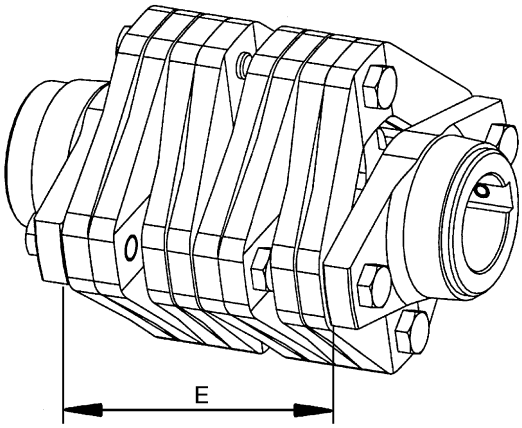
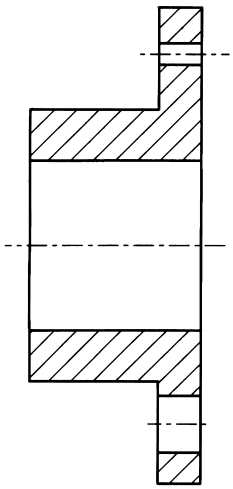
LAMEX® Lamina coupling from plastics

Backlash-free, torsionally stiff and maintenance-free couplings

- Less weight due to highly stiff plastic laminae
- Laminae to be assembled radially
- Lamina material electroconductive
- Release for explosion-proof drives
- Backlash-free and maintenance-free
- Torsionally stiff and flexible under bending

- Easy variation of shaft distance dimensions (distance dimension E)
- As a result optimally to adapt to the existing adjacent components
- Laminae to be assembled radially
- Available as a reinforced lamina design for higher torques

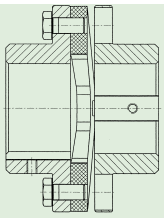
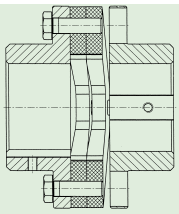
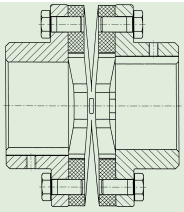
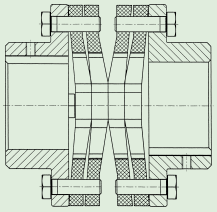
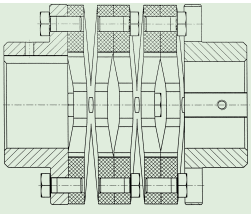
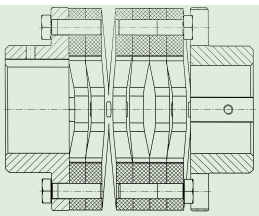


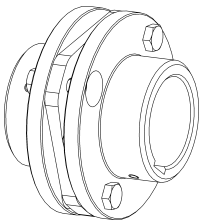


- ***New:*** Revised flanges as turning parts
- Various hub designs can be realized easier:
  - clamping hubs
  - clamping ring hubs
  - hubs with CLAMPEX clamping sets

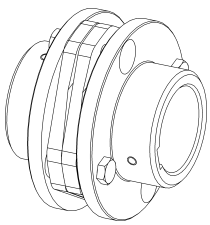
LAMEX® Lamina coupling from plastics

Designs and applications

Design	Characteristics	Applications
 **Design EK** (see page 117)	• single cardanic design • only angular and axial displacement permissible • backlash-free • compact dimensions	• mixers • agitating machines • applications with high radial and axial load
 **Design EKS** (see page 117)	• reinforced design Ek • single cardanic design, can be built from design EK by modification of the lamina set	• as design EK, but for higher performance range • for higher radial and axial forces
 **Design DK** (see page 117)	• double cardanic design • angular, axial and radial displacements permissible • lamina set to be assembled radially	• pump drives • for the range of general engineering • for low to average performance
 **Design DKS** (see page 117)	• reinforced design DK • higher torques with maximum displacement figures • easy assembly of lamina sets	• packaging machines • water pumps • paper machines
 **Design ZS** (see page 117)	• coupling with variable intermediate shaft dimensions • length of spacers adapted to standard pump dimensions • easy modification of intermediate shaft dimensions	• standard pumps • process pumps (explosion-proof applications) • for the range of general engineering
 **Design ZSS** (see page117)	• reinforced design ZS • variable intermediate shaft dimensions • connection of bigger shaft distance dimensions • lamina set to be assembled radially	• as design ZS, but for higher performances • pump drives • packaging machines



