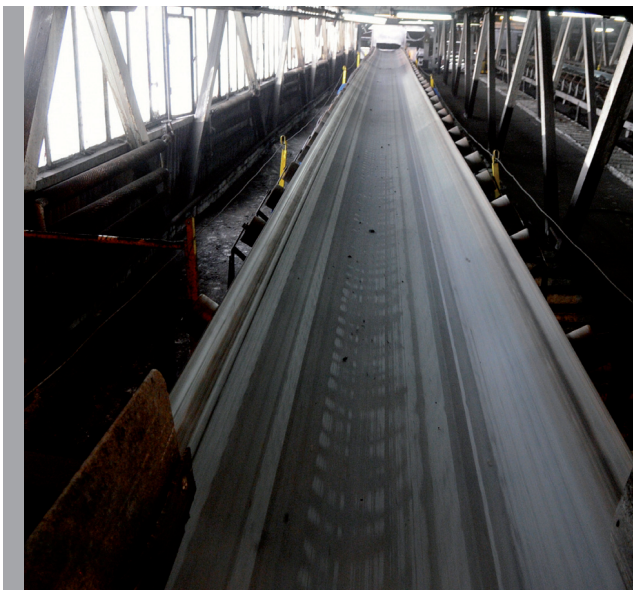
Rubber- fabric conveyor belts oil resistant, oil resistant & non- inflammable and oil & heat resistant



Application

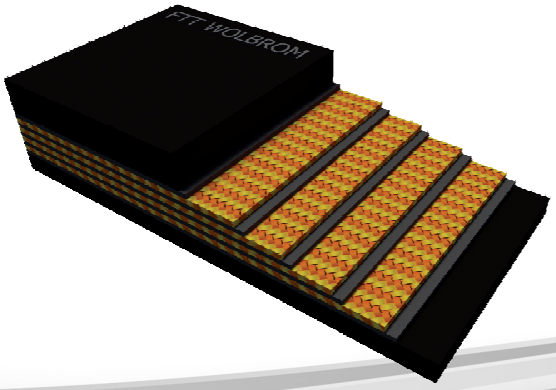
Rubber- fabric conveyor belts oil resistant, oil resistant & non-flammable and oil & heat resistant are used for transport of loose materials of any grade of granulation (considering safety of conveyor and belt, granulation is recommended not to exceed 300 [mm]) containing organic and mineral oil or fat.

Depending on type of the belt, a transport of materials at the following temperatures is allowed:

- From -25 [°C] to +60 [°C] for LG, LGG,
- From -20 [°C] to +60 [°C] for LGK, LGGK, LGS,
- From -25 [°C] to +100 [°C] for LGT100,
- From -25 [°C] to +150 [°C] for LGT150.

Structure

Rubber- fabric conveyor belts oil resistant, oil resistant & non-flammable and oil & heat resistant are composed of 2 to 5-ply fabric and rubber carcass, carrying and running rubber covers and rubber edges. A layer of carcass rubber is placed between textile plies.



In range of design, dimension of the belt, theirs elements and tolerances of dimensions, joints of rubber-textile plies and strength parameters, belts are in accordance with PN-EN ISO 14890. Depending on its type, oil resistant conveyor belt meets requirements concerning safety category 1 or 2A or 2B acc. to PN-EN 12882.

In order to protect the carcass against increased temperature, oil & heat resistant belts LGT-100 are produced with rubber covers of 4+2 mm recommended minimum thickness, and oil & heat resistant belts LGT-150 with rubber covers of 5+2 mm recommended minimum thickness.

Rubber- fabric conveyor belts oil resistant, oil resistant & non-flammable and oil & heat resistant belts are manufactured in accordance with WT-6.

Typically, rubber- fabric conveyor belts oil resistant, oil resistant & non-flammable and oil & heat resistant conveyor belts are made of EP (polyester-polyamide) fabric ply. On client's request belts may be made of PP (polyamide-polyamide) fabric ply.

