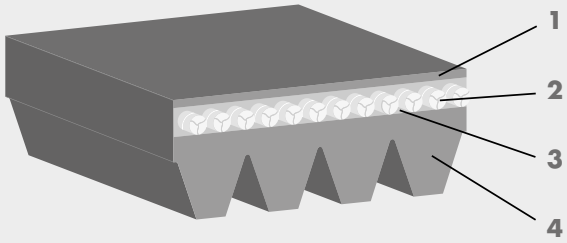
PRODUCT DESCRIPTION
AUTOMOTIVE DRIVES optibelt CAR POWER RBK

New engine designs demand more and more space saving. It is not unusual to encounter small pulley diameters and limited drive widths. Being extremely elastic and dimensionally stable, Optibelt ribbed belts can adapt to the respective drive geometry. They are flexible enough to find their path as a serpentine drive through the motor labyrinth. The flexible ribbed belt is extremely quiet and supple in its job of controlling the power train.
Optibelt ribbed belts drive ancillary units in cars, commercial vehicles and buses. They reduce vibration and give the generator, air-conditioning compressor, and the power steering pump the right spin.

Characteristics
- Large speed ratios
- High power transmission
- Minimum slip
- Largely oil and temperature resistant
- Vibration free and quiet
- Extraordinarily resilient

Profiles
PK

Dimensions
2 PK	from	786 to 905 mm
3 PK	from	550 to 1285 mm
4 PK	from	560 to 1520 mm
5 PK	from	625 to 2055 mm
6 PK	from	675 to 2680 mm
7 PK	from	870 to 2355 mm
8 PK	from	800 to 2605 mm
9 PK	from	1200 to 4145 mm
10 PK	from	1108 to 2063 mm
11 PK	from	1515 to 2055 mm
12 PK	from	1165 to 2500 mm



1 Belt top surface:
wear resistant polychloroprene rubber compound

2 Tension cord:
low-stretch polyester cord

3 Cushioning:
high-adhesion polychloroprene rubber compound (cushion layer)

4 Base compound:
polychloroprene rubber compound

Additional sizes on request.

