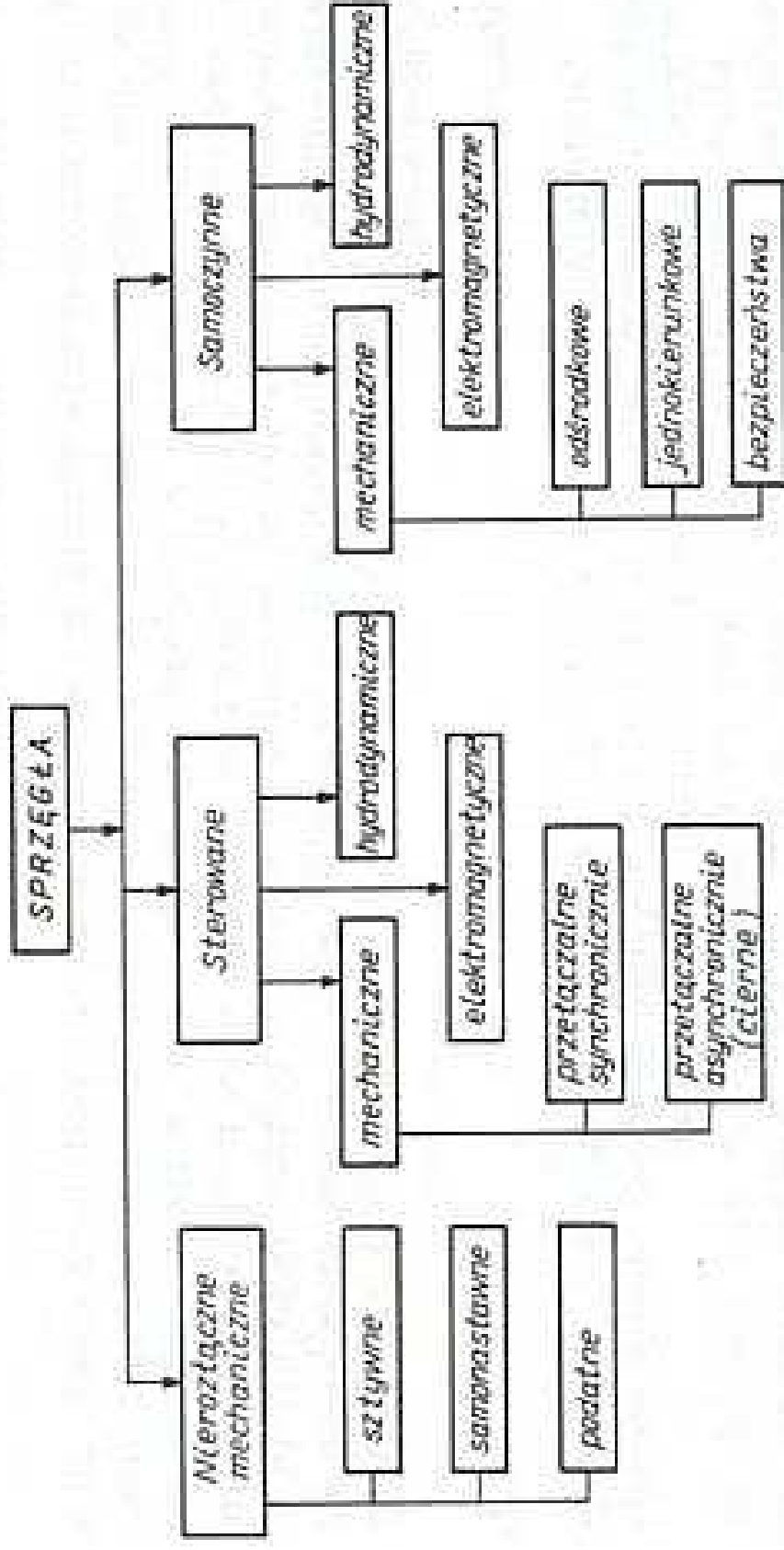




Podstawy Konstrukcji Maszyn

Wykład nr. 10 „Sprzęganie wałów”

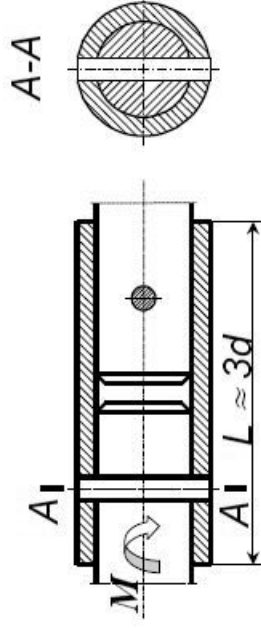


Rys. 1. Podział sprzęgł według cech funkcjonalno-konstrukcyjnych

TULEJOWE SPRZĘGŁO KÓŁKOWE

Ścinanie kółka

$$\tau_t = \frac{P_\tau}{2A_k} \leq k_t \Rightarrow d_k \geq 2 \sqrt{\frac{M}{\pi d k_t}}$$



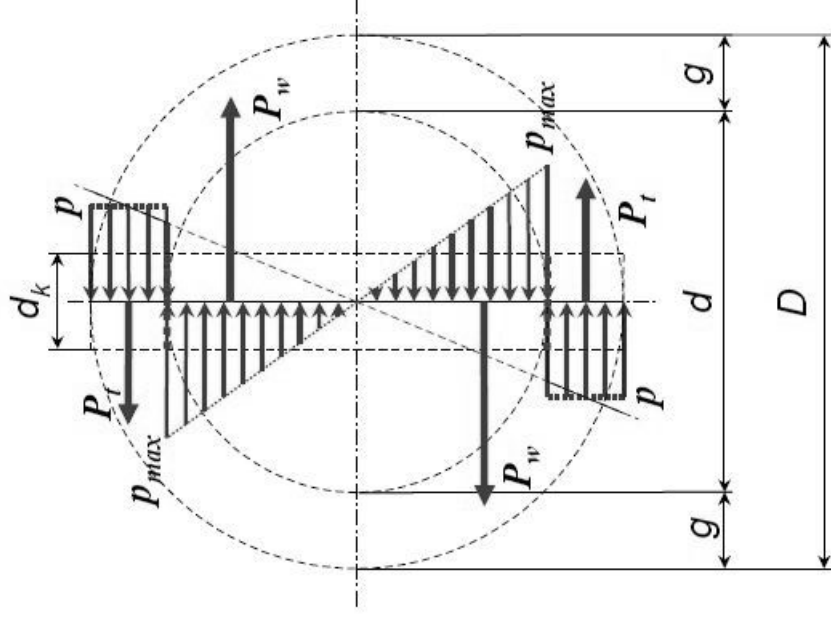
Naciski powierzchniowe:

- między wałem a kołkiem

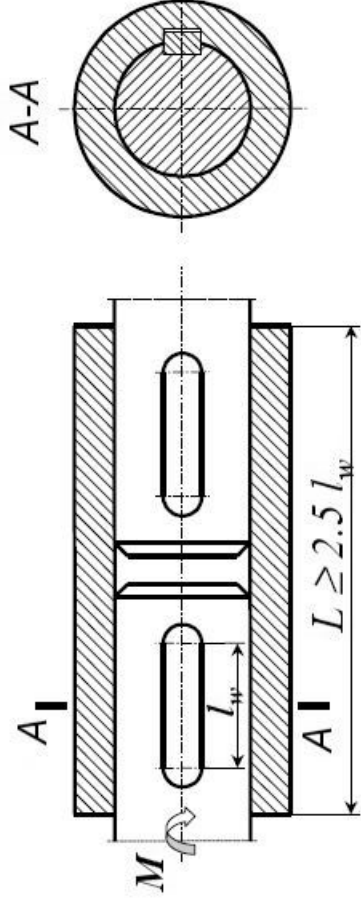
$$P_{\max} = \frac{4P_w}{d d_k} \leq P_{dop} \Rightarrow d_k \geq \frac{6M}{d^2 P_{dop}}$$

- między tuleją a kołkiem

$$P = \frac{P_t}{A_t} \leq P_{dop} \Rightarrow d_k \geq \frac{M}{g(d+g)P_{dop}}$$



