Available according to API 610**

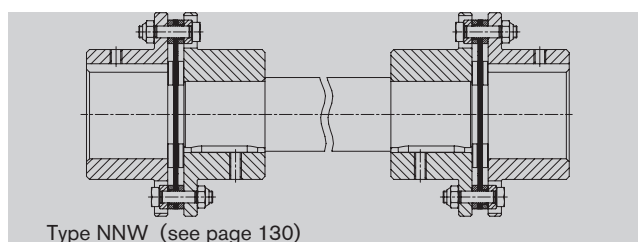
- Process pumps
- Water pumps
- Pumps according to API standard
- Turbines
- Compressors



Type NANA 4 (see page 130)

- Spacers can be determined by the customer
- Maximum shaft distance dimension up to approx. 6 m
- Welded intermediate pipes for high torsional rigidity

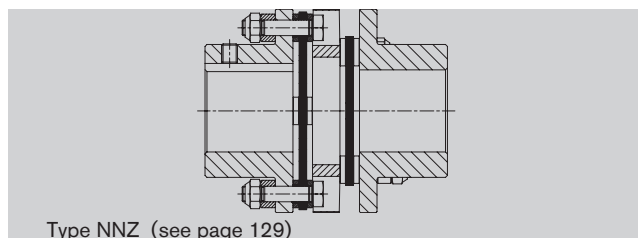
- Foil and paper machines
- Pallet and conveyor systems
- Portal robots
- Test benches
- Cooling towers/blowers



Type NNW (see page 130)

- Spacers can be determined by the customer
- Coupling consisting of 2 x type NN with intermediate shaft
- For drives with relatively low speeds

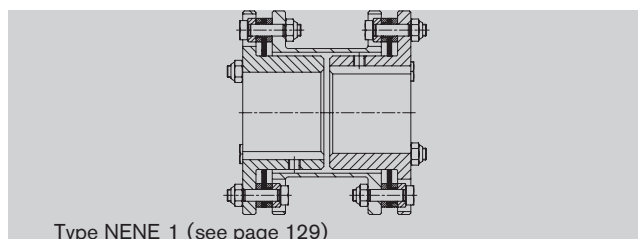
- Low speed drives with big shaft distance dimensions
- Agitating machines
- Crushers
- Presses
- Packaging machines



Type NNZ (see page 129)

- 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 129)

- With reduced hubs
- Compact double cardanic design
- Spacers cannot be assembled radially
- Variable spacer length

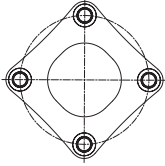
- Applications with short shaft distance dimensions
- Replacement for curved-tooth gear couplings from steel



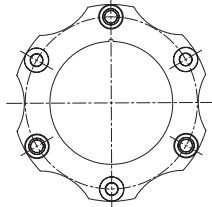
### Technical data

The following laminae types are distinguished for RADEX®-N

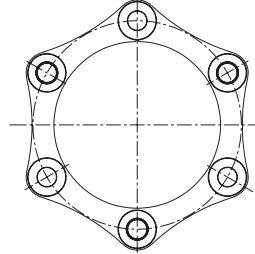
Size 20 – 50  
(4 hole laminae)



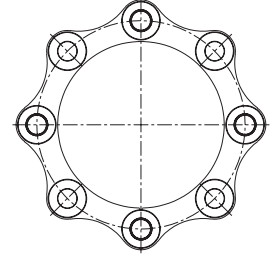
Size 60 – 135  
(6 hole laminae)



Size 136 – 336  
(6 hole laminae)



Size 138 – 338  
(8 hole laminae)



### Torques and displacements

Size	Laminae types	Torques [Nm]				Permissible displacements <sup>1)</sup>			
		T <sub>KN</sub>	T <sub>K max</sub>	T <sub>KW</sub>	Angular [°] each laminae	Axial [mm]		Radial [mm]	
						NN	NANA 1/ NANA2/ NNZ	NANA 1	NANA 2/NNZ
20	4 hole laminae	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		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	12000	24000	4000	1,0	1,75	3,5	3,8	–	
136	6 hole laminae	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			
138	23000	46000	11500	0,5	1,30	2,6			
158	33000	66000	16500	0,5	1,40	2,8			
168	45000	90000	22500	0,5	1,50	3,0			
188	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			

