



**CONVEYOR ROLLERS
TECHNICAL INFORMATION
TUBES**

GENERAL TECHNICAL INFORMATION TUBES

The length changes depend on the actual shaft version. Please direct any questions to your Interroll contact person. Axial support by the seal may no longer be guaranteed with a length change. With greater axial forces, e.g. where there is lateral displacement, suitable replacement structures, such as spacing tubes, may have to be fitted.

With female threaded shafts, the shaft can be lengthened only if the seal is given an axial support. Depending on the thread and shaft diameter, a retaining ring can be inserted. The retaining ring is secured via a groove incorporated in the shaft. The combination of a female threaded shaft with flatted shaft also requires a support of the seal.

In case of a shaft lengthening, the maximum load capacity of the roller is reduced compared to the values that are specified for each side.

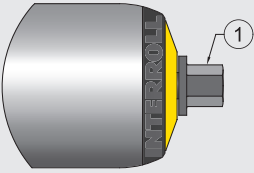
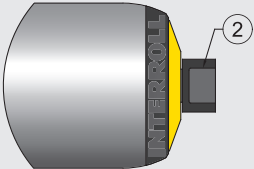
Shaft adapter

The shaft adapter is a conductive polymer component that can be pressed onto roller shafts. It can be inserted in side profiles with open elongated holes. In this case, the roller is placed from the top. The shaft adapter significantly reduces the noise level compared to the pure steel shaft and increases the installation length of the roller. The shaft adapter is not an alternative to the tapered shaft-shuttle (page 13).

Technical data

Material	Polyoxymethylene, RAL9005 (jet black)
Temperature range	0 to + 40 °C
Suitable shafts	Fixed round shafts (Ø 8 and 10 mm)
Anti-static version	< 10 ⁶ Ω
Max. static load of a roller with the use of shaft adapters	See load capacity in the corresponding table (load capacity is not reduced by shaft adapter)

Design versions

Shaft diameter [mm]	Drawing	Longer installation length [mm]
8		+5
10		+4

- 1 Adapter 11 HEX (hexagon)
2 Adapter flat shaft 12

The shaft adapter can be used with the following roller series:

- Series 1100
- Series 1700
- Series 3500 (for drive heads for belts)

Tubes

Tube materials/tube diameters

Steel/stainless steel

The steel tubes used by Interroll are manufactured in accordance with DIN EN 10305-1, DIN EN 10305-3 and DIN EN 10305-7, but with stricter tolerance specifications.

The roller manufacturing and transport may result in minor scoring or scratches to appear on the tube surface. However, they do not have any effect on the functionality of the roller.



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Benefits

- Highest resistance and bending stiffness
- Steel – corrosion protection through zinc-plating or carbonitriding
- Stainless steel – very good and long-life corrosion protection
- Stainless steel – Application also possible in aggressive environments (not suitable for seawater)
- Sprockets and flanges can be welded on (flanges not together with stainless steel tube)
- Steel tubes can be flanged over the bearing assembly so that the bearing housing can no longer move out (not for carbonitrided tube as well as tubes with a wall thickness greater than 1.5 mm)

Versions

- With grooves (not for carbonitrided tube)
- Covered with PVC or PU sleeve
- With lagging
- With pushed-on tapered elements
- With flanges welded on

When used in belt conveyors, there is noise caused by the pared tube welds coming into contact with the belt. Interroll recommends testing the relevant application.

Aluminum

Aluminum tubes have slightly lower strength and only about 33 % of the flexural strength of steel tubes. However, they weigh only 36 % of the weight of comparable steel tubes.

Benefits

- Significantly lighter than steel tube
- Corrosion-resistant
- Aluminum tubes can be flanged over the bearing assembly so that the bearing housing can no longer move out

Versions

- Covered with PVC or PU sleeve
- With pushed-on tapered elements

Ø Rollers [mm]	Anodized surface	Anti-static version
20	Yes	No
50	No	Yes

PVC

Benefits

- Noise-dampening
- Highly impact-resistant
- Very lightweight
- Corrosion-resistant, no surface treatment required
- Easy to clean

Polymer tubes have a significantly lower load capacity compared with steel and aluminum tubes with the same diameter.

With polymer tubes with a diameter of 30 mm and larger, the bearing assemblies are connected form-fit with the tube so that an absolutely safe seating is ensured.

An ambient temperature range from -5 to +40 °C applies to polymer tubes. With a high ambient temperature (from 30 °C) and high continuous static load (over hours), a permanent deformation of the rollers cannot be ruled out.

