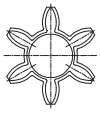
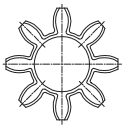
Properties of standard spiders

ROTEX® 14

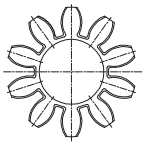
ROTEX® 19



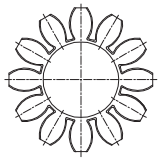
ROTEX® 24 - 65



ROTEX® 75 - 160



ROTEX® 180



Degree of hardness

Spider type (Shore hardness)	92 Shore A (T-PUR®)	92 Shore A
	T-PUR®	
Size	14 to 180	14 to 90
Material	T-PUR®	Polyurethane (PUR)
Permissible temperature range Permanent temperature Short-term temperature	 -50 °C to +120 °C -50 °C to +150 °C	 -40 °C to +90 °C -50 °C to +120 °C
Properties	– significantly higher service life expectancy – very good temperature resistance – improved damping of vibrations – good damping, average flexibility – suitable for all hub materials	– good damping, average flexibility – suitable for all hub materials

Spider type (Shore hardness)	98 Shore A (T-PUR®) [1]	98 Shore A [1]
	T-PUR®	
Size	14 to 180	14 to 90
Material	T-PUR®	Polyurethane (PUR)
Permissible temperature range Permanent temperature Short-term temperature	 -50 °C to +120 °C -50 °C to +150 °C	 -30 °C to +90 °C -40 °C to +120 °C
Properties	– significantly higher service life expectancy – very good temperature resistance – improved damping of vibrations – transmission of high torques with average damping – recommended hub material: steel, GJL and GJS	– transmission of high torques with average damping – recommended hub material: steel, GJL and GJS

Spider type (Shore hardness)	64 Shore D (T-PUR®)	64 Shore D
	T-PUR®	
Size	14 to 180	14 to 90
Material	T-PUR®	Polyurethane (PUR)
Permissible temperature range Permanent temperature Short-term temperature	 -50 °C to +120 °C -50 °C to +150 °C	 -30 °C to +110 °C -30 °C to +130 °C
Properties	– significantly higher service life expectancy – very good temperature resistance – improved damping of vibrations – transmission of very high torques with low damping – recommended hub material: steel and GJS	– transmission of very high torques with low damping – suitable for displacing critical speeds – suitable with high humidity, resistant to hydrolysis – recommended hub material: steel and GJS