NEW

NEW

Mounting dimension E as indicated  
by the customer

### Permissible speeds and torsional stiffness

Size	Max. speed [rpm] (higher speeds on request)	Torsion spring rigidity x 10 <sup>6</sup> [Nm/rad] per laminae set	Size	Max. speed [rpm] (higher speeds on request)	Torsion spring rigidity x 10 <sup>6</sup> [Nm/rad] per laminae 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

<sup>1)</sup> The permissible displacement figures mentioned are maximum figures which must not arise at the same time. If radial, axial and angular displacements arise at the same time the figures need to be reduced.



**Technical data**

**Weights and mass moments of inertia**

Size	Hub <sup>1)</sup> [kg] / [kgm <sup>2</sup> ]	Laminae set [kg] / [kgm <sup>2</sup> ]	NN <sup>1)</sup> complete [kg] / [kgm <sup>2</sup> ]	NANA 1 <sup>1)</sup> complete [kg] / [kgm <sup>2</sup> ]	NANA 2 <sup>1)</sup> complete [kg] / [kgm <sup>2</sup> ]	NNZ <sup>1)</sup> complete [kg] / [kgm <sup>2</sup> ]
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	Mounting dimension E as indicated by the customer	Mounting dimension E as indicated by the customer	–
138	16,2 / 0,145	9,9 / 0,143	42,3 / 0,433	–	–	–
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	–	–	–

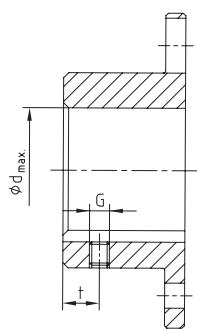
<sup>1)</sup> Hubs with max. bore

NEW

NEW

RADEX®-N  
RIGIFLEX®-N

**Cylindrical bores**



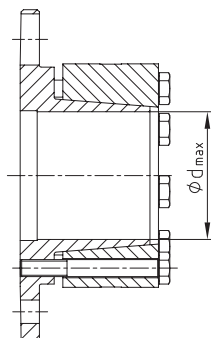
**Standard hub 1.0 according to DIN 6885 sheet 1 (with keyway)**

Size	d <sub>max.</sub>	G	t	T <sub>A</sub> [Nm]	Size	d <sub>max.</sub>	G	t	T <sub>A</sub> [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			
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			

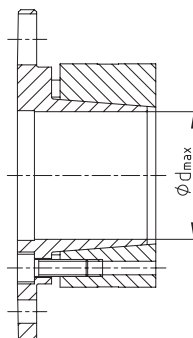
**Backlash-free shaft-hub connections without feather key**

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.

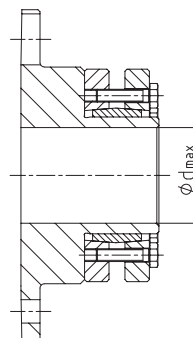
Clamping ring hub type 6.5  
(clamping screws from the outside)



Clamping ring hub type 6.0  
(clamping screws from the inside)




