PAGUFLEX® PLUS
Shaft Couplings
Highly flexible, torsionally rigid, free of play, one-piece

PAGUFLEX® PLUS
... the sure, uncomplicated, economical solution, if angled, radial and/or axially displaced drive shafts are to be frictionally connected.

NEW:

The double loop-shaped, thermoplastic compensating element of the coupling HYTREL®, a Thermoplastic Ether Ester Elastomer (TEEE) from DuPont.

Owing to the hogh reverse bending strenght of the flexible material and the cardan-like shaping of the power transmitter, this development is the ingenious, technical solution for shaft displacement problems in motive power engineering and in measurement and control techniques.

Recommendations fpr our products come from the design of:
shaft-anle encorders, counting mechanisms, tachogenerators, servo valves, elevating tables, feeding drives, pumps, compressors and ventilators, kitchen equipment, office systems, textile machines and for numerous applications in the automobile and aircraft industries.

The one-piece coupling works frictionless, waerless and silently, and without any troubling effects (i. e. without troubling structure-borne sounds).

Thus in changes of direction of rotation or during torque fluctuations with load direction reversal, PAGUFLEX® PLUS enables play-free and shock-free power transmission, together with effective vibration damping and sound insulation.



In noumerous technical applications the material HYTREL® has been successfully substituted not only for established thermoplastics but also for elastomers. In combines ideally the advantages of both materials and therefore is the innovation for flexible shaft couplings.

It enables the opening up of new areas of application in extremely low and high temperatures. Also in association with media in which owing to their sensitivity elastic elements have shown themselves to be of `limited use´. Further applications are those in which up to now the reverse bedning strenght of the material has set narrow limits with regard to mechanical fatigue loading. In these, PAGUFLEX® PLUS is now the solution.

The high flexibility of the thermoplastic coupling element effectively lightens the burden of the shaft bearings of motors and machines even in circumstances of large radial and angular, alignment errors. With the help of PAGUFLEX® PLUS, the bearings run quieter, warm up less and achieve longer durability, thus lengthening service life.

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Calculation bases:

Selection of coupling according to greatest torque

Selection criterion		$T_K max > T_S$		
Max. permissible coupling torque	[Nm]	$T_K max$		
Peak operational torque	[Nm]	T_S	=	$T_N \cdot M \cdot S_Z \cdot S_\vartheta \cdot S_A$
Rated torque [1]	[Nm]	T_N	=	$P / (2 \cdot \pi \cdot n)$
Rated transmission power	[W]	P		*(motor, machine, unit)*
Rated speed	[s^{-1}]	n		*at the coupling*
Mass factor [2]	[1]	M	=	$J_G / (J_G + J_S)$
Moment of inertia	[kgm^2]	J_G		*of the constant rotating side*
Moment of inertia [3]	[kgm^2]	J_S		*of the shock/vibration-causing side*
Startup factor	[1]	S_Z	= 1.0	*at Z ≤ 120*
			= 1.3	*at Z ≤ 240*
			= 2.0	*at Z > 240*
Startups per hour	[h^{-1}]	Z		
Temperature factor	[1]	S_ϑ	= 1.0	*at –20 to + 50 °C*
			= 1.3	*at +50 to + 80 °C*
			= 1.8	*at +80 to +100 °C*
Shock factor [4]	[1]	S_A	= 1.5	*for small…*
			= 1.8	*for medium…*
			= 2.2	*for large irregularity of the torque*

1) *For motors use the greatest torque in place of the rated moment (e. g. for electric motors the moment of tilt).*
2) *Only to be calculated if the drive side or the load side has irregular torque trends and torsional vibrations develop. Otherwise M = 1.*
3) *E. g. reciprocating pumps and compressors.*
4) *Dependent on the type of drive and output machines or units and the type of load.*

The factors specified are orientation values; in special cases send us your proposals.
For coupling calculations see DIN 740 also.

Field-proven:
Suited to a great variety of uses, PAGUFLEX® PLUS couplings are flexibly designed in accordance with the given shaft arrangements and/or in accordance with the differing requirements of specific cases of application.
In the standard versions, each of the galvanised bosses (material C15K) has a cylindrical hole (tolerance H7) and is fixed on the shaft by means of stud bolts with hexagon socket and cup point (DIN 916).

The internal bosses benefit use in circumstances of tight space and fitting.

For particular cases special boss/shaft connections are obtainable.

