



Technical conditions

Components for belt conveyors

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1 Introduction

- 1.1 These technical conditions (hereafter referred to as “TC” only) are valid for smooth rollers of nominal diameter 63 – 194 mm, for impact rollers \varnothing 89 – 245, disc rollers \varnothing 108 – 245 and guide rollers \varnothing 63 – 133 used for solid and garland platforms of belt conveyors for belt width B = 400 – 2200 mm.
- 1.2 These TC do not relate to rollers for rollways, to special machines and for non-standard applications of rollers (location, load, special working environment on garbling places, on excavators and on dumping machines). Any non-standard application should be consulted with the producer in regard to exact specification of the roller's attributes.
- 1.3 The validity of these TC is in conformity with extent of rollers according to standard ISO 1537 (ČSN 261102) with completing of rollers' dimensions (diameters, dimensions of axes ends) according to Transroll - catalogue „ROLLERS AND GARLAND STATIONS FOR BELT CONVEYORS“ (hereafter referred to as "**catalogue**" only).
- 1.4 The suitability of rollers of different dimensions (e.g. of atypical rollers with bearings of 223xx series) and of rollers used according to par. 1.2. is determined by the designer of transporter and machine. The operation warranty stated in par. 5.7. does not apply for such rollers and garland platforms. In this case the producer provides the warranty for each individual order based on consultation with the customer.
- 1.5 These TC describe the recent state. TC and all valid changes of products' parameters take priority over technical conditions given in the Catalogue of producer, which are for general orientation purposes only.

2 Roller description

2.1 Delivered types of rollers

The basic types are mentioned here only. More detailed overview to be found in the catalogue.

2.1.1 FLAT ROLLERS

are used for the upper or lower branch of belt transporter. They are produced with two stage (three stage in case of 6305, 6306 and 6308 bearings) HDPE labyrinth sealing, see the pic. 1 – 3.

The sealing is used in roller according to:

- pic. 1 is used for as standard for rollers with 6204, 6205, 6206 bearings
- pic. 2 is used for as standard for rollers with 6308, 6305, 6306 bearings
- pic. 3 is used for as standard for rollers with 6310, 6312 bearings



Flat rollers in standard version are not suitable for transition, folding or other exposed locations of the transporter, if the application was not directly consulted with the distributor of the rollers and/or with the designer of transporter and rollers.

2.1.2 IMPACT ROLLERS

are designed for locations with direct impact of material on the belt, the maximal height of fall = belt width.

For hoppers with higher fall out and for material of greater size of grains the rollers with 223xx series bearings should be used. The designer of transporter decides on their use.

Produced types:

- rubber coated \varnothing 89–225
- with rubber rings \varnothing 89–245

The rings are secured with steel rings on each end of the roller.

They are delivered with sealing according to pic. 1 – 3.

2.1.3 DISC ROLLERS

ø 108 – 245 for the lower return branch of the conveyor.

They are produced with labyrinth sealing, see the pic. 1 – 3. The arrangement of discs is either uniform, or concentrated on one or on both sides of the roller. The discs can be:

- reinforced with wire ring (assembly without spacers)
- without reinforcing, wave shaped, assembled with spacers or one directly next to each other.

2.1.4 GUIDE ROLLERS

ø 63 – 133 - they are used for regulation, guiding of belt.

They are produced with labyrinth sealing, see pic. 1 – 3.

2.2 The design of the rollers

2.2.1 The shell of roller is produced from steel lengthwise welded or seamless tube of tensile strength at least 340 MPa. The dimensional deviations are determined by the standards of tube producer. The tube surface of rubber coated roller has a rubber layer of 60 ± 5 °ShA hardness.

The steel shell of disc and rubber-lagged rollers is provided with discs or rings of 60 ± 5 °ShA hardness, in case of PU discs of 90 ± 2 °ShA hardness.

These standard parameters can be modified after consulting the producer.

2.2.2 The roller shaft is from round steel of tensile strength min. 500 MPa. The bearing fit has the tolerance h6. Surface roughness for bearing fit on the shaft is Ra 0,8.

2.2.3 The bearing housings are produced as either:

- pressed from sheet metal
- machined from forged metal piece (for rollers Ø159 with bearings 6308 and 6310 and rollers Ø194 with bearings 6308, 6310 and 6312)
- machined from thick walled tube

Bearing housings are non-detachably connected with the shell by welding or by flashing.