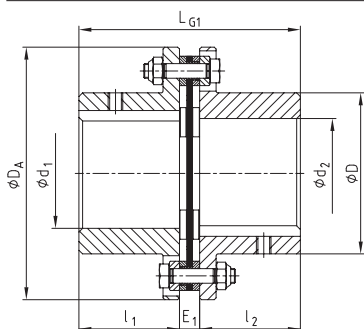
Design with CLAMPEX®  
element type 603



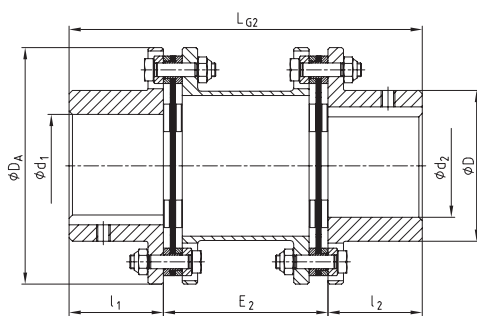
### Standard types



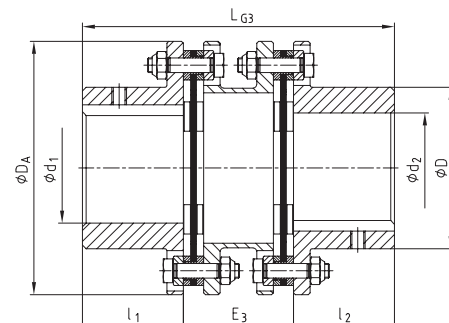
- Standard types available from stock
- Single and double cardanic designs
- Furthermore available with frictionally engaged shaft-hub-connection
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9
-  Approved according to EC Standard 94/9/EC (Explosion Certificate ATEX 95)
- From size 136 screwing of laminae by means of clamping nut (see assembly instructions KTR-N 47112)



Type NN



Type NANA 1




Type NANA 2

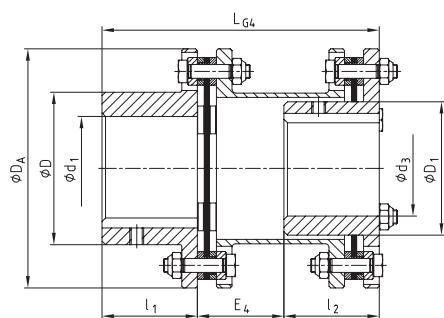
RADEX®-N types NN, NANA 1, NANA 2										
Size	Finish bore d <sub>1</sub> /d <sub>2</sub>	Dimensions [mm]								
		D	D <sub>A</sub>	l <sub>1</sub> /l <sub>2</sub>	L <sub>G1</sub>	E <sub>1</sub>	L <sub>G2</sub>	E <sub>2</sub>	L <sub>G3</sub>	E <sub>3</sub>
20	20	32	56	20	45	5	100	60	-	-
25	25	40	68	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				
138	135	180	300	135	293	23	Indicated by the customer			
158	150	195	325	150	327	27				
NEW 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				

Order form	RADEX®-N 60	NANA 1	Ø 50	Ø 60
	Coupling size	Type	Bore d <sub>1</sub>	Bore d <sub>2</sub>

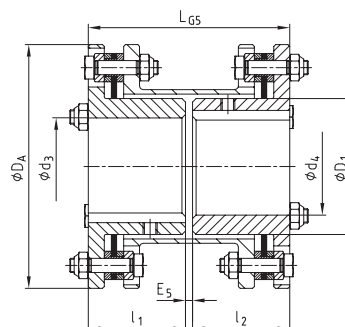
### Standard types



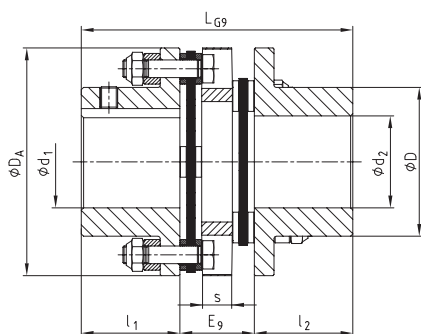
- Standard types available from stock
- Single and double cardanic designs
- Furthermore available with frictionally engaged shaft-hub-connection
- Type NNZ (double-cardanic) for very short shaft distance dimensions
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9
-  Approved according to EC Standard 94/9/EC (Explosion Certificate ATEX 95)



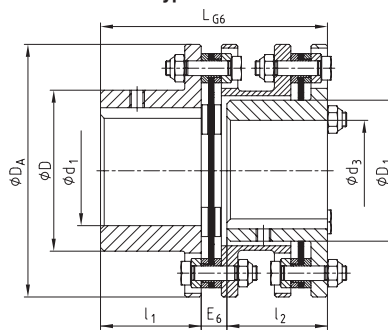
Type NENA 1



Type NENE 1



Type NNZ



Type NENA 2

#### RADEX®-N types NENA 1, NENE 1, NENA 2, NNZ


Size	Finish bore		Dimensions [mm]												
	d <sub>1</sub> /d <sub>2</sub>	d <sub>3</sub> /d <sub>4</sub>	D	D <sub>1</sub>	D <sub>A</sub>	l <sub>1</sub> /l <sub>2</sub>	L <sub>G4</sub>	E <sub>4</sub>	L <sub>G5</sub>	E <sub>5</sub>	L <sub>G6</sub>	E <sub>6</sub>	L <sub>G9</sub>	E <sub>9</sub>	
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	-	-	