Belt designation used for the purpose of orders

WT-6/15 | 450 | 1000 | EP | 800 | 4 | 6+2 | LG | 1

where:

- completion acc. to standard (FTT Technical Conditions)
- quantity of the belt [m]
- width of the belt [mm]
- ply material
- tensile strength of the belt (type) [N/mm]
- number of plies in the carcass
- thickness of the covers: carrying (S_1) and running (S_2) [mm]
- class of rubber covers
- safety category acc. to PN-EN 12882

Types

Following types of belts designed for materials containing organic and mineral oil and fat are manufactured:

LG – with oil resistant covers; safety category 1;

LGG – with oil resistant covers & carcass; safety category 1;

LGK – with oil resistant and non-flammable covers, used in fire hazard environment; safety category 2A;

LGGK – with oil resistant covers & carcass and non-flammable covers, used in fire hazard environment; safety category 2A;

LGS – with oil resistant covers and non-flammable covers & carcass, used in fire hazard environment; safety category 2B;

LGT100 – with oil resistant covers used for transport of high-temperature materials up to +100 [°C]; safety category 1;

LGT150 – with oil resistant covers used for transport of high-temperature materials up to +150 [°C]; safety category 1.

Cover Thickness

Minimum thickness of carrying cover (S1) for belts LG, LGG, LGK, LGGK, LGS is 2 [mm]. Minimum thickness of carrying cover (S_1) for belts LGT-100 is 4[mm]. Minimum thickness of carrying cover (S_1) for belts LGT-150 is 5[mm]. Minimum thickness of running cover (S_2) for all types of belts is 2[mm]. Recommended maximal thickness of carrying cover (S_1) is- 8[mm]. Recommended maximal thickness of running cover (S_2) is- 6[mm].

Belt thickness

Table 3 shows approximate thickness of carcasses for rubber - fabric conveyor belts oil resistant of any type. Approximate total thickness of a belt containing covers of any thickness may be calculated from the following equation:

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

where:

S – approximate total thickness of the belt [mm]

S_3 – thickness of the belt carcass taken from Table 3 [mm]

S_1 – thickness of carrying cover [mm]

S_2 – thickness of running cover [mm]

Belt weight

Table 3 shows approximate weight of carcasses for rubber-fabric conveyor belts oil resistant of all types.

Approximate weight of a belt containing covers of any thickness may be calculated from the following equation:

$$M = m1 + X*(S_1 + S_2)$$

where:

M – approximate weight of the belt [kg/m²]

m_1 – weight of the belt carcass taken from Table 3 for specific type of the belt [kg/m²]

S_1 – thickness of carrying cover [mm]

S_2 – thickness of running cover [mm]

X – value depending on the type of the belt:

- for LG, LGG – 1,18 [g/cm³]
- for LGK, LGGK, LGS – 1,28 [g/cm³]
- for LGT100 – 1,18 [g/cm³]
- for LGT150 – 1,17 [g/cm³]

Dimension tolerances - compliant with PN-EN ISO 14890.

Allowable tolerance for belt width is ± 1 [%].

Allowable tolerance for belt total thickness is ± 10 [%].

Allowable tolerance for cover thickness is:

- for cover thickness up to 4 mm: +1/-0,2 [mm];
- for cover thickness exceeding 4 mm: +1 [mm]/-5 [%].

Standard lengths: 100, 150, 200, 250, 300 [m].

Minimum diameter of drums

In **Table 4** 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 belts

Typically, on the carrying cover of the belt at the distance of 1÷3 [m] from the beginning and the ending of the belt and approximately each 20 [m] durable stamp in the form of relief is impressed in rubber cover. It includes name of the manufacturer, marking acc. to foregoing pattern (excluding length, width and thickness of covers), belt serial number, last two digits of the year of manufacture.

Packing

Typically, the belt is wound on 450 [mm] diameter wooden coil which has an internal square hole with 230 [mm] cheek. The wound 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

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

Table 1. Physical and mechanical properties of cover rubber for rubber- fabric conveyor belts oil resistant, oil resistant & non-flammable and oil & heat resistant.