Boss design:

1 Standard design in four size classes with screw thread conforming to DIN 916

2 Special design with continuous cross hole and pin

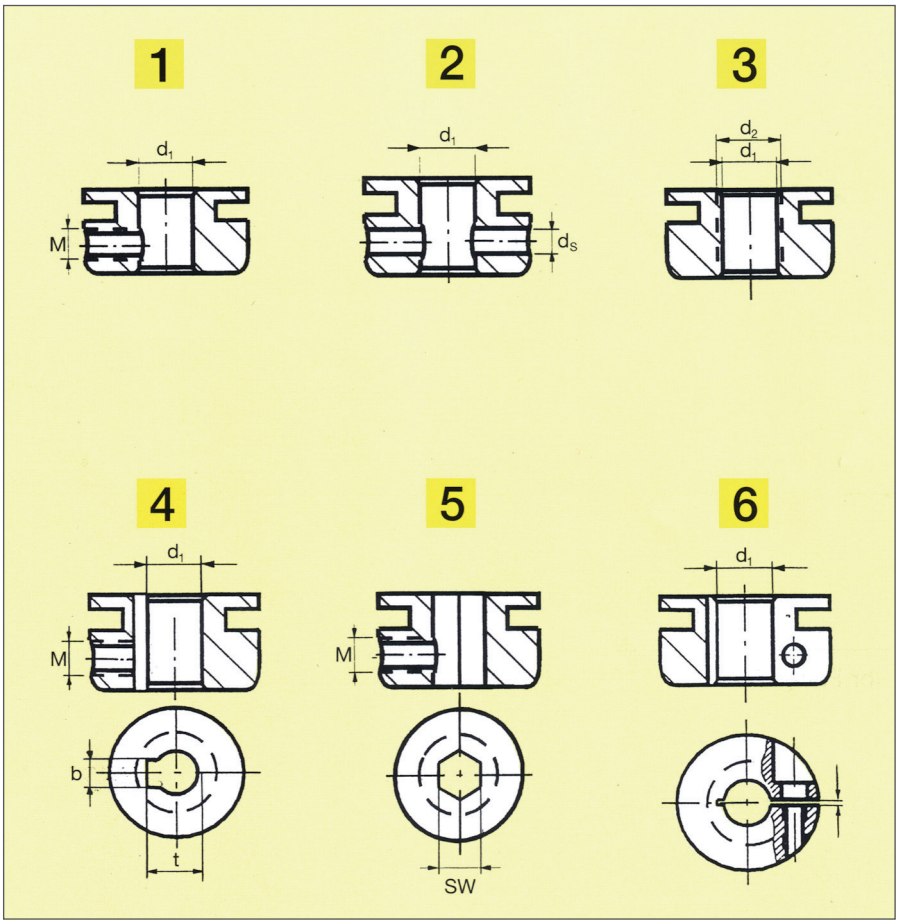
3 Special design with serration conforming to DIN 5481

4 Special design with feather key and screw thread

5 Special design with hexagon and screw thread

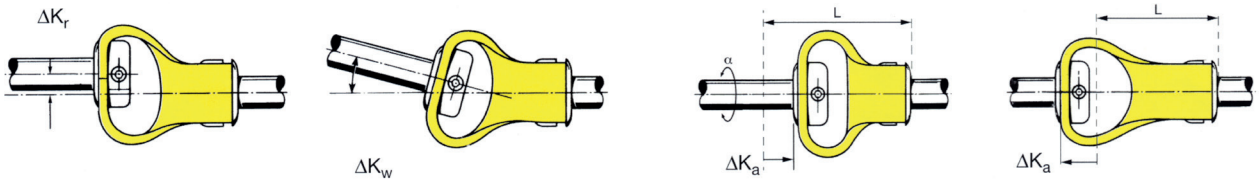
6 Special design, slotted, with clamping bolt

(Other variants on request)

