



**MATERIAL HANDLING**

**optibelt RR / RR Plus / HRR**

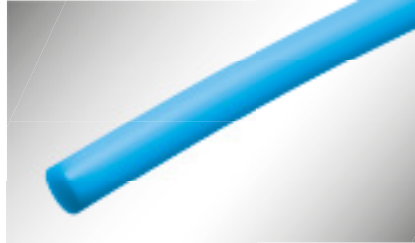


# ROUND BELTS



## 82 SHORE A YELLOW

For use with small idler pulleys; flexible at low temperatures; very elastic; low power transmission capacity



## 85 SHORE A LIGHT BLUE FDA

For use in the food processing industry, in direct contact with goods



## 88 SHORE A GREEN (SMOOTH/ROUGH)

For use in all areas with medium loading; the rough version offers advantages when transporting damp or greasy products and improves the entrainment effect.

## STRUCTURE

Optibelt round belts are made from high quality materials. They are produced as open-ended belts in various diameters using a special manufacturing process and are available by the metre. The **optibelt RR Plus** version of the round belts also incorporates a polyester tension cord.

## PROPERTIES

- Favourable coefficient of friction
- Good slip resistance for conveying goods
- Good resistance to abrasion and wear
- High elasticity, good damping
- High tensile strength
- Colour-fast
- Resistant to grease, oil and many chemicals (see Resistance Table)
- UV and ozone resistant
- The **optibelt RR Plus** version is particularly low-stretch

## ADVANTAGES

- Welding on site, also for the **optibelt RR Plus** version
- No disassembly of the drive is required
- Quick repairs
- Short downtimes
- Easy storage (supplied in rolls)
- Immediate availability
- Various design possibilities, as any length can be produced

## TYPES OF USE

**optibelt RR** round belts is predominantly used in the conveying industry, e.g. for transport:

- tiles, panels, sheet glass,
- veneers in the wood processing industry,
- roof tiles, marble, concrete slabs,
- cardboard boxes in the packaging industry,
- and as guide belts for conveying bottles and cans.
- The **optibelt RR Plus** version is particularly suitable for long transport distances.

Furthermore, **optibelt RR** round belts can be used in specific applications as two-pulley and multi-pulley drives.

Optibelt manufactures various different types of round belts. These are easily distinguishable according to their colour. They are yellow, orange, green, white, blue and black. The required grade and attributes can be selected according to the intended use.

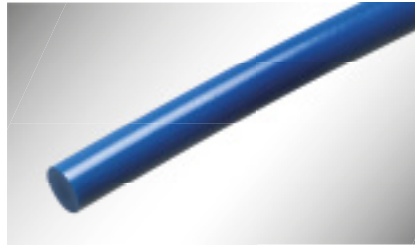
Optibelt is a specialist in superior drive elements and supplies round belts of the highest quality.



**92 SHORE A WHITE**

For applications in the medium to heavy duty range, the white version still offers sufficient flexibility.

Suitable for continuous use at high temperatures.



**98 SHORE A BLUE**

Especially suitable for high loads and high temperatures; extra hard grade; minimum pulley diameters must be observed.



**65 SHORE A BLACK**

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

**BELT PROFILES, WEIGHTS AND CROSS-SECTIONS**

Diameter		Weight* [g/m]	Material cross-section mm <sup>2</sup>
mm	inch		
2	0.0787	3.4	3.142
3	0.1181	8.2	7.069
4	0.1575	14.8	12.566
4.8	0.1890	21.4	18.096
5	0.1968	23.0	19.635
6	0.2362	33.6	28.274
6.3	0.2480	37.1	31.172
7	0.2756	45.2	38.485
8	0.3150	59.2	50.265
9	0.3543	76.1	63.617
9.5	0.3740	84.6	70.882
10	0.3937	93.0	78.540
12	0.4724	133.0	113.097
12.5	0.4921	145.9	122.718
15	0.5906	210.3	176.715

Non standard lengths on request  
\* Minimum weight reduction for **optibelt RR Plus** version

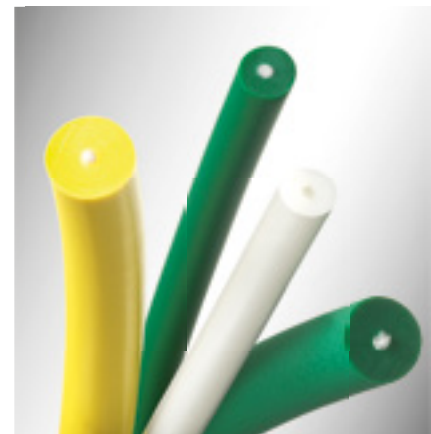
**optibelt RR Plus**

The round belts with tension cord is particularly low-stretch and therefore especially useful for longer conveying distances.