Applications
Use in automotive engineering to drive the power train

STANDARD RANGE
RIBBED BELTS

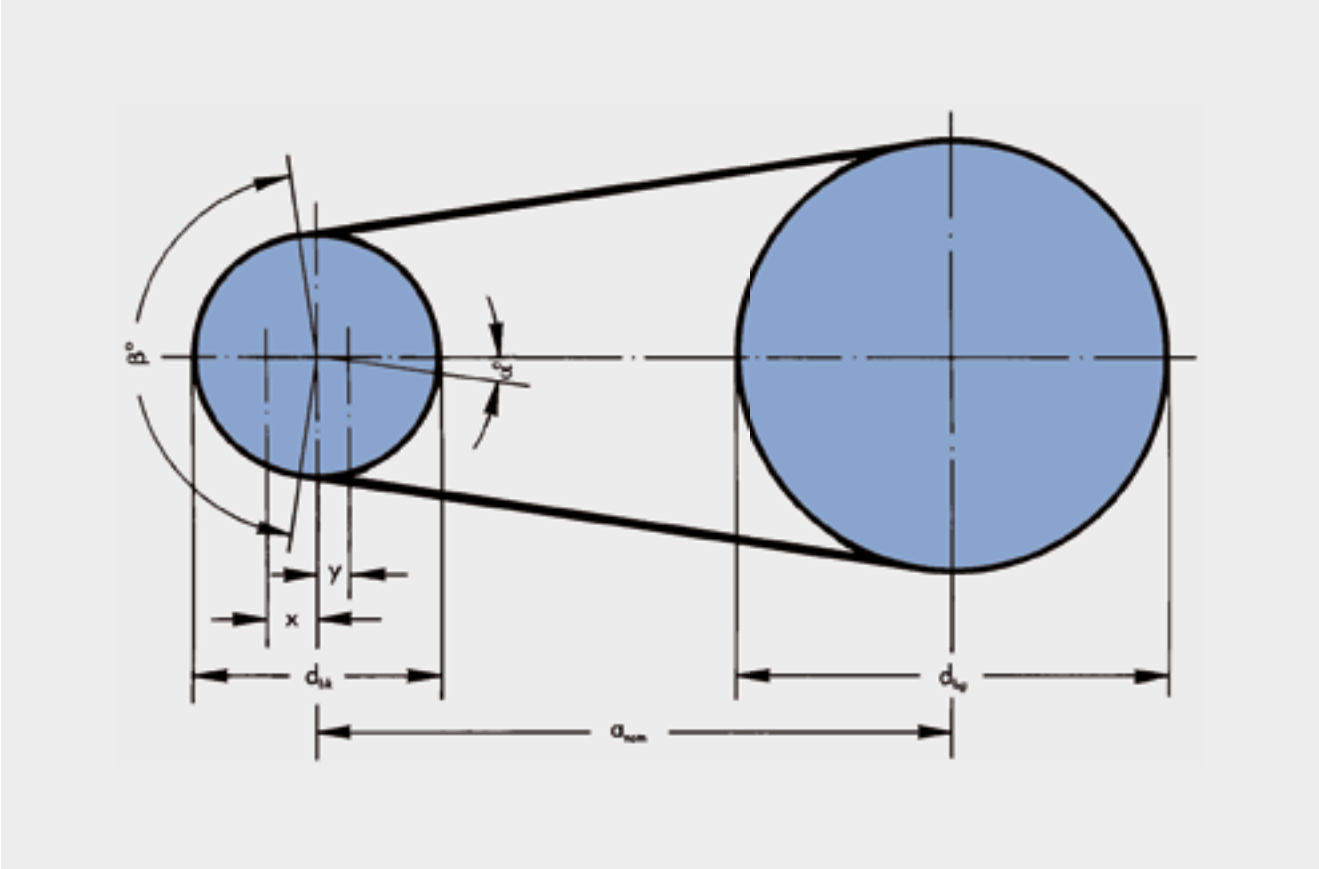
Profile PK						Profile PL		Profile PM	
Effective length L_b		Effective length L_b		Effective length L_b		Effective length L_b		Effective length L_b	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
630•	24.80	1290•	50.80	2515•	99.00	954	37.50	2286	90.00
648	25.50	1321•	52.00	2845•	112.00	991	39.00	2388	94.00
698	27.50	1330	52.40			1075	42.30	2515	99.00
730	28.70	1345	53.00			1194	47.00	2693	106.00
775	30.50	1371•	54.00			1270	50.00	2832	111.50
800	31.50	1397•	55.00			1333	52.50	2921	115.00
812	32.00	1439•	56.70			1371	54.00	3010	118.50
830	32.70	1460	57.50			1397	55.00	3124	123.00
865	34.00	1520	59.80			1422	56.00	3327	131.00
875	34.50	1560	61.40			1562	61.50	3531	139.00
890	35.00	1570	61.80			1613	63.50	3734	147.00
913	36.00	1600•	63.00			1664	65.50	4089	161.00
920	36.20	1655	65.20			1715	67.50	4191	165.00
940	37.00	1690	66.50			1764	69.50	4470	176.00
954	37.60	1755	69.10			1803	71.00	4648	183.00
962	37.80	1854•	73.00			1841	72.50	5029	198.00
990	39.00	1885	74.20			1943	76.50	5410	213.00
1015	40.00	1930•	76.00			1981	78.00	6121	241.00
1080	42.50	1956•	77.00			2020	79.50	6883•	271.00
1090	43.00	1980	78.00			2070	81.50	7646•	301.00
1125	44.30	2030	79.90			2096	82.50	8408•	331.00
1150	45.30	2050	80.70			2134	84.00	9169•	361.00
1165	45.90	2080	82.00			2197	86.50	9931•	391.00
1190	46.80	2120	83.50			2235	88.00	10693•	421.00
1200•	47.20	2145	84.40			2324	91.50	12217•	481.00
1222•	48.10	2170	85.40			2362	93.00	13741•	541.00
1230•	48.40	2235•	88.00			2476	97.50	15266•	601.00
1245	49.00	2255	88.80			2515	99.00		
1270•	50.00	2362•	93.00			2705	106.50		
1285•	50.60	2460	96.90			2743	108.00		
						2845	112.00		
						2895	114.00		
						2921	115.00		
						2997	118.00		
						3086	121.50		
						3124	123.00		
						3289	129.50		
						3327	131.00		
						3492	137.50		
						3696	145.50		
						4051	159.50		
						4191	165.00		
						4470	176.00		
						4622	182.00		
						5029	198.00		
						5385	212.00		
						6096	240.00		

Note: Individually designed ribbed belts may deviate from the standard composition.
Please contact our Applications Engineering Department!

Non standard lengths on request.
Maximum number of ribs: Please contact our Applications Engineering Department.
• **non stock items**

DRIVE DESIGN
ABBREVIATIONS USED IN FORMULAE

a	= Drive centre distance	[mm]
a_{nom}	= Drive centre distance, calculated with a standard belt length	[mm]
c_1	= Arc of contact correction factor	
c_2	= Drive service factor	
c_3	= Belt length correction factor	
d_{bg}	= Effective diameter of large pulley	[mm]
d_{bk}	= Effective diameter of small pulley	[mm]
d_{b1}	= Effective diameter of driver pulley	[mm]
d_{b2}	= Effective diameter of driven pulley	[mm]
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 per rib	[N]
h	= Belt thickness	[mm]
h_b	= Effective line difference	[mm]
i	= Speed ratio	
k	= Constant for calculation of centrifugal force	
L	= Span length	[mm]
L_{bSt}	= Standard belt effective length	[mm]
L_{bth}	= Calculated belt effective length	[mm]
n_g	= Speed of large pulley	[rpm]
n_k	= Speed of small pulley	[rpm]
n_1	= Speed of driver pulley	[rpm]
n_2	= Speed of driven pulley	[rpm]
P	= Motor or normal running power	[kW]
P_B	= Design power	[kW]
P_N	= Power rating per rib	[kW]
s	= Drive span length	[mm]
S_a	= Minimum static shaft loading	[N]
T	= Minimum static belt tension per rib	[N]
v	= Belt speed	[m/s]
x	= Minimum adjustment required above drive centre distance a_{nom} to compensate for tensioning and retensioning	[mm]
y	= Minimum adjustment required below drive centre distance a_{nom} to allow for belt installation	[mm]
z	= Number of ribs	
α	= Angle of belt run = $90° - \frac{\beta}{2}$	°[degrees]
β	= Arc of contact on small pulley	°[degrees]