TULEJOWE SPRZĘGŁO WPUSTOWE

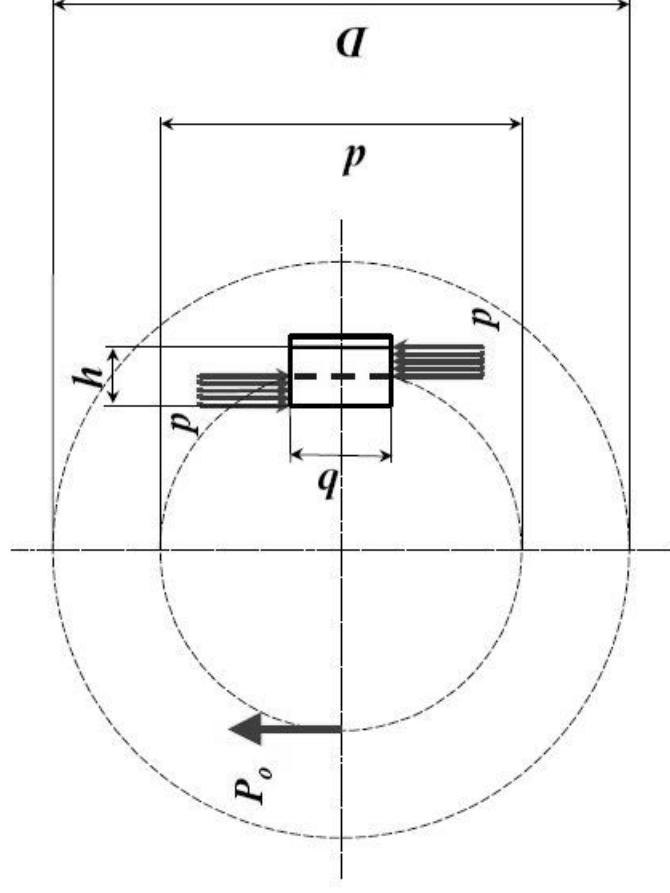


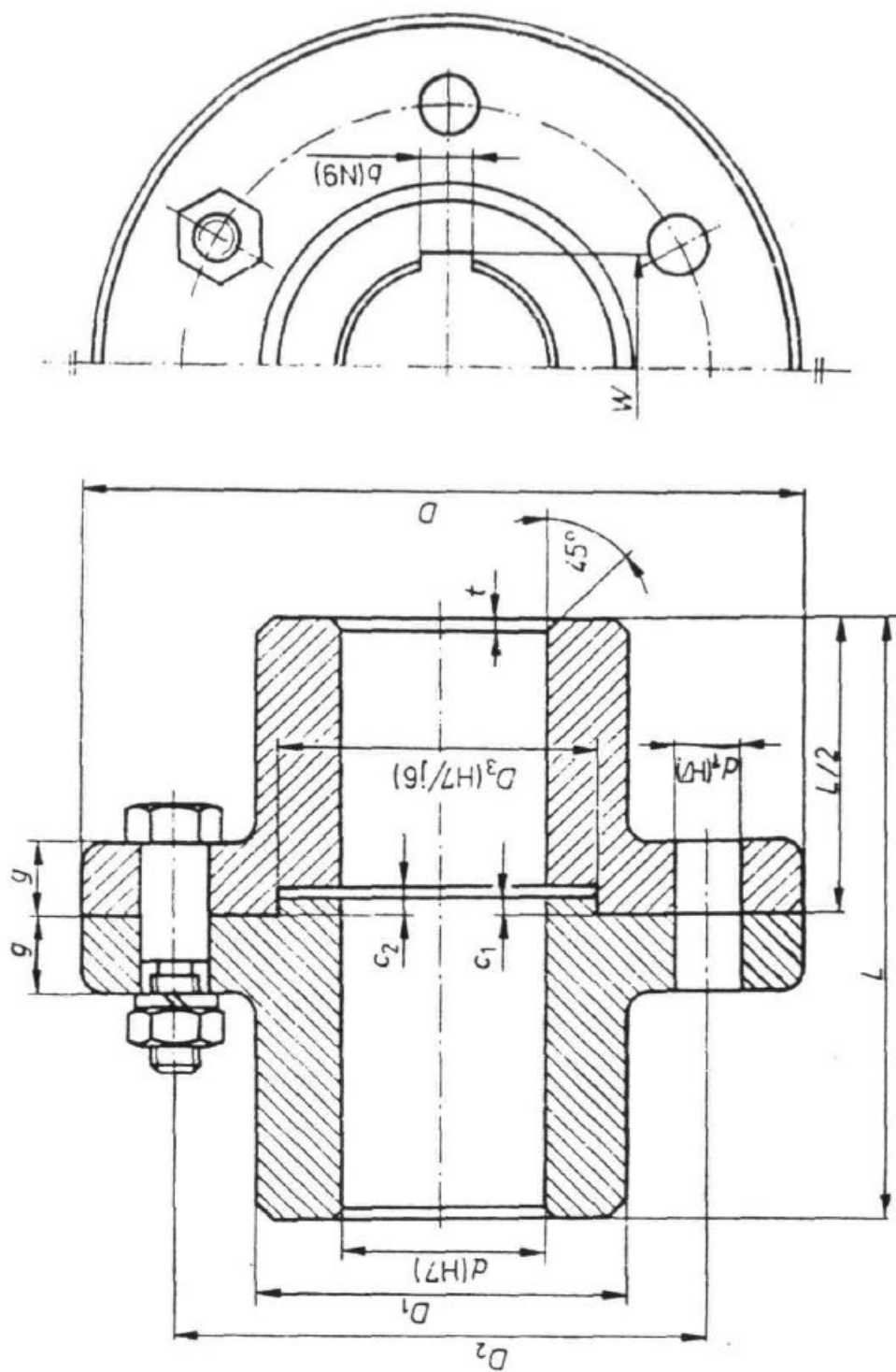
Ścinanie wpustu

$$\tau_t = \frac{P_\tau}{A_\tau} \leq k_t \Rightarrow l_w \geq \frac{2M}{d b k_t}$$

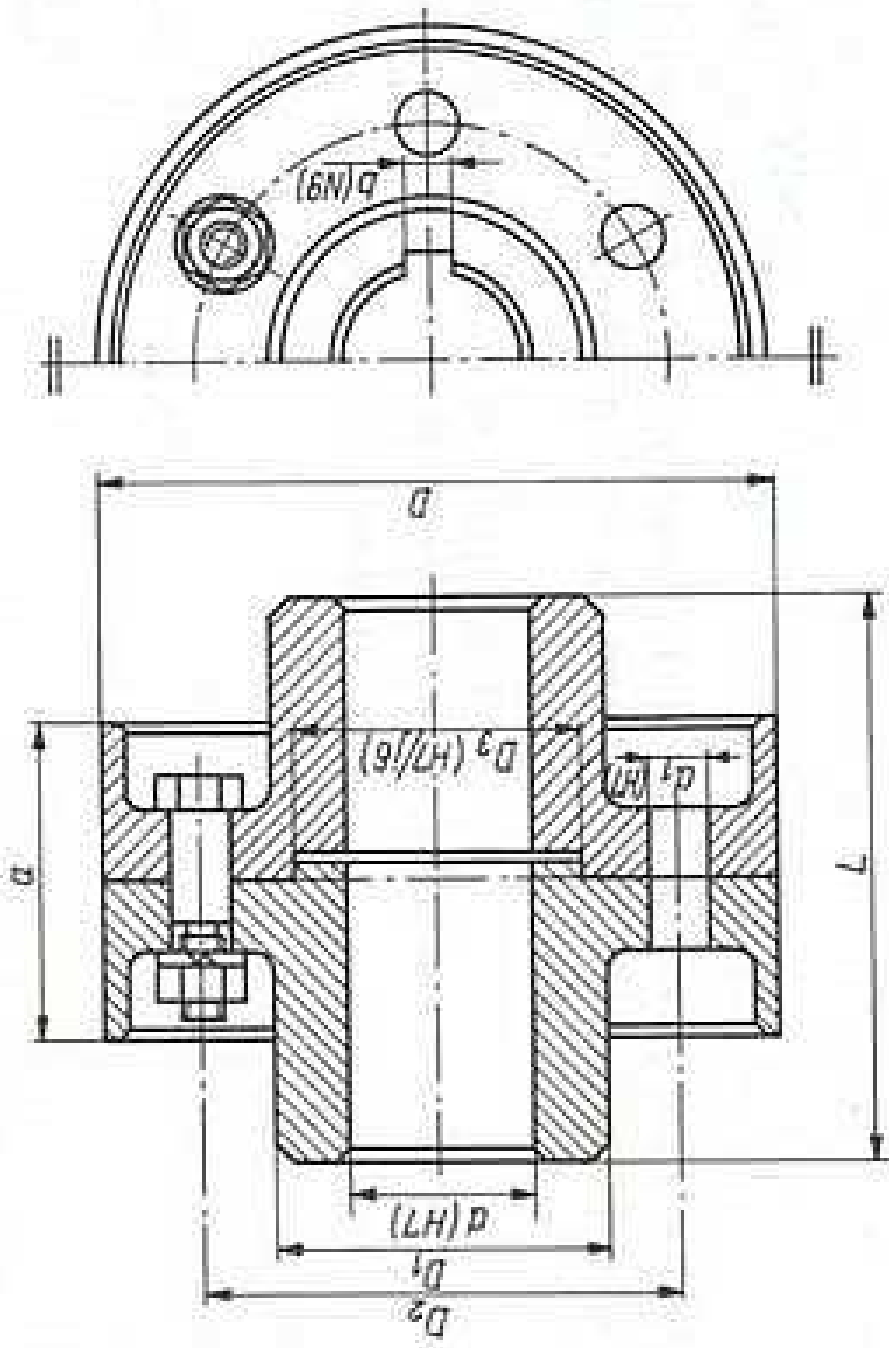
Naciski powierzchniowe:

$$p \approx \frac{P_o}{A_p} \leq p_{dop} \Rightarrow l_w \geq \frac{4M}{d h p_{dop}}$$