Diameters available from 6 to 15 mm

**DIAMETER TOLERANCES:**

- 2- 7 mm: ± 0.2 mm
- 8-12.5 mm: ± 0.3 mm
- > 12.5 mm: ± 0.5 mm



**COEFFICIENTS OF FRICTION optibelt RR/RR Plus/HRR**

	65 Shore A black	75 Shore A red smooth	82 Shore A yellow	85 Shore A light blue FDA	85 Shore A green rough	88 Shore A green smooth	88 Shore A green rough	92 Shore A white	98 Shore A blue
Polished steel	ap- prox. 1.00	0.90	0.90	0.90	0.45	0.85	0.55	0.70	0.45
Aluminium	0.90	0.80	0.80	0.80	0.35	0.75	0.45	0.75	0.50
Polyethylene guide rails	0.50	0.40	0.35	0.35	0.30	0.35	0.30	0.30	0.20

These are guideline values. Deviations are possible depending on the surface characteristics of the materials used and on how long the belts have been in service (wear).

# TENSION VALUES FOR THE ROUND BELTS

82 SHORE A YELLOW			
Tension in [N/mm <sup>2</sup> ]			
	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

85 SHORE A LIGHT BLUE FDA			
Tension in [N/mm <sup>2</sup> ]			
	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

88 SHORE A GREEN			
Tension in [N/mm <sup>2</sup> ]			
	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

92 SHORE A WHITE			
Tension in [N/mm <sup>2</sup> ]			
	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

98 SHORE A BLUE			
Tension in [N/mm <sup>2</sup> ]			
	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

The values given can vary depending on the storage period or the effects of temperature!

65 SHORE A BLACK
On request

Tension values for round belts with tension cord are available on request.

### ROLL LENGTH (STANDARD)

The material can be welded to create endless belts of any length required. This also applies to the **optibelt RR Plus** version.

Guiding clamp and a welding tool are required for precise welding of the belts.

Diameter Ø [mm]	Roll length on reel	Minimum length welding
2- 5	200	200
6-10	100	200
11-17	50	400
18-20	30	400



### DATA SHEET SELECTOR

The data sheet selector provides quick and easy online access to the data sheets for Optibelt round belts and other polyurethane belts. See [www.optibelt.com/datenblattselektor](http://www.optibelt.com/datenblattselektor).

# TECHNICAL DATA

## optibelt RR/RR Plus/HRR

### MINIMUM PULLEY DIAMETERS [MM] FOR optibelt RR/RR Plus

Belt diameter	65 Shore A black	82 Shore A yellow	85 Shore A light blue FDA	88 Shore A green	92 Shore A white	98 Shore A blue
○ 2	—	20	20	20	25	30
○ 3	—	25	25	25	30	35
○ 4	—	30	30	35	40	50
○ 4.8	—	40	40	40	50	60
○ 5	30	40	40	45	50	60
⊙ 6	40	50	50	55	60	70
⊙ 6.3	45	55	55	60	65	75
⊙ 7	50	60	60	65	70	85
⊙ 8	55	70	70	75	80	95
⊙ 9	60	80	80	85	90	105
⊙ 9.5	65	85	85	90	95	110
⊙ 10	70	90	90	100	100	120
⊙ 12	80	100	100	115	120	140
⊙ 12.5	—	110	110	120	125	150
⊙ 15	—	120	120	135	150	180

### BELT OPERATING TEMPERATURES

65 Shore A black	from -45 °C to +60 °C
75 Shore A red/smooth	from -30 °C to +60 °C
82 Shore A yellow	from -25 °C to +60 °C
85 Shore A light blue FDA	from -25 °C to +70 °C
85 Shore A green/rough	from -30 °C to +60 °C
88 Shore A green	from -20 °C to +80 °C
92 Shore A white	from -20 °C to +90 °C
98 Shore A blue	from -20 °C to +80 °C

