



TECHNICAL INFORMATION

optibelt **BLUE POWER 2**

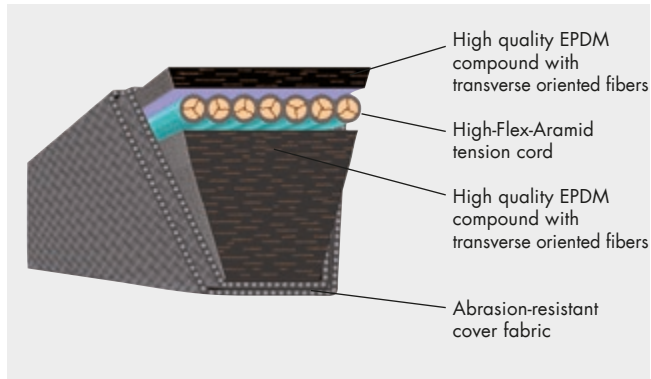


PRODUCT DESCRIPTION

optibelt BLUE POWER 2 HIGH PERFORMANCE WEDGE BELTS

Structure and Properties

optibelt BLUE POWER 2 wedge belts:



The aramid tension cord has extremely low stretch compared to common materials such as polyester. The breaking strength is almost twice as high with the same cord diameter. Nevertheless, the fibre is extremely flexible. The high quality specially prepared aramid tension cord is embedded in a rubber compound. It is supported by the top and bottom structures. These consist of a EPDM rubber compound with transverse fibres. The abrasion-proof cover fabric is coated with a special rubber compound and covers the whole belt. The V-belt is electrically conductive according to ISO 1813

Application areas

optibelt BLUE POWER 2 belts are mainly used when

- highest power transmission levels are required
- there are limited design dimensions
- there is only little installation and tensioning space
- high temperature influences occur

This way, a much better performance is guaranteed e. g. with the same number of belts. Even the operation of once critical drives is now largely free of risk. Higher load limits are now safety zones. Thus **optibelt BLUE POWER 2** belts are mainly implemented in heavily loaded drives:

- in critical drives in mechanical engineering
- in special machines
- in agricultural machinery
- in construction machinery

Application

Attention: When retro-fitting existing drives please let Optibelt check the tension. As part of this description not all criteria can be dealt with. Please consult our Application Engineering Department.

Standardisation/Dimensions

optibelt BLUE POWER 2 high performance wedge belts in the profiles SPB, SPC, 5V/15N and 8V/25N are standardised according to DIN 7753 Part 1, ISO 4184 and ARPM/MPTA.

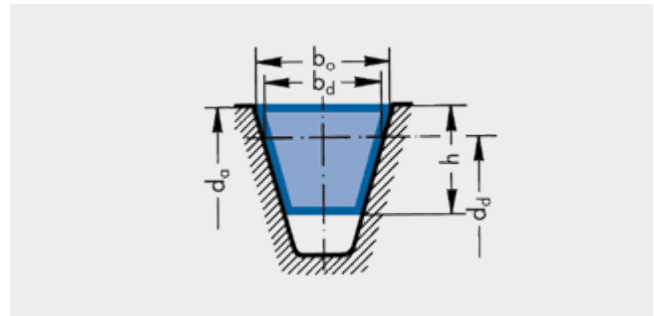


Table 1

Profile		SPB	SPC
Belt top width	$b_o \approx$	16.3	22
Datum width	$b_d \approx$	14	19
Belt height	$h \approx$	13	18
Recommended minimum datum pulley diameter	$d_{d \min}$	180	280
Weight per meter [kg/m]	\approx	0.185	0.418
Flex rate [s ⁻¹]	$f_{B \max} \approx$	100	
Belt speed [m/s]	$v_{\max} \approx$	50*	

* $v > 50$ m/s. Please consult our Application Engineering Department.

Table 2

Profile		5V/15N	8V/25N
Datum width	$b_o \approx$	15	25
Belt height	$h \approx$	13	23
Recommended minimum outside pulley diameter	$d_{a \min}$	191	355
Weight per meter [kg/m]	\approx	0.185	0.508
Flex rate [s ⁻¹]	$f_{B \max} \approx$	100	
Belt speed [m/s]	$v_{\max} \approx$	50*	

* $v > 50$ m/s. Please consult our Application Engineering Department.

SET CODING

optibelt BLUE POWER 2 HIGH PERFORMANCE WEDGE BELTS



Set coding

optibelt BLUE POWER 2 high performance wedge belts



Every **optibelt BLUE POWER 2** single belt and kraftband is set-coded. Each colour (see table 1) denotes a particular class for use as a set.

Each class denotes a specific length range within the V-belt length tolerance.

Marking

The specific length class of each belt is identified in an internal production procedure and is marked on the belt in the form of a cross.



Unmeasured set constant

Optibelt ensures that belts marked with the same class identification can be used unmeasured as a set.

Identifying the class with a practical colour code makes it quick and easy to combine multiple belts into a set.

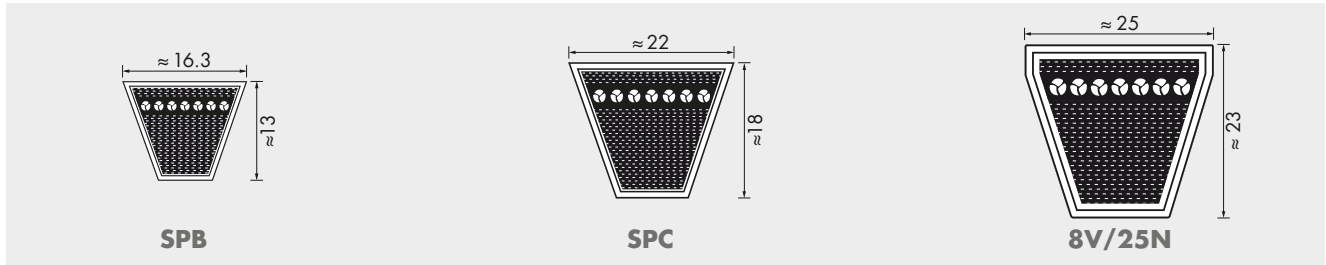
Table 1

Name	Colour	Colour
Turquoise blue		RAL 5018
Heather violet		RAL 4003
Melon yellow		RAL 1028
Traffic blue		RAL 5017
Blue lilac		RAL 4005
Light green		RAL 6027
Traffic purple		RAL 4006