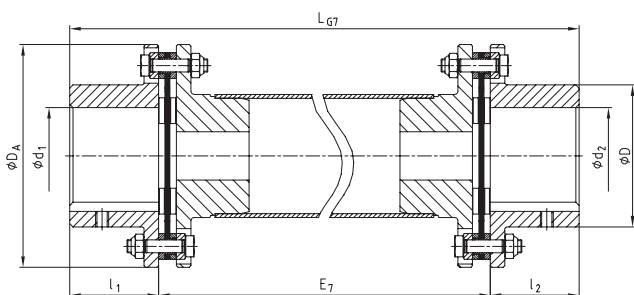
#### Order form

RADEX®-N 60	NENA 1	Ø 50	Ø 60
Coupling size	Type	Bore d <sub>1</sub>	Bore d <sub>2</sub>

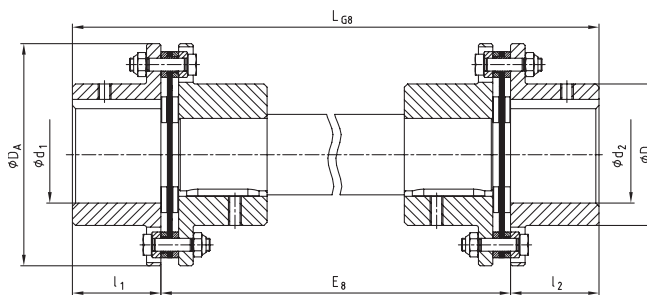
### Special types on request of customers



- 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 full shaft (please note the critical whirling speed)
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9
-  Approved according to EC Standard 94/9/EC (Explosion Certificate ATEX 95)
- From size 136 screwing of laminae 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 <sub>1</sub> /d <sub>2</sub>	D	D <sub>A</sub>	l <sub>1</sub> /l <sub>2</sub>	L <sub>G7</sub>	E <sub>7</sub>	L <sub>G8</sub>	E <sub>8</sub>
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				
<b>NEW</b> 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				
<b>NEW</b> 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<sub>G7</sub> = E<sub>7</sub> + l<sub>1</sub> + l<sub>2</sub>

Intermediate shaft dimension according to customer specification

L<sub>G8</sub> = E<sub>8</sub> + l<sub>1</sub> + l<sub>2</sub>

Intermediate shaft dimension according to customer specification

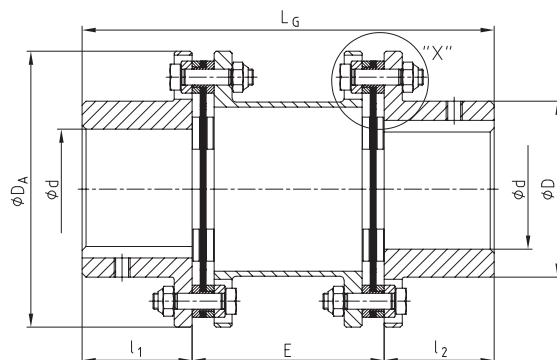
Order form:

RADEX®-N 60	NANA 4	Ø 50	Ø 60	2500
Coupling size	Type	Bore d <sub>1</sub>	Bore d <sub>2</sub>	Shaft distance dimension

**Standard line NANA 3 for pump drives according to API 610**



- Line NANA 3 for pump drives
- Coupling according to API 610
- High balancing quality due to precise manufacture (AGMA class 9)
- Device to secure the spacer if the laminae breaks (see detail "X")
- Finish bore according to ISO fit H7, feather keyway according to DIN 6885 sheet 1 - JS9
- $\text{Ex}$  Approved according to EC Standard 94/9/EC (Explosion Certificate ATEX 95)
- From size 136 screwing of laminae by means of clamping nut (see assembly instructions KTR-N 47112)



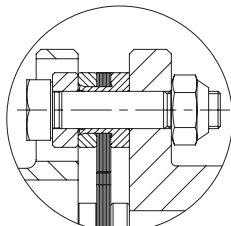
NEW

NEW

RADEX®-N type NANA 3							
Size	Max. finish bore	Dimensions [mm]				Perm. displacements	
	d	D	D <sub>A</sub>	E <sup>Standard</sup> <sup>1)</sup>	l <sub>1</sub> /l <sub>2</sub>	Angle each laminae [°]	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		280	0,7	6,7
336	330	445	660	Indicated by the customer	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

<sup>1)</sup> Other E-dimensions available on request.