• optibelt HRR

#### KEY

○ = Standard version  
 ⊙ = optibelt RR Plus version with tension cord

### RECOMMENDED BELT SPEEDS

	optibelt RR/RR Plus						optibelt HRR	
	65 Shore A black	82 Shore A yellow	85 Shore A light blue FDA	88 Shore A green	92 Shore A white	98 Shore A blue	75 Shore A red/smooth	85 Shore A green/rough
$v_{max}$	on request	10 m/s	10 m/s	15 m/s	20 m/s	20 m/s	10 m/s	10 m/s

### EXAMPLE OF CALCULATION

Diameter of the optibelt RR: 8 mm  
 Version: A 88 green  
 Nominal length:  $L_{nom} = 2500$  mm  
 Selected pre-tensioning: at 6% elongation  
 Installation length:  $L = L_{nom} - \text{pre-tensioning} [\%]$   
 $L = 2500 - 6\%$   
 $L = 2500 - 150 = 2350$  mm

The required installation length is 2350 mm.  
 This results in a free-span belt tension of 106 N.

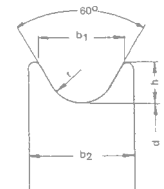
### RECOMMENDED PRE-TENSIONING (% ELONGATION)

Diameter range	82 Shore A yellow	85 Shore A light blue FDA	88 Shore A green	92 Shore A white	98 Shore A 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%

Pre-tensioning of 6 to 8% is recommended for the A 65 black version.

### FOR optibelt RR/RR Plus/HRR, PULLEYS WITH THE FOLLOWING DIMENSIONS ARE RECOMMENDED:

Diameter [mm]	2	3	4	5	6	8	10	12	15
$b_1$ [mm]	4.5	5.5	7.0	8.0	10.0	12.0	14.5	18.5	23.0
$b_2$ [mm]	6.5	8.0	10.0	12.0	14.0	16.0	19.0	23.0	27.0
$r$ [mm]	1.4	1.9	2.5	3.0	3.5	4.5	5.5	7.0	8.0
$h$ [mm]	2.5	3.0	3.5	4.0	5.0	6.0	7.0	9.0	12.0



# HOLLOW ROUND BELTS



## 75 SHORE A RED/SMOOTH

For use with small pulley diameters,  
for quick repairs

Rec. pre-tension: Welded 4...8 %  
Nipple connector max. 3...6 %



## 85 SHORE A GREEN/ROUGH

For use with medium drives,  
for quick repairs

Rec. pre-tension: Welded 4...8 %  
Nipple connector max. 3...6 %

75 SHORE A RED/SMOOTH					
Ø outside [mm]	Ø outside [inch]	Material cross-section [mm <sup>2</sup> ]	Weight [g/m]	Min. pulley Ø [mm]	Min. pulley Ø [inch]
4.8	0.189	0.147	18	30	1.2
6.3	0.248	0.261	32	45	1.8
8.0	0.315	0.420	51	50	2.2
9.5	0.374	0.600	72	65	2.6

85 SHORE A GREEN/ROUGH					
Ø outside [mm]	Ø outside [inch]	Material cross-section [mm <sup>2</sup> ]	Weight [g/m]	Min. pulley Ø [mm]	Min. pulley Ø [inch]
4.8	0.189	0.147	18	35	1.4
6.3	0.248	0.261	32	50	2.2

### optibelt HRR BELT ELONGATION, TENSION, LENGTH AND WEIGHT

	HRR 75 SHORE A RED/SMOOTH				HRR 85 SHORE A GREEN/ROUGH	
	4.8	6.3	8	9.5	4.8	6.3
Diameter d [mm]	4.8	6.3	8	9.5	4.8	6.3
Free-span belt tension [N] at 3% elongation	19	34	55	77	27	48
Free-span belt tension [N] at 6% elongation	32	57	92	131	46	80
Free-span belt tension [N] at 8% elongation	37	67	108	153	53	94
Recommended pre-tensioning [%]	6-8	6-8	6-8	6-8	6-8	6-8
Minimum pulley diameter d <sub>min</sub> [mm]	30	45	55	65	35	55
Weight per metre [g/m]	18	32	51	72	18	32
Roll length on reel [m]	200	100	100	100	200	100

# CHEMICAL RESISTANCE

## CHEMICAL RESISTANCE OF THE URETHANE BELTS

In practical applications, urethane belts may often be in contact with substances that make the use of conventional belts impossible.

The following list should give the user some guidelines regarding possible applications for the urethane belts. In case of doubt, however, definitive results can be gained only by carrying out a practical trial.