DRIVE DESIGN

BELT LENGTH CORRECTION FACTOR c_3

Table 2

Profile PK				Profile PL				Profile PM	
Effective length L_b [mm]	c_3	Effective length L_b [mm]	c_3	Effective length L_b [mm]	c_3	Effective length L_b [mm]	c_3	Effective length L_b [mm]	c_3
559	0.78	1956	1.04	954	0.83	4051	1.14	2286	0.87
630	0.81	1980	1.05	991	0.84	4191	1.15	2388	0.88
648	0.81	2030	1.05	1075	0.86	4470	1.16	2515	0.89
698	0.82	2050	1.05	1194	0.88	4622	1.17	2693	0.91
730	0.84	2080	1.06	1270	0.89	5029	1.19	2832	0.92
775	0.85	2120	1.06	1333	0.90	5385	1.21	2921	0.92
800	0.85	2145	1.06	1371	0.91	6096	1.24	3010	0.93
812	0.86	2170	1.07	1397	0.91			3124	0.94
830	0.86	2235	1.09	1422	0.91			3327	0.95
865	0.87	2362	1.09	1562	0.93			3531	0.96
875	0.87	2460	1.09	1613	0.94			3734	0.98
890	0.88	2515	1.10	1664	0.95			**4089**	**1.00**
913	0.88	2743	1.12	1715	0.95			**4191**	**1.00**
920	0.88	2845	1.13	1764	0.96			4470	1.01
940	0.89			1803	0.96			4648	1.02
954	0.89			1841	0.97			5029	1.04
962	0.89			1943	0.98			5410	1.06
990	0.90			1981	0.98			6121	1.08
1015	0.90			2020	0.99			6883	1.11
1080	0.92			2070	0.99			7646	1.13
1090	0.91			**2096**	**1.00**			8408	1.16
1100	0.92			**2134**	**1.00**			9169	1.18
1125	0.93			2197	1.01			9931	1.19
1150	0.93			2235	1.01			10693	1.21
1165	0.93			2324	1.02			12217	1.24
1190	0.94			2362	1.02			13741	1.27
1200	0.94			2476	1.03			15266	1.30
1222	0.94			2515	1.03				
1230	0.94			2705	1.05				
1245	0.95			2743	1.05				
1270	0.95			2845	1.06				
1285	0.95			2895	1.07				
1290	0.95			2921	1.07				
1321	0.96			2997	1.07				
1330	0.96			3086	1.08				
1345	0.96			3124	1.08				
1371	0.97			3289	1.09				
1397	0.97			3327	1.10				
1439	0.98			3492	1.11				
1460	0.98			3696	1.12				
1520	0.99								
1560	0.99								
1570	**1.00**								
1600	**1.00**								
1655	1.01								
1690	1.01								
1755	1.02								
1854	1.03								
1885	1.04								
1930	1.04								

Additional sizes on request.

