

ROUND SECTION BELTING





For drives with Optibelt plastic round section belting

Product description



A 82 yellow ○⊙

Applications with small idler pulleys flexible at low temperatures, very elastic, low power transmission



A 85 orange FDA O

Application in the food processing industry in direct contact with goods The materials used fulfill the EDA

The materials used fulfill the FDA paragraphs 21 CFR § 177.2600, 21 CFR § 178.2010 and 21 CFR § 175.105.

Structure

Optibelt round section belting consists of high quality raw materials manufactured in openended rolls in different sections using special manufacturing processes. In version Optibelt RR PLUS, the round section belting is additionally equipped with a polyester tension cord.

Properties

- Favorable coefficient of friction
- Good non-skid properties for conveying duties
- Good wear and abrasion resistance
- High elasticity, good shock absorbing properties
- High tensile strength
- Non marking
- Resistant to greases, oils and many chemicals (see resistance table)
- Resistant to ultraviolet light and ozone
- In version Optibelt RR PLUS especially low stretch

Advantages

- Welding on site, also for version Optibelt RR PLUS
- No disassembly of the machine
- Quick fixing of breakdowns
- Short breakdown times
- Easy storage (material in rolls)
- Immediate availability
- Various design possibilities, since any length can be produced



A 88 green ○⊙ (smooth/rough)

Application in all areas with medium loads; the rough version offers advantages when transporting damp or greasy products. Furthermore, the rough version improves the coefficient of friction.

Areas of application

Optibelt RR round section belting openended material is predominantly used in the conveying industry, e.g. for transporting

- tiles, panels, sheet glass
- veneers in the wood working industry
- roof tiles, marble, concrete slabs
- cardboard boxes in the packaging industry
- as well as guide belts when transporting bottles and cans
- version Optibelt RR PLUS is especially suitable for long transport distances

Furthermore, Optibelt RR round belting can be applied in specific performance areas for serpentine or multi-pulley drives.

Optibelt manufactures plastic round section belting for different versions. These are easily distinguishable by colors. The colors are: yellow, orange, green, white, blue and black. The required quality can be selected for the specific application.

Optibelt is a specialist for high quality drive elements and supplies round section belting of the highest quality. This brochure contains important technical data and working instructions for the joining of endless Optibelt plastic round section belting.

Explanation

- O = standard version
- ⊙ = version Optibelt RR PLUS with tension cord



A 92 white ○⊙

Applications in the medium to heavy load range, the white version still offers sufficient flexibility

Suitable for permanent utilization at higher temperatures



A 98 blue ○⊙

Application especially for high loads and high temperatures, very hard quality. Minimum pulley diameters must be observed.

Product description



A 65 black O

For special applications, belt diameter available from 5 to 12 mm, very flexible at low temperatures, extremely soft material

Belt sections and weights

Dian mm	neter inch	Weight* (g/m)			
2	0.0787	3.4			
3	0.1181	8.2			
4	0.1575	14.8			
4.8	0.1890	21.4			
5	0.1968	23.0			
6	0.2362	33.6			
6.3	0.2480	37.1			
7	0.2756	45.2			
8	0.3150	59.2			
9	0.3543	76.1			
9.5	0.3740	84.6			
10	0.3937	93.0			
12	0.4724	133.0			
12.5	0.4921	145.9			
15	0.5906	210.3			
Intermediate lengths on request					
* Minimum weight reduction in version Optibelt RR Plus.					

optibelt *RR PLUS*

Round section belting with tension cord is especially low stretch and preferably applied to long conveying distances. Belting available from 6 to 15 mm diameter

Diameter tolerances:



Coefficients of friction of the various products

	A 65 black	A 82 yellow	A 85 orange FDA	A 88 green smooth	A 88 green rough	A 92 white	A 98 blue
Polished steel	ca. 1.00	0.90	0.90	0.85	0.55	0.70	0.45
Aluminium	0.90	0.80	0.80	0.75	0.45	0.75	0.50
Guide rails of polyethylene	0.50	0.35	0.35	0.35	0.30	0.30	0.20

These are guide values. Depending on the surface condition of the materials used and the type of service life (abrasion) Differences are possible.