Parameter			Unit	Requirements for cover rubber designed for specific types of belts					Testing method acc. to [1]
				LG LGG	LGK LGGK	LGS	LGT100	LGT150	
Longitudinal tensile strength, min.		TS	[MPa]	15					PN-ISO 37 (sample type 2)
Elongation at break, min.		E_b	[%]	350					
Abrasion resistance, max.		-	[mm³]	200					PN-ISO 4649 (method A)
Resistance to fluid expressed in mass change, max.	- oil IRM 903 [2] (24 [h] x 100 [°C])	Δm_{100}	[%]	±30			±30	-	PN-ISO 1817
	- oil IRM 903 [2] (24 [h] x 150 [°C])			-	-	-	-	±30	
	- soybean oil (24 [h] x 100 [°C])			±10			-	-	
Resistance to heat, in air, in condition, max.	+70 [°C] x 168 [h]	Δ TS Δ E_b	[%]	±25 ±30			-	-	PN-ISO 188 (method B) PN-ISO 37 (sample type 2)
	+100 [°C] x 168 [h]	Δ TS Δ E_b		-	-	-	±25 ±60	-	
	+125 [°C] x 72 [h]	Δ TS Δ E_b		-	-	-	-	±30 ±75	

[1] Testing acc. to current standards. [2] Model oil is compliant to PN- ISO 1817.

Table 2. Oil resistance of carcass rubber for rubber- fabric conveyor belts oil resistant, type LGG and LGGK.

Parameter	Type of media		Unit	Requirements for carcass rubber designed for specific types of belts		Testing method acc. to [1]
				LGG	LGGK	
Resistance to fluid expressed in mass change, max.	- oil IRM 903 [2] (24 [h] x 100 [°C])	Δm_{100}	[%]	±50		PN-ISO 1817
	- soybean oil (24 [h] x 100 [°C])			±15		

[1] Testing acc. to current standards. [2] Model oil is compliant to PN- ISO 1817.

Table 3. The range of manufactured belts, including standard width, weight and thickness of rubber - fabric conveyor bets oil resistant, oil resistant & non-flammable and oil & heat resistant, type EP.

Type of the belt/number of plies1	Standard width of the belt [mm] [1]									Approximate thickness of the carcass S_3 [mm]		Approximate weight of the carcass [kg/m²]						
	500	600	650	800	1000	1200	1400	1600	1800	LG	LGK, LGGK, LGS, LGT100, LGGLGT150	LG	LGG	LGK	LGGK	LGS	LGT 100	LGT 150
400 /3	X	X	X	X	X	X	X	-	-	3,6	4,2	4,8	5,7	6,1	6,1	6,0	5,5	5,5
500 /3	X	X	X	X	X	X	X	-	-	3,6	4,2	4,8	5,7	6,1	6,1	6,0	5,5	5,5
630 /3	X	X	X	X	X	X	X	X	X	4,5	5,1	5,3	6,1	6,6	6,5	6,5	6,0	5,9
630 /4	X	X	X	X	X	X	X	-	-	4,8	5,6	6,4	7,5	8,2	8,1	8,0	7,3	7,3
800 /3	X	X	X	X	X	X	X	X	X	5,1	5,7	5,7	6,5	7,0	7,0	6,9	6,4	6,4
800 /4	X	X	X	X	X	X	X	X	X	6,0	6,8	7,0	7,1	8,8	8,7	8,7	7,9	7,9
800 /5	X	X	X	X	X	X	X	-	-	6,0	7,0	8,0	9,4	10,2	10,1	10,0	9,2	9,1
1000 /3	-	-	X	X	X	X	X	X	X	5,4	6,0	6,4	7,0	7,7	7,7	7,6	7,1	7,0
1000 /4	-	-	X	X	X	X	X	X	X	6,8	7,6	7,5	8,7	9,4	9,3	9,2	8,5	8,5
1000 /5	-	-	X	X	X	X	X	X	X	7,5	8,5	8,8	10,1	11,0	10,9	10,8	9,9	9,9
1250 /3	-	-	X	X	X	X	X	X	X	6,9	6,9	8,1	8,2	8,8	8,8	8,7	8,0	8,0
1250 /4	-	-	X	X	X	X	X	X	X	7,2	8,0	8,5	9,3	10,3	10,3	10,2	9,4	9,4
1250 /5	-	-	X	X	X	X	X	X	X	8,5	9,5	9,4	10,8	11,7	11,6	11,5	10,6	10,5
1400 /4	-	-	-	X	X	X	X	X	X	8,4	8,4	10,0	10,2	10,9	10,9	10,8	9,9	9,9
1600 /4	-	-	-	-	X	X	X	X	X	9,2	9,2	10,8	10,9	11,7	11,7	11,6	10,7	10,7

[1] Types and width of the belts, other than determined in Table 3, shall be agreed with manufacturer.