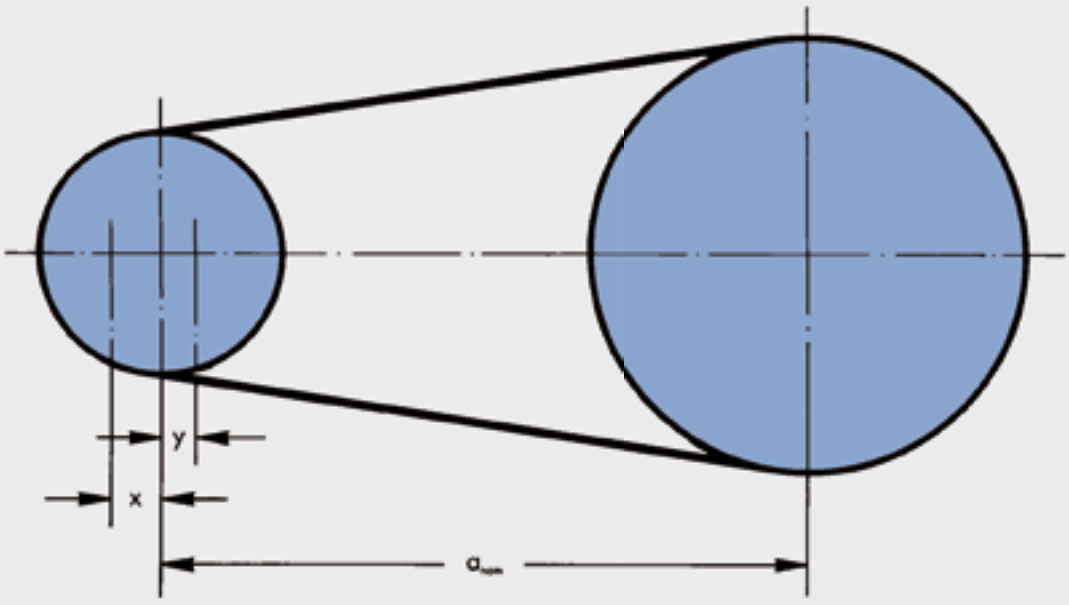
DRIVE DESIGN

MINIMUM ALLOWANCE x/y ABOVE AND BELOW DRIVE CENTRE DISTANCE a_{nom}

Table 3

Effective length L_b [mm]	Minimum allowance x [mm] – for tensioning and retensioning	Minimum allowance y [mm] – for ease of fitting				
		Profile PH	Profile PJ	Profile PK	Profile PL	Profile PM
≤ 500	10	10	10	–	–	–
> 500 ≤ 1000	15	15	15	20	25	–
> 1000 ≤ 1500	20	15	15	20	25	–
> 1500 ≤ 2000	25	15	15	20	25	–
> 2000 ≤ 2500	30	20	20	20	25	40
> 2500 ≤ 3000	35	20	20	25	30	40
> 3000 ≤ 4000	45	–	–	25	30	45
> 4000 ≤ 5000	55	–	–	30	35	45
> 5000 ≤ 6000	65	–	–	30	35	50
> 6000 ≤ 7500	85	–	–	–	–	55

Minimum Allowance



DRIVE DESIGN
FORMULAE AND CALCULATION EXAMPLE

Prime Mover

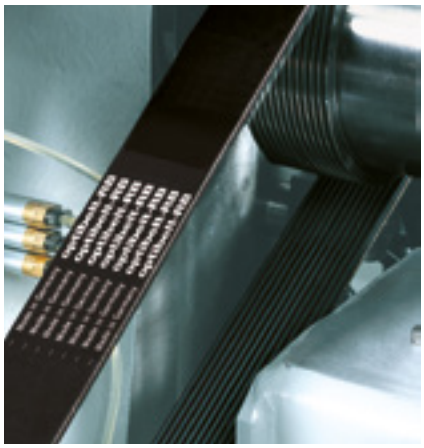
Electric motor
P = 13 kW
n_1 = 2440 rpm
Start up: direct
Starting torque: $M_A = 2.7\ M_N$

Drive Conditions

Operational hours per day: 8 hours
Number of starts: 20 per day
Normal ambient temperature,
no exposure to oil and water

Drive centre distance: between
350 and 400 mm acceptable
Effective diameter of driver pulley:
$d_{b1} \leq 140$ mm

Driven Machine



Grinding spindle
P = 13 kW
n_2 = 3100 ± 100 rpm
Start up: from idling

Formulae

Drive service factor

c_2 from table 4, page 20

Design power

$P_B = P \cdot c_2$

Belt profile selection

from diagram 1, page 21

Speed ratio

$$i = \frac{n_1}{n_2} = \frac{d_{w2}}{d_{w1}} = \frac{d_{b2} + 2\ h_b}{d_{b1} + 2\ h_b}$$

h_b see page 32

Effective diameters of ribbed belt pulleys

d_{b1} see page 45
$d_{b2} = d_{b1} \cdot i + 2\ h_b\ (i - 1)$
when d_{b2} is known:

$$d_{b1} = \frac{d_{b2}}{i} + 2\ h_b \left(\frac{1}{i} - 1 \right)$$

Calculation Example

c_2 = **1.6**

$P_B = 13 \cdot 1.6 =$ **20.80 kW**

Profile PL

$$i = \frac{2440}{3173} = \mathbf{0.769}$$

d_{b1} = **123 mm** selected
$d_{b2} = 123\ \text{mm} \cdot 0.769 + 2 \cdot 3.5\ (0.769 - 1) = 92.97$ mm

d_{b2} = **93 mm** – see page 44

DRIVE DESIGN
FORMULAE AND CALCULATION EXAMPLE

Formulae

Recalculation of speed of driven machine

$$i_{actual} = \frac{d_{w2}}{d_{w1}} = \frac{d_{b2} + 2\,h_b}{d_{b1} + 2\,h_b}$$

$$n_{2\ actual} = \frac{n_1}{i_{actual}}$$

Drive centre distance (suggested)

Recommendation: $a > 0.7 \quad (d_{bg} + d_{bk})$

$a < 2 \quad (d_{bg} + d_{bk})$

Effective length of ribbed belt

$$L_{bth} \approx 2\,a + 1.57\,(d_{bg} + d_{bk}) + \frac{(d_{bg} - d_{bk})^2}{4\,a}$$

Actual:

$$L_{bth} = 2\,a \cdot \sin\frac{\beta}{2} + \frac{\pi}{2}(d_{bg} + d_{bk}) + \frac{\alpha \cdot \pi}{180°}(d_{bg} - d_{bk})$$