standard design



reinforced design

LAMEX® Lamina coupling from plastics

For advanced drive technology KTR

Technical data

Torques, misalignments

Size	Torques [Nm]				Permissible misalignments								
	EK, DK, ZS		EKS, DKS, ZSS		angular [°]			axial [mm]			radial [mm]		
	T_{KN}	T_{Kmax}	T_{KN}	T_{Kmax}	EK/ EKS	DK/ DKS	ZS/ ZSS	EK/ EKS	DK/ DKS	ZS/ ZSS	EK/ EKS	DK/ DKS	ZS/ ZSS
19	10	30	22	60	1	1	1	0,5	1	2	–	0,35	1,4
24	25	75	50	140	1	1	1	0,5	1	2	–	0,35	2
28	40	120	80	240	1	1	1	0,5	1	2	–	0,35	2
38	60	180	120	320	1	1	1	0,5	1	2	–	0,35	2
42	100	300	200	380	1	1	1	0,5	1	2	–	0,35	2
48	150	450	280	590	1	1	1	0,5	1	2	–	0,35	2,5
55	200	600	400	700	1	1	1	0,5	1	2	–	0,35	2,5
65	280	840	560	900	1	1	1	0,5	1	2	–	0,35	2,5
75	380	1140	720	1750	1	1	1	0,5	1	2	–	0,35	2,5
90	580	1740	1040	2200	1	1	1	0,5	1	2	–	0,35	2,5

Speeds, stiffness data

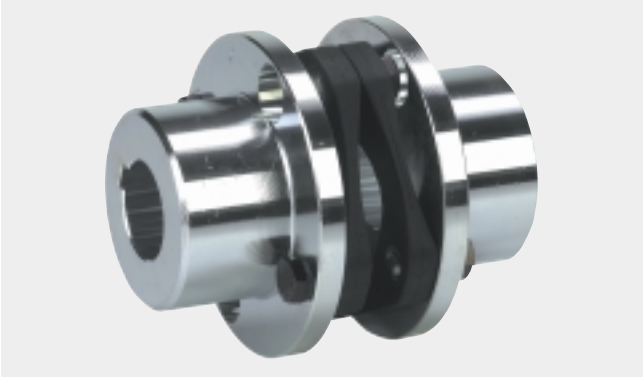
Size	Maximum speed [min^{-1}]	Torsion spring stiffness x 10^6 [Nm/rad]						Axial spring stiffness [N/mm]					
		EK	EKS	DK	DKS	ZS	ZSS	EK	EKS	DK	DKS	ZS	ZSS
19	12500	0,005	0,009	0,002	0,003	0,001	0,001	1852	3260	750	1578	263	600
24	9500	0,023	0,04	0,01	0,12	0,004	0,007	1600	4898	1112	2325	432	898
28	8000	0,046	0,08	0,02	0,03	0,01	0,014	3555	7111	1473	2450	610	1250
38	7100	0,07	0,09	0,03	0,04	0,015	0,02	2500	4000	950	2020	400	900
42	6000	0,08	0,1	0,04	0,05	0,02	0,024	1632	2666	600	1300	285	690
48	5300	0,17	0,26	0,05	0,1	0,04	0,05	2240	4200	1090	1923	323	680
55	4500	0,23	0,3	0,11	0,13	0,05	0,06	1667	3160	800	1500	200	520
65	4000	0,27	0,4	0,1	0,13	0,03	0,06	1200	2200	570	1078	150	400
75	3550	0,38	0,6	0,17	0,2	0,06	0,1	961	1700	430	900	112	312
90	3000	0,4	0,5	0,17	0,2	0,06	0,07	800	1400	400	750	100	250