Table 4. **Minimum drums diameters for belts EP [mm].**

Type of the belt/number of plies	LG			LGG, LGK, LGGK, LGS, LGT100, LGT150		
	A	B	C	A	B	C
400 /3	400	315	250	400	315	250
500 /3	400	315	250	400	315	250
630 /3	500	400	315	500	400	315
630 /4	500	400	315	630	500	400
800 /3	500	400	315	630	500	400
800 /4	630	500	400	800	630	500
800 /5	630	500	400	800	630	500
1000 /3	630	500	400	630	500	400
1000 /4	800	630	500	800	630	500
1000 /5	800	630	500	1000	800	630
1250 /3	800	630	500	800	630	500
1250 /4	800	630	500	800	630	500
1250 /5	1000	800	630	1000	800	630
1400 /4	1000	800	630	1000	800	630
1600 /4	1000	800	630	1000	800	630

Table 5. **Physical and mechanical properties of rubber- fabric conveyor belts oil resistant, oil resistant & non-flammable and oil & heat resistant.**

Parameter	Unit	Type of the belt							Requirements accordingly to belt tensile strength (type) 1								Testing method acc. to [2]
									400	500	630	800	1000	1250	1400	1600	
Longitudinal tensile strength, min.	[N/mm]	LG	LGG	LGK	LGGK	LGS	LGT100	LGT150	400	500	630	800	1000	1250	1400	1600	PN-EN ISO 283
Elongation at a load equivalent to 10 [%] of nominal strength of the belt, max.	[%]	LG	LGG	LGK	LGGK	LGS	LGT100	LGT150	1,5		2,5				3,0		
Elongation at break, min.	[%]	LG	LGG	LGK	LGGK	LGS	LGT100	LGT150	10								
Adhesion resistance: - Between textile plies, min. - Between covers and carcass, min.	[N/mm]	LG	LGG	LGK	LGGK	LGS	LGT100	LGT150	4,5 3,5								PN-EN ISO 252 (method A)
Heat resistance for determination of adhesive strength, between elements of the belt, in air, in condition: 70 [°C] after 168 [h]: - Between plies, max.; - Between covers and carcass, max.	[%]	LG	LGG	LGK	LGGK	LGS	-	-	±30 ±40								PN-ISO 188 (method B) PN-EN ISO 252 (method A)
Heat resistance for determination of adhesive strength, between elements of the belt, in air, in condition: 100 [°C] after 168 [h]: - Between plies, max.; - Between covers and carcass, max.		-	-	-	-	-	LGT100	-	±50 ±35								
Heat resistance for determination of adhesive strength, between elements of the belt, in air, in condition: 125 [°C] after 72 [h]: - Between plies, max.; - Between covers and carcass, max.		-	-	-	-	-	-	LGT150	±55 ±35								
Electric resistance, max.	[Ω]	LG	LGG	LGK	LGGK	LGS	LGT100	LGT150	3×10^8								PN-EN ISO 284
Low-temperature resistance	[°C]	LG	LGG	-	-	-	LGT100	LGT150	-25								PN-72/C-05011.06
			-	LGK	LGGK	LGS	-	-	-20								
Combustion time determined by flame method: - Total combustion time for each group of six samples with covers is shorter than: - Maximum combustion time for a single sample with covers, max.	[s]	-	-	LGK	LGGK	LGS	-	-	45 15								PN-EN ISO 340
Combustion times determined by flame method: - Total combustion time for each group of six samples without covers is shorter than: - Maximum combustion time for a single sample without covers, max.		-	-	-	-	LGS	-	-	45 15								
Safety category is compliant with PN- EN 12882	-	1	1	2A	2A	2B	1	1	-								-

[1] Other than enlisted, non-standard, values of belt (types) strength are allowed upon arrangements with recipient. [2] Current standards are in effect.

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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