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AB 169
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EN ISO 9001 | EN ISO 14001 | PN-N 18001 | PN-ISO/IEC 27001
PN-EN ISO/IEC 17025 Laboratorium



Heat resistant rubber fabric conveyor belts

Application

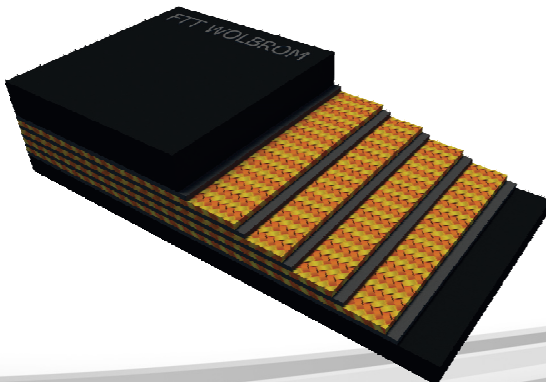
Heat resistant rubber fabric conveyor belts are intended for transport of hot materials with maximum temperature +280 [°C], within the range of ambient temperatures from -40 [°C] to +60 [°C].

Heat resistant rubber fabric conveyor belts can transport hot: ashes and slags, sinter, moulding sands, limestone, cement clinker, coke, chemical fertilizers (e.g. urea, ammonium nitrate(V)) and others. For transport of materials with temperature up to +200 [°C], the temperature of belt surface cannot exceed +180 [°C]. For transport of materials with temperature up to +280 [°C], the temperature of belt surface cannot exceed +200 [°C].

Construction

Heat resistant rubber fabric conveyor belts consists of textile-rubber carcass, with 2-5 plies, rubber covers: carrying and running as well as rubber edges. Layer of interlayer rubber is located between textile plies.

Within the structure, dimensions of the belt, its individual elements and tolerances of these dimensions, connections of rubber- fabric plies and strength parameters, the belts are in accordance with standard PN- EN ISO 14890.



Heat resistant rubber fabric conveyor belts fulfil the requirements for safety class 1 acc. to the standard PN- EN 12882.

To protect carcass against high temperature, belts T120, T150 and T200 are manufactured with rubber covers of minimum recommended thickness 4+2 mm, while belt T280 with covers of minimum recommended thickness 6+2 mm.

Heat resistant rubber fabric conveyor belts are manufactured on the basis of WT-13.

Types

The following types of **heat resistant rubber fabric conveyor belts** are manufactured:

T120 - for materials with temperature to +120 [°C],

T150 - for materials with temperature to +150 [°C],

T200 - for materials with temperature to +200 [°C],

T280 - for materials with temperature to +280 [°C].

Heat resistant rubber fabric conveyor belts are manufactured on the basis of fabric:

PP - polyamide-polyamide,

EP - polyester-polyamide (not applied for belts type T280).

Belt designation used for orders

	<u>WT-13/13</u>	<u>450</u>	<u>1000</u>	<u>EP</u>	<u>800</u>	<u>4</u>	<u>6+2</u>	<u>T200</u>
where:								
completion acc. to (Technical conditions FTT)								
length of the belt in [m]								
width of the belt in [mm]								
material of plies								
tensile strength (belt type) in [N/mm]								
number of plies in carcass								
thickness of rubber covers: carrying (S ₁) and running (S ₂) in [mm]								
type of heat resistant belt								

Cover Thickness

Minimum thickness of carrying cover (S₁) for belts T120, T150 and T200 is 4[mm]

Minimum thickness of carrying cover (S₁) for belts T280 is 6[mm]

Minimum thickness of running cover (S₂) for all types of heat resistant belts is 2[mm]

Maximum thickness of carrying cover (S₁) is:

- for types 400/3; 500/3- 8[mm]
- for types 630/3; 630/4; 800/3; 800/4; 800/5; 1000/3- 10[mm]
- for higher types- 12[mm]

Recommended maximal thickness of running cover (S₂) is- 6[mm]

Belts thickness

Approximated thickness of carcass of heat resistant rubber fabric conveyor belts is presented in the **table 2**.

Approx. total thickness of the belt with any thickness of the covers can be calculated using the formula:

$$S = S_3 + (S_1 + S_2)$$

where:

- S – approximated total thickness of belt [mm]
- S₃ – thickness of belt carcass taken from Table 2 [mm]
- S₁ – thickness of carrying cover [mm]
- S₂ – thickness of running cover [mm]

Belt weight

Approximated weight of carcass of heat resistant rubber fabric conveyor belts are presented in the **table 2**. Approximated weight of belts with covers of any thickness can be obtained from the formula:

$$M = m_1 + X * (S_1 + S_2)$$

where:

- M – approximated weight of the belt [kg/m²]
- m₁ – weight of belt carcass taken from the **Table 2** for the given type of belt [kg/m²]
- S₁ – thickness of carrying cover [mm]
- S₂ – thickness of running cover [mm]
- X – value depending on heat resistant belt type:
 - for type T120 - 1,15 [g/cm³]
 - for type T150 - 1,14 [g/cm³]
 - for type T200 - 1,08 [g/cm³]
 - for type T280 - 1,08 [g/cm³]