General behaviour with respect to aqueous liquids, oil, lubricating grease and urethanes:

### • WATER AND AQUEOUS MEDIA

Due to the chemical structure of the thermourethane material, the presence of water causes degradation of the polymer chains. This process speeds up with an increase in temperature. The effects of this degradation are a reduction in tear resistance and an increase in the compression set and the elongation at break. Hot water, hot aqueous solutions, saturated steam and hot humid air produce the same effects. At normal temperatures, the said media cause no detectable damaging effects, providing that they are neutral and do not exceed a temperature of +40 °C. Up to this temperature, no measurable changes to the mechanical properties can be ascertained. In cases where temperatures exceed 70 °C, however, a decrease in tear resistance of around 50% can be expected.

### • ACIDS AND ALKALIS

Concentrated acids and aqueous alkalis are quick to attack belts even at room temperature. Exposure to a 10% ammonia solution at room temperature results in a reduction in tear resistance of about 30% after a short period of time (around 100 days). Exposure to 10% sulphuric acid under the same conditions can be expected to cause a reduction in tear resistance of 10%.

## KEY TO RESISTANCE TABLE

- ++ = resistant over a longer period of time
- + = limited resistance; discoloration and reduction of strength are possible
- = not resistant, but can still be used under certain conditions
- = not resistant; severely affected within a short time
- O = soluble
- RT = room temperature: 23 °C

## RESISTANCE TABLE

Medium	Temperature °C		Max. volume increase %
Acetone	RT	-	40
Al chloride aqueous, 5% aq. sol.	RT	++	1
Ammonia, 10% aq. 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%	RT	+	11
Petrol, normal	RT	++	10
Petrol, super	RT	-	17
Benzene	RT	-	
Butanol	RT	-	
Butyl acetate	RT	-	40
Cyclohexanol	RT	+	5
Dibutyl phthalate	RT	+	40
Diesel oil	RT	++	5
Dimethylformamide	RT	O	
Acetic acid 3n	RT	-	2
Acetic acid, 20%	RT	+	
Ethyl acetate	RT	-	40
Ethyl ether	RT	+	
Ferric chloride aqueous, 5%	40°C	+	
Glycol	RT	++	2
Glysantin/water 1 : 1	20°C	+	
Glysantin/water 1 : 1	80°C	+	
Isopropyl alcohol	RT	+	12
Kerosene	RT	++	3
Saline solution, concentrated	RT	++	
Methanol	RT	+	10
Dichloromethane	RT	--	
Methyl ethyl ketone	RT	-	45
Mineral oil	80°C	++	
Sodium base grease	RT	++	
Sodium hydroxide solution 1N	RT	+	
Nitric acid, 20%	RT	--	
Hydrochloric acid, 20%	RT	+	
Sulphuric acid, 20%	RT	+	
Seawater	RT	++	
Carbon tetrachloride	RT	-	
Toluene	RT	-	35
Trichloroethylene	RT	-	
Water	100°C	-	
Water	RT	++	1
Water	80°C	+	1.5



- **REGULAR PETROL AND SATURATED HYDROCARBONS**

The urethane belts are completely resistant to saturated hydrocarbons. The only effect is a greater or lesser degree of swelling.

- **SUPER-GRADE PETROL AND AROMATIC HYDROCARBONS**

Aromatics such as benzene, toluene etc. cause significant swelling of thermourethanes, even at room temperature, and result in a considerable reduction in hardness. Concentrated solutions of super-grade petrol have the same effect.

The swelling can amount to as much as 50% of the weight and cause a reduction in tear resistance of up to 40%.

The process is reversible, which means that approximately the initial tear resistance is achieved once the solvents have evaporated.

- **LUBRICATING OIL AND LUBRICATING GREASE**

The belts have good resistance to lubricating oils and greases, even at higher temperatures. However, caution is advised in the case of special oils that have a higher acid content.

- If dichloromethane, ethylene chloride or other strong solvents are used, their negative effects are so great that they should not be allowed to come into contact with the belt over longer periods. Swollen belts are extremely susceptible particularly to mechanical damage.

The aforementioned properties and the table on page 8 are intended to help fabricators and designer engineers decide whether these urethane belts are suitable for specific applications.

The different versions vary slightly with regard to their chemical resistance.

When it comes to special applications, we recommend that you consult our Applications Engineering Department or carry out individual trials.

# JOINING TOOLS

## Service case BASIC

This five-piece service case BASIC provides the user with a complete set of standard equipment for occasional use.