STANDARD RANGE

optibelt BLUE POWER 2 HIGH PERFORMANCE WEDGE BELTS



DIN 7753 Part 1 / ISO 4184 / BS 3790

ARPM/MPTA

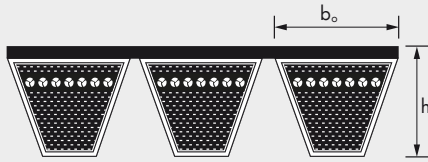
Profile SPB		Profile SPC		Profile 8V/25N	
Datum length ISO L _d [mm]		Datum length ISO L _d [mm]		Belt designation	
				Profile, length code	Profile, outside length, L _o [mm]
1800	5600	2000	6300	8V 1600	25N 4064
1900	6000	2120	6700*	8V 1700*	25N 4318
2000*	6300	2240	7100	8V 1800*	25N 4572
2120	6700	2360	7500	8V 1900	25N 4826
2240	7100	2500*	8000*	8V 2000	25N 5080
2360	7500	2650	8500	8V 2120	25N 5385
2500	8000	2800	9000	8V 2240	25N 5690
2650		3000		8V 2360*	25N 5994
2800		3150		8V 2500	25N 6350
3000*		3350*		8V 2650	25N 6731
3150		3550*		8V 2800	25N 7112
3350		3750		8V 3000	25N 7620
3550		4000*		8V 3150*	25N 8001
3750*		4250*		8V 3350*	25N 8509
4000		4500*		8V 3550	25N 9017
4250		4750*			
4500		5000*			
4750		5300*			
5000*		5600*			
5300*		6000*			
<p>*Available from stock.</p> <p>You can find the current status on our website.</p> <p>www.optibelt.com</p>					
Maximum production length: 21 000 mm L _d Non-standard length ranges from 1800 mm L _d Minimum order quantity: 1800 – 3400 mm = 36 = pieces 3400 – 21000 mm = 25 pieces Weight: ≈ 0.185 kg/m		Maximum production length: 21 000 mm L _d Non-standard length ranges from 1900 mm L _d Minimum order quantity: 1900 – 21000 mm = 16 pieces Weight: ≈ 0.418 kg/m		Maximum production length: 21 000 mm L _o Non-standard length ranges from 1900 mm L _o Minimum order quantity: 1900 – 21000 mm = 14 pieces Weight: ≈ 0.508 kg/m	

STANDARD RANGE

optibelt **BLUE POWER 2** KRAFTBANDS

WITH HIGH PERFORMANCE WEDGE BELTS

DIN 7753 PART 1 / ISO 4184



Profile	SPC
$b_o \approx$ [mm]	22.0
$h \approx$ [mm]	22.6
Minimum pulley- \emptyset [mm]	315

Profile SPC

Datum length ISO
 L_d [mm]

3000
3150
3350
3550
3750
4000
4250
4500
4750
5000
5300
5600
6000
6300
6700
7100
7500
8000
8500
9000
9500
10000

Maximum production length: 12 000 mm L_d
Non-standard length ranges from 2 000 mm L_d
Minimum order quantity:
3 pieces with 5 ribs or
4 pieces with 4 ribs or
5 pieces with 3 ribs or
8 pieces with 2 ribs
or a multiple thereof

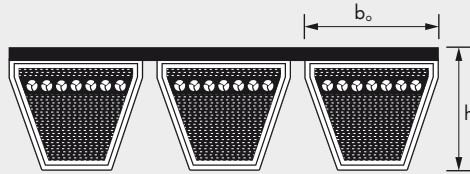
Weight: per rib \approx 0.468 kg/m

STANDARD RANGE

optibelt **BLUE POWER 2** KRAFTBANDS

WITH HIGH PERFORMANCE WEDGE BELTS

ARPM/MPTA



Profile	5V/15J	8V/25J
$b_o \approx$ [mm]	15.0	25.0
$h \approx$ [mm]	15.1	25.5
Minimum pulley- \varnothing [mm]	212	450

Profile 5V/15J		Profile 8V/25J	
Belt designation		Belt designation	
Profile, length code	Profile, outside length, L_o [mm]	Profile, length code	Profile, outside length, L_o [mm]
5V KB 1320	15J 3353	8V KB 1000	25J 2540
5V KB 1400	15J 3556	8V KB 1060	25J 2692
5V KB 1500	15J 3810	8V KB 1120	25J 2845
5V KB 1600	15J 4064	8V KB 1180	25J 2997
5V KB 1700	15J 4318	8V KB 1250	25J 3175
5V KB 1800	15J 4572	8V KB 1320	25J 3353
5V KB 1900	15J 4826	8V KB 1400	25J 3556
5V KB 2000	15J 5080	8V KB 1500	25J 3810
5V KB 2120	15J 5385	8V KB 1600	25J 4064
5V KB 2240	15J 5690	8V KB 1700	25J 4318
5V KB 2360	15J 5994	8V KB 1800	25J 4572
5V KB 2500	15J 6350	8V KB 1900	25J 4826
5V KB 2650	15J 6731	8V KB 2000	25J 5080
5V KB 2800	15J 7112	8V KB 2120	25J 5385
5V KB 3000	15J 7620	8V KB 2240	25J 5690
5V KB 3150	15J 8001	8V KB 2360	25J 5994
		8V KB 2500	25J 6350
		8V KB 2650	25J 6731
		8V KB 2800	25J 7112
		8V KB 3000	25J 7620
		8V KB 3150	25J 8001
		8V KB 3350	25J 8509
		8V KB 3550	25J 9017
		8V KB 3750	25J 9525
		8V KB 4000	25J 10160
		8V KB 4250	25J 10795
		8V KB 4500	25J 11430

<p>Maximum production length: 12 500 mm L_o Non-standard length ranges from 2000 mm L_o Minimum order quantity: 6 pieces with 5 ribs or 7 pieces with 4 ribs or 10 pieces with 3 ribs or 15 pieces with 2 ribs or a multiple thereof</p> <p>Weight: per rib 5V KB \approx 0.222 kg/m</p>	<p>Maximum production length: 21 000 mm L_o Non-standard length ranges from 2000 mm L_o Minimum order quantity: 3 pieces with 5 ribs or 3 pieces with 4 ribs or 5 pieces with 3 ribs or 7 pieces with 2 ribs or a multiple thereof</p> <p>Weight: per rib 8V KB \approx 0.577 kg/m</p>
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Further sizes on request

POWER RATINGS

optibelt BLUE POWER 2 PROFILE 5V

NOMINAL POWER RATING P_N [kW]