Drive centre distance

Calculated from L_{bSt} and L_{bth}

(when $L_{bSt} > L_{bth}$) $a_{nom} \approx a + \frac{L_{bSt} - L_{bth}}{2}$

(when $L_{bSt} < L_{bth}$) $a_{nom} \approx a - \frac{L_{bth} - L_{bSt}}{2}$

Actual:

$$a_{nom} = \frac{L_{bSt} - \frac{\pi}{2}(d_{bg} + d_{bk})}{4} + \sqrt{\left[\frac{L_{bSt} - \frac{\pi}{2}(d_{bg} + d_{bk})}{4}\right]^2 - \frac{(d_{bg} - d_{bk})^2}{8}}$$

Minimum allowance x/y above and below drive centre distance a_{nom}

x/y from table 3, page 19

Speed

$$v = \frac{d_{wk} \cdot n_k}{19100} = \frac{(d_{bk} + 2 \cdot h_b) \cdot n_k}{19100}$$

Calculation Example

$$i_{actual} = \frac{93 + 2 \cdot 3.5}{123 + 2 \cdot 3.5} = \mathbf{0.769}$$

$$n_{2\ actual} = \frac{2440}{0.769} = \mathbf{3173\ rpm}$$

Required:
3100 ± 100 rpm
(Calculated speed meets requirement)

a = **380 mm** suggested

$$L_{bth} \approx 2 \cdot 380 + 1.57 \cdot (123 + 93) + \frac{(123 - 93)^2}{4 \cdot 380} \approx 1099.7\ mm$$

Nearest standard length from page 14 selected

L_{bSt} = **1075 mm**

$$a_{nom} \approx 380 - \frac{1099.7 - 1075}{2} \approx \mathbf{367.65\ mm}$$

x ≥ **20 mm** / y ≥ **25 mm**

$$v = \frac{(93 + 2 \cdot 3.5) \cdot 3173}{19100} = \mathbf{16.61\ m/s}$$

DRIVE DESIGN
FORMULAE AND CALCULATION EXAMPLE

Formulae

Arc of contact correction factor and arc of contact

$$\frac{d_{bg} - d_{bk}}{a_{nom}}$$

Approximate $\beta°$ and c_1 from table 1, page 16

Actual: $\cos \frac{\beta}{2} = \frac{d_{bg} - d_{bk}}{2\, a_{nom}}$

Belt length correction factor

c_3 from table 2, page 17

Power rating per rib

P_N for $\begin{cases} d_{bk} = 93 \text{ mm} \\ n_k = 3173 \text{ rpm} \\ i* = \frac{1}{0.769} = 1.3 \end{cases}$ Profile PL from table 8, page 29

The condition $i \geq 1$ applies for selecting the speed ratio power increment.

Number of ribs

$$z = \frac{P \cdot c_2}{P_N \cdot c_1 \cdot c_3}$$

Minimum static belt tension per rib

$$T \approx \frac{500 \cdot (2.03 - c_1) \cdot P_B}{c_1 \cdot z \cdot v} + k \cdot v^2$$

k from table

Profile	k	f [N] (per rib)
PH	0.005	3.0
PJ	0.009	5.0
PK	0.020	7.5
PL	0.036	10.0
PM	0.123	25.0

Minimum static shaft loading

$$S_a \approx 2\, T \cdot \sin \frac{\beta}{2} \cdot z$$

Belt deflection for a given span length

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

E from diagram 2, page 49

$L = a_{nom} \cdot \sin \frac{\beta}{2}$ For explanation see chapter on tensioning on page 48

Calculation Example

$\frac{123 - 93}{368} = 0.082$

$\beta \approx 175°$
$c_1 = \mathbf{1.0}$ } linearly interpolated

$c_3 = \mathbf{0.86}$

$P_N = 2.28 + 0.2 = \mathbf{2.48 \text{ kW}}$

$$z = \frac{13 \cdot 1.6}{2.48 \cdot 1.0 \cdot 0.86} = 9.74$$

Design:
1 optibelt RB ribbed belt 10 PL 1075

$$T \approx \frac{500 \cdot (2.03 - 1.0) \cdot 20.8}{1.0 \cdot 10 \cdot 16.6} + 0.036 \cdot 16.6^2 \approx \mathbf{75 \text{ N}}$$