The SG02 welding tool has a longer warm-up phase than the premium model and is suitable only for urethane belts that can be welded using the two corresponding guiding clamps as required.

The FZ01 guiding clamps are used for round belts with a diameter of up to 10 mm and for V-belts with profiles of up to 10, whereas the FZ02/3 model is used for round belts from 8 mm upwards in diameter and V-belts up to profile 32.

To ensure the perfect cut for optimum welding results, the set also includes a pair of shears as well as a side cutter for removing the weld seam.



### GUIDING CLAMPS FZ02/3

for round belts with diameters from 8 mm and V-belt profiles up to 32 (D)



### SIDE CUTTER SE02

for removing the weld seam



### SHEARS AS02

for cutting round belts and V-belts



### GUIDING CLAMPS FZ01

for round belts with diameters of up to 10 mm and V-belt profiles up to 10 (Z)



### WELDING TOOL SG02

for PU 290-300 °C;  
power supply: 230 V

## Service case PREMIUM

This five-piece service case PREMIUM is suitable for daily use. With its ergonomic and temperature regulated EErgo welding tool, TPE and urethane belts can be welded quite easily at the press of a button. Due to the short warm-up phase, of less than two minutes, the tool is optimised for instant use.

The versatile FZ01 Vario clamps are a perfect complement to the other tools in the welding set. The quick clamping function allows round belts with diameters up to 10 mm and V-belts up to profile 10 to be clamped and welded within a short space of time. The exchangeable profile jaws also make it possible to process special profiles. The service case PREMIUM also includes a second set of guiding clamps, which are used for round belts with diameters from 8 mm upwards and V-belts with profiles of up to 32.

The set is completed by a pair of shears with an adjustable angled stop that allows both straight and angled cuts, and a side cutter for removing welded seams.



### GUIDING CLAMPS FZ02/3

for round belts with diameters from 8 mm and V-belt profiles up to 32 (D)



### SIDE CUTTER SE02

for removing the weld seam



### SHEARS AS04

with adjustable angled stop



### GUIDING CLAMPS FZ01 VARIO

with exchangeable profile jaws,  
for round belts with diameters of up to 10 mm and V-belt profiles up to 10 (Z)



### WELDING TOOL EERGO

for TPE and PU; under 2 minutes warm-up time; temperature regulated welding tool, ergonomic and quick

# JOINING TOOLS

## Friction welding tool RS02 for round section, V-belt and special profiles

### ADVANTAGES OF THE RS02:

- Precision clamping jaws and automatic 0 setting prevent offset welded seams
- Speed-controlled frictional heat guarantees a 100% weld
- No poor welding seams caused by temperature fluctuations or draughts

### ACCESSORIES FOR THE FRICTION WELDING TOOL RS02:

- Friction welding device
- 1 set of standard clamping jaws of choice
- 1 Allen key
- 1 shears AS02
- 1 side cutter SE02
- 1 carrying case with rigid foam lining

### STANDARD CLAMPING JAWS:

- For round belts,  $\varnothing$  6 mm to 20 mm
- For V-belts, 6 x 4 mm to 22 x 14 mm
- For various special profiles



**FOR ROUND BELTS**



**FOR V-BELTS**



**FOR SPECIAL PROFILES**

Further standard clamping jaws for round belts and V-belts are available at additional cost.

We can also produce clamping jaws for special PU profiles on request.

# GUIDELINES

## FOR MORE QUALITY AND SUSTAINABILITY

The resolute implementation of stringent guidelines in quality, environmental and energy management in accordance with internationally applicable standards is an integral part of our corporate philosophy within the Arntz Optibelt Group.

The Environmental Management System in accordance with DIN EN ISO 14001 effectively helps Optibelt to continuously improve the company's environmental performance and permanently prevent adverse environmental impacts. All of the environmental effects of work processes and products are continuously determined and evaluated. The Energy Management System, in accordance with DIN EN ISO 50001, has enabled Optibelt to put important conditions and measures into place for the sustainable management of energy and raw material sources within the company. Their use and consumption can thus be purposely optimised – for sustainable energy efficiency.

The same high standards apply in the area of Quality Management, in accordance with DIN EN ISO 9001. Here, all of the Optibelt employees are highly committed, every day, to pursuing the objectives of meeting the most exacting demands in the areas of products, customer consultation, service and customer satisfaction and to continuously improving internal processes with the aim of improving efficiency.







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