FOR $\beta = 180^\circ$ AND $L_a = 3550$ mm



Table 5

Pulleys	v [m/s]	n_k [min ⁻¹]	Outside diameter of small pulley d_{ok} [mm]											Additional power [kW] per belt for speed ratio i				
			180	190	200	212	224	236	250	280	315	355	375	400	1.01 to 1.05	1.06 to 1.26	1.27 to 1.57	> 1.57
Dynamically balanced	5	700	9.37	10.67	11.95	13.48	15.02	16.54	18.32	22.08	26.41	31.27	33.68	36.65	0.10	0.65	0.91	1.12
		950	12.34	14.06	15.76	17.79	19.80	21.81	24.14	29.04	34.63	40.85	43.87	47.57	0.14	0.87	1.25	1.53
		1450	17.69	20.17	22.61	25.50	28.34	31.15	34.36	41.02	48.39	56.18	59.81	64.08	0.20	1.33	1.89	2.32
		2850	26.6	30.18	33.57	37.40	40.93	44.14	47.48	53.05	56.51	0.00	0.00	0.00	0.41	2.62	3.73	4.57
		100	1.51	1.70	1.89	2.12	2.37	2.59	2.87	3.45	4.13	4.90	5.28	5.76	0.01	0.10	0.13	0.16
	200	2.90	3.28	3.68	4.14	4.59	5.05	5.58	6.73	8.06	9.59	10.34	11.29	0.03	0.18	0.26	0.32	
	300	4.26	4.83	5.41	6.08	6.76	7.45	8.25	9.93	11.9	14.15	15.27	16.64	0.04	0.28	0.39	0.48	
	400	5.58	6.33	7.08	7.99	8.89	9.79	10.84	13.08	15.66	18.60	20.08	21.89	0.05	0.37	0.53	0.65	
	500	6.86	7.82	8.74	9.86	10.98	12.08	13.38	16.15	19.34	22.95	24.76	26.98	0.08	0.46	0.66	0.81	
	600	8.14	9.26	10.35	11.70	13.02	14.34	15.88	19.15	22.92	27.18	29.28	31.91	0.09	0.55	0.78	0.96	
	700	9.37	10.67	11.95	13.48	15.02	16.54	18.32	22.08	26.41	31.27	33.68	36.65	0.10	0.65	0.91	1.12	
	800	10.58	12.04	13.50	15.24	16.97	18.69	20.69	24.92	29.79	35.23	37.89	41.19	0.12	0.74	1.04	1.28	
	900	11.77	13.39	15.02	16.94	18.88	20.78	22.99	27.69	33.05	39.01	41.93	45.49	0.13	0.83	1.17	1.44	
	1000	12.91	14.72	16.49	18.62	20.73	22.83	25.25	30.36	36.18	42.62	45.75	49.56	0.14	0.92	1.31	1.60	
	1100	14.04	16.00	17.92	20.24	22.53	24.80	27.42	32.93	39.17	46.02	49.33	53.35	0.16	1.01	1.44	1.76	
	1200	15.13	17.23	19.33	21.81	24.27	26.70	29.51	35.40	42.02	49.22	52.68	56.82	0.17	1.11	1.57	1.92	
	1300	16.18	18.44	20.68	23.33	25.95	28.53	31.52	37.74	44.70	52.19	55.75	60.01	0.18	1.19	1.70	2.09	
	1400	17.20	19.60	21.97	24.79	27.55	30.29	33.44	39.96	47.19	54.92	58.53	62.82	0.20	1.29	1.83	2.25	
	1500	18.18	20.73	23.22	26.19	29.11	31.98	35.26	42.05	49.51	57.37	61.02	65.25	0.22	1.38	1.96	2.41	
	1600	19.12	21.79	24.41	27.53	30.56	33.56	36.98	44.01	51.63	59.56	63.15	67.28	0.23	1.47	2.10	2.57	
	1700	20.02	22.80	25.55	28.79	31.97	35.07	38.59	45.82	54.12	61.44	64.95	68.92	0.25	1.57	2.23	2.72	
	1800	20.88	23.78	26.63	29.99	33.27	36.46	40.10	47.45	55.24	63.00	66.37	70.09	0.26	1.66	2.35	2.88	
	1900	21.67	24.68	27.65	31.11	34.50	37.78	41.47	48.92	56.71	64.23	67.41	70.78	0.27	1.75	2.48	3.04	
	2000	22.44	25.54	28.60	32.16	35.63	38.97	42.73	50.23	57.91	65.12	68.03	70.97	0.28	1.84	2.61	3.20	
	2100	23.14	26.34	29.47	33.12	36.65	40.04	43.86	51.35	58.86	65.63	68.22	70.66	0.30	1.94	2.74	3.36	
	2200	23.79	27.08	30.28	34.00	37.58	41.02	44.85	52.29	59.53	65.76	67.95	69.77	0.31	2.02	2.87	3.53	
	2300	24.39	27.76	31.01	34.80	38.41	41.87	45.69	53.01	59.94	65.48	67.21	68.33	0.32	2.12	3.01	3.69	
	2400	24.94	28.36	31.67	35.49	39.13	42.59	46.39	53.54	60.04	64.79	65.98	66.28	0.34	2.21	3.14	3.85	
	2500	25.42	28.90	32.25	36.09	39.74	43.18	46.91	53.84	59.83	63.65	64.23	63.60	0.35	2.30	3.27	4.01	
	2600	25.84	29.36	32.73	36.60	40.23	43.65	47.29	53.91	59.31	63.58			0.37	2.40	3.40	4.17	
	2700	26.19	29.73	33.14	36.99	40.60	43.95	47.49	53.74	58.44	63.09			0.39	2.48	3.53	4.32	
	2800	26.48	30.06	33.45	37.29	40.85	44.11	47.55	53.35	57.23				0.40	2.58	3.66	4.48	
	2900	26.70	30.28	33.67	37.47	40.97	44.13	47.40	52.69	55.69				0.41	2.67	3.79	4.64	
	3000	26.85	30.43	33.80	37.54	40.95	43.99	47.06	51.78	53.74				0.43	2.76	3.92	4.81	
	3100	26.93	30.49	33.82	37.49	40.79	43.69	46.54	51.50					0.44	2.86	4.05	4.97	
	3200	26.93	30.47	33.74	37.32	40.48	43.20	45.82	50.98					0.45	2.95	4.18	5.13	
	3300	26.85	30.34	33.56	37.02	40.03	42.56	44.89	50.66					0.47	3.04	4.31	5.29	
	3400	26.70	30.13	33.26	36.58	39.43	41.75	43.75	50.20					0.48	3.13	4.44	5.45	
	3500	26.46	29.83	32.85	36.03	38.67	40.74	42.40						0.49	3.23	4.58	5.61	
	3600	26.12	29.42	32.35	35.34	37.74	40.61	42.38						0.52	3.31	4.71	5.77	
	3700	25.72	28.91	31.69	34.50	36.66	40.05	41.65						0.53	3.41	4.84	5.93	
	3800	25.22	28.29	30.94	33.52	35.40	39.48	40.91						0.54	3.50	4.97	6.08	
	3900	24.64	27.57	30.06	32.39	33.97	38.93							0.56	3.59	5.10	6.25	
	4000	23.94	26.75	29.04	31.09	32.36	38.36							0.57	3.69	5.22	6.41	
	4100	23.18	25.80	27.89	30.77	32.42	37.80							0.58	3.77	5.36	6.57	
	4200	22.28	24.75	26.61	29.92	31.49								0.60	3.87	5.49	6.73	
	4300	21.31	23.56	25.20	29.08	30.56								0.61	3.96	5.62	6.89	
	4400	20.23	22.27	23.64	28.23									0.62	4.05	5.75	7.05	
	4500	19.04	20.84	21.94	27.39									0.65	4.14	5.88	7.21	
	4600	18.51	20.03	21.13										0.66	4.24	6.01	7.37	
4700	17.63	18.91	19.86										0.67	4.32	6.14	7.54		
4800	16.75	17.79											0.69	4.42	6.28	7.69		
4900	15.87	16.67											0.70	4.52	6.41	7.85		
5000	14.97	15.54											0.71	4.60	6.54	8.01		
5100	14.09												0.73	4.70	6.67	8.17		
5200	13.21												0.74	4.78	6.79	8.33		
5300	12.33												0.75	4.88	6.92	8.49		

$v > 50$ m/s.
Please consult our
Application Engineering
Department.

v [m/s]

Dynamically balanced (ARPM/MPTA)

Pulleys

POWER RATINGS

optibelt BLUE POWER 2 PROFILE 8V

NOMINAL POWER RATING P_N [kW]