Tension values of round section belting

	Shore hardness A 82 yellow					
	Tension in (N/mm ²)					
	1	1.6	2			
Diameter (mm)	Force (N) at 3 % elongation	Force (N) at 6 % elongation	Force (N) at 8 % elongation			
2	3	5	7			
3	7	11	14			
4	12	20	25			
4.8	18	29	36			
5	20	31	39			
6	28	45	57			
6.3	31	50	62			
7	38	62	76			
8	50	80	100			
9	64	102	128			
9.5	71	113	142			
10	79	126	158			
12	113	181	226			
12.5	123	196	246			
15	177	282	354			

	Shore hardness A 88 green					
	Tension in (N/mm ²)					
	1.2	2.1	2.9			
Diameter (mm)	Force (N) at 3 % elongation	Force (N) at 6 % elongation	Force (N) at 8 % elongation			
2	4	7	9			
3	9	15	20			
4	15	26	36			
4.8	18	32	44			
5	24	41	57			
6	34	59	82			
6.3	37	65	90			
7	46	81	111			
8	60	106	146			
9	76	134	185			
9.5	85	149	206			
10	94	165	228			
12	136	238	328			
12.5	147	258	356			
15	212	371	512			

	Shore hardness A 85 orange FDA					
	Tension in (N/mm ²)					
	1.15	1.8	2.15			
Diameter (mm)	Force (N) at 3 % elongation	Force (N) at 6 % elongation	Force (N) at 8 % elongation			
2	4	6	7			
3	8	13	15			
4	14	23	27			
4.8	21	33	39			
5	23	35	42			
6	32	51	61			
6.3	36	56	67			
7	44	69	83			
8	58	90	108			
9	73	114	137			
9.5	81	128	153			
10	90	141	169			
12	130	203	243			
12.5	141	221	264			
15	203	218	378			

	Shore hardness A 92 white				
	Te	ension in (N/mm	1 ²)		
	1.95	3.1	3.8		
Diameter (mm)	Force (N) at 3 % elongation	Force (N) at 6 % elongation	Force (N) at 8 % elongation		
2	6	10	12		
3	14	22	27		
4	24	39	48		
4.8	35	56	69		
5	38	61	75		
6	55	88	107		
6.3	61	97	118		
7	75	119	146		
8	98	156	191		
9	124	197	242		
9.5	138	220	269		
10	153	243	298		
12	220	350	430		
12.5	239	380	466		
15	344	548	672		

Tension values of round section belting

	Shore hardness A 98 blue					
	Te	ension in (N/mm	1 ²)			
	4.3	7.1	8.2			
Diameter (mm)	Force (N) at 3 % elongation	Force (N) at 6 % elongation	Force (N) at 8 % elongation			
2	14	22	26			
3	30	50	58			
4	54	89	103			
4.8	78	128	148			
5	84	139	161			
6	122	201	232			
6.3	134	221	256			
7	165	273	316			
8	216	357	412			
9	273	451	522			
9.5	305	503	581			
10	338	557	644			
12	486	803	927			
12.5	527	871	1006			
15	759	1254	1449			

Tension values stated can change according to the storage period or temperature/humidity involved!

Recommended belt speeds

	A 65	A 82	A 85 FDA	A 88	A 92	A 98
	black	yellow	orange	green	white	blue
v _{max}	on request	10 m/s	10 m/s	15 m/s	20 m/s	20 m/s

Example of calculation

of Optibelt RR:	8 mm
Version:	A 88 green
Nominal length:	$L_{nom} = 2500 \text{ mm}$
Selected tensioning:	at 6 % elongation
Assembly length:	$L = L_{nom} - tensioning (%)$
	L = 2500 - 6 %
	L = 2500 - 150 = 2350 mm

The belting should be cut to 2350 mm length for welding. In turn, the resulting static belt tension is 106 N.