Minimum pulley diameters - acc. to table 3

In **Table 3** are given recommended minimum diameters of drums [mm] for belts, for the load factor range 60-100%, designated in accordance with DIN 22101:

- A – drive pulleys and other pulleys in the range of high belt tensions
- B – deflection pulleys and other pulleys in the range of low belt tensions
- C – snub pulleys (change in belt moving direction ≤ 30°)

Marking of belt

Typically on the carrying cover at the distance of about 1÷3 [m] from the beginning and the end of the belt and approx. every 20 [m] there will be made permanent mark in form of relief impression in rubber containing: name of the manufacturer, marking according to the above mentioned belt designation pattern (without giving length, width and thickness of covers), belt serial number, last two digits of manufacturing year.

Packing

Typically, the belt is rolled up on wooden coil with diameter 450 [mm] which has an internal square hole with side 230 [mm]. Rolled up belts are protected against unwinding during transport by wrapping with polypropylene tape.

Diameter of the roll

Approximate diameter of the roll D [m] with length L [m], and thickness S [mm] may be calculated from the following equation:

$$D = \sqrt{0,25 + \frac{1,27 \times L \times S}{1000}}$$

Table 1. Physical and mechanical properties of cover rubber of heat resistant rubber fabric conveyor belts

Parameter		Unit	Requirements for cover rubber of heat resistant belts				Method of testing acc. to ¹	
			T120	T150	T200	T280		
Tensile strength, min.	TS	[MPa]	15	15	12	12	PN-ISO 37 (sample type 2)	
Elongation at break, min.	E _b	[%]	350	350	400	400	PN-ISO 37 (sample type 2)	
Abrasion resistance, max.	-	[mm ³]	150	150	150	150	PN-ISO 4649 (metoda A)	
Resistance to heat, in air, in condition, max.	+100 [°C] x 72 [h], max	Δ TS Δ E _b	[%] [%]	±40 ±60	- -	- -	PN-ISO 188 (method B) PN-ISO 37 (sample type 2)	
	+125 [°C] x 72 [h], max.	Δ TS Δ E _b	[%] [%]	- -	±45 ±65	- -		
	+125 [°C] x 168 [h], min.	TS E _b	[MPa] [%]	- -	- -	10 300		- -
	+175 [°C] x 168 [h], min.	TS E _b	MPa [%]	- -	- -	- -		4 150

¹ Testing acc. to current standards.

Table 2. Range of manufactured types of belt, basic widths, weights and thickness of carcass of heat resistant rubber fabric conveyor belts

Belt type/number of plies ¹	Basic widths of belt [mm] ¹								Approx. thickness of carcass S ³ [mm]		Approx. weight of carcass [kg/m ²]							
	500	600	650	800	1000	1200	1400	1600	1800	EP	PP	T120		T150		T200		T280
												EP	PP	EP	PP	EP	PP	EP
400 /3	X	X	X	X	X	X	X	-	-	4,2	-	5,6	-	5,6	-	5,5	-	-
500 /3	X	X	X	X	X	X	X	-	-	4,2	-	5,6	-	5,6	-	5,5	-	-
630 /3	X	X	X	X	X	X	X	X	X	5,1	4,8	6,1	5,8	6,1	5,8	6,0	5,7	5,5
630 /4	X	X	X	X	X	X	X	-	-	5,6	-	7,5	-	7,5	-	7,3	-	-
800 /3	X	X	X	X	X	X	X	X	X	5,7	5,4	6,9	6,3	6,5	6,2	6,4	6,1	5,9
800 /4	X	X	X	X	X	X	X	X	X	6,8	6,4	8,2	7,8	8,1	7,7	8,0	7,6	7,4
800 /5	X	X	X	X	X	X	X	-	-	7,0	-	9,4	-	9,3	-	9,2	-	-
1000 /3	-	-	X	X	X	X	X	X	X	6,0	5,7	7,3	6,7	7,2	6,7	7,1	6,6	6,4
1000 /4	-	-	X	X	X	X	X	X	X	7,6	6,8	9,2	8,0	9,2	8,0	9,0	7,8	7,6
1000 /5	-	-	X	X	X	X	X	X	X	8,5	8,0	10,2	9,7	10,2	9,7	10,0	9,5	9,2
1250 /3	-	-	X	X	X	X	X	X	X	6,9	6,3	8,3	7,4	8,2	7,4	8,1	7,3	7,1
1250 /4	-	-	X	X	X	X	X	X	X	8,0	7,2	9,7	8,3	9,6	8,3	9,5	8,1	7,9
1250 /5	-	-	X	X	X	X	X	X	X	9,5	8,5	11,6	10,0	10,9	10,0	10,7	9,8	9,5
1400 /4	-	-	-	X	X	X	X	X	X	8,4	7,6	10,2	8,9	10,2	8,9	10,0	8,7	8,5
1600 /4	-	-	-	-	X	X	X	X	X	9,2	8,4	11,0	9,9	11,0	9,9	10,8	9,7	9,5
1600 /5	-	-	-	-	X	X	X	X	X	10,0	9,5	12,1	11,2	12,1	11,1	11,9	11,0	10,6
1800 /4	-	-	-	-	X	X	X	X	X	9,6	10,4	11,4	11,5	11,4	11,4	11,2	11,3	11,0
1800 /5	-	-	-	-	X	X	X	X	X	10,5	10,5	12,8	12,4	12,7	12,4	12,6	12,2	11,8
2000 /4	-	-	-	-	X	X	X	X	X	9,6	10,4	11,4	11,5	11,4	11,4	11,2	11,3	11,0
2000 /5	-	-	-	-	X	X	X	X	X	11,5	10,5	13,8	12,4	13,7	12,4	13,6	12,2	11,8
2500 /4	-	-	-	-	X	X	X	X	X	12,8	11,2	14,9	12,8	14,9	12,7	14,7	12,5	12,3
2500 /5	-	-	-	-	X	X	X	X	X	13,0	13,0	15,4	14,3	15,4	14,3	15,2	14,1	13,7