FOR $\beta = 180^\circ$ AND $L_a = 6350$ mm



Table 6

Pulleys	v [m/s]	n_k [min ⁻¹]	Pitch diameter of small pulley d_{wk} [mm]												Additional power [kW] per belt for speed ratio i					
			355	375	400	425	450	475	500	530	560	600	630	710	800	1.01 to 1.05	1.06 to 1.26	1.27 to 1.57	> 1.57	
Dynamically balanced		700	42.08	48.83	57.18	65.44	73.63	81.71	89.70	99.15	108.45	120.62	129.52	152.42	176.53	0.57	3.67	5.19	6.37	
		950	53.54	62.19	72.83	83.27	93.50	103.51	113.29	124.73	135.78	149.94	160.07	184.98	208.90	0.76	4.97	7.05	8.64	
		1450	68.62	79.75	93.10	105.77	117.76	128.98	139.43	150.87	161.05	172.55	179.54	1.17	7.58	10.76	13.20			
		50	3.69	4.22	4.90	5.57	6.25	6.92	7.59	8.39	9.19	10.27	11.06	13.18	15.58	0.04	0.26	0.38	0.45	
		100	7.11	8.16	9.48	10.80	12.13	13.44	14.76	16.34	17.92	20.02	21.59	25.77	30.44	0.09	0.53	0.74	0.91	
		150	10.38	11.96	13.93	15.89	17.85	19.80	21.76	24.11	26.45	29.54	31.87	38.07	44.97	0.12	0.78	1.12	1.37	
		200	13.59	15.68	18.29	20.88	23.47	26.05	28.63	31.71	34.80	38.89	41.96	50.08	59.18	0.16	1.04	1.48	1.82	
		250	16.74	19.33	22.54	25.77	28.97	32.17	35.37	39.19	43.00	48.05	51.85	61.87	73.06	0.20	1.31	1.86	2.28	
		5	300	19.80	22.89	26.72	30.55	34.38	38.18	41.98	46.52	51.03	57.04	61.52	73.38	86.57	0.25	1.57	2.23	2.73
		10	350	22.81	26.38	30.84	35.26	39.69	44.09	48.46	53.72	58.92	65.84	70.99	84.61	99.70	0.28	1.83	2.60	3.18
			400	25.77	29.81	34.85	39.88	44.88	49.86	54.83	60.74	66.63	74.42	80.23	95.50	112.36	0.32	2.10	2.97	3.64
			450	28.66	33.17	38.80	44.41	49.98	55.52	61.04	67.62	74.15	82.79	89.20	106.06	124.55	0.37	2.35	3.34	4.10
			500	31.49	36.46	42.67	48.84	54.96	61.06	67.11	74.31	81.46	90.90	97.90	116.23	136.20	0.41	2.61	3.71	4.55
			550	34.24	39.67	46.44	53.16	59.82	66.45	73.02	80.83	88.57	98.77	106.32	125.98	147.28	0.44	2.88	4.09	5.01
		600	36.92	42.81	50.12	57.37	64.56	71.70	78.75	87.15	95.45	106.34	114.39	135.29	157.72	0.48	3.14	4.45	5.46	
		650	39.54	45.86	53.70	61.47	69.17	76.79	84.32	93.27	102.08	113.64	122.14	144.11	167.50	0.53	3.40	4.83	5.91	
		700	42.08	48.83	57.18	65.44	73.63	81.71	89.70	99.15	108.45	120.62	129.52	152.42	176.53	0.57	3.67	5.19	6.37	
		750	44.55	51.70	60.54	69.29	77.93	86.46	94.86	104.79	114.54	127.24	136.50	160.18	184.77	0.60	3.92	5.57	6.83	
		15	800	46.92	54.47	63.80	73.00	82.09	91.02	99.82	110.2	120.34	133.49	143.08	167.35	192.18	0.65	4.18	5.93	7.28
			850	49.22	57.17	66.94	76.57	86.08	95.41	104.55	115.33	125.82	139.40	149.22	173.89	198.70	0.69	4.44	6.31	7.74
			900	51.43	59.72	69.95	80.00	89.88	99.56	109.05	120.17	130.98	144.87	154.90	179.78	204.30	0.73	4.71	6.68	8.19
			950	53.54	62.19	72.83	83.27	93.50	103.51	113.29	124.73	135.78	149.94	160.07	184.98	208.90	0.76	4.97	7.05	8.64
			1000	55.55	64.53	75.56	86.38	96.93	107.24	117.28	128.98	140.23	154.55	164.75	189.44	212.47	0.81	5.22	7.42	9.11
		20	1050	57.46	66.76	78.17	89.31	100.17	110.74	121.00	132.89	144.30	158.70	168.87	193.13	214.95	0.85	5.49	7.79	9.56
			1100	59.26	68.86	80.63	92.06	103.20	113.99	124.43	136.49	147.97	162.38	172.44	196.03	216.27	0.89	5.75	8.17	10.01
			1150	60.96	70.85	82.91	94.63	106.00	116.98	127.56	139.71	151.22	165.54	175.42	198.07	216.39	0.94	6.01	8.54	10.47
			1200	62.54	72.70	85.04	97.01	108.59	119.71	130.40	142.59	154.05	168.15	177.81	199.25	215.26	0.97	6.28	8.91	10.92
			1250	64.03	74.41	87.02	99.19	110.92	122.16	132.89	145.07	156.41	170.23	179.51	199.52	212.84	1.01	6.54	9.28	11.37
		25	1300	65.36	75.97	88.81	101.18	113.03	124.32	135.06	147.15	158.33	171.72	180.59	199.18	1.05	6.79	9.65	11.84	
			1350	66.59	77.39	90.44	102.93	114.86	126.19	136.88	148.81	159.75	172.62	180.97	198.98	1.10	7.06	10.02	12.29	
			1400	67.66	78.65	91.87	104.48	116.44	127.74	138.34	150.06	160.66	172.91	180.61	1.13	7.32	10.40	12.74		
			1450	68.62	79.75	93.10	105.77	117.76	128.98	139.43	150.87	161.05	172.55	179.54	1.17	7.58	10.76	13.20		
			1500	69.42	80.68	94.14	106.86	118.78	129.88	140.13	151.21	160.90	171.53	177.68	1.21	7.85	11.14	13.65		
		30	1550	70.09	81.45	94.97	107.67	119.51	130.45	140.43	151.09	160.74	171.48	1.26	8.11	11.50	14.10			
			1600	70.62	82.05	95.60	108.25	119.96	130.67	140.33	150.47	160.59	171.12	1.29	8.36	11.88	14.57			
			1650	70.97	82.47	96.01	108.55	120.09	130.52	139.80	149.34	160.44	1.33	8.63	12.24	15.02				
			1700	71.19	82.70	96.18	108.60	119.91	130.00	138.85	147.72	160.29	1.38	8.89	12.62	15.47				
			1750	71.23	82.74	96.14	108.37	119.39	129.10	137.45	145.54	1.42	9.15	12.99	15.93					
		35	1800	71.12	82.59	95.86	107.87	118.53	127.79	137.15	144.68	1.45	9.42	13.36	16.38					
			1850	70.84	82.24	95.33	107.07	117.35	126.09	136.40	1.49	9.68	13.73	16.83						
			1900	70.37	81.68	94.56	105.95	115.80	123.97	135.65	1.54	9.93	14.10	17.30						
			1950	69.72	80.90	93.53	104.55	113.89	121.42	134.91	1.58	10.20	14.47	17.75						
			2000	68.92	79.93	92.25	102.82	111.60	118.43	1.61	10.46	14.85	18.20							
		40	2050	67.89	78.71	90.68	102.62	111.63	117.56	1.66	10.72	15.22	18.66							
			2100	66.68	77.28	88.84	101.66	110.42	1.70	10.99	15.59	19.11								
			2150	65.28	75.63	86.72	100.70	109.21	1.74	11.24	15.96	19.57								
			2200	63.69	73.71	84.32	99.74	1.78	11.50	16.29	20.02									
			2250	63.69	73.71	84.32	98.78	1.82	11.77	16.71	20.48									
		45	2300	62.48	72.27	82.12	1.86	12.03	17.06	20.93										
			2350	61.48	71.08	80.50	1.90	12.29	17.44	21.38										
2400	60.49		69.90	78.87	1.95	12.56	17.80	21.84												
2450	59.49		68.71	1.98	12.81	18.17	22.30													
2500	58.49		67.52	2.02	13.07	18.54	22.75													
50	2550	57.50	66.34	2.06	13.34	18.91	23.21													
	2600	56.50	2.11	13.60	19.29	23.66														
	2650	55.50	2.15	13.86	19.65	24.11														
	2700	54.51	2.18	14.13	20.02	24.56														

$v > 50$ m/s.
Please consult our
Application Engineering
Department.