Technical data of standard spiders

92 Shore A spider made of T-PUR® and PUR

ROTEX® size	Max. speed		Torsion angle ϕ with		Torque [Nm]				Damping power P_{KW} [W] [3]	Relative damping ψ	Resonance factor V_R	Torsion spring stiffness C dyn. [Nm/rad]			
					DIN 740 [1]										
	v=35 m/s cast iron	v=40 m/s steel	T_{KN}	$T_{K\,max}$	Rated T_{KN}	Max. $T_{K\,max}$	Vibratory T_{KW}	$T_{K\,max}$ [2]				1.0 T_{KN}	0.75 T_{KN}	0.5 T_{KN}	0.25 T_{KN}
14	22200	25400	6.4°	10°	7.5	15	2.0	22.5	–			$0.38x10^3$	$0.31x10^3$	$0.24x10^3$	$0.14x10^3$
19	16700	19000			10	20	2.6	30	4.8			$1.28x10^3$	$1.05x10^3$	$0.8x10^3$	$0.47x10^3$
24	12100	13800			35	70	9.1	105	6.6			$4.86x10^3$	$3.98x10^3$	$3.01x10^3$	$1.79x10^3$
28	10100	11500			95	190	25	285	8.4			$10.9x10^3$	$8.94x10^3$	$6.76x10^3$	$4.01x10^3$
38	8300	9500			190	380	49	570	10.2			$21.05x10^3$	$17.26x10^3$	$13.05x10^3$	$7.74x10^3$
42	7000	8000			265	530	69	795	12.0			$23.74x10^3$	$19.47x10^3$	$14.72x10^3$	$8.73x10^3$
48	6350	7250			310	620	81	930	13.8			$36.7x10^3$	$30.09x10^3$	$22.75x10^3$	$13.49x10^3$
55	5550	6350			410	820	107	1230	15.6			$50.7x10^3$	$41.59x10^3$	$31.45x10^3$	$18.64x10^3$
65	4950	5650	3.2°	5°	625	1250	163	1875	18.0	0.80	7.90	$97.1x10^3$	$79.65x10^3$	$60.2x10^3$	$35.7x10^3$
75	4150	4750			1280	2560	333	3840	21.6			$113.3x10^3$	$92.9x10^3$	$70.3x10^3$	$41.65x10^3$
90	3300	3800			2400	4800	624	7200	30.0			$190.1x10^3$	$155.9x10^3$	$117.9x10^3$	$69.9x10^3$
100	2950	3350			3300	6600	858	9900	36.0			$253.1x10^3$	$207.5x10^3$	$156.9x10^3$	$93x10^3$
110	2600	2950			4800	9600	1248	14400	42.0			$415.5x10^3$	$336.9x10^3$	$257.6x10^3$	$177.4x10^3$
125	2300	2600			6650	13300	1729	19950	48.0			$647.7x10^3$	$537.3x10^3$	$412.2x10^3$	$277.5x10^3$
140	2050	2350			8550	17100	2223	25650	54.6			$813.4x10^3$	$670.2x10^3$	$519.7x10^3$	$351.7x10^3$
160	1800	2050			12800	25600	3328	38400	75.0			$1298x10^3$	$1104x10^3$	$901.9x10^3$	$655.7x10^3$
180	1550	1800			18650	37300	4849	55950	78.0			$2327x10^3$	$1981x10^3$	$1618x10^3$	$1176x10^3$

98 Shore A spider made of T-PUR® and PUR

ROTEX® size	Max. speed		Torsion angle ϕ with		Torque [Nm]				Damping power P_{KW} [W] [3]	Relative damping ψ	Resonance factor V_R	Torsion spring stiffness C dyn. [Nm/rad]			
					DIN 740 [1]										
	v=35 m/s cast iron	v=40 m/s steel	T_{KN}	$T_{K\,max}$	Rated T_{KN}	Max. $T_{K\,max}$	Vibratory T_{KW}	$T_{K\,max}$ [2]				1.0 T_{KN}	0.75 T_{KN}	0.5 T_{KN}	0.25 T_{KN}
14	22200	25400	6.4°	10°	12.5	25	3.3	37.5	–			$0.56x10^3$	$0.46x10^3$	$0.35x10^3$	$0.21x10^3$
19	16700	19000			17	34	4.4	51	4.8			$2.92x10^3$	$2.39x10^3$	$1.81x10^3$	$1.07x10^3$
24	12100	13800			60	120	16	180	6.6			$9.93x10^3$	$8.14x10^3$	$6.16x10^3$	$3.65x10^3$
28	10100	11500			160	320	42	480	8.4			$26.77x10^3$	$21.95x10^3$	$16.6x10^3$	$9.84x10^3$
38	8300	9500			325	650	85	975	10.2			$48.57x10^3$	$39.83x10^3$	$30.11x10^3$	$17.85x10^3$
42	7000	8000			450	900	117	1350	12.0			$54.5x10^3$	$44.69x10^3$	$33.79x10^3$	$20.03x10^3$
48	6350	7250			525	1050	137	1575	13.8			$65.3x10^3$	$53.54x10^3$	$40.48x10^3$	$24x10^3$
55	5550	6350			685	1370	178	2055	15.6			$95x10^3$	$77.9x10^3$	$58.88x10^3$	$34.9x10^3$
65	4950	5650	3.2°	5°	940	1880	244	2820	18.0	0.80	7.90	$129.5x10^3$	$106.2x10^3$	$80.3x10^3$	$47.6x10^3$
75	4150	4750			1920	3840	499	5760	21.6			$197.5x10^3$	$162x10^3$	$122.5x10^3$	$72.6x10^3$
90	3300	3800			3600	7200	936	10800	30.0			$312.2x10^3$	$256x10^3$	$193.6x10^3$	$114.7x10^3$
100	2950	3350			4950	9900	1287	14850	36.0			$383.3x10^3$	$314.3x10^3$	$237.6x10^3$	$140.9x10^3$
110	2600	2950			7200	14400	1872	21600	42.0			$805.9x10^3$	$663.1x10^3$	$515.3x10^3$	$360.5x10^3$
125	2300	2600			10000	20000	2600	30000	48.0			$1207x10^3$	$1003x10^3$	$787.6x10^3$	$552.5x10^3$
140	2050	2350			12800	25600	3328	38400	54.6			$1549x10^3$	$1283x10^3$	$979.8x10^3$	$674.1x10^3$
160	1800	2050			19200	38400	4992	57600	75.0			$2481x10^3$	$2137x10^3$	$1781x10^3$	$1275x10^3$
180	1550	1800			28000	56000	7280	84000	78.0			$4220x10^3$	$3635x10^3$	$3031x10^3$	$2170x10^3$