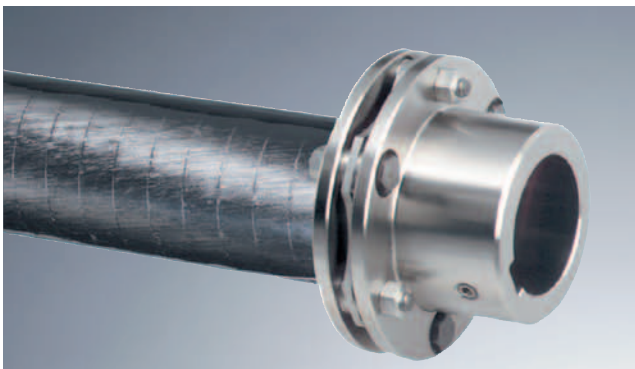
Detail "X"



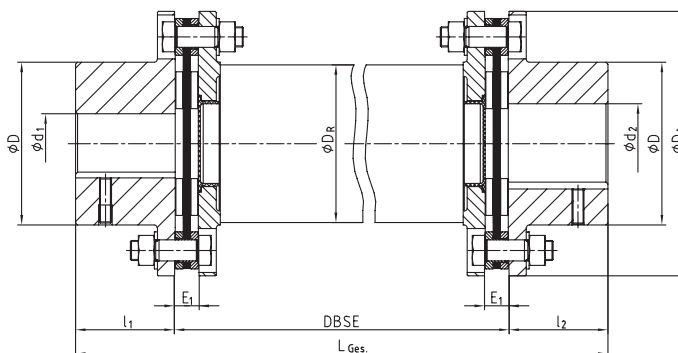
Securing device of the spacer:  
The laminae packings have a sleeve in order to secure the spacer if the laminae breaks.

Order form:	RADEX®-N 60	NANA 3	Ø 50	Ø 60	140
	Coupling size	Type	Bore d <sub>1</sub>	Bore d <sub>2</sub>	Shaft distance dimension

## Corrosion-resistant type for large shaft distance dimension



- 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 disc made of stainless material
- ATEX release possible



RADEX®-N type NANA 4 CFK											
Size	Torque [Nm]		Dimensions [mm]								
	$T_{KN}$	$T_{Kmax.}$	$D_A$	max. $d_1/d_2$	$D$	$l_1/l_2$	$E_1$	DBSE	$L_{Ges.}$	Composite Pipe $D_R$	max. DBSE <sup>1)</sup> at 1500 rpm
70	800	1600	149	70	102	65	11	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

<sup>1)</sup> In case of higher speeds or longer DBSE dimensions please contact the KTR engineering department (+49 5971 798-484).  
Due to composite tubes optimized by applications the aforementioned technical details (e. g. max. DBSE) may be varied, if required.

Particularly the steel laminae 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 from glass fiber or carbon fiber reinforced nylon (GRP or CFRP) are used, if necessary.

Order form:	RADEX®-N 85	NANA 4 CFK	Ø 60	Ø 70	3000
	Coupling size	Type	Bore $d_1$	Bore $d_2$	Shaft distance dimension

### Description of coupling

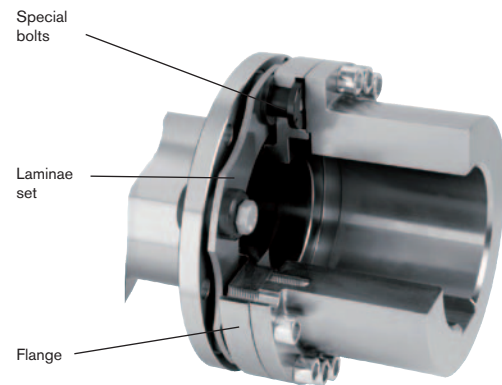
RIGIFLEX®-N couplings are used on such applications which require a reliable and maintenance-free torque transmission with shaft displacement at the same time.