When dimensioning the rollers for an existing width between the side profiles (lane width), a thermal expansion must be taken into account. In case of large temperature differences, the length of the roller changes based on the following formula:

$$\Delta L T = \frac{0,08 \cdot L \cdot \Delta T}{1000}$$

- ΔLT = change in length due to temperature change (mm)
- ΔT = temperature difference (°C)
- L = tube length (mm)

A proper functioning requires that a warping of the roller at high temperature is being avoided.

Versions

- Covered with PVC or PU sleeve

Polymer tubes are available in the following colors:

Color	RAL number	Ø Tube [mm]
Stone gray	7030	16, 20, 30, 40, 50, 63
Graphite gray	7024	20
Sky blue	5015	50



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Tube diameter

The following overview lists all available shell diameters and their wall thicknesses. The respective shell series chapter describes which diameter is available in which material.

Ø Tube [mm]	Wall thicknesses [mm]
16	1.0
20	1.5
30	1.2; 1.8
40	1.5; 2.3
50	1.5; 2.8; 3.0
51	2.0
60	1.5; 2.0; 3.0
63	3.0
80	2.0; 3.0
89	3.0

Finishing of shell materials

Material	Surface finishing
Steel	Zinc-plating
Steel	Carbonitriding
Aluminum	Anodizing

Zinc-plating

Galvanized zinc-plating of steel tubes is a cost-efficient corrosion protection.

Application

- For dry application areas with normal temperatures
- Conditional suitability for environments with salt and humidity, e. g. installations in harbor areas or in sub-tropical countries
- Conditional suitability in applications with moist or wet materials

Besides zinc-plated tubes, Interroll also offers zinc-plated shafts and zinc-plated sprocket heads. Front sides of shafts cannot be zinc-plated.

Procedure

The surface of the steel tube material is galvanically zinc-plated (using electrolysis). The electrolysis produces an extremely even, thin sleeve. The entire process involves pre-treatment, zinc-plating, passivating and drying.

Properties

Zinc-plated tubes are suitable for flanging and applying grooves. The galvanized zinc-plating is a temporary protection of the steel tube against corrosion.

The duration of the corrosion protection is reduced by the mechanical and thermal loads to which it is subjected. Particles of the zinc layer may be carried off when transporting materials over zinc-plated steel rollers.

Zinc-plated surfaces are sensitive to scratching and abrasion. Damage can result in point corrosion.

Extreme changes in temperature must be avoided as they can cause internal tension. Furthermore, corrosion resistance becomes reduced as the temperature rises.

In order to maintain the limited protective effects of zinc-plating, special packaging must be used for sea freight, for example.

Special measures must also be employed if the materials are to be stored for a longer period of time. Zinc-plating is not food-compatible.

A zinc-plated and passivated surface reacts with the following substances:

- Humidity
- Acidic environment (exhaust fumes, salts, wood acid etc.)
- Alkaline substances (lime, chalk, cleaning agents, CO₂)
- Perspiration
- Solutions of other metals (copper, iron etc.)

Layer thickness	6 to 15 µm
Passivation	Additional blue passivation (chromium(IV)-free)
Standards complied with	DIN EN ISO 2081 DIN 50961 Zinc-plating according to RoHS regulations
Temperature range	-40 to +200 °C
Antistatic	Yes

The long material is zinc-plated. When the tube is sawed off, the front sides are not zinc-plated.

Carbonitriding

Carbonitriding is a wear-resistant corrosion protection for steel tubes.



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Application

- For highly stressed conveyor rollers, e.g. from the transport of steel containers
- For applications where materials must be transported axially on rollers

Procedure

Carbonitriding is a thermochemical process. For this purpose, the surface of the tube is enriched with nitrogen which creates a wear-resistant ceramic coating.

Properties

Carbonitrided tubes are partially suitable (up to 1.5 mm wall thickness) for flanging, but not for the application of grooves.

The ceramic coating is a temporary protection of the steel tube against corrosion. It is resistant to scratching and chafing. Mechanical damage can result in point corrosion.

In addition, carbonitriding distinguishes itself with the following properties:

- Abrasion-resistant surfaces
- Good sliding properties
- Excellent temperature resistance
- Low warpage
- Free of scales
- Good corrosion resistance

The ceramic coating is not food-compatible. The carbonitrided surface does not create any abrasion, but can leave color traces behind.

A carbonitrided surface can react with the following substances:

- Acidic environment (exhaust fumes, salts, wood acid etc.)
- Alkaline substances (lime, chalk, cleaning agents, CO₂)
- Perspiration
- Solutions of other metals (copper, iron etc.)

Tube color	Matt, light gray, and scale-free (no grinding necessary/possible)
Min. reference length	100 mm
Max. reference length	2000 mm
Temperature range	-40 to +80 °C
Antistatic	Yes

Carbonitriding is performed on the tube section that has already been cut to the correct length. This will also carbonitride the front sides.