$S_a \approx 2 \cdot 75 \cdot 0.9986 \cdot 10 \approx \mathbf{1500 \text{ N}}$

$E_a \approx \frac{2.5 \cdot 367.0}{100} \approx \mathbf{9 \text{ mm}}$

$E \approx 2.5$ mm

$L = 367.6 \cdot 0.9986 = 367.0$ mm

PROFILE PK

POWER RATING P_N [kW] PER RIB FOR β = 180° AND L_b = 1600 mm

Table 7

v [m/s]	n_k [rpm]	Effective diameter of small pulley d_{bk} [mm]																Arc of contact correction factor [kW] per rib for speed ratio i			
		45	50	63	71	80	90	100	112	125	140	160	180	190	224	250	280	315	1.01 to 1.05	1.06 to 1.26	1.27 to 1.57	> 1.57
	700	0.17	0.21	0.32	0.38	0.45	0.53	0.61	0.70	0.80	0.91	1.06	1.21	1.28	1.53	1.71	1.92	2.16		0.02	0.02	0.03
	950	0.21	0.27	0.41	0.49	0.59	0.69	0.79	0.92	1.05	1.20	1.39	1.58	1.68	2.00	2.23	2.50	2.81	0.01	0.02	0.03	0.04
	1450	0.29	0.37	0.58	0.70	0.84	0.99	1.14	1.32	1.51	1.73	2.01	2.28	2.42	2.86	3.19	3.56	3.97	0.01	0.04	0.05	0.06
	2850	0.48	0.63	1.00	1.23	1.48	1.75	2.01	2.32	2.65	3.01	3.47	3.90	4.11	4.75	5.16	5.56	5.91	0.02	0.07	0.10	0.12
	200	0.06	0.08	0.11	0.13	0.15	0.18	0.20	0.23	0.27	0.30	0.35	0.40	0.42	0.50	0.56	0.63	0.71			0.01	0.01
	400	0.11	0.13	0.20	0.24	0.28	0.33	0.37	0.43	0.49	0.56	0.65	0.74	0.78	0.93	1.04	1.17	1.32		0.01	0.01	0.02
	600	0.15	0.19	0.28	0.33	0.40	0.46	0.53	0.61	0.70	0.80	0.93	1.06	1.12	1.33	1.49	1.68	1.89		0.01	0.02	0.03
	800	0.19	0.23	0.35	0.43	0.51	0.60	0.68	0.79	0.90	1.03	1.20	1.36	1.44	1.72	1.92	2.16	2.42		0.02	0.03	0.03
②	1000	0.22	0.28	0.43	0.52	0.61	0.72	0.83	0.96	1.09	1.25	1.45	1.66	1.76	2.09	2.34	2.62	2.93	0.01	0.02	0.03	0.04
	1100	0.24	0.30	0.46	0.56	0.67	0.78	0.90	1.04	1.19	1.36	1.58	1.80	1.91	2.27	2.53	2.84	3.18	0.01	0.03	0.04	0.05
	1200	0.25	0.32	0.50	0.60	0.72	0.85	0.97	1.12	1.28	1.47	1.70	1.94	2.06	2.44	2.73	3.05	3.41	0.01	0.03	0.04	0.05
	1300	0.27	0.34	0.53	0.64	0.77	0.91	1.04	1.20	1.37	1.57	1.83	2.08	2.20	2.61	2.92	3.26	3.64	0.01	0.03	0.04	0.06
	1400	0.29	0.36	0.56	0.68	0.82	0.96	1.11	1.28	1.47	1.67	1.95	2.21	2.35	2.78	3.10	3.46	3.86	0.01	0.03	0.05	0.06
	1500	0.30	0.38	0.60	0.72	0.87	1.02	1.18	1.36	1.56	1.78	2.07	2.35	2.49	2.95	3.28	3.66	4.07	0.01	0.04	0.05	0.06
	1600	0.32	0.40	0.63	0.76	0.92	1.08	1.24	1.44	1.64	1.88	2.18	2.48	2.62	3.11	3.46	3.85	4.28	0.01	0.04	0.05	0.07
	1700	0.33	0.42	0.66	0.80	0.96	1.14	1.31	1.51	1.73	1.98	2.30	2.61	2.76	3.26	3.63	4.03	4.47	0.01	0.04	0.06	0.07
	1800	0.34	0.44	0.69	0.84	1.01	1.19	1.38	1.59	1.82	2.07	2.41	2.73	2.89	3.41	3.79	4.21	4.65	0.01	0.04	0.06	0.08
	1900	0.36	0.46	0.72	0.88	1.06	1.25	1.44	1.66	1.90	2.17	2.52	2.86	3.02	3.56	3.95	4.37	4.83	0.01	0.05	0.06	0.08
	2000	0.37	0.48	0.75	0.92	1.10	1.31	1.50	1.74	1.98	2.27	2.63	2.98	3.15	3.71	4.11	4.54	4.99	0.01	0.05	0.07	0.08
⑤	2100	0.39	0.50	0.79	0.96	1.15	1.36	1.57	1.81	2.07	2.36	2.74	3.10	3.27	3.85	4.25	4.69	5.15	0.01	0.05	0.07	0.09