Recommended tensioning (% elongation)

Diameter range	A 82 yellow	A 85 orange FDA	A 88 green	A 92 white	A 98 blue
2- 5 mm	6-8 %	6-8 %	6-8 %	5-6 %	2-4 %
6-10 mm	5-6 %	5-6 %	5-6 %	3-5 %	2-3 %
12-15 mm	3-5 %	3-5 %	3-5 %	2-4 %	2 %

For version A 65 black, tensioning of 6-8 % is recommended.

Shore hardness A 65 black

on request

Tension values for round section belting with tension cord on request.

Belt application temperatures

A 65 black	from –45 °C to +60 °C
A 82 yellow	from –25 °C to +60 °C
A 85 FDA orange	from –25 °C to +70 °C
A 88 green	from –20 °C to +80 °C
A 92 white	from –20 °C to +90 °C
A 98 blue	from –20 °C to +80 °C

Chemical resistance

Chemical resistance of plastic belting

In practical applications, plastic belting may often be in contact with substances, where the use of conventional belts is no longer possible.

The following list should give the user some guidelines as far as application possibilities of plastic belting are concerned. In cases of doubt, only practical tests will show definite results.

General behavior towards watery liquids, oils, lubricating greases and plastic materials:

• Water and watery media

Due to the structure of thermo-plastic material, there is a reduction of the polymer chains in the presence of water. The higher the temperature, the higher the reduction. This reduction shows in diminishing tensile strength as well as in an increase in the permanent compression set and extension at fracture. Hot water, hot watery solutions, saturated steam and hot humid air will show the same effects. At normal temperatures, no damaging effects can be noticed by the said media, as long as they remain neutral and do not exceed temperatures of +40 °C. Up to this temperature range, no measurable changes of the mechanical properties will be noticed. In cases where temperatures exceed 70 °C, a reduction of tensile strength by about 50% has to be reckoned with.

Acids and alkalis

Concentrated acids and watery alkalis quickly attack belts, even at room temperature. Storage in a 10-%-ammonia solution at room temperature results in a reduction of tensile strength of about 30 % after a short period of time (approx. 100 days). When storing under equal conditions in 10-%-sulphuric acid, a reduction of tensile strength of 10% has to be expected.

• Standard gasoline and saturated hydrocarbons

Plastic belts are absolutely resistant to saturated hydrocarbons. Some swelling may occur.

Explanation of resistance table

++ = resistant over a longer period of time

- + = limited resistance, discoloration and reduction of strength are possible
- = unstable, application possible under specific conditions
- -- = unstable, very strongly affected within a short period of time
- O = soluble
- RT = room temperature 23 °C

Resistance table

Medium	Temper- ature °C		Max. increase in volume %
aceton	RT	-	40
Al chloride watery, 5% ag. sol.	RT	++	1
ammonia, 10% ag. sol.	RT	++	1
aniline	RT		
ASTM fuel A	RT	++	4
ASTM fuel B	RT	++	10
ASTM fuel C	20 °C	+	18
ASTM oil 1	80 °C	++	
ASTM oil 2	80 °C	++	3
ASTM oil 3	80 °C	++	6
ethanol. 96%ia	RT	+	11
standard gasoline	RT	++	10
premium gasoline	RT	-	17
benzole	RT	_	
benzole	RT		
butyl acetate	RT		10
	RT	-	40
dibuty phtalata		т ,	40
		+	40
		++	5
		0	2
		-	Ζ
dcefic dcid 20 % dq. soi.		+	40
ethyl acetate		-	40
		+	
terric chloride watery, 5 % aq. sol.	40°C	+	
glykol	KI	++	2
glysanfine/water 1 : 1	20 °C	+	
glysantine/water 1 : 1	0° 08	+	10
isopropanol	RI	+	12
kerosene	RT	++	3
salin solution, concentrated	RT	++	
methanol	RT	+	10
methylene chloride	RT		
methyl ethylketone	RT	-	45
mineral oil	80 °C	++	
sodium soap fat	RT	++	
caustic soda 1N	RT	+	
nitric acid, 20% aq. sol.	RT		
hydrochloric acid, 20% aq. sol.	RT	+	
sulphuric acid, 20% aq. sol.	RT	+	
see water	RT	++	
carbon tetrachloride	RT	-	
toluene	RT	-	35
trichlorethylene	RT	-	
water	100 °C	-	
water	RT	++	1
water	80 °C	+	1.5

Premium gasoline and aromatic hydrocarbons

Aromatics such as benzole and toluene strongly swell thermoplastics, even at room temperature, at the same time resulting in a considerable reduction in hardness. The same applies to premium gasoline in a concentrated solution.