RIGIFLEX®-N was developed for pump drives in particular. 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 laminae

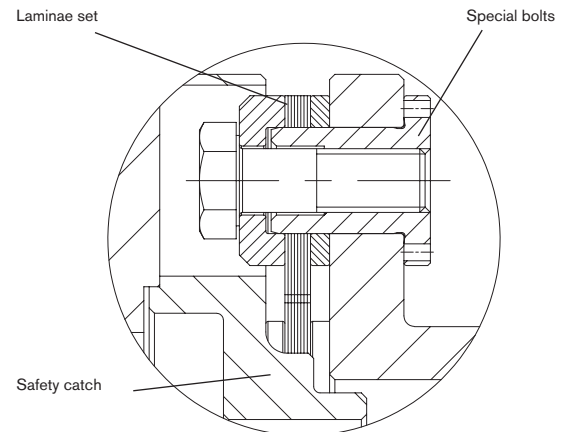
RIGIFLEX®-N laminae are waisted laminae sets arranged in layers. They are connected to the hubs or flanges, respectively, in an absolutely backlash-free fit by means of positive-locking set screws. The number of the layers of individual laminae allows to vary torques, displacement figures and stiffness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



### Securing 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 laminae break the spacer remains within the coupling.

In general the removable part is supplied along with a laminae 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](http://www.ktr.com).

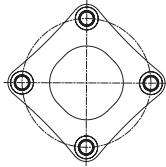




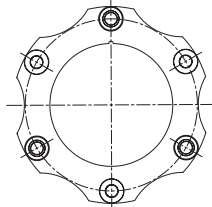
### Technical data

The following laminae types are distinguished for RIGIFLEX®-N:

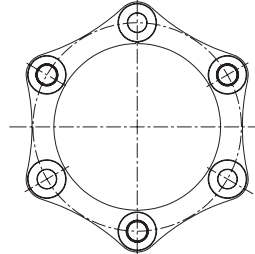
Size 35 – 65  
(4 hole laminae)



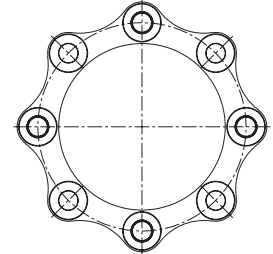
Size 75 – 160  
(6 hole laminae)



Size 166 – 406  
(6 hole laminae)



Size 168 – 408  
(8 hole laminae)



Torques and displacements												
Size	Laminae type	Torque [Nm]			Permissible displacements							
		T <sub>KN</sub>	T <sub>K max</sub>	T <sub>KW</sub>	Angular ± K <sub>w</sub> <sup>1)</sup> [°]	Axial ± K <sub>a</sub> [mm]	Radial ± K <sub>r</sub> [mm]					
							E=100	E=140	E=180	E=200	E=250	
35	4 hole laminae	120	240	60	0,7	1,2	0,90	1,40	–	–	–	
50		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	6 hole laminae	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		17500	35000	8750	0,7	3,7	Mounting dimension E as indicated by the customer					
196		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							
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 laminae	70000	140000	35000	0,5	3,5						
308		115000	230000	57500	0,5	4,0						
348		180000	360000	90000	0,5	4,5						
408		280000	560000	140000	0,5	5,0						

<sup>1)</sup> Angular displacement each laminae

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]	Complete coupling ca [N/mm]	Each laminae 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	30	107	170000	65020	56700	-	-	-
50	18000	75	470	198000	73953	63990	-	-	-
65	13600	136	860	360000	146022	129938	117046	-	-
75	12400	340	1500	720000	306145	278381	255234	-	-
85	11000	385	2300	1062000	-	406641	369429	353265	318433
110	9000	390	2800	1460000	-	664284	637587	625028	595693
120	8000	600	4100	4500000	-	1798018	1637553	1567602	1416348
140	6400	580	6400	5600000	-	-	-	2363340	2226630
160	5600	620	9800	6850000	-	-	-	-	2654894
166	5600	670	10200	7640000	Mounting dimension E as indicated by the customer				
196	5200	1020	17130	9200000					
216	4600	1280	32300	13800000					
256	3900	1640	47060	23800000					
306	3300	1910	64700	28400000					
346	2900	2050	85300	41400000					
406	2500	2140	161000	48500000					
168	5600	1230	34000	13200000					
198	5200	1800	58000	18300000					
218	4600	2300	110000	26200000					
258	3900	2950	160000	52000000					
308	3300	3400	220000	71000000					
348	2900	3700	290000	108000000					
408	2500	3800	550000	156000000					