	2200	0.40	0.52	0.82	1.00	1.20	1.41	1.63	1.88	2.15	2.45	2.84	3.21	3.40	3.98	4.40	4.83	5.29	0.01	0.05	0.07	0.09
	2300	0.41	0.53	0.84	1.03	1.24	1.47	1.69	1.95	2.23	2.54	2.94	3.33	3.51	4.11	4.53	4.97	5.42	0.01	0.06	0.08	0.10
	2400	0.42	0.55	0.87	1.07	1.28	1.52	1.75	2.02	2.31	2.63	3.04	3.44	3.63	4.24	4.66	5.10	5.54	0.01	0.06	0.08	0.10
	2500	0.44	0.57	0.90	1.10	1.33	1.57	1.81	2.09	2.39	2.72	3.14	3.55	3.74	4.36	4.79	5.22	5.64	0.01	0.06	0.08	0.11
	2600	0.45	0.59	0.93	1.14	1.37	1.62	1.87	2.16	2.46	2.80	3.24	3.65	3.85	4.48	4.90	5.33	5.74	0.02	0.06	0.09	0.11
	2700	0.46	0.60	0.96	1.18	1.41	1.67	1.93	2.22	2.54	2.89	3.33	3.76	3.96	4.59	5.01	5.43	5.82	0.02	0.07	0.09	0.11
	2800	0.47	0.62	0.99	1.21	1.46	1.72	1.98	2.29	2.61	2.97	3.43	3.86	4.06	4.69	5.11	5.52	5.88	0.02	0.07	0.09	0.12
	2900	0.49	0.64	1.02	1.25	1.50	1.77	2.04	2.36	2.69	3.05	3.52	3.95	4.16	4.79	5.21	5.60	5.94	0.02	0.07	0.10	0.12
	3000	0.50	0.65	1.04	1.28	1.54	1.82	2.10	2.42	2.76	3.13	3.61	4.05	4.25	4.89	5.30	5.67	5.97	0.02	0.07	0.10	0.13
	3100	0.51	0.67	1.07	1.31	1.58	1.87	2.15	2.48	2.83	3.21	3.69	4.14	4.35	4.98	5.38	5.73	6.00	0.02	0.08	0.10	0.13
	3200	0.52	0.68	1.10	1.35	1.62	1.92	2.21	2.54	2.90	3.29	3.77	4.22	4.43	5.06	5.45	5.78	6.01	0.02	0.08	0.11	0.14
	3300	0.53	0.70	1.12	1.38	1.66	1.97	2.26	2.61	2.97	3.36	3.86	4.31	4.52	5.14	5.51	5.82		0.02	0.08	0.11	0.14
	3400	0.54	0.71	1.15	1.41	1.70	2.01	2.31	2.67	3.03	3.43	3.93	4.39	4.60	5.21	5.57	5.85		0.02	0.08	0.11	0.14
	3500	0.55	0.73	1.18	1.44	1.74	2.06	2.37	2.73	3.10	3.51	4.01	4.47	4.67	5.28	5.62	5.86		0.02	0.09	0.12	0.15
	3600	0.56	0.74	1.20	1.48	1.78	2.10	2.42	2.78	3.16	3.58	4.08	4.54	4.75	5.34	5.65	5.87		0.02	0.09	0.12	0.15
	3700	0.57	0.76	1.23	1.51	1.82	2.15	2.47	2.84	3.23	3.64	4.15	4.61	4.82	5.39	5.68	5.86		0.02	0.09	0.12	0.16
	3800	0.58	0.77	1.25	1.54	1.85	2.19	2.52	2.90	3.29	3.71	4.22	4.68	4.88	5.43	5.70			0.02	0.09	0.13	0.16
	3900	0.59	0.79	1.28	1.57	1.89	2.24	2.57	2.95	3.35	3.77	4.29	4.74	4.94	5.47	5.71			0.02	0.10	0.13	0.17
	4000	0.60	0.80	1.30	1.60	1.93	2.28	2.62	3.01	3.41	3.83	4.35	4.80	4.99	5.50	5.72			0.02	0.10	0.13	0.17
	4100	0.61	0.82	1.33	1.63	1.96	2.32	2.66	3.06	3.46	3.89	4.41	4.85	5.04	5.53	5.71			0.02	0.10	0.14	0.17
	4200	0.62	0.83	1.35	1.66	2.00	2.36	2.71	3.11	3.52	3.95	4.47	4.91	5.09	5.54	5.69			0.02	0.10	0.14	0.18
	4300	0.63	0.84	1.37	1.69	2.03	2.40	2.76	3.16	3.57	4.01	4.52	4.95	5.13	5.55				0.03	0.11	0.14	0.18
⑩	4400	0.64	0.86	1.40	1.72	2.07	2.44	2.80	3.21	3.63	4.06	4.57	5.00	5.17	5.56				0.03	0.11	0.15	0.19
	4500	0.65	0.87	1.42	1.75	2.10	2.48	2.85	3.26	3.68	4.12	4.62	5.03	5.20	5.55				0.03	0.11	0.15	0.19
	4600	0.66	0.88	1.44	1.78	2.14	2.52	2.89	3.31	3.73	4.17	4.67	5.07	5.23	5.54				0.03	0.11	0.15	0.19
	4700	0.67	0.90	1.47	1.80	2.17	2.56	2.93	3.35	3.77	4.21	4.71	5.10	5.25	5.51				0.03	0.11	0.16	0.20