The swelling can increase the belt cross sectional area by up to 50%; at the same time a reduction of tensile strength of up to 40% may occur.

This process can be reversed by evaporating the solvents, which results in the recovery of almost the original tensile strength.

Lubricating oil and lubricating grease

The belting has good resistance to lubricating oils and greases, even at higher temperatures, however, care should be taken with special oils with a higher content of acid substances.

 The application of methylene chloride, ethylene chloride and other strong solvents have such highly adverse effects, that they should not come into touch with the belt for longer periods of time. Swollen belting is particularly sensitive to mechanical damage.

The properties as described above, and the table on page 6, should be regarded by users and designers as an additional way to help decide about the applicability of this plastic belting.

The different qualities vary only marginally as far as their chemical resistance is concerned.

When it comes to special applications it is recommended, that our Applications Engineering Dept. is consulted or individual tests are carried out.

Minimum pulley diameters (mm) for the different products

Belt Belt	A 65 black	A 82 yellow	A 85 orange FDA	A 88 green	A 92 white	A 98 blue
O 2	_	20	20	20	25	30
03		25	25	25	30	35
o 4		30	30	35	40	50
O 4.8		40	40	40	50	60
05	30	40	40	45	50	60
00 6	40	50	50	55	60	70
○⊙6.3	45	55	55	60	65	75
00 7	50	60	60	65	70	85
00 8	55	70	70	75	80	95
00 9	60	80	80	85	90	105
O⊙ 9.5	65	85	85	90	95	110
00 10	70	90	90	100	100	120
00 12	80	100	100	115	120	140
0012.5		110	110	120	125	150
0015		120	120	135	150	180



The Optibelt RR (version A 88 green) in application

Joining tools



Guiding tongs B 2



Table clamping attachment for guiding tongs



Spare non-stick head



Guiding tongs B 3



Welding tool incl. non-stick head



Shears with stop

Length of roll (standard)

Belt diameter up to	5 mm	=	200 r	m
	6-10 mm	=	100 r	m
	12-15 mm	=	50 r	m

To make the belt endless, the material can be welded and thus can be made to any required length. This is also applicable to the version Optibelt RR PLUS.

In order to weld the belting properly, guiding tongs and a welding tool are necessary.

Process for the welding of round section belting

The belting should be cut so that both ends are square. It is advisable to use guiding tongs to align the ends exactly to one another. Any lateral offset results in poor belt running and thus in a reduced service life.

The ends are then melted simultaneously by the non-stick welding head (at approx. 240 °C), until a suitable welding bead has formed (2-3 mm). Now the non-stick welding head has to be removed very quickly and the ends of the belting clamped together. Depending on the thickness of the section, the clamping pressure has to be maintained for approx 3-5 min. (guiding tongs with lock nut). Only after that may the belt be removed and the welding bead treated (cut and/or ground). The finished belt should only be fitted after further cooling for 10-30 min. (depending on the section thickness).

The Optibelt offer is exclusively directed to specialized dealers. Optibelt recommends the application of its products only in accordance with the recommendations contained in the Optibelt documentation.

Optibelt rejects any liability, where its products are used in applications for which they were not developed or manufactured. Furthermore, Optibelt refers to its General Terms and Conditions of Sale.



Power Transmission

Optibelt GmbH

P.O. Box 100132 • D-37669 Höxter/Germany Tel. +49 (0)5271-621 • Fax +49 (0)5271-976200 info@optibelt.com • www.optibelt.com A member of the Arntz Optibelt Group