¹ Belt widths and types other than specified in Table 2 shall be agreed with the manufacturer

Table 3. Minimum pulley diameters [mm]

Belt type/number of plies	EP carcass			PP carcass		
	A	B	C	A	B	C
400 /3	400	315	250	-	-	-
500 /3	400	315	250	-	-	-
630 /3	500	400	315	400	315	250
630 /4	630	500	400	-	-	-
800 /3	630	500	400	500	400	315
800 /4	800	630	500	630	500	400
800 /5	800	630	500	-	-	-
1000 /3	630	500	400	500	400	315
1000 /4	800	630	500	630	500	400
1000 /5	1000	800	630	800	630	500

Table 3. Minimum pulley diameters [mm]

Belt type/number of plies	EP carcass			PP carcass		
	A	B	C	A	B	C
1250 /3	800	630	500	630	500	400
1250 /4	800	630	500	630	500	400
1250 /5	1000	800	630	800	630	500
1400 /4	1000	800	630	630	500	400
1600 /4	1000	800	630	800	630	500
1600 /5	1250	1000	800	800	630	500
1800 /4	1000	800	630	1000	800	630
1800 /5	1250	1000	800	1000	800	630
2000 /4	1000	800	630	1000	800	630
2000 /5	1250	1000	800	1000	800	630
2500 /4	1400	1250	1000	1250	1000	800
2500 /5	1400	1250	1000	1400	1250	1000

Table 4. Physical and mechanical parameters of heat resistant rubber fabric conveyor belts

Parameter	Unit of measure	Type of heat resistant belt				Requirements accordingly to belt tensile strength (type)										Method of Testing acc. to ¹	
						400	500	630	800	1000	1250	1400	1600	1800	2000		2500
Longitudinal tensile strength, min.	[N/mm]	T120	T150	T200	T280	400	500	630	800	1000	1250	1400	1600	1800	2000	2500	PN-EN ISO 283
Belt elongation at load equal to 10 [%] of nominal strength of the belt, max.	EP	T120	T150	T200	T280	1,5		2,5		3,0							
	PP					4											
Belt elongation at break, min.	[%]	T120	T150	T200	T280	10										PN-EN ISO 252 (method A)	
Belt adhesion strength: - average value of test results between textile plies, min. - average value of test results between covers and carcass, min.	[N/mm]	T120	T150	T200	T280	4,5 3,5											
Change of average adhesion strength of belt after accelerated thermal ageing, in air, in conditions: - 100 [°C] x 72 [h]: - between plies, max. - between covers and carcass, max.	[%]	T120	-	-	-	±30 ±50										PN-ISO 188 (method B)	
Change of average adhesion strength of belt after accelerated thermal ageing, in air, in conditions: - 125 [°C] x 72 [h]: - between plies, max. - between covers and carcass, max.		-	T150	-	-												
Average adhesion strength of belt after accelerated thermal ageing, in air, in conditions: - 125 [°C] x 168 [h]: - between plies, min. - between covers and carcass, min.	[N/mm]	-	-	T200	-	3,5 2,5										PN-EN ISO 252 (method A)	
Average adhesion strength of belt after accelerated thermal ageing, in air, in conditions: - 175 [°C] x 168 [h]: - between plies, min. - between covers and carcass, min.		-	-	-	T280												
Electric resistance of belt, max.	[Ω]	T120	T150	T200	T280	3 x 10 ⁸										PN-EN ISO 284	
Low temperature resistance	[°C]	T120	T150	T200	T280	-40										PN-72/C-05011.06	

¹Testing acc. to current standards.

Procedure for used products

Recovery of used products through e.g. combustion or bulk storage in the yard with non-hazard or neutral wastes shall be applied.

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