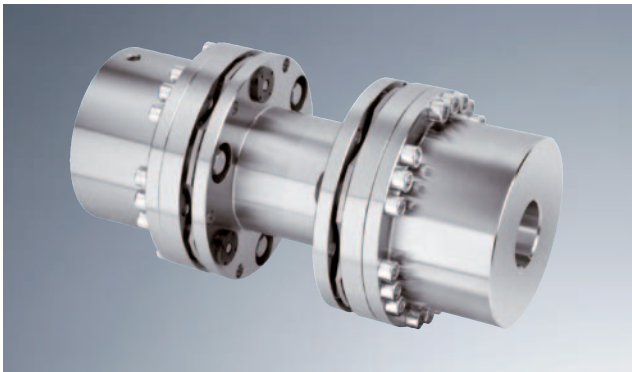
ca = axial stiffness


cw = angular stiffness

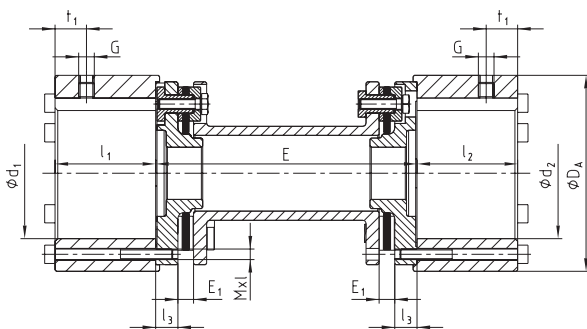
ct = torsion spring stiffness

Weights [kg] / Mass moments of inertia x 10 <sup>-3</sup> [kgm <sup>2</sup> ]												
Size	Hub (max. bore)		Spacer complete [kg]					Spacer complete [kgm <sup>2</sup> ]				
	[kg]	[kgm <sup>2</sup> ]	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	Mounting dimension E as indicated by the customer									
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										
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										

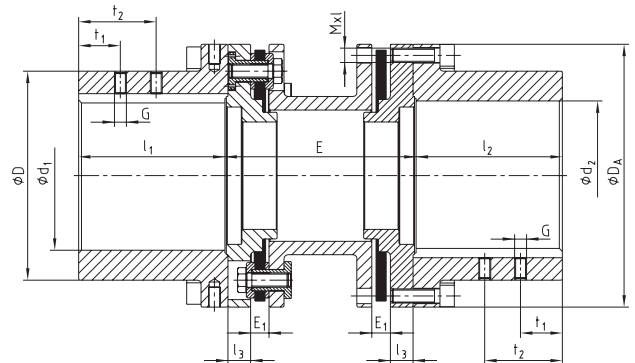
### Type A



- 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)
-  Approved according to EC Standard 94/9/EC (Explosion Certificate ATEX 95)



Size 35



Size 50 - 408

RIGIFLEX®-N type A																			
Size	Torque [Nm]			Max. finish bore	Dimensions [mm]											Screws DIN EN ISO 4762			
	T <sub>KN</sub>	T <sub>Kmax</sub>	T <sub>KW</sub>		d <sub>1</sub> /d <sub>2</sub>	D	D <sub>A</sub>	l <sub>1</sub> /l <sub>2</sub>	l <sub>3</sub>	G	t <sub>1</sub>	t <sub>2</sub>	E <sub>1</sub>	E <sup>1)</sup>				MxI	T <sub>A</sub>
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	3900	
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	3900	

<sup>1)</sup> Other shaft distances available on request

For selection of coupling see pages 121/122. Mounting instructions no. 47410 under [www.ktr.com](http://www.ktr.com).

Order form:	RIGIFLEX®-N 120	A	Ø 100	Ø 120	200
	Coupling size	Type	Bore d <sub>1</sub>	Bore d <sub>2</sub>	Shaft distance dimension E