64 Shore D spider made of T-PUR® and PUR

ROTEX® size	Max. speed		Torsion angle ϕ with		Torque [Nm]				Damping power P_{KW} [W] [3]	Relative damping ψ	Resonance factor V_R	Torsion spring stiffness C dyn. [Nm/rad]			
					DIN 740 [1]										
	v=35 m/s cast iron	v=40 m/s steel	T_{KN}	$T_{K\,max}$	Rated T_{KN}	Max. $T_{K\,max}$	Vibratory T_{KW}	$T_{K\,max}$ [2]				1.0 T_{KN}	0.75 T_{KN}	0.5 T_{KN}	0.25 T_{KN}
14	22200	25400	4.5°	7.0°	16	32	4.2	48	9.0			$0.76x10^3$	$0.62x10^3$	$0.47x10^3$	$0.28x10^3$
19	16700	19000			21	42	5.5	63	7.2			$5.35x10^3$	$4.39x10^3$	$3.32x10^3$	$1.97x10^3$
24	12100	13800			75	150	19.5	225	9.9			$15.11x10^3$	$12.39x10^3$	$9.37x10^3$	$5.55x10^3$
28	10100	11500			200	400	52	600	12.6			$27.52x10^3$	$22.57x10^3$	$17.06x10^3$	$10.12x10^3$
38	8300	9500			405	810	105	1215	15.3			$70.15x10^3$	$57.52x10^3$	$43.49x10^3$	$25.78x10^3$
42	7000	8000			560	1120	146	1680	18.0			$79.9x10^3$	$65.5x10^3$	$49.52x10^3$	$29.35x10^3$
48	6350	7250			655	1310	170	1965	20.7			$95.5x10^3$	$78.3x10^3$	$59.22x10^3$	$35.1x10^3$
55	5550	6350			825	1650	215	2475	23.4			$107.9x10^3$	$88.5x10^3$	$66.9x10^3$	$39.66x10^3$
65	4950	5650	2.5°	3.6°	1175	2350	306	3525	27.0	0.75	8.50	$151.1x10^3$	$123.9x10^3$	$93.7x10^3$	$55.53x10^3$
75	4150	4750			2400	4800	624	7200	32.4			$248.2x10^3$	$203.5x10^3$	$153.9x10^3$	$91.2x10^3$
90	3300	3800			4500	9000	1170	13500	45.0			$674.5x10^3$	$553.1x10^3$	$418.2x10^3$	$247.9x10^3$
100	2950	3350			6185	12370	1608	18555	54.0			$861.2x10^3$	$706.2x10^3$	$533.9x10^3$	$316.5x10^3$
110	2600	2950			9000	18000	2340	27000	63.0			$1230x10^3$	$1001x10^3$	$773.1x10^3$	$531.4x10^3$
125	2300	2600			12500	25000	3250	37500	72.0			$1749x10^3$	$1436x10^3$	$1149x10^3$	$832.1x10^3$
140	2050	2350			16000	32000	4160	48000	81.9			$2312x10^3$	$1929x10^3$	$1521x10^3$	$1082x10^3$
160	1800	2050			24000	48000	6240	72000	112.5			$3415x10^3$	$2961x10^3$	$2471x10^3$	$1830x10^3$
180	1550	1800			35000	70000	9100	105000	117.0			$5670x10^3$	$4917x10^3$	$4103x10^3$	$3038x10^3$