SPECIAL DRIVES

DRIVE ELEMENTS WITH ARAMID STRUCTURES



Aramid is an organic polyamide fibre that is manufactured in a complex chemical process. It may be used wherever maximum stress resistance and reliability are required. The processing of this fibre requires the highest level of experience and know-how as well as sophisticated testing facilities. Aramid is used as the tension cord material for highly loaded V-belts and kraftbands.

Structure and properties

Compared to materials commonly used for tension cords e.g. polyesters, aramid stands out due to its extremely low-stretch properties.

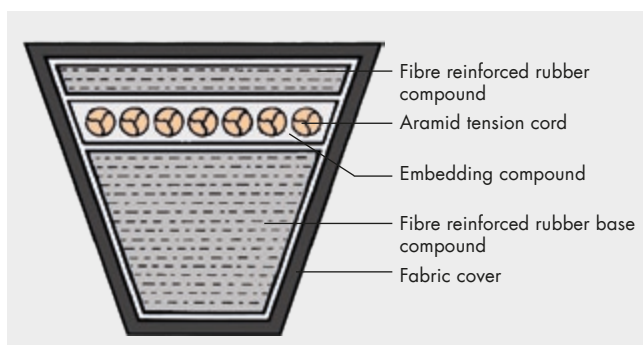
The breaking strength is at the same thread strength almost twice as high.

	Tensile strength [cN/tex]	Stretching at break [%]	Tension at 2 % [cN/tex]
Polyester	81	14	15
Aramid	190	4	73

cN = Centi-Newton Thread weight: 1 tex = 1 g/1000 m

These properties, which are of special importance for V-belts and kraftbands, result in huge improvements in comparison to conventional constructions.

Optibelt V-belts in aramid cord structure comprise:



The high quality, specially processed aramid tension cord is embedded in a special rubber compound. The upper and substructure are thus supported effectively. These consist of a fibre reinforced rubber compound. The cover fabric is treated with a rubber compound on both sides and covers the whole belt.

Applications areas

The advantages of Optibelt V-belts and kraftbands with aramid tension cords are best applicable where

- high power transmission is required
- there is only small installation space
- there is little adjustment range.

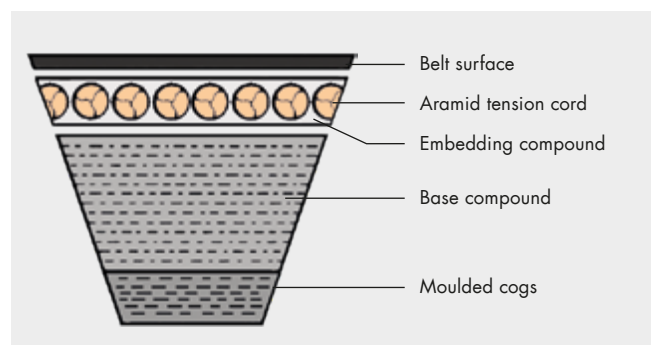
Thus, with the same number of belts and unchanged drive parameters, significantly higher power levels can be transmitted without reducing the service life of the belts. Even drive constructions that have previously had to be classified as critical may now be considered risk free. From now on, load limits apply as safety buffer zones; minimal belt stretch results in virtually maintenance-free running.

For these reasons Optibelt V-belts and kraftbands with aramid tension cord are to be found on drives with exceptional loading requirements:

- in critical drives in mechanical engineering
- in special machines
- in agricultural machinery
- in construction machinery

Attention: With two-pulley drives, particular requirements are placed on the shafts and bearings. It is recommended to use spring-loaded idlers (inside/outside idlers) with aramid V-belts / aramid kraftbands.

A discussion of all the relevant criteria would be beyond the scope of this manual. We therefore recommend contacting our Application Engineering Department to discuss your special requirements.



Special applications can also be designed with raw edge V-belts and kraftbands employing aramid tension cords.

Drive calculation

Calculation should follow the example given on pages 83 to 85 in our **Technical Manual V-belt drives**.

Please ask for the higher power ratings.

Diagram 1

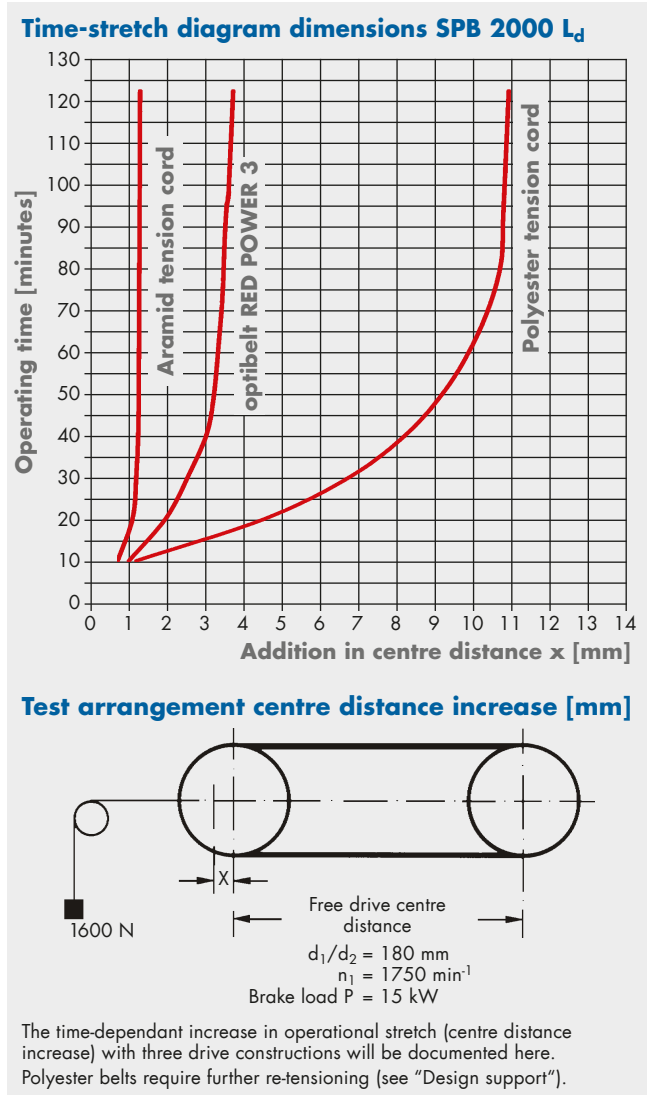
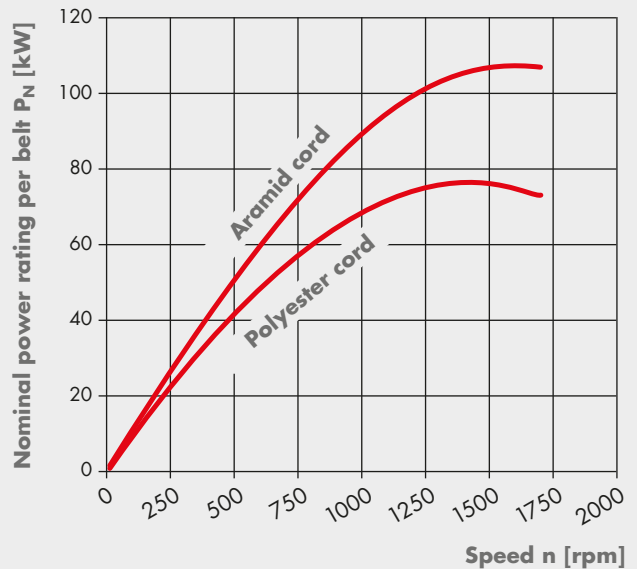


