

Characteristics of raw material

Polyethylene PE-100 HDPE (natural, white colour)

Indicators	Rate	Units	Test methods
Smelting index (Skg)	0,21	g/10min	ASTM D1238
Density	0,949	g/sm ³	ASTM D1505
Water Absorption	<0,01	%	ASTM D570
Ultimate tensile strength	240	Kgf/sm ²	ASTM D638
Elongation (Brick)	>600	%	ASTM D638
Bending module	9,000	Kgf/sm ²	ASTM D790
Hardness (Rockwell)	40	R Scale	ASTM D785
Impact toughness (Izoda)	>50	Kgf sm/sm	ASTM D256
Resistance to stress cracking	>5,000	hr.Cond.B.10%	ASTM D1693
Melting point	133	°C	ASTM D3418
Softening Point (Vic)	124	°C	ASTM D1525
Oxidation induction time of 200 ° C	>60	min	ASTM D3895
Thermal diffusion temperature	65	°C	ASTM D648
Temperature of brittleness	<-70	°C	ASTM D746

Polyethylene PE-100 HDPE (black colour)

Physical properties and indicators	Value	Units	Test methods
Density (base material)	949-965	kg/m ³	ISO 1183/ISO 1872-2B
The melt flow index (190 ° C / 2.16 kg)	<0.1	g/10min	ISO 1133
The melt flow index (190 ° C / 5.0 kg)	0.25	g/10min	ISO 1133
Stretching force (50mm / min)	25	MPa	ISO 527-2
Stretching at rupture	>600	%	ISO 527-2
Charpy impact strength, notched, + 0 ° C	16	kJ/m ²	ISO 179/1eA
Hardness, Shore D	60	-	ISO 858
Black carbon content	≥2,5	%	ASTM D 1603
Vulnerability Temperature	<-70	°C	ASTM D 746
Thermal stability (210 ° C)	>15	min	EH 728
Minimum long-term strength, MRS	10	MPa	ISO/TR 9080

Polyethylene 63(no TDS 16337-77)

Indicators	Rate	Units	Test methods
Density	915-930	kg/m ³	ISO 1183
Melt flow rate 190 ° C / 5.0 kg	>0,8	gr/10min	ISO 1133
Ultimate tensile strength	19	MPa	ISO 527-2
50mm / min	800	MPa	ISO 527-2
Elasticity	>600	%	ISO 527-2
Heat resistance 200 ° C	>20	min	EH 728
Resistance to slow crack growth 8 bar, 80 ° C	>2000	hour	ISO 13479
Resistance to rapid growth of cracks	>7	bar	ISO 13477

Polyethylene LLDPE

Linear low density polyethylene, used as a universal additive. This additive improves the mechanical and dielectric properties of the product, provides high tensile strength.

To give transparency and flexibility, use a 10-20% LDPE additive.

Indicators	Rate	Units	Test methods
Properties of the polymer			
The melt flow rate at 190 ° and 2.16 kg	1,0	gr/10min	ISO 1133
Density	918	kg/m ³	ISO 1183(A)
Formulation			
Slip erucamide	1500	mg/kg	SABIC method
Antiblock	3500	mg/kg	SABIC method
Antioxidant	+	mg/kg	SABIC method
Optical properties			
Glitter (45 °)	42	%	ASTM D 2457
Turbidity	20	%	ASTM D 1003A
Transparency	20	mV	SABIC method
Physical properties			
Impact strength	22	kg/m	ASTM D 4272
Strength for wear TD	120	kN/m	ISO 6388-2
Wear resistance MD	40	kN/m	ISO 6383-2
Resistance to breakdown	380	J/m	SABIC method
Yield point of AP	11	MPa	
MD yield strength	11	MPa	
Ultimate Strength TD	30	MPa	
Strength limit of MD	37	MPa	
Deformation of TD destruction	800	%	
Deformation of MD destruction	600	%	
The modulus of elasticity of TD	180	MPa	
Modulus of elasticity of MD	160	MPa	
Coefficient of friction	0,1	-	ISO 8295
Blocking	15	Gr	SABIC method
Re-blocking	10	gr	SABIC method
Thermal properties			
Softening temperature at 10N (VST / A)	101	°C	ISO 306/B
Deformation of TD destruction	121	°C	SABIC method