	4800	0.68	0.91	1.49	1.83	2.20	2.60	2.97	3.40	3.82	4.26	4.75	5.13	5.27	5.48				0.03	0.12	0.16	0.20
	4900	0.69	0.92	1.51	1.86	2.23	2.63	3.01	3.44	3.87	4.30	4.79	5.15	5.28					0.03	0.12	0.16	0.21
	5000	0.69	0.93	1.53	1.88	2.27	2.67	3.05	3.48	3.91	4.34	4.82	5.16	5.28					0.03	0.12	0.17	0.21
	5100	0.70	0.94	1.55	1.91	2.30	2.71	3.09	3.53	3.95	4.38	4.85	5.18	5.28					0.03	0.12	0.17	0.22
	5200	0.71	0.96	1.57	1.94	2.33	2.74	3.13	3.57	3.99	4.42	4.87	5.18	5.28					0.03	0.13	0.17	0.22
	5300	0.72	0.97	1.59	1.96	2.36	2.78	3.17	3.60	4.03	4.45	4.90	5.19	5.27					0.03	0.13	0.18	0.22
	5400	0.73	0.98	1.62	1.99	2.39	2.81	3.20	3.64	4.07	4.48	4.92	5.18	5.25					0.03	0.13	0.18	0.23
	5500	0.73	0.99	1.64	2.01	2.42	2.84	3.24	3.68	4.10	4.51	4.93	5.18						0.03	0.13	0.18	0.23
	5600	0.74	1.00	1.65	2.04	2.45	2.87	3.27	3.71	4.13	4.54	4.94	5.16						0.03	0.14	0.19	0.24
	5800	0.76	1.02	1.69	2.08	2.50	2.94	3.34	3.78	4.19	4.59	4.95	5.12						0.03	0.14	0.19	0.25
	6000	0.77	1.05	1.73	2.13	2.55	2.99	3.40	3.84	4.25	4.62	4.95							0.04	0.15	0.20	0.25
	6200	0.78	1.07	1.77	2.17	2.60	3.05	3.46	3.89	4.29	4.65	4.93							0.04	0.15	0.21	0.26
	6400	0.80	1.09	1.80	2.21	2.65	3.10	3.51	3.94	4.33	4.66	4.90							0.04	0.16	0.21	0.27
	6600	0.81	1.10	1.84	2.26	2.70	3.15	3.56	3.98	4.36	4.66	4.85							0.04	0.16	0.22	0.28
	6800	0.82	1.12	1.87	2.29	2.74	3.20	3.60	4.02	4.38	4.66								0.04	0.17	0.23	0.29
	7000	0.83	1.14	1.90	2.33	2.78	3.24	3.64	4.05	4.39	4.64								0.04	0.17	0.23	0.30
	7200	0.84	1.16	1.93	2.37	2.82	3.28	3.68	4.07	4.39	4.60								0.04	0.18	0.24	0.30
	7400	0.85	1.17	1.96	2.40	2.86	3.31	3.71	4.09	4.39	4.56								0.04	0.18	0.25	0.31
	7600	0.86	1.19	1.98	2.43	2.89	3.34	3.73	4.10	4.37									0.04	0.19	0.25	0.32
	7800	0.87	1.20	2.01	2.46	2.92	3.37	3.75	4.10	4.35									0.05	0.19	0.26	0.33
	8000	0.88	1.21	2.03	2.49	2.95	3.40	3.77	4.10	4.31									0.05	0.20	0.27	0.34
	8200	0.88	1.23	2.05	2.51	2.97	3.42	3.78	4.09	4.27									0.05	0.20	0.27	0.35
⑳	8400	0.89	1.24	2.08	2.54	3.00	3.43	3.78	4.07	4.21									0.05	0.21	0.28	0.36
	8600	0.90	1.25	2.10	2.56	3.02	3.44	3.78	4.05										0.05	0.21	0.29	0.36
	8800	0.90	1.26	2.11	2.58	3.03	3.45	3.77	4.01										0.05	0.22	0.29	0.37
	9000	0.91	1.27	2.13	2.59	3.05	3.46	3.76	3.97										0.05	0.22	0.30	0.38
	9200	0.91	1.28	2.14	2.61	3.06	3.46	3.74	3.92										0.05	0.23	0.31	0.39
	9400	0.91	1.28	2.16	2.62	3.06	3.45	3.72	3.87										0.06	0.23	0.31	0.40
	9600	0.91	1.29	2.17	2.63	3.07	3.44	3.69											0.06	0.23	0.32	0.41
	9800	0.92	1.30	2.18	2.64	3.07	3.43	3.65											0.06	0.24	0.33	0.41
	10000	0.92	1.30	2.19	2.64	3.07	3.41	3.61											0.06	0.24	0.33	0.42
	10200	0.92	1.31	2.19	2.65	3.06	3.39												0.06	0.25	0.34	0.43
	10400	0.92	1.31	2.20	2.65	3.05	3.36												0.06	0.25	0.35	0.44

Where v > 50 m/s, please consult our Applications Engineers!

v [m/s]