Mass moment of inertia

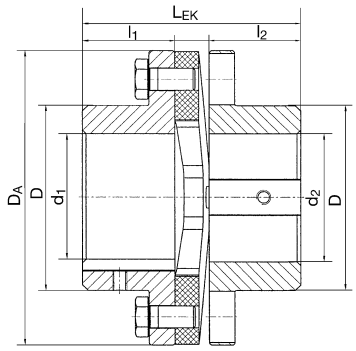
Size	Mass moments of inertia [kgm^2], hubs with maximum bore				
	Hub	Lamina	EK complete	DK complete	ZS complete
19	0,000005	0,00002	0,00003	0,00005	0,00009
24	0,00002	0,00009	0,00013	0,00022	0,00040
28	0,00035	0,00013	0,00083	0,00093	0,00119
38	0,00075	0,00024	0,00174	0,00198	0,00246
42	0,0015	0,00044	0,00344	0,00388	0,00476
48	0,0025	0,00076	0,00576	0,00652	0,00804
55	0,006	0,0012	0,0132	0,0144	0,0168
65	0,010	0,0016	0,0216	0,0232	0,0264
75	0,021	0,0033	0,0453	0,0486	0,0552
90	0,045	0,0073	0,0973	0,1046	0,1192

LAMEX® Lamina coupling from plastics

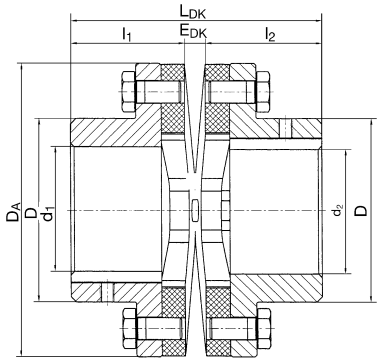
Standard designs



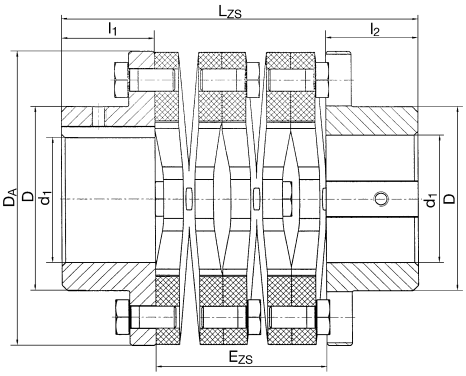
- Standard designs single and double cardanic
- Backlash-free and torsionally stiff, able to compensate for displacements
- Available from stock
- Finish bores H7 tolerance, keyway to DIN 6885/1, JS9 tolerances
- Furthermore available with frictionally engaged shaft-hub-connection



EK

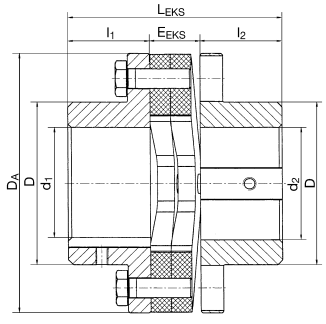


DK

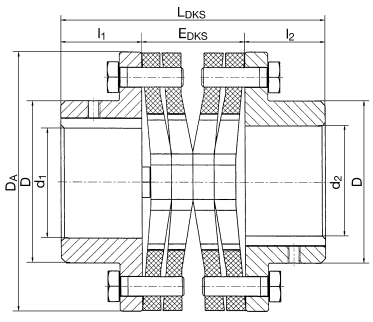


ZS

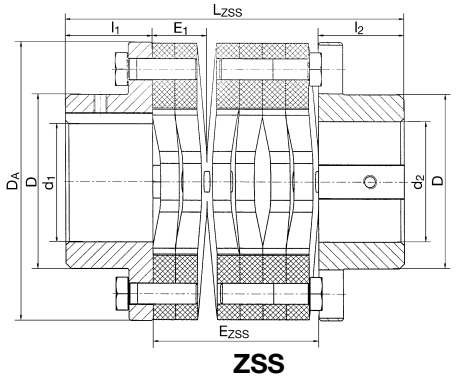
Size	Standard hub 1a				Hub 1				$l_1;l_2$	Designs EK and EKS				Designs DK and DKS				Designs ZS and ZSS				
	d_1/d_2 min.	d_1/d_2 max.	D_A	D	d_1/d_2 min.	d_1/d_2 max.	D_A	D		E_{EK}	L_{EK}	E_{EKS}	L_{EKS}	E_{DK}	L_{DK}	E_{DKS}	L_{DKS}	E_{ZS}	L_{ZS}	E_1	E_{ZSS}	L_{ZSS}
19	–	24	74	38	–	19	70	36	25	20	70	31,0	81,0	40	90	62	112	100	150	31,0	93	143
																					124	174
24	–	32	93	49	–	24	90	41	27	20	74	31,5	85,5	40	94	63	117	100	154	31,5	94,5	148,5
																		140	194		126	180
28	–	40	113	59	–	28	108	48	39	20	98	32,5	110,5	40	118	65	143	100	178	32,5	130	208
																		140	218		162,5	240,5
38	–	50	128	74	–	38	122	61	39	20	98	32,5	110,5	40	118	65	143	100	178	32,5	130	208
																		140	218		162,5	240,5
42	–	65	148	94	–	42	145	71	50	20	120	32,5	132,5	40	140	65	165	100	200	32,5	130	230
																		140	240		162,5	262,5
48	–	70	161	101	–	48	160	76	52	20	124	33,0	137,0	40	144	66	170	140	244	33,0	165	269
																		180	284		198	302
55	–	85	186	126	–	55	185	88	64	20	148	33,0	161,0	40	168	66	194	140	268	33,0	165	293
																		180	308		198	326
65	–	100	206	146	–	65	205	103	66	20	152	33,0	165,0	40	172	66	198	140	272	33,0	165	297
																		180	312		198	330
75	–	115	240	164	–	75	240	121	77	20	174	33,75	187,8	40	194	67,5	221,5	140	294	33,75	168,8	322,8
																		180	334		202,5	356,5
90	–	150	288	214	–	90	288	142	89	20	198	33,75	211,8	40	218	67,5	245,5	140	318	33,75	168,8	346,8
																		180	358		202,5	380,5



EKS



DKS



ZSS

Orderform:

LAMEX® 38	ZSS	L_{ZSS}	Ø 38 / Ø 38
Coupling size	Design	Spacer length Indication only for ZS and ZSS	Finish bores

LAMEX® Lamina coupling from plastics

Technical description

Assembly and operating advice:
(please see our mounting instructions KTR standard 40410)
For the assembly it is important to make sure that the laminae packages are assembled free from distortion in axial direction.

The screw tightening torques of the laminae are shown in the following table:

Screw tightening torques of laminae:

Size	Screw	T_A [Nm]
19	M6	14
24	M8	35
28	M10	69
38	M10	69
42	M10	69
48	M12	120
55	M12	120
65	M12	120
75	M16	295
90	M16	295

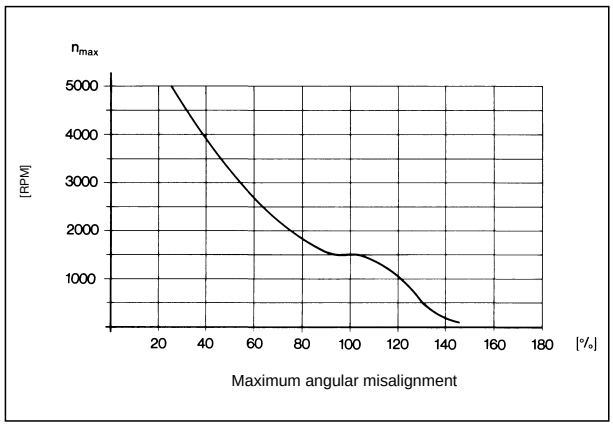
The following lamina types must be distinguished for LAMEX:

Lamina type	Design
D	4 x through hole
G	4 x tapping
DG	2 x through hole 2 x tapping

Balancing:
On request of the customer the LAMEX couplings can be balanced. Please consult with us for any further questions.

Shaft misalignments:
For the LAMEX coupling the compensation of shaft misalignments is effected by the elastic deformation of the plastic laminae. For that reason the lifetime is considerably influenced by the misalignments that arise.
The LAMEX coupling is selected in a way that it can absorb a maximum angular displacement of 1° with each "lamina joint". These displacement figures refer to the nominal power and the nominal speed of 1500 min -1. For higher or lower speeds please see the maximum permissible figure of angular misalignment in the following diagramme:

Permissible angular misalignments:

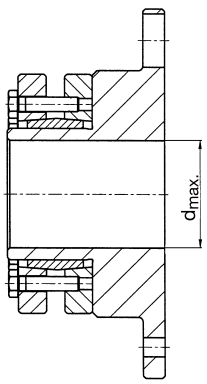


Thread for setscrews:
Position and dimensions of the thread for setscrews of LAMEX hubs (hub 1.0, cylindrical bore with keyway) are shown in the following table:

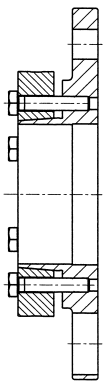
Size	Thread G	Distance t
19	M5	14
24	M5	14
28	M6	20
38	M8	20
42	M8	25
48	M8	25
55	M10	30
65	M10	30
75	M10	40

Hub designs:
Apart from the above-mentioned standard hub (hub 1.0, cylindrical bore with keyway) frictionally engaged, backlash-free shaft-hub-connections are available, as an example:

Frictionally engaged shaft-hub-connection with KTR 603



Frictionally engaged shaft-hub-connection with clamping ring hub



Coupling selection

1. **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.

1.1 **Loading by rated torque**
Taking into account the operating factor SB the permissible rated torque must be at least as big as the rated torque T_N of the machine.

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

(For operating factor S_B see table below)

1.2 **Loading by torque shocks**
The permissible maximum torque T_{Kmax} of the coupling must be at least as big as the sum of the peak torque T_S and the rated torque T_N of the machine. 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 program (please consult with our engineering department).

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

2. **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).

2.1 **Loading by rated torque**
Taking into account the operating factor S_B the permissible rated speed must be at least as large as the rated torque T_N of the machine.

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

2.2 **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}.

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

Explanation of the above-mentioned coupling torques

Description	Code	Explanation
Rated torque of coupling	T_{KN}	Torque which can be transmitted continuously over the entire speed range of the coupling

Benennung	Zeichen	Erläuterung
Maximum torque of coupling	T_{Kmax}	Torque which can be transmitted during the entire life of the coupling $\geq 10^5$ times as spike load or 5×10^4 times as alternating load

Guidelines for operating factor S_B

Application	S_B
Construction machinery	2
Agitators	1 - 2
Centrifuges	1,5
Conveyors	2
Elevators	2
Fans/Blowers	1,5
Generators	1
Calanders	2
Crushers	2,5
Textile machinery	2
Rolling mills	2,5

Application	S_B
Woodworking machinery	1,5
Mixers and extruders	2
Stamps, presses	2,5
Machine tools	2
Grinders	2,5
Packaging machines	1
Roller drives	2,5
Piston pumps	2,5
Centrifugal pumps	1,5
Piston compressors	2,5
Turbo compressors	2