PPRC Polypropylene Random Copolymer

Physical properties and indicators	Value	Units	Test methods
Density	905	kg/m ³	ISO 1183
Melt flow, (230 ° C / 2.16 kg)	0,3	gr/10min	ISO 1133
Bending module, (2mm / min)	800	MPa	ISO 1178
Tensile strength, (50mm / min)	25	MPa	ISO 527-2
Ultimate tensile strength, (50mm / min)	13,5	%	ISO 527-2
The elastic modulus at tension, (1mm / min)	900	MPa	ISO 527
Charpy impact strength, notched, (+ 23 ° C)	20	kJ/m ²	ISO 179/1eA
Charpy impact strength, notched, (0 ° C)	3,5	kJ/m ²	ISO 179/1eA
Charpy impact strength, notched, (-20 ° C)	2	kJ/m ²	ISO 179/1eA
Charpy Impact Strength, uncapped, (+ 23 ° C)	unknown	kJ/m ²	ISO 179/1eU
Charpy impact strength, uncarved, (-0 ° C)	unknown	kJ/m ²	ISO 179/1eU
Charpy Impact Strength, Unsurface, (-20 ° C)	40	kJ/m ²	ISO 179/1eU

Characteristics of raw fiberglass pipes

Orthophthalic resin

Physical properties

Physical properties and indicators	Value	Units	Test methods
Appearance	transparent	-	TM 2265
Acid number	25±5	mgKOH/gp	TM 2401
Viscosity, 23 °C	350±50	Pa·c	TM2013, TDS 25271
Solids content	60,3-62,3	%	TM 2033
Elastic modulus	3800	MPa	ASTM D790, ISO 178
Flexural strength	110	MPa	ASTM D790, ISO 178
Gel Time	10-20	min	TDS 22181, ASTM D2471
Time of thickening from 25 to 35 °C	13-24	min	TDS 22181, TM 2625, ASTM D2471
Heating time from 25 °C to max.	<40	min	TDS 22181, TM 2625 ASTM D2471
Peak temperature	140-180	°C	TDS 21970, TM 2625
Hardness of the finished resin	not less than 40	Barcol	ASTM D2583
Density, 23 °C	≈1120	kg/dm ³	TM 2160, ISO 1675, ASTM D1298
Flash point	≈33	°C	TM 2800
Guaranteed shelf life, at 10 ° -25 °C	6	month	TDS 27952
Colour	yellow/ brown	-	-
Monomer content	40±1	%	TM 2032

Isophthalic resin

Physical properties and indicators	Value	Units	Test methods
Appearance	transparent	-	TM 2265
Viscosity	370±100	Pa·c	TM2013, TDS 25271
Solids content	58-61	%	TM 2033
Time of thickening from 25 to 35 °C	8-16	min	TDS 22181, TM 2625, ASTM D2471
Heating time from 25 °C to max.	16-28	min	TDS 22181, TM 2625
Hardness of the finished resin	not less than 40	Barcol	ASTM D2583
Elastic modulus	not less than 3600	MPa	ASTM D790, ISO 178
Flexural strength	not less than 130	MPa	ASTM D790, ISO 178
Peak temperature	150-180	°C	TDS 21970, TM 2625
Acid number	15±5	Mg KON/gr	TM 2401
Coefficient of refraction	1536-1540	-	TM 2150
Density, 23 °C	≈1060	kg/dm ³	TM 2160, ISO 1675, ASTM D1298
Flash point	≈33	°C	TM 2800
Monomer content	45±2	%	TM 2032
Guaranteed shelf life, at 10 ° -25 °C	6	month	TDS 27952

Quartzisand**Grading**

The particle size is mm.	Retained on a sieve%	Missed hour sieve%
0,85	1,81	98,19
0,6	60,39	37,8
0,425	34,13	3,67
0,3	3,44	0,23
0,212	0,23	0
0,150	0,00	0
0,106	0,00	0

Chemical composition

Content	Quantity %
SiO ₂	98,1
Al ₂ O ₃	1,1
Fe ₂ O ₃	0,1
TiO ₂	0,8
CaO	0,6
K ₂ O	0,5
Na ₂ O	0,6

Physical properties

Absolute density	2,6 kg/ dm ³
Bulk density	1,5-1,7 kg/ dm ³
Mohs hardness	7
Zeger fire resistance	1710°C
Humidity	Max 0,1%
Combustion loss	Max 0,3%

Surface tulle

In terms of chemical composition, it is a glass fiber material of the "C" type, which has an increased chemical resistance.

Chemical composition

	«C» glass
SiO ₂	64,8
B ₂ O ₂	4,9
CaO	14,1
MgO	3,2
F ₂	-
K ₂ O	0,5
Na ₂ O	8,2
Al ₂ O ₃	4,0
Fe ₂ O ₃	0,3

Technical characteristics

	Rate	Value	Limits		Test methