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PN-EN ISO/IEC 17025 Laboratorium



Non- inflammable rubber fabric conveyor belts with increased fire resistance

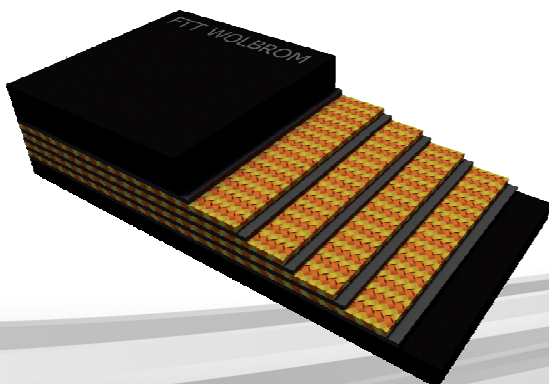
Applications

Non- inflammable rubber fabric conveyor belts with increased fire resistance GTP are intended for transport of loose materials in underground excavation mining plants- transportation of combustible minerals (e.g. coal) and non- inflammable (e. g. copper ore, salts, aggregates). Non- inflammable rubber fabric conveyor belts with increased fire resistance GTP are applied to convey materials of any grade of granulation but, considering the safety of the conveyor, conveyor operators and belt installed, it is recommended to transport materials with up to 300 [mm] diameter of the grain.

GTP belts can work in mining plants in ambient temp. from - 25°C up to +60°C, in methane and non-methane fields, excavation with methane explosion hazard "a", "b" and "c", and excavation with coal dust explosion hazard "A" and "B".

Structure

Non- inflammable rubber fabric conveyor belts with increased fire resistance GTP are composed of 3 to 5-ply fabric and rubber carcass, carrying and running covers and rubber edges. A layer of carcass rubber is placed between textile plies. Non- inflammable rubber fabric conveyor belts with increased fire resistance GTP are made of EP (polyester-polyamide) fabric plies. Non- inflammable rubber fabric conveyor belts with increased fire resistance GTP are made in accordance with standard PN-EN ISO 22721 (and PN- EN ISO 14890).



Offered non- inflammable rubber fabric conveyor belts with increased fire resistance GTP have got admission of President of State Mining Authority in Katowice (Prezesa Wyższego Urzędu Górniczego w Katowicach) for use in underground excavation mining plants.

The covers and edges are manufactured in the rubber class L and V according to PN- EN ISO 22721. Parameters of the cover rubber are shown in Table 1.

Non- inflammable rubber fabric conveyor belts with increased fire resistance GTP fulfil requirements for safety category A, B2, C2 acc. to standard PN- EN 14973 and are anti- electrostatic.

Cover Thickness

Minimum thickness of carrying cover (S_1) and running cover (S_2) is 2[mm]

Recommended maximal thickness of carrying cover (S_1) is:

- for types 800/3; 800/4; 1000/4; 1000/5- 10[mm]

- for higher types - 12[mm]

Recommended maximal thickness of running cover (S_2) is

- 6[mm]

Belt thickness

Table 2 shows approximate thickness of carcasses used for the non- inflammable rubber fabric conveyor belts with increased fire resistance GTP. 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 2 [mm]

S_1 – thickness of carrying cover [mm]

S_2 – thickness of running cover [mm]

Belt designation used for orders

	22721	200	1200	GTP	EP	1250	4	4+3	L	C2
where:										
completion acc. to standard										
quantity of the belt [m]										
width of the belt [mm]										
Mining Conveyor Belt										
material of plies										
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 cover rubber										
safety category acc. to PN-EN 14973										

Belt weight

Table 2 shows approximate weight of carcasses used for the non- inflammable rubber fabric conveyor belts with increased fire resistance GTP. An approximate weight of a belt containing covers of any thickness may be calculated from the following equation:

$$M = m_1 + 1,41 * (S_1 + S_2)$$

where:

- M – approximate weight of the belt [kg/m²]
- m₁ – weight of the belt carcass taken from Table 2 for specific type of the belt [kg/m²]
- S₁ – thickness of carrying cover [mm], S₁ minimum value is 2 [mm]
- S₂ – thickness of running cover [mm], S₂ minimum value is 2 [mm]

Minimum diameter of drums

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 belts

Typically on the carrying cover at the distance of 1÷3 [m] from the beginning and the ending of the belt, and not more than every 25 [m], a permanent mark will be made in form of relief impression in rubber, containing the required information according to the standard PN- EN ISO 22721.

Durable stamp includes following information : name (mark) of the manufacturer, name of the standard, type of the fabric, type of the belt (GTP), number of the plies, class of the rubber, safety category, the belt serial number, two last digits of the year of manufacture.

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:

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

For belt rolled up on the “tape recorder” (double roll) to upper formula use 0,5xL, to receive diameter of single ocular.