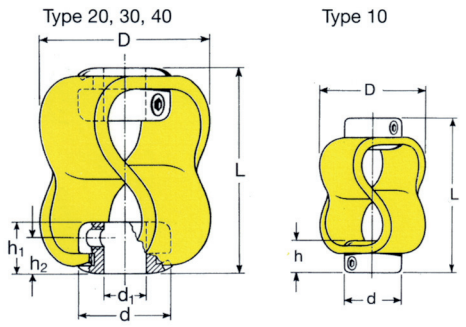


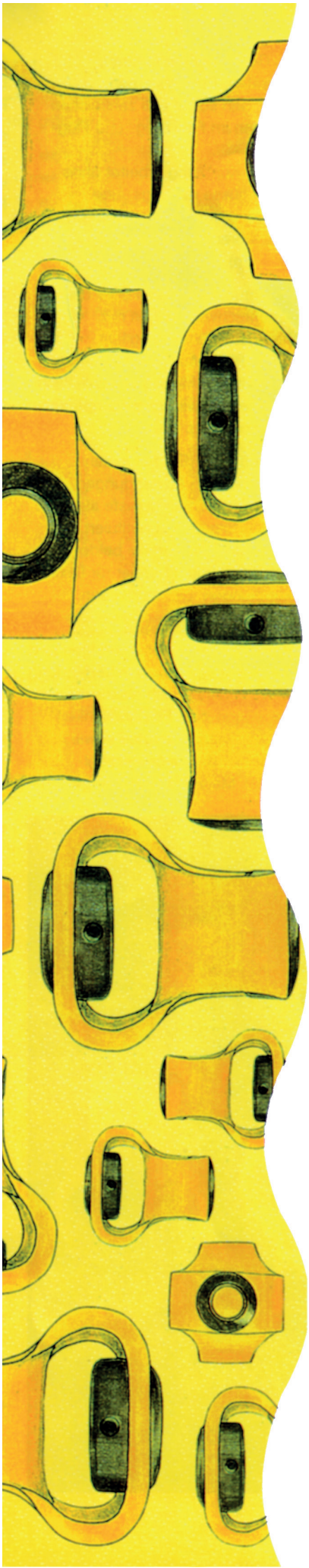
Selection system PAGUFLEX® PLUS:

Parameters	Symbols	Unit	Coupling size			
			10	**20**	**30**	**40**
Max. torque						
for displacement $K_w \leq 1°$, $K_a \leq 2$ mm, $K_r \leq 0.5$ mm	$T_K max_1$	Nm	0.8	3.0	8.0	18
for max. angular & radial displacement	$T_K max_2$	Nm	0.5	1.8	5.0	10
Mobility						
max. axial displacement	$2 \cdot \Delta K_a$	mm	9.0	15	17	22
max. radial displacement	ΔK_r	mm	2.6	3.2	3.2	3.2
max. angular displacement	ΔK_w	∢°	10	15	15	15
Torsion angle at 50 % $T_K max_1$	α	∢°	4.0	8.0	10	24
Torsion spring rigidity up to 50 % $T_K max_1$	C_t	Nm/rad	3.2	7.8	21	23
Axial spring rigidity up to 20 % ΔK_a	C_a	N/mm	31	13	33	72
Radial spring rigidity up to 20 % ΔK_r	C_r	N/mm	11	4.5	7.7	21
Angular spring rigidity up to 50 % ΔK_w	C_w	Nm/rad	5.2	9.5	13	17
Angular momentum of the coupling	J_K	kg·m²	$0{,}1 \cdot 10^{-5}$	$0{,}91 \cdot 10^{-5}$	$1{,}87 \cdot 10^{-5}$	$1{,}65 \cdot 10^{-5}$
Mass - standard design	M_K	kg	0,024	0,077	0,119	0,108



Fitting dimensions: (in mm)	Symbols					
			10	**20**	**30**	**40**
Rotation diameter	D		26.0	48.0	54.0	54.0
Length, slack	L		28.0	48.0	58.0	61.0
Boss diameter	d		18.0	25.0	28.0	28.0
Boss height	h_1		7.9	12.7	15.9	15.9
Height of mounting bolt	h_2		5.5	7.9	10.4	11.2
Standard bore diameter	d_1		6.0	10.0	12.0	14.0
Max. permissible bore diamter	d_1		8.0	12.0	16.0	16.0
Bolt with hexagon socket DIN 916			M3	M4	M5	M6





Plus points:

... of the PAGUFLEX® PLUS couplings

- high torsional rigidity with optimal beeding and traction or thrust flexibility
- ingeniously simple constructional principle
- one-piece design - without play, friction, wear and structure vibrations
- simple fitting, no extra machining of the shaft journals
- minimum fitting volume, radially and axially
- extremely high, permissible displacement error values: angular approx. Ø ±15°, radial approx. Ø ±3 mm and axial approx. 10 to 20 mm
- coupling can be used as an universal joint for large or inermittent bending angles of the shaft
- elastic element made of HYTREL® (Thermoplastic Ether Ester Elastomer, TEEE); enabling:
  - high operational reliability in the temperature range between -40 °C und +100 °C
  - outstandig chemical resistance to acids, alkalis, solvents, oils, gases, ozone
  - high tear propagation resistance, high low-temperature flexibility, high abrasion resistance and reverse bending strenght
- lisulation from heat, structure-borne noise and leakage currents
- damping of vibration and shock
- relieves the motor/machine shaft bearings of lateral and axial forces
- steel bosses with corrosion-protected, galvanised surface or optionally available in special designs
- couplings can be used as safety element: shearing off of the elastic body as a result of overload = limitation of damage

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