2.2.4 The bearing sealing against impurities and defluent water is made as labyrinth sealing from plastic, UV radiation resistant in version with fire resistance, pic. 1–3, for 6204–6312 bearings.

2.2.5 The bearings are radial ball bearings of size 6204 – 6312 in C3 version, with permanent grease filling (for the whole lifetime of roller). The rollers could be provided with covered bearings of type Z, 2Z, RS, 2RS.

3 Main dimensions

- 3.1 The main recommended dimensions of rollers according to types in standard ISO 1537 are delivered in the extent given in the Transroll catalogue „ROLLERS AND GARLAND STATIONS FOR BELT CONVEYORS“.
- 3.2 Besides the catalogue rollers TRANSROLL is also capable of delivering a range of custom made rollers on request.

4 Technical data

- 4.1 **Working environment** – the rollers are designed for use in external environment at temperatures $-32 / +45^{\circ}\text{C}$ (for temperatures below -20°C a special grease should be used) with combination of chemical and mechanical impurities IE41, with max. absolute humidity 22 g/m^3 and in an external environment with corrosive aggression C4 according to ISO 9223 – strong corrosion aggression and high level of dust.

These standard solutions can be modified after consulting the producer.

- 4.2 **Recommended transport belt velocities** for flat rollers are depending on the diameter $\varnothing D$:

Dimension/ bearing	Transport velocity [m/s]	Roller RPM
$\varnothing 63 / 6204$	2,00	602
$\varnothing 89 / 6204$	3,15	676
$\varnothing 102 / 108 / 6204$	3,15	654 / 590
$\varnothing 133 / 6204$	3,50	502
$\varnothing 108 / 133 / 6205, 6305$	3,50	618 / 502
$\varnothing 133 / 159 / 6306$	4,50	645 / 540
$\varnothing 133 / 159 / 6308$	5,00	718 / 601
$\varnothing 194 / 6310, 6312$	6,30	620

The recommended transport velocities of disc rollers are same as at smooth rollers with same bearing.

The rollers for velocities greater than 6,3 m/s should be dynamically balanced (must be agreed with the producer in advance and specified in the order).

- 4.3 **Transported material** – bulk, unsorted material of defined granularity and specific weight of 1.4 t/m^3 for rollers up to $\varnothing 76 \text{ mm}$ and 2.1 t/m^3 for rollers with diameter greater than $\varnothing 76 \text{ mm}$.

B [mm]	400	500	650	800	1000	1200	1400	1600	1800	2000
Max. grain size [mm]	100	150	250	300	400	500	600	675	750	800

4.4 Rotation resistance

The value of rotation resistance measured on the roller perimeter is depending on the roller diameter, the sealing type, the bearing fitting, the quantity of grease filling, the size and rotation speed of the bearing. Following rotations resistance values are to be measured and reached in use:

Dimension/ bearing	Speed [m/s]	RPM	Rotational resistance [N]
∅ 63/6204	2,0	602	3,5
∅ 89/6204	3,15	676	2,7
∅ 102/108/6204	3,5	654/618	2,3
∅ 133/6204	3,5	502	1,4
∅ 108/133/6305	3,5	618/502	3,3
∅ 133/159/6306	4,0	645/540	3,9
∅ 159/6308	5,5	661	5,4
∅ 194/6310	6,3	620	6,4
∅ 194/6312	6,3	620	9,0

The rotation resistance of rollers are determined after a 20 minute of operation.

(The mentioned values are valid for rollers with bearings without cover. The rotation resistance is increased for all rollers with covered bearings type Z, 2Z, RS, 2RS by the rotation resistances of bearing covers.)

4.5 **Lifetime of a roller** is assumed for normally loaded rollers and under conditions in compliance with the par. 4 of these TC. Average calculated lifetime of a roller is 30 000 hours of operation for no more than 5 years from the day of production. Roller lifetime is calculated in regard to the lifetime of bearing, specific operation conditions (load, belt velocity, dust, character of transported material), effectiveness of used sealing, lifetime of lubricating grease and time period of storing. The average lifetime means that at least 90% of delivered rollers achieve the determined lifetime. The lifetime is valid in case the rollers were put into operation no more than 6 months from delivery date and after being stored in compliance with storing conditions determined in the par. 5.6. The rollers thus cannot be exposed to extreme climatic conditions during storage.

Wear of rubber parts is not covered by the roller lifetime. The producer recommends using rollers with greater number of discs for transport of abrasive material. This solution is to be consulted with and approved by the producer.

These standard parameters can be modified after consulting the producer.

4.6 **The load of rollers** – the rollers are designed for a load corresponding to fully filled belt profile by bulk material with spacing of supporting stations 1 m, at specific weight max 2.1 t/m³ and granularity according to par. 4.3.



5 Commercial technical data

5.1 **Ordering** – see the Demand sheet on www.transroll.cz

The delivery of rollers not contained in the catalogue (variations in length, modifications of shaft ends, ...) should be consulted with the sales department individually. Displacement and number of discs must be clarified for disc rollers. Requirements for improved attributes of rollers (run out, balancing, painting, and other) must be declared in the inquiry.

5.2 **Surface treatment**

Rollers with bearing 6204 are standardly covered with powder coating RAL 3000, rollers with 6205 and higher bearing class (6305, 6306, ...) are standardly treated with a single layer of synthetic anticorrosive primer black paint. These standard solutions can be modified after consulting the producer.

Roller surface treatment with different paint type, for instance with synthetic covering paint, with zinc coated surface etc. should be consulted with the producer.

5.3 **Delivery docs and packaging**

Rollers are delivered bound on pallets 800 x 1200 mm. Garlands are delivered disassembled on pallets 800 x 1200 mm. The garland platforms can be delivered assembled after agreeing with the producer.

Delivery notes issued by the producer are part of the delivery. Other documentation is provided based on an agreement with the producer.

A different type of packaging (for instance into boxes) should be discussed with the producer and specified in the order.

5.4 **Marking**

The rollers are marked with logo of the producer, with month and year of production. The marking is located either on the bearing housing, on the sealing cover, or on the shaft.

Each pallet or box is marked with a label displaying roller description, dimensions of roller, roller drawing no. and the date of the output approval.

5.5 **Acceptance** – customer acceptance test are not executed, unless otherwise agreed.

5.6 **Storage and handling**

The rollers must be stored in horizontal position, in roofed and dry place on solid floor. Rollers with rubber lagging shall be protected from direct sunlight. The producer does not recommend storing for more than 6 months.

Rollers shall be handled carefully to prevent shaft impacts, sealing deformation or dropping to ground.

5.7 Warranty

Unless otherwise agreed, the producer provides a warranty for a period of 24 months from the date of putting into operation if all provisions of these TC are complied with and the rollers are put into operation up to 6 months from the delivery date.

All possible claims are under the Transroll Claim Procedure.

6 The operational conditions

6.1 **The assembly of rollers** into idler stations can be performed by authorized persons only and according to rules of organization that performs the assembly or conveyor operator. The assembly should be carried out by with increased attention. The rollers must be installed perpendicular to the belt movement; roller axes in one line. Unsuitable roller positioning (e.g. overlapping, or deliberate misalignment in order to achieve centering of belt) significantly decreases roller lifetime (the lifetime of bearings and shell surface).

The correct positioning of rollers should be checked by manual rotation before placing the belt.

6.2 Replacing of rollers

The rollers should be inspected during operation. Rollers showing signs of whistling, wrong rotation, excessive heating, increased radial and axial play, rollers with worn or deformed shell or rubber coating, should be marked and replaced as soon as possible.

6.3 Maintenance of roller stations

The conveyor should be maintained so, that the run is regular and continuous. Rollers must be installed on all idler station positions. The station must remain clear from dropped material and the rollers must not be not blocked by the transported material.

6.4 **Replacing of rollers and manipulation** with the rollers during conveyor operation is strictly forbidden.

6.5 **The special requirements** for operation of rollers in extreme conditions (very high or very low temperatures, high dustiness, transport of abrasive material, material with big lump size and the use of rollers in unsuitable places), should be specified in the inquiry and later in the following order.

6.6 Disposal

At termination of roller service, proceed in accordance with waste management law and ensure an ecological way of waste disposal. Adhere to waste recycling rules, and detach rubber or plastic components from the roller.

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