Anodizing

Anodizing is a corrosion protection for aluminum tubes.

Application

- For weight-sensitive applications, e.g. shuttle systems
- For aluminum tubes with 20-mm diameter

Procedure

The surface of the aluminum tube is given an oxidic protective coating. Compared to galvanizing procedures, the top material layer is transformed and an oxide is formed.

Properties

The duration of the corrosion protection is reduced by the mechanical and thermal loads to which it is subjected. Particles may be carried off when transporting materials over anodized rollers.

Anodized surfaces are low-sensitive to scratching and abrasion. Mechanical damage can result in point corrosion.

An anodized surface can react with solutions of other metals, such as copper, iron, etc.

Layer thickness	≥ 20 µm
Tube color	Aluminum color (natural)
Standards complied with	DIN 17611, DIN EN 754/755
Temperature range	-40 to +80 °C
Antistatic	No

The rod material is anodized. When the tube is sawed off, the front sides are not anodized.

Comparison

The different finishings of steel tube have different resisting forces compared to mechanical wear. The following table provides a factor that shows the reduction in wear of the tube surface compared to the steel zinc-plated version.

Material/finishing	Factor
Zinc-plated steel	1
Stainless steel	5
Steel carbonitrided	120

A carbonitrided surface is 120 times as resistant as a zinc-plated surface.



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Tubes with grooves



Grooves are running grooves that can be placed in steel tubes. They are used to guide round belts. When using the corresponding round belt, they are below the roller surface and, as such, do not contact the conveying good.

When the round belt is moved, the conveyor roller also moves. Two options are differentiated here:

- Wrapping from roller to roller
- Wrapping of a driven shaft that is positioned below the conveyor rollers. The guide rollers required for guiding the round belts on the drive shaft are located on Series 2600.

Grooves can be applied for the following roller and RollerDrive series:

Roller or RollerDrive series		Catalog page
Universal conveyor roller	1700	page 58
Universal conveyor roller	1700 heavy	page 72
Tapered universal conveyor roller	1700KXO	page 66
RollerDrive	EC5000	-

For tapered universal conveyor rollers, the tube must be longer than the tapered elements. The grooves are applied to this tube extension.

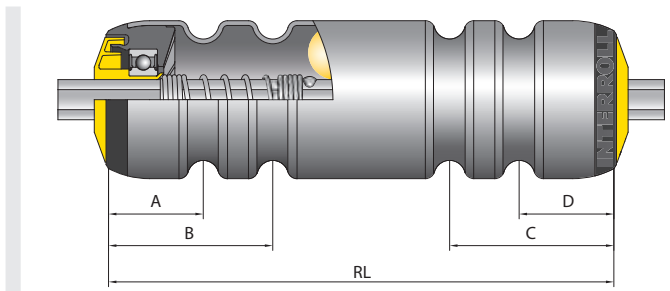
Please contact your Interroll contact person if grooves need to be applied to other roller series.

Rollers with grooves always contain an antistatic element. The maximum conveyor force of the round belt measures 300 N. The maximum load capacity per conveyor roller with groove measures 300 N due to the low conveyor force of the round belt.

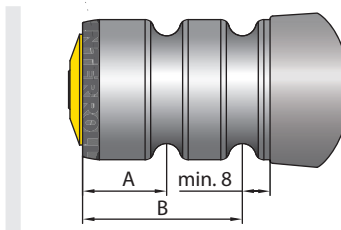
The load capacity information in the individual roller series refers to rollers without grooves.

The maximum load capacity of the conveyor roller is lower with tube lengths of greater than 1400 mm. Interroll recommends a shaft version that is secured against twisting for round belt drives, such as a female threaded shaft. Grooves can be applied to tubes with a wall thickness of up to 2 mm.

It is possible to apply one to four grooves for each tube. The dimensions A and up to D, as needed, must be specified accordingly at the time of ordering. Version-dependent limitations of the groove positions are located in the respective chapters of the roller and RollerDrive series.



Grooves reduce the concentric precision and load capacity of conveyor rollers. Interroll recommends conveyor rollers with round belt drive heads or PolyVee drive heads of the Series 3500 to ensure that concentric precision is adhered to (page 80).



Concentric precision

Conveyor rollers and RollerDrive are manufactured from tubes according to DIN standard. This standard allows deviations in form and straightness, which give rise to the concentric precision.

The concentric deviation is the maximum radial deviation of the diameter of the tube from a perfect circle.

Example: A concentric deviation $t = 0.3$ mm means that the maximum radial deviation of the entire tube is 0.3 mm.