Rys. 1.5. Sprzęgło sztywne tarczowe bez obrzeży ochronnych



Rys.4 Sprzęgło sztywne kołnierzyowe z ochronnymi obrzeżami





**ARROW
GEAR
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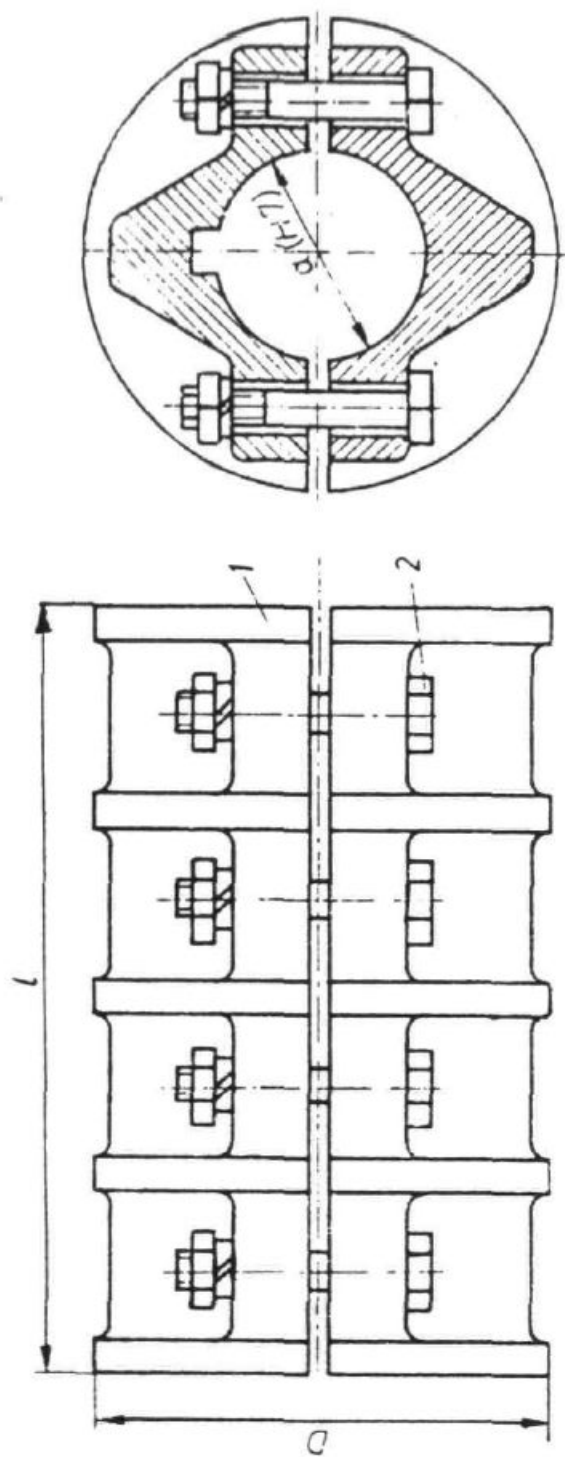




SEALED
CARTRIDGE
UNIT

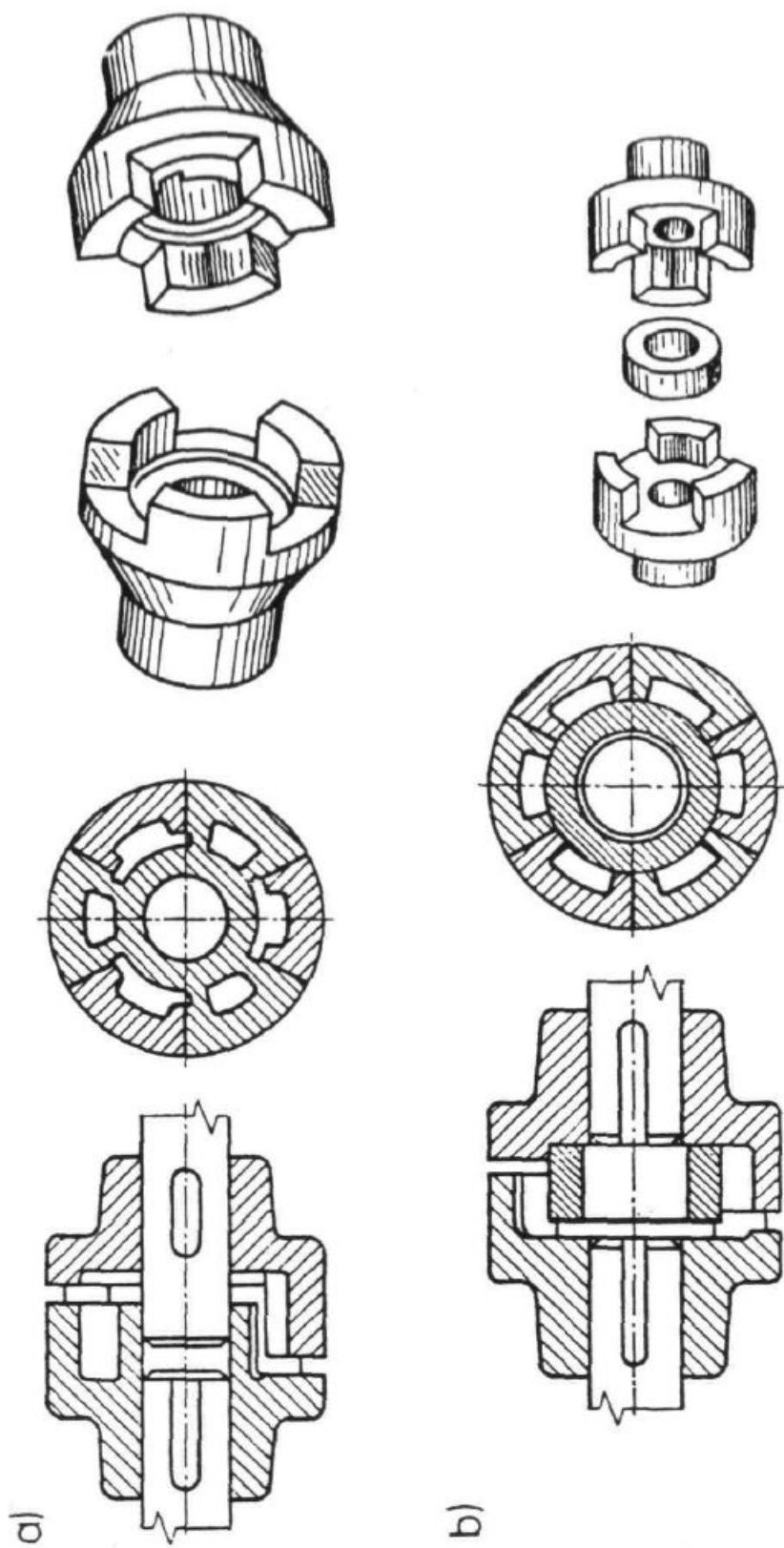
SHIMANO
BB-UN26
VIA SINGAPORE

68
BC1.37 x 24
L → MM110 → R

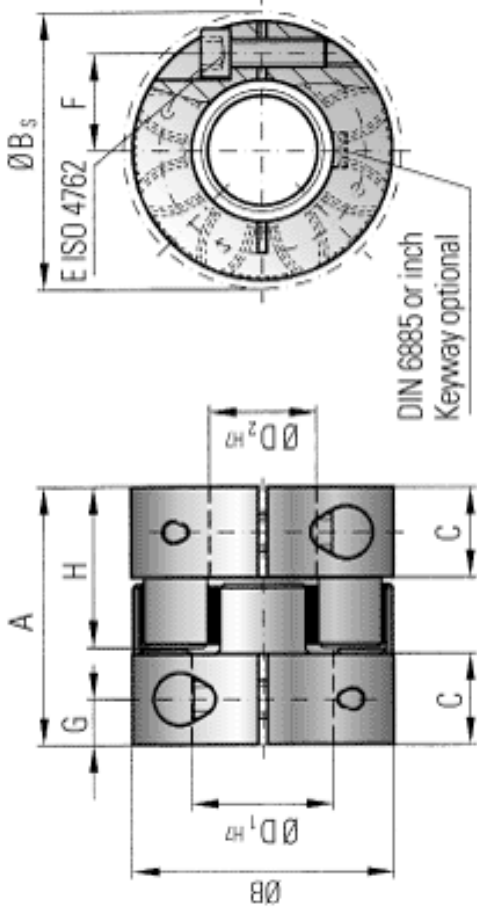


Rys. 1.4. Sprzęgło sztywne łubkowe

1 – łubki, 2 – śruby



Rys. 1.16. Sprzęgło samonastawne kłowe: a) środkowane w otworze członu, b) środkowane za pomocą tulejki



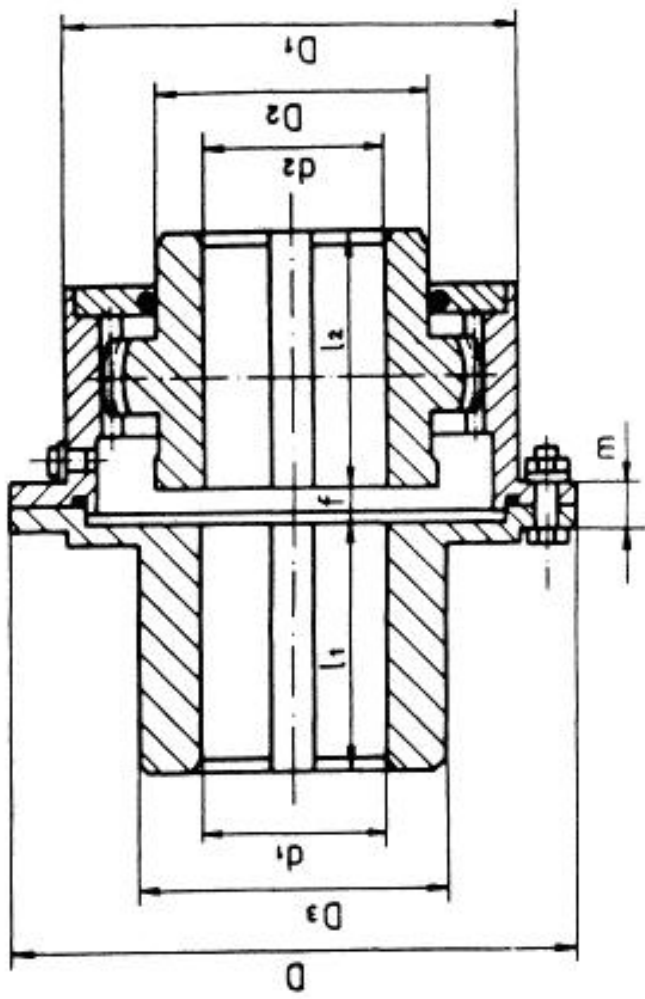
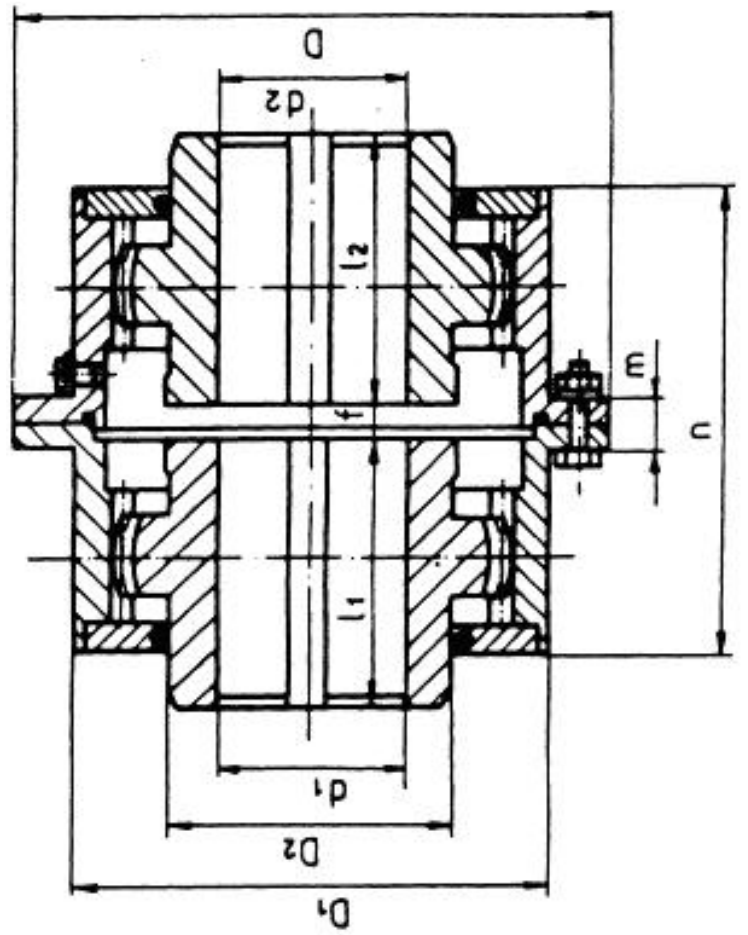
DIN 6885 or inch
Keyway optional



Elastomer insert
Type A / B / C







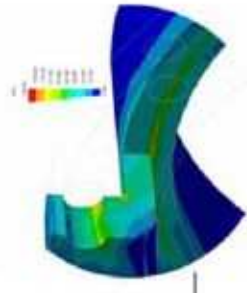


Special gear teeth realized in order to increase the contact surface and to limit the superficial pressure.



Special Shape of tooth in order to limit noise and vibrations interferences.

Ring Gear:
Gear Teeth optimized by finite elements.



Fasteners class 12.9 allow torque transmission by friction.



Tightness with standard o-rings that guarantee the long life of couplings.



Gear Hub:
Bore hub capacity up to 800 mm optimization by finite elements.

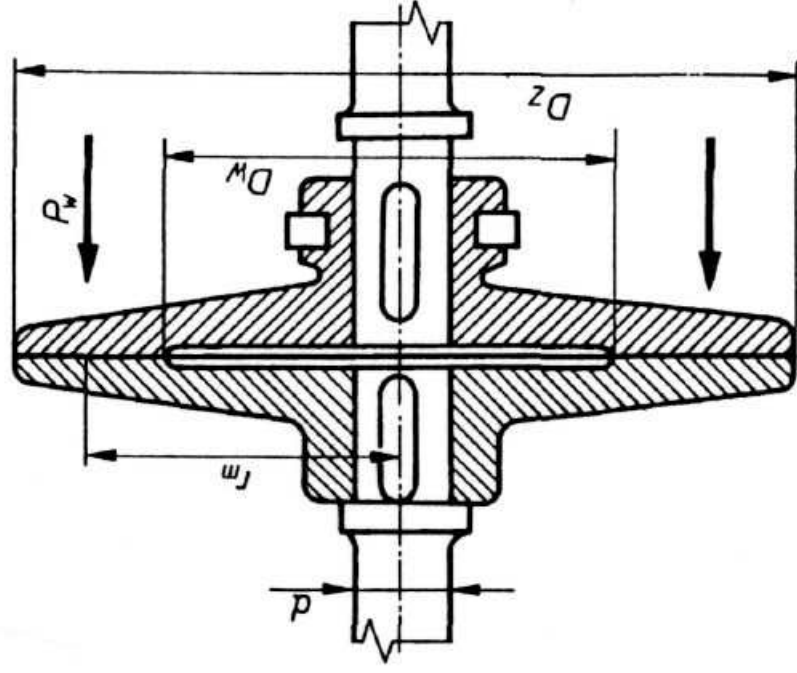


ISO 9001





CIERNE SPRZĘGŁO JEDNOTARCZOWE



- pod pełnym obciążeniem

$$M_T \geq M_d = M_R + M_o$$

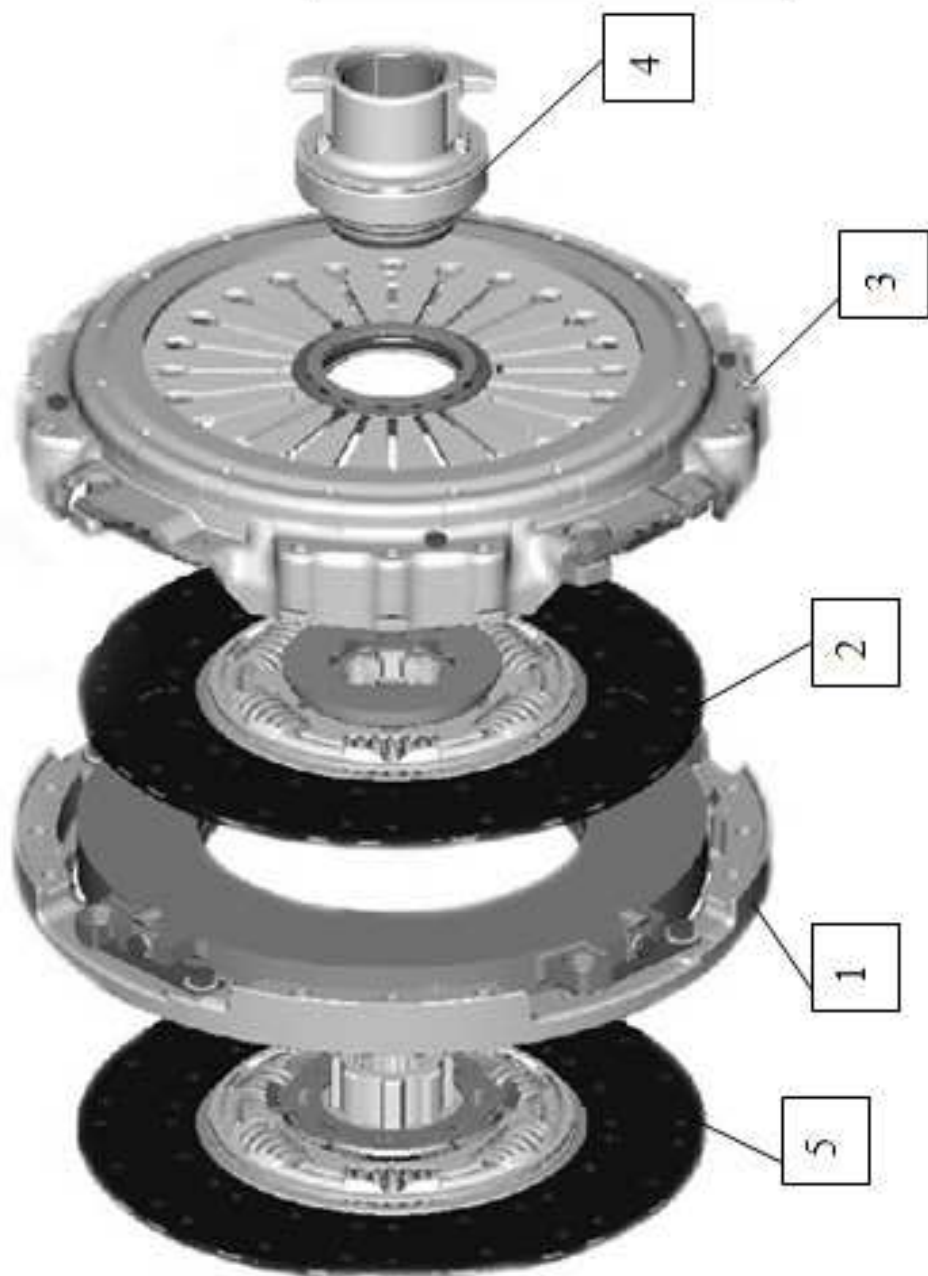
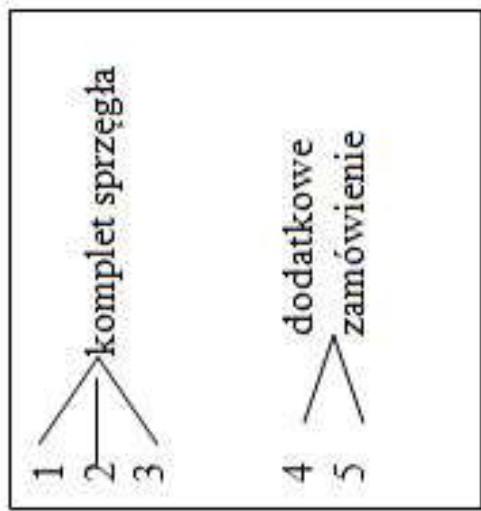
- na biegu jałowym

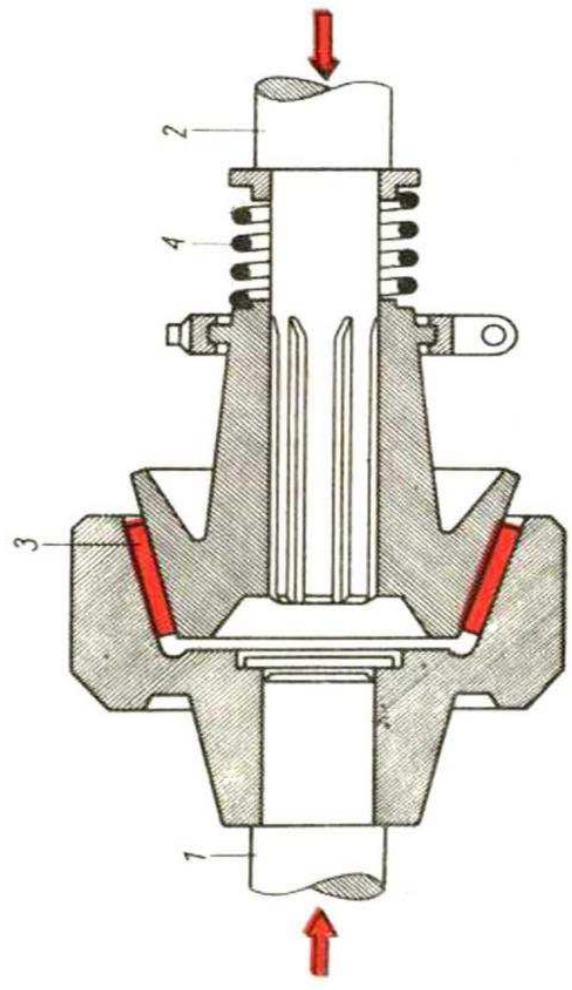
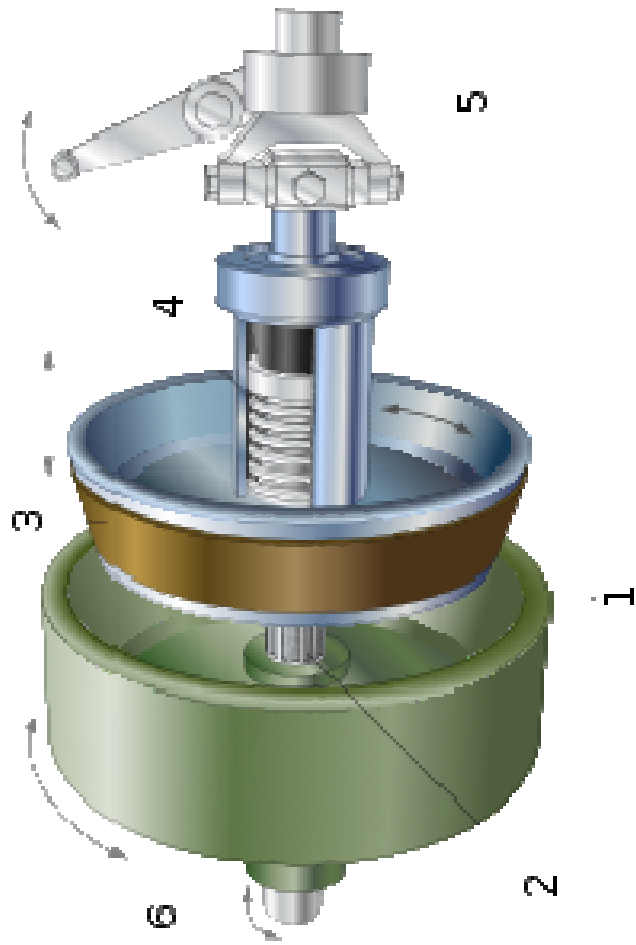
$$M_T \geq M_d = M_o$$

dla

$$M_o \geq M_R$$





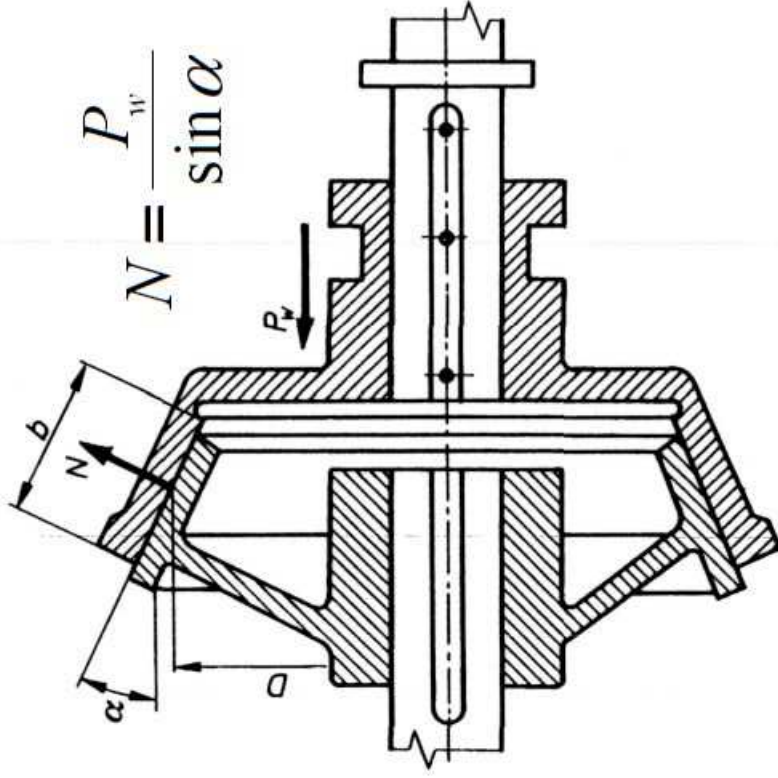


Rys. 26/III. Sprzęgło cierne stożkowe: 1 – wał napędzający, 2 – wał napędzany, 3 – okładzina cierna, 4 – sprężyna

CIERNE SPRZĘGŁO STOŻKOWE

Warunek obliczeniowy

$$p \leq p_{dop}$$



Moment tarcia

$$M_T = T \frac{D}{2} = \frac{\mu' P_w D}{2} \geq M_d$$

Sila docisku

$$P_w \geq \frac{2M_d}{\mu' D}$$

Naciski powierzchniowe

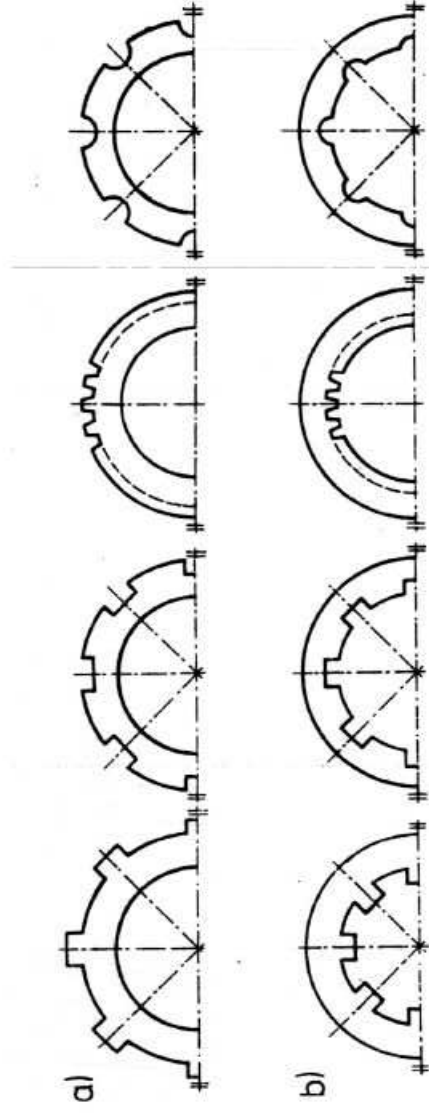
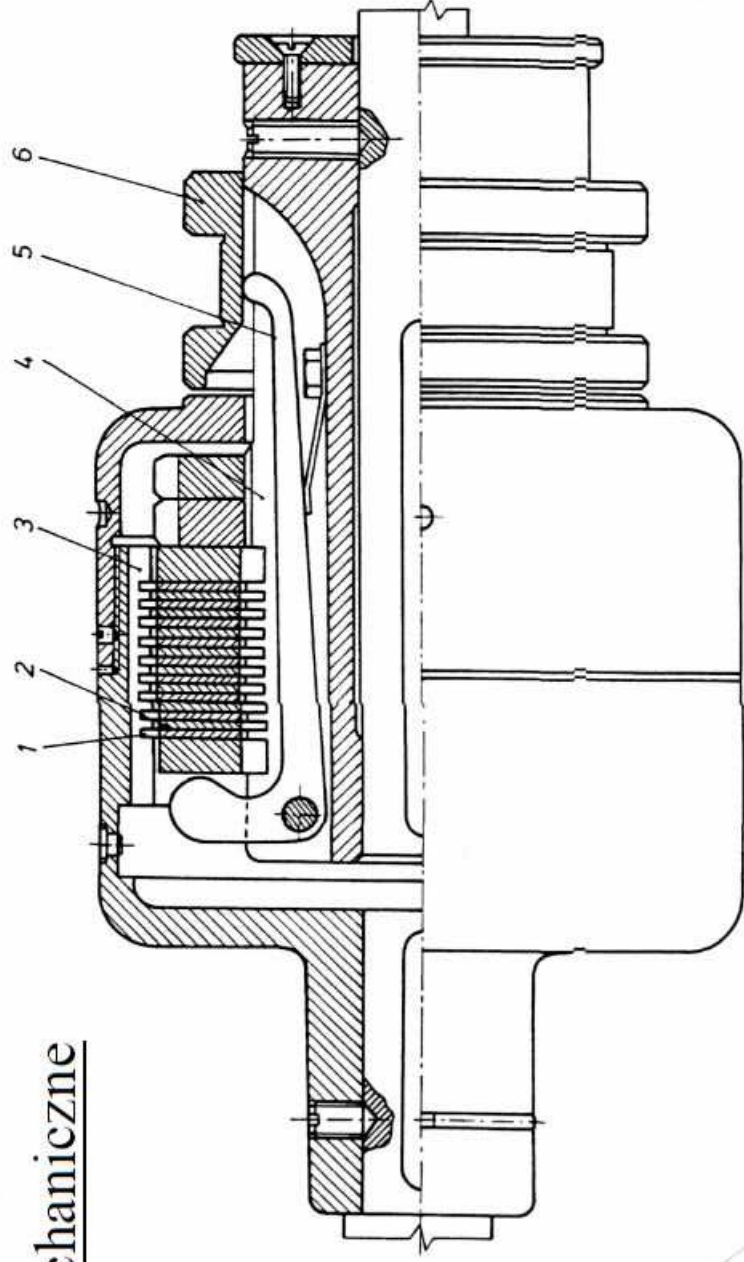
$$p = \frac{N}{\pi D b} = \frac{P_w}{\pi D b \sin \alpha}$$

Sila tarcia

$$T = \mu N = \frac{\mu P_w}{\sin \alpha} = \mu' P_w$$

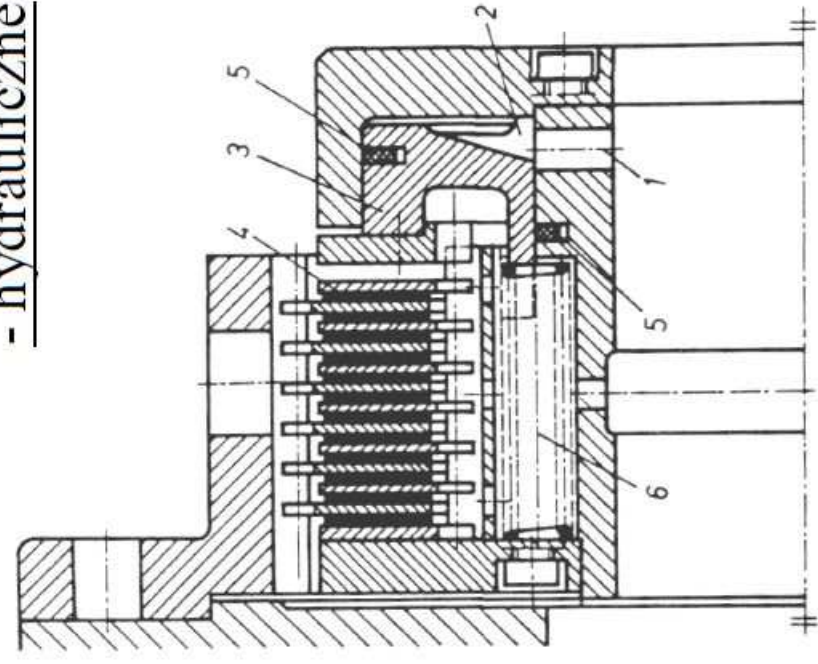
SPRZĘGŁO WIELOTARCZKOWE

- mechaniczne

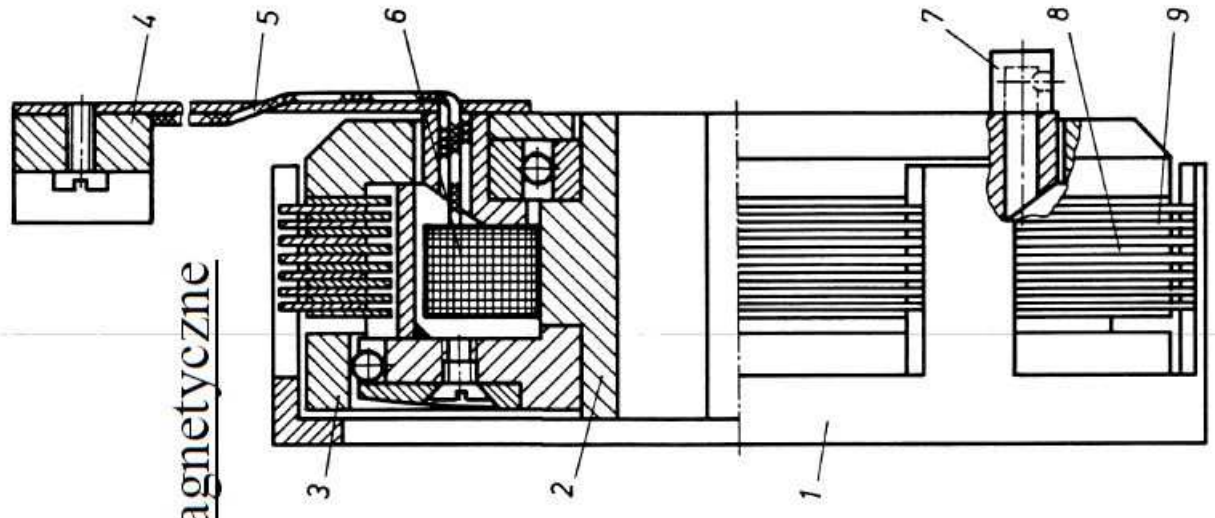


SPRZĘGŁO WIELOTARCZKOWE

- hydrauliczne

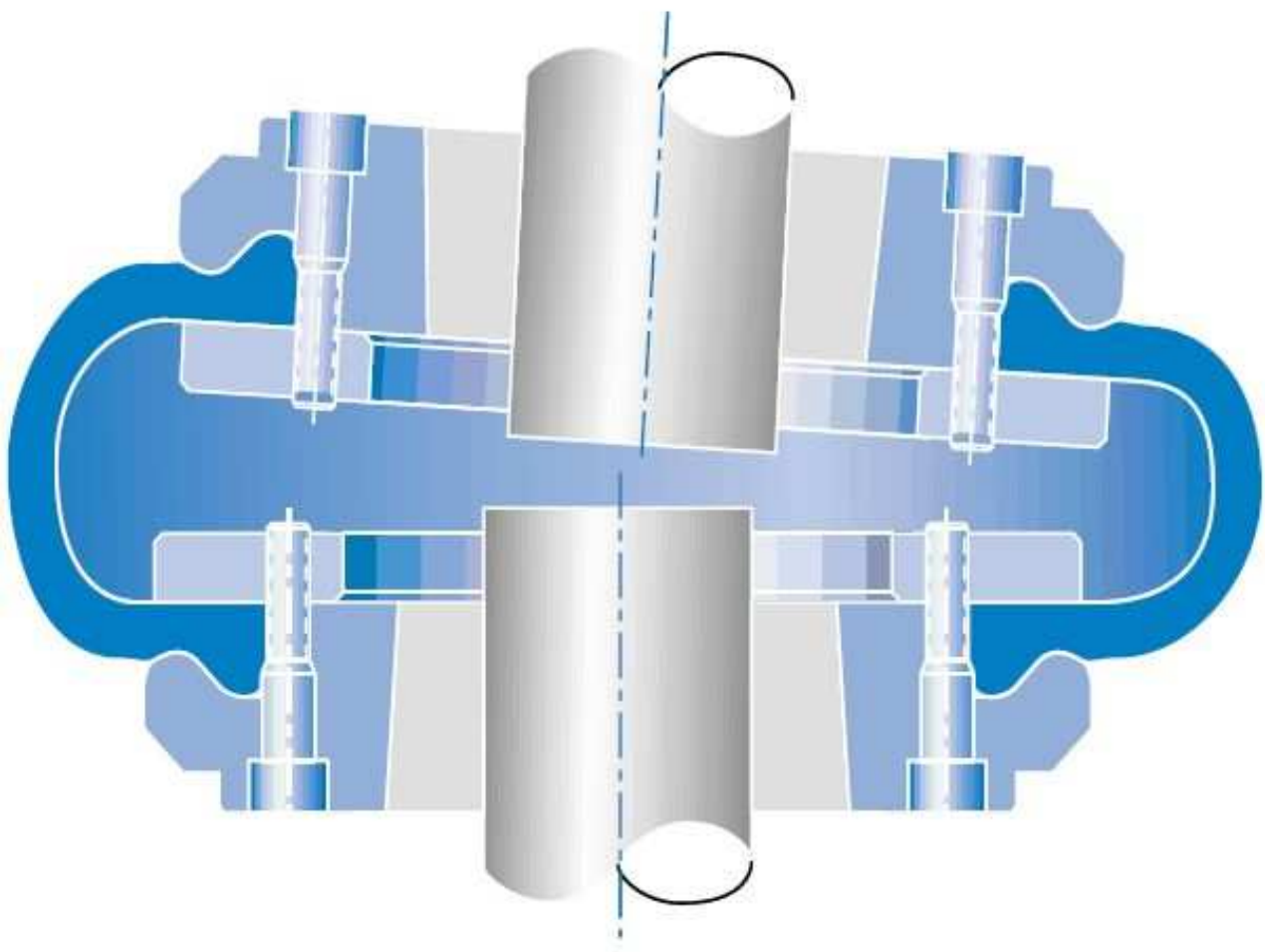


- elektromagnetyczne





Accommodate
simultaneous
maximum
misalignment
in all planes.



CHALLENGE COUPLINGS;

TYRE

HRC

JAW

CHAIN

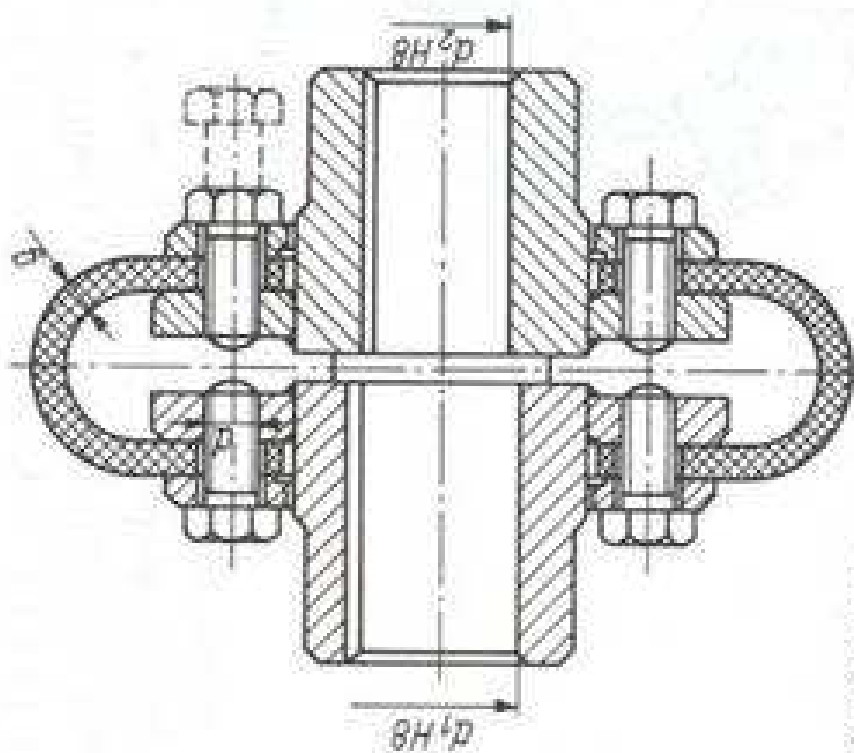
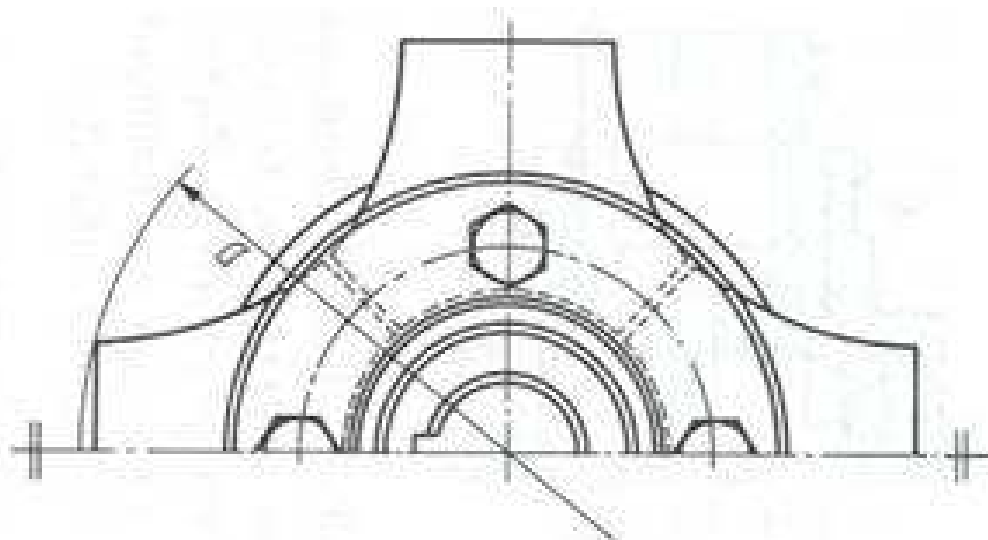


Lock In to:
Secure source of supply • Superior serv

FFX Coupling Installation and Operational Data

Coupling Size	Flange Face Spacing (mm)	Gap Between Tyre Ends (mm)	Nominal Torque (Nm)	Max Speed (rev/min)	Max Par Mis (mm)	Max End Float (mm)	Clamping Screw	
							Size	Torque (Nm)
40	22	2	24	4500	1.1	1.3	M6	15
50	25	2	66	4500	1.3	1.7	M6	15
60	33	2	127	4000	1.6	2.0	M6	15
70	23	3	250	3600	1.9	2.3	M8	24
80	25	3	375	3100	2.1	2.6	M8	24
90	27	3	500	3000	2.4	3.0	M10	40
100	27	3	675	2600	2.6	3.3	M10	40
110	25	3	875	2300	2.9	3.7	M10	40
120	29	3	1330	2050	3.2	4.0	M12	50
140	32	5	2325	1800	3.7	4.6	M12	55
160	30	5	3770	1600	4.2	5.3	M16	80
180	46	6	6270	1500	4.8	6.0	M16	105
200	48	6	9325	1300	5.3	6.6	M16	120
220	55	6	11600	1100	5.8	7.3	M20	165
250	59	6	14675	1000	6.6	8.2	M20	165

NB. All flexible tyres have an angular misalignment capacity up to 4 deg.



Rys. 8. Sprzęgio kabłąkowe
(oponowe)

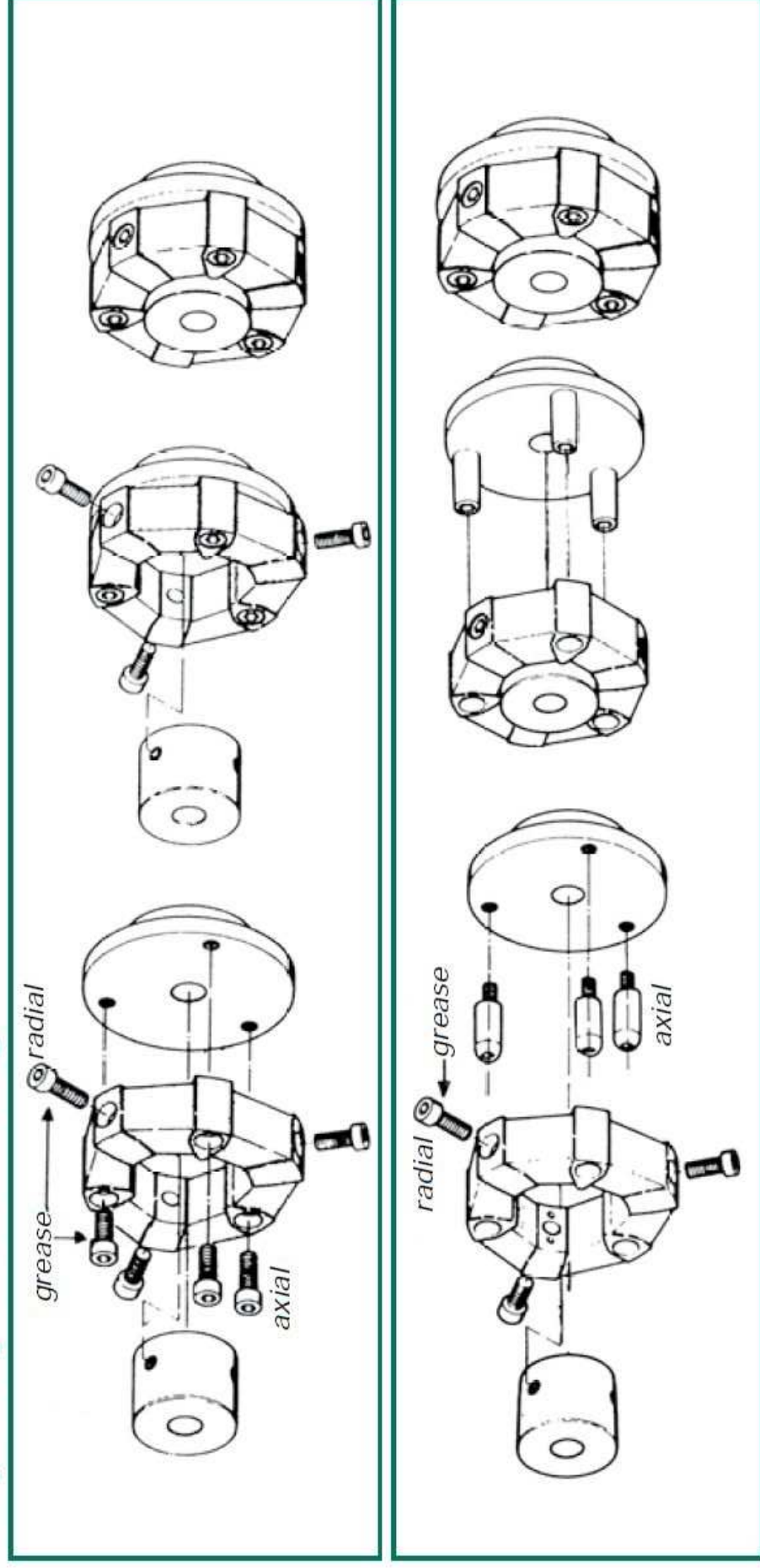


Power Transmission
Leading by innovation



Catalog CF-A-E-14-07

Sequence of Assembly





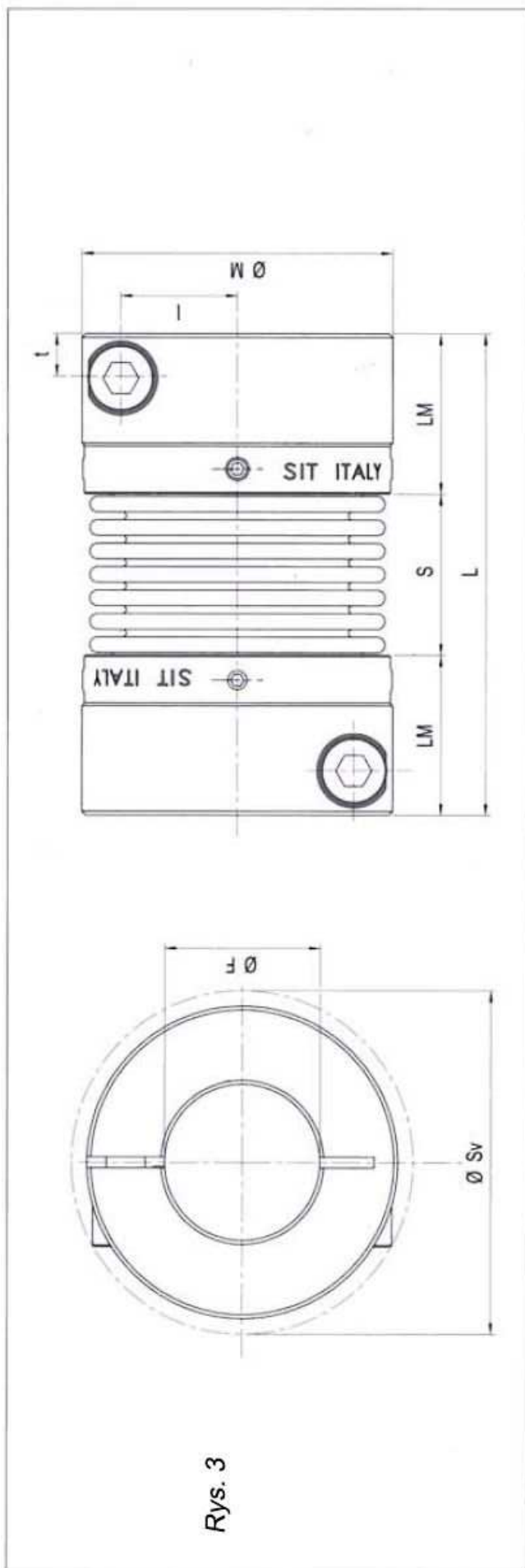
A 1.0 Performance table

Centaflex size		1	2	4	8	12	16	22	25	28	30	50	80	90	140	200	250	400	Remarks*	
Pos.	Description	Symbol	Unit																	
1	Nominal Torque	T_{KN}	Nm	10	20	50	100	140	200	275	315	420	500	700	900	1100	1700	2400	3000	5000
2	Maximum Torque	T_{Kmax}	Nm	25	60	125	280	360	560	750	875	1200	1400	2100	3150	4900	6000	8750	12500	
3	Angle of Twist	T_{KN}	degree	6°	6°	5°	5°	3°	5°	3°	5°	3°	5°	3°	5°	3°	3°	3°	3°	3°
		T_{Kmax}	degree	17°	17°	12°	14°	14°	7.5°	14°	14°	7.5°	14°	7.5°	14°	7.5°	7.5°	7.5°	7.5°	7.5°
4	Max speed	n_{max}	min-1	10000	8000	7000	6500	6500	6000	6000	5000	5000	4000	4000	4000	3600	3000	3000	2500	
5	Angular Elasticity	ΔK_w	degree	3°	3°	3°	3°	2°	3°	2°	3°	2°	3°	2°	3°	2°	2°	2°	2°	2°
6	Axial Elasticity	ΔK_a	mm	2	3	3	4	4	5	5	5	5	5	3	5	5	5	5	5	5
7	Radial Elasticity	ΔK_r	mm	1.5	1.5	1.5	2	2	2	2	2	2	2	1.5	2	2	2	2	2	2
8	Cont. Oscillating Torque	T_{KW}	Nm	5	10	20	40	50	80	100	125	150	200	300	320	450	700	960	1250	2000
9	Allowable Energy Loss	P_{EV}	W	6	10	15	25	30	40	50	68	75	80	90	100	120	150	170	200	250
10	Dyn. Torsional Stiffness	C_{tdyn}	Nm/rad	90	180	550	900	2700	2000	6100	2800	7500	4800	12000	16000	10500	26500	38700	43000	75000
		C_{tdyn}	Nm/rad	140	290	850	1500	4400	3400	9000	4500	12000	7800	19000	25000	16000	40000	60000	67000	120000
11	Axial Stiffness	c_a	N/mm	38	22	75	75	250	100	500	140	550	190	650	850	220	650	900	1150	1300
12	Radial Stiffness	c_r	N/mm	150	150	500	500	1000	500	1300	600	1400	750	2200	2900	1000	2300	3100	4100	6000
13	Angular Stiffness	c_w	Nm/degree	0.3	0.3	2.4	2.4	3.6	9.0	5.0	12.0	7.0	17.0	9.0	26.0	34.0	48.0	68.0	88.0	88.0

Figures given for lines 3, 11, 12, 13 are values for a shore hardness of 60° measured statically ($c_{dyn} = C_{stat} \cdot 1,3$)

METALOWE SPRZĘGŁA MIESZKOWE





Wielkość	Wymiary										Dane techniczne																									
	ØF		ØM		ØS		L		S		L		LM		Szywność osiowa (N/mm)	Szywność skrętna (N/rad)	Moment bezwładności ($\times 10^{-6} \text{Kg m}^2$)	Obroty n (min^{-1})	Moment T_{kn} (Nm)	Zestaw śrub		Śruby				Szywność promieniowa (N/mm)	Dopuszczalne odchyłki			Ciężar (kg)						
	min	max	min	max	min	max	min	max	min	max	min	max	min	max						Typ	T_s (Nm)	T_s (Nm)	t	l	Typ		T_s (Nm)	ka	kr		a					
GSP16	5	16	34	36	17	16,5	50,5	M4	4,5	12	2,9	0,8	5	14000	14	3050	30	93	3050	M3	0,8	2,9	4,5	12	2,9	0,8	5	14000	14	3050	30	93	±0,5	0,2	1,5	0,092
GSP20	8	20	40	44	20,5	21	62	M5	5,5	15	6	0,8	15	11900	34	7000	44	130	7000	M3	0,8	6	5,5	15	6	0,8	15	11900	34	7000	44	130	±0,6	0,2	1,5	0,135
GSP30	10	30	55	58	22,5	27	72	M6	6,5	20	10	2	35	8700	140	16100	68	160	16100	M4	2	10	6,5	20	10	2	35	8700	140	16100	68	160	±0,8	0,25	2	0,289
GSP38	14	38	65	73	26	32	84	M8	8	25	25	2	65	7300	310	31000	75	225	31000	M4	2	25	8	25	25	2	65	7300	310	31000	75	225	±0,8	0,25	2	0,438
GSP45	14	45	83	89	31	41	103	M10	9,5	30	49	2	150	5800	1056	62000	85	480	62000	M4	2	49	9,5	30	49	2	150	5800	1056	62000	85	480	±1	0,3	2	0,924