Table 1. Physical and mechanical properties of cover rubber for non- inflammable rubber fabric conveyor belts with increased fire resistance GTP

Parameter	Unit	Requirements for cover rubber		Testing method ¹	
		V			
Tensile strength, min.	TS	[MPa]	15	17	PN-ISO 37 (sample type 2)
Elongation at rupture min.	E _b	[%]	350		PN-ISO 37 (sample type 2)
Abrasion resistance, max.		[mm ³]	200	175	PN-ISO 4649 (method A)
Heat ageing resistance, in air, in condition: +70 [°C] after 168 [h.], max.	ΔTS	[%]	±25		PN-ISO 188 (method B)
	ΔE _b	[%]	±25		PN-ISO 37 (sample type 2)

¹ Tests acc. to current edition of standards.

Table 2. The range of manufactured belts including standard width, weight and thickness of carcasses for the Non- inflammable rubber fabric conveyor belts with increased fire resistance GTP.

Type of the belt/number of plies	Standard width of the belt [mm] ¹							Approximate thickness of the carcass S ³ [mm]	Approximate weight of the carcass [kg/m ²]
	650	800	1000	1200	1400	1600	1800		
800 /3	X	X	X	X	X	X	X	5,1	7,3
800 /4	X	X	X	X	X	X	X	6,2	9,2
1000 /3	X	X	X	X	X	X	X	5,4	7,8
1000 /4	X	X	X	X	X	X	X	7,0	9,7
1000 /5	X	X	X	X	X	X	X	7,9	11,4
1250 /3	X	X	X	X	X	X	X	6,3	9,1
1250 /4	X	X	X	X	X	X	X	7,4	10,4
1250 /5	X	X	X	X	X	X	X	8,9	12,1
1400 /3	-	X	X	X	X	X	X	6,6	9,4
1400 /4	-	X	X	X	X	X	X	7,8	11,3
1600 /3	-	-	X	X	X	X	X	7,2	10,1
1600 /4	-	-	X	X	X	X	X	8,6	12,1
1600 /5	-	-	X	X	X	X	X	9,4	13,0
1800 /4	-	-	X	X	X	X	X	9,0	12,5
1800 /5	-	-	X	X	X	X	X	9,9	14,2
2000 /4	-	-	X	X	X	X	X	9,0	12,5
2000 /5	-	-	-	X	X	X	X	10,9	15,1
2500 /4	-	-	-	X	X	X	X	12,8	16,6
2500 /5	-	-	-	X	X	X	X	12,4	16,7

¹ Types and width of the belts, other than determined in Table 2, shall be agreed with manufacturer.

Table 3. Minimum drum diameters [mm]

Drum group	Type of the belt / number of plies																		
	800/3	800/4	1000/3	1000/4	1000/5	1250/3	1250/4	1250/5	1400/3	1400/4	1600/3	1600/4	1600/5	1800/4	1800/5	2000/4	2000/5	2500/4	2500/5
A	630	800	630	800	1000	800	800	1000	800	1000	800	1000	1250	1000	1250	1000	1250	1400	1400
B	500	630	500	630	800	630	630	800	630	800	630	800	1000	800	1000	800	1000	1250	1250
C	400	500	400	500	630	500	500	630	500	630	500	630	800	630	800	630	800	1000	1000

Table 4. Physical and mechanical properties of the non- inflammable rubber fabric conveyor belts with increased fire resistance GTP

Parameter	Unit	Type of the belt							Test method acc. ¹	
		800	1000	1250	1400	1600	1800	2000		2500
Longitudinal tensile strength, min.	[N/mm]	800	1000	1250	1400	1600	1800	2000	2500	PN-EN ISO 283
Elongation at load equivalent to 10 [%] of nominal strength of the belt, max.	[%]	4,0								
Elongation at break, min.	[%]	10								
Adhesion resistance: - average results obtained from testing between plies, min. - average results obtained from testing between covers and carcass, min.	[N/mm]	6,0 4,5							PN-EN ISO 252 (method A)	
Heat ageing resistance, in air, in condition: +70 [°C] after 168 [h.], - between plies, max., - between covers and carcass, max.,	[%]	- 25 - 25							PN-ISO 188 (method B) PN-EN ISO 252 (method A)	
Combustion times determined by flame method ² : - total combustion time for each group of six samples with covers is shorter than: - maximum combustion time of a single sample with covers - total combustion time for each group of six samples without covers is shorter than: - maximum combustion time of a single sample without covers	[s]	45 15 45 15							PN-EN ISO 340	
Combustion and glowing times determined by flame method ³ : - average combustion and glowing time for each group of six samples with covers max: - maximum combustion and glowing time of a single sample with covers - average combustion and glowing time for each group of six samples without covers max: - maximum combustion and glowing time of a single sample without covers	[s]	5 10 10 15							PN-93/C-05013	
Electric resistance of the belt, max. ^{2,3}		3 x 10 ⁸							PN-EN ISO 284	
Low temperature resistance	[°C]	-25							PN-72/C-05011.06	

¹Tests acc. to current edition of standards.

²Evaluation criteria for safety category C2, B2 and A acc. to PN-EN 14973

³Evaluation criteria acc. to Council of Ministers Regulation (Rozporządzenia Rady Ministrów) dated 30 April 2004 on the admission of products for use in the mining plants (Dz. U. nr 99, pos.1003) with later changes.

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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