Diagram 2

Power rating diagram belt size 8V 2000 L_d

Datum diameter of the small pulley $d_{ak} = 450 \text{ mm}$

Speed ratio $i > 1.57$



This diagram shows the significantly higher power rating of the Optibelt V-belts with aramid cord in direct comparison to polyester cord belts.

Profiles/Lengths

Raw edge and wrapped Optibelt V-belts and kraftbands are available with aramid to DIN/ISO and ARPM/MPTA. Lengths and minimum order quantities on request.

Profile	Length		Range
V-belts			
SPB	$\geq 1800 L_w$	$\leq 21000 L_w$	As per the Optibelt standard range
SPC	$\geq 1900 L_w$	$\leq 21000 L_w$	
5V/15N	$\geq 5V 710 / 15N 1800 L_a$	$\leq 5V 8260 / 15N 21000 L_a$	
8V/25N	$\geq 8V 750 / 25N 1900 L_a$	$\leq 8V 8260 / 25N 21000 L_a$	
Kraftbands			
SPC KB	$> 2000 L_w$	$\leq 12000 L_w$	
5V/15J	$\geq 5V 800 / 15J 2000 L_a$	$\leq 5V 4920 / 15J 12500 L_a$	
8V/25J	$\geq 8V 800 / 25J 2000 L_a$	$\leq 8V 8260 / 25J 21000 L_a$	

Further profiles and length ranges as well as minimum order quantities on request.

Datum length $L_d \triangleq$ pitch length L_w ; outside length = L_a

For proper power transmission and for achieving an acceptable belt service life, the correct belt tension is of the utmost importance.

Too low or too high belt tension will lead to the premature failure of the belts. Over tensioning often leads to bearing failure on the driver or the driven machine. Experience has shown that unscientific belt tensioning methods, such as the "thumb pressure method", are not suitable for applying the optimum tension to the drive for maximum efficiency. It is therefore recommended that for each drive the required static belt tension "T" is calculated using the formulas by Optibelt. This tension is the lowest possible required by a drive to transmit the highest power level from the drive, taking account of the normal amount of slip.

Once the belt has been fitted and the initial tension has been applied, it should be checked using an Optibelt tension gauge.

The belt should be monitored regularly during the first hours of operation. Experience has shown that the first re-tensioning should be carried out after approximately 30 minutes to four hours operating under full load. In doing so, the initial stretch is absorbed.

After approximately 24 hours of operation, it is often recommended to check the drive and re-tension the belts if necessary, particularly when not continuously run under full load. The time between checks can be significantly increased then. Also see our installation and maintenance advice on pages 156 to 157 in our Technical Manual V-belt drives.

Too high or too low tension of the drive will be avoided if the belt tension is calculated, set and checked using one of the following methods.

I. Checking the belt tension by span deflection

This method provides an indirect measurement of the calculated or actual static belt tension. It is applicable for belt sections SPZ, SPA, SPB, SPC, 3V/9N, 5V/15N, Z/10, A/13, B/17, 20, C/22, 25, D/32, XPZ, XPA, XPB, XPC, 3VX, 5VX, ZX/X10, AX/X13, BX/X17, CX/X22.

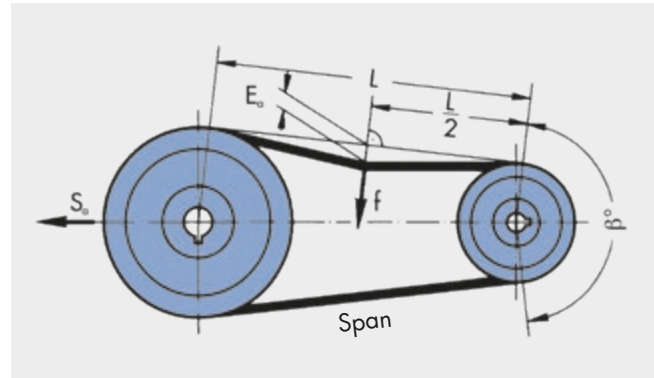
E	= belt deflection per 100 mm span length	[mm]
E _a	= belt deflection for a given span length	[mm]
f	= load used to set belt tension	[N]
k	= constant for calculation of centrifugal force	
L	= drive span length	[mm]
S _a	= minimum static shaft load	[N]
T	= minimum static tension per belt	[N]

1. Calculation of the static belt tension using the following formula:

$$T \approx \frac{500 \cdot (2.04 - c_1) \cdot P_B}{c_1 \cdot z \cdot v} + k \cdot v^2$$

During new installation, the drive is to be tensioned with 1.3 T.

2. Determine the belt deflection per 100 mm span length E from the belt tension/deflection diagram 3.



3. Calculate the belt deflection for a given span length E_a for the actual drive span length L.

$$E_a \approx \frac{E \cdot L}{100}$$

$$L = a_{nom} \cdot \sin \frac{\beta}{2}$$

Apply test load "f" (taken from diagram 3 for the appropriate belt profile) to the centre of, and perpendicular to, the span as illustrated above. Measure the deflection and if necessary adjust the centres until the correct belt tension is achieved.

II. Checking the belt tension via speed measurement

This method checks belt tension using the theoretical slip. The speed of the driver and driven pulleys are measured first in an unloaded condition and then under load.

S	= slip	[%]
n _{1L}	= driver pulley speed, no load	[rpm]
n _{2L}	= driven pulley speed, no load	[rpm]
n _{1B}	= driver pulley speed, under load	[rpm]
n _{2B}	= driven pulley speed, under load	[rpm]