[1] see catalogue page 11
[2] ≤ 1000 load cycles
[3] with +30°C

Temperature factor S_t

	-50 °C	-30 °C +30 °C	+40 °C	+50 °C	+60 °C	+70 °C	+80 °C	+90 °C	+100 °C	+110 °C	+120 °C
T-PUR®	1.0	1.0	1.1	1.2	1.3	1.45	1.6	1.8	2.1	2.5	3.0
PUR	–	1.0	1.2	1.3	1.4	1.55	1.8	2.2	–	–	–

Unless explicitly specified in your order, we will supply spiders with Shore hardness 92 Shore A T-PUR®.
For peripheral speeds exceeding v = 30 m/s dynamic balancing is required. For circumferential speeds exceeding v = 35 m/s only steel or nodular iron.

Technical data and properties of special spiders

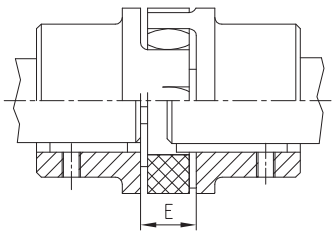
Designation	PA	PEEK
Material	Polyamide	Polyetheretherketone
Permissible temperature range Permanent temperature Short-term temperature	 -20 °C to +130 °C [1)] -30 °C to +150 °C [1)]	 up to +180 °C (ATEX to +160 °C) up to +250 °C
Properties	– small twisting angle and high torsion spring stiffness – transmission of very high torques with very low damping – good resistance to chemicals [1)] – recommended hub material: steel – high restoring forces with displacements	– small twisting angle and high torsion spring stiffness – transmission of very high torques with very low damping – highly temperature-resistant, resistant to hydrolysis – good resistance to chemicals – recommended hub material: steel – high restoring forces with displacements

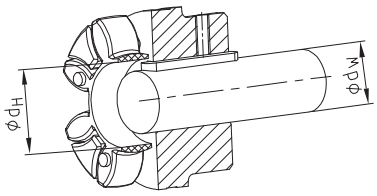
[1)] different properties depending on compound

Torques			
ROTEX® size	PA, PEEK		
	T_{KN} [Nm]	$T_{K\,max}$ [Nm]	T_{KW} [Nm]
14	22	44	5.5
19	30	60	8.0
24	105	210	27.5
28	280	560	73
38	565	1130	147
42	785	1570	204
48	915	1830	238
55	1200	2400	312
65	1645	3290	427
75	2560	5130	667
90	6300	12600	1640
100	8650	17300	2250
110	10500	21000	2730
125	13000	26000	3380

Temperature factor S_t												
	-50 °C	-30 °C +30 °C	+40 °C	+50 °C	+60 °C	+70 °C	+80 °C	+90 °C	+100 °C	+110 °C	+120 °C	+180 °C
PA	–	1.0	1.15	1.25	1.4	1.6	1.9	2.3	3.0	–	–	–
PEEK	–	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Installation of spider





Shaft Ød$_W$ with feather key (acc. to DIN 6885 sheet 1) protuding into the spider Ød$_H$

Assembly dimensions																	
ROTEX® size	14	19	24	28	38	42	48	55	65	75	90	100	110	125	140	160	180
Distance dimension E	13	16	18	20	24	26	28	30	35	40	45	50	55	60	65	75	85
Dimension d_H	10	18	27	30	38	46	51	60	68	80	100	113	127	147	165	190	220
Dimension d_W [2)]	7	12	20	22	28	36	40	48	55	65	80	95	100	120	135	160	185

[2)] If the shaft diameter is smaller than or equal to dimension d_H, one shaft end or both shaft ends may protude with the feather keyway into the spider.