Formula for calculating the slip:

$$S = \left(1 - \frac{n_{1L}/n_{2L}}{n_{1B}/n_{2B}}\right) \cdot 100$$

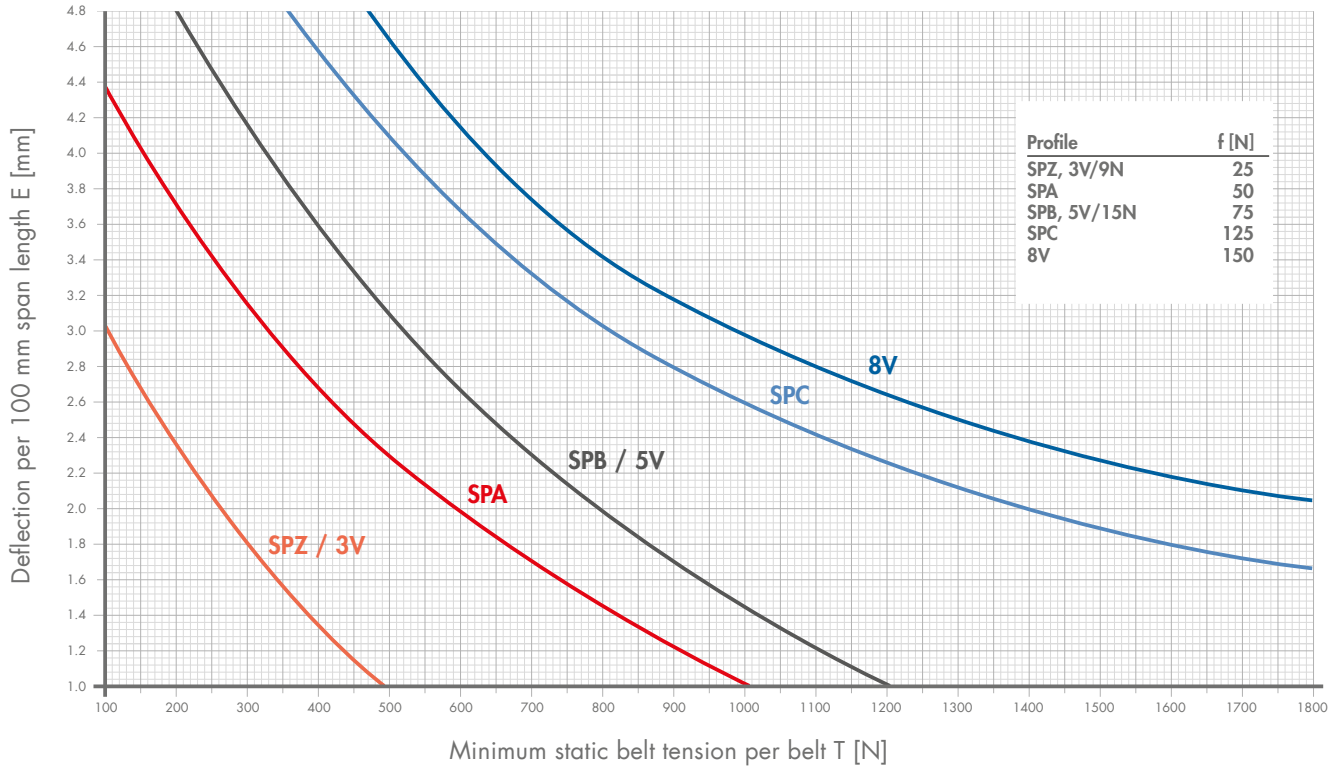
At the rated loading, the slip should not exceed 1%. The belt service life is considerably shortened due to incorrectly low tension or overloading with a slip of over 2%.

DESIGN SUPPORT

BELT TENSION FOR OPTIBELT V-BELTS



Diagram 3: Belt tension characteristics for optibelt high performance wedge belts



DESIGN SUPPORT

BELT TENSION FOR OPTIBELT V-BELTS AND optibelt **KB** KRAFTBANDS



III. Belt tensioning via "length addition value" method

It has become evident that span deflection methods are not ideal for checking the tension of kraftbands of all profiles and of individual belts. The following, very simple method for the setting and checking of belt tension is therefore recommended:

1. Calculation of the static belt tension "T":

$$T \approx \frac{500 \cdot (2.04 - c_1) \cdot P_B}{c_1 \cdot z \cdot v} + k \cdot v^2$$

2. Measure the setting length "M" of the kraftband or the single belt, on the top surface of the kraftband or on the belt top surface when not tensioned. However the belt can be measured when fitted to the drive, provided that it is completely **without** tension.

3. Procedure

- a) Install the kraftband or the single belt on the pulleys. Provisionally tighten the belt in order to seat it into the pulley grooves.
- b) Next, completely slacken the kraftband or the single belt.
- c) Mark two lines on the top of the belt, with distance "M". The lines must be marked on the free span length, not where the belt is on the pulley ("M" should ideally be 1000 mm minimum or a multiple of it).

Important: The longer the measured profile, the more accurate the tension setting will be.

4. Calculate the length additional value "A" using the formula:

$$A = \frac{M \cdot R}{1000}$$

R = stretch factor from table 7 page 16

5. Tighten the kraftband or the single belt until the length calculated under point 4 is reached. The drive is now correctly tensioned.
6. If the drive has to be re-tensioned, the belts have to be slackened first so that they can be re-measured completely free of tension. After that, the procedure described in paragraphs 3 to 5 applies.

Example:

$$P_B = 1136 \text{ kW}$$

$$c_1 = 0.97$$

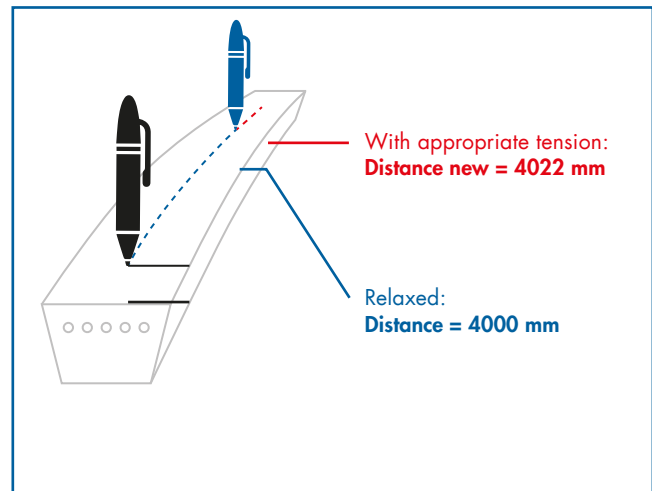
$$v = 25.91 \text{ m/s}$$

Drive arrangement with one set comprising:

2 optibelt KB kraftbands 4-8V 3750/25J 9525 L₀

2 optibelt KB kraftbands 5-8V 3750/25J 9525 L₀

$$T \approx \frac{500 \cdot (2.04 - 0.97) \cdot 1136}{0.97 \cdot 18 \cdot 25.91} + 0.69 \cdot 25.91^2 = 1807 \text{ N}$$



"M" selected 4000 mm

$$A = \frac{4000 \cdot 5.5}{1000} = 22.0 \text{ mm}$$

Tighten the kraftband until the length additional value is reached. This will set the correct tension.

At initial installation, the static belt tension must be multiplied by 1.3.

DESIGN SUPPORT

BELT TENSION FOR OPTIBELT V-BELTS AND optibelt **KB** KRAFTBANDS



Table 7: R factor per 1000 mm selected measuring distance

Profile	Kraftband	3V/9J	5V/15J	8V/25J	SPZ	SPA	SPB	SPC	A/HA	B/HB	C/HC	D/HD
	Single belt	3V/9N	5V/15N	8V/25N	SPZ	SPA	SPB	SPC	A/13	B/17	C/22	D/32
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
Minimum static belt tension per rib/single belt T [N]	50	0.8			0.8	0.8			0.8			
	75	1.2			1.2	1.0			1.0			
	100	1.6			1.6	1.3			1.3			
	125	2.1			2.1	1.6			1.6			
	150	2.6			2.6	1.9			1.9	0.8		
	175	3.0			3.0	2.2			2.2	0.9		
	200	3.5			3.5	2.5			2.5	1.1		
	225	4.0			4.0	2.8			2.8	1.2		
	250	4.5			4.5	3.0			3.0	1.4		
	275	4.9			4.9	3.3			3.3	1.5		
	300	5.3	1.3		5.3	3.6	1.3		3.6	1.6	1.6	
	350	6.4	1.7		6.4	4.2	1.7		4.2	1.8	1.8	
	400	7.6	2.0		7.6	4.7	2.0		4.7	2.0	2.1	
	450	8.7	2.4		8.7	5.3	2.4		5.3	2.2	2.3	
	500	10.0	2.7		10.0	5.8	2.7		5.8	2.5	2.5	
	550		3.1				3.1			2.7	2.7	
	600		3.4				3.4	2.0		3.0	2.9	2.0
	650		3.8				3.8	2.2		3.2	3.1	2.2
	700		4.1				4.1	2.4		3.5	3.4	2.4
	800		4.8				4.8	2.8		4.2	3.8	2.7
	900		5.5				5.5	3.3		4.8	4.2	2.9
	1000		6.2				6.2	3.7		5.3	4.7	3.3
	1100		6.9				6.9	4.1			5.1	3.6
	1200		7.6	2.9			7.6	4.5			5.5	3.9
	1300		8.3	3.3			8.3	5.0				4.2
	1400		9.0	3.7			9.0	5.4				4.5
	1500		9.7	4.1			9.7	5.8				4.8
	1600		10.4	4.6			10.4	6.3				5.1
	1700		11.1	5.0			11.1	6.8				5.5
	1800		11.8	5.5			11.8	7.3				5.8
	1900			6.0				7.8				
	2000			6.5				8.3				
	2100			7.0				8.8				
2200			7.5				9.3					
2300			8.0				9.8					
2400			8.6									
2500			9.6									
2600			10.6									
2700			11.7									
2800			12.8									
2900			13.5									
3000			14.2									
3100			14.9									
3200			15.6									
3300			16.3									
Factor k for kraftbands	0.12	0.25	0.69	0.12	0.16	0.25	0.55	0.16	0.27	0.45	0.85	
Factor k for single belts	0.07	0.19	0.57	0.07	0.12	0.19	0.37	0.11	0.20	0.33	0.67	

Intermediate values may be determined by linear interpolation.
The values only apply to drives with V-grooved pulleys.
Values for V-flat drives on request.

DESIGN SUPPORT

TECHNICAL TOOLS

FREQUENCY TENSION TESTER **optibelt TT**



The **optibelt TT** frequency tension tester is an appliance that is used to check the tension of drive belts by means of measuring frequency. Thanks to a compact design, this product offers universal application possibilities in machine construction, in the automotive industry and many other technical applications. The **optibelt TT** can even be effortlessly used in difficult-to-reach places so that the tension values of V-belts, ribbed belts and timing belts can be easily and quickly checked.

After start up, the device is immediately ready for obtaining data. The measuring head is held over the belt to be tested (two red LED light points help to position it). The belt is made to vibrate by striking it with a finger or an object. The **optibelt TT** begins recording data and displays the result in Hertz [Hz]. The condition, colour and type of the belt have no effect upon the measurement.

Calculation of frequency

$$f = \sqrt{\frac{T \cdot 10^6}{4 \cdot k \cdot L^2}}$$

$$f = \sqrt{\frac{1484 \text{ N} \cdot 10^6}{4 \cdot 0.377 \frac{\text{kg}}{\text{m}} \cdot 2189.3^2 \text{ mm}^2}} = 14.33 \text{ Hz} \approx 14.3 \text{ Hz}$$

Calculation of static belt tension

$$T = 4 \cdot 10^{-6} \cdot k \cdot L^2 \cdot f^2$$

$$T = 4 \cdot 10^{-6} \cdot 0.377 \frac{\text{kg}}{\text{m}} \cdot 2189.3^2 \text{ mm}^2 \cdot 14.33^2 \text{ Hz}^2 = 1484.24 \text{ N} \approx 1484 \text{ N}$$

T \triangleq belt tension [N]
 k \triangleq meter weight [kg/m]
 L \triangleq span length [mm]
 f \triangleq frequency [Hz]

Advantages of optibelt TT

- Two trouble-free measuring methods:
 EM: electro magnetic wave
 AC: acceleration, integrated
- Usable also for long centre distances by all-time wide frequency range:
 AC: 1 - 10 Hz
 EM: 6 - 600 Hz
- Easy handling of the measuring head: two red LED points on the belt help to find the correct position
- For hard accessible belt span: measuring head on flexible goose-neck (EM) or with 250 mm cable (AC)
- Safe meter-reading by big display: width 43 mm and height 58 mm, illuminated and colored
- Long running time and environment-friendly by high capacity, rechargeable battery (USB) and changeability
- Chargeable via USB
- No interference in loud and bright environments
- Automatic switch-off function

The optibelt TT:

A guarantee for longer durability of your V-belts, ribbed belts, and timing belts!



Profile	Diameter of the small pulley [mm]	Static belt tension [N]						
		optibelt RED POWER 3		Standard (wrapped)		optibelt BLUE POWER 2		
		Initial installation new V-belts	Operation after running-in	Initial installation new V-belts	Operation after running-in	Diameter of the small pulley	Initial installation new V-belts	Operation after running-in
SPZ; 3V/9N	≤ 71	250	200	200	150	—	—	—
	> 71 ≤ 90	300	250	250	200			
	> 90 ≤ 125	400	300	350	250			
	> 125*							
SPA	≤ 100	400	300	350	250	—	—	—
	> 100 ≤ 140	500	400	400	300			
	> 140 ≤ 200	600	450	500	400			
	> 200*							
SPB; 5V/15N	≤ 160	700	550	650	500	> 180 ≤ 236	850	650
	> 160 ≤ 224	850	650	700	550			
	> 224 ≤ 355	1000	800	900	700			
	> 355*							
SPC	≤ 355	1400	1100	1000	800	> 280 ≤ 375	1700	1300
	> 355 ≤ 560	1600	1200	1400	1100			
	> 560*	1900	1500	1800	1400			
Z/10	> 50 ≤ 71	—	—	120	90	—	—	—
	> 71 ≤ 100			140	110			
	> 100*							
A/13	≤ 80	—	—	150	110	—	—	—
	> 80 ≤ 100			200	150			
	> 100 ≤ 132			300	250			
	> 132*							
B/17	≤ 125	—	—	300	250	—	—	—
	> 125 ≤ 160			400	300			
	> 160 ≤ 200			500	400			
	> 200*							
C/22	≤ 200	—	—	700	500	—	—	—
	> 200 ≤ 250			800	600			
	> 250 ≤ 355			900	700			
	> 355*							
D/32	≤ 355	—	—	1000	750	—	—	—
	> 355*			1200	900			

8V

Check of belt tension via length addition value

* Tension values for these pulleys must be calculated.

Tension gauges:

optibelt OPTIKRIK 0 Measuring range: 70 - 150 N
 optibelt OPTIKRIK I Measuring range: 150 - 600 N
 optibelt OPTIKRIK II Measuring range: 500 - 1400 N
 optibelt OPTIKRIK III Measuring range: 1300 - 3100 N

The tension values (static belt tension) are reference values, if no exact drive data is available. These values are given for maximum power transmission (per belt).

Calculation basis

Wedge belts speed $v = 5$ to 42 m/s
 Classic V-belts speed $v = 5$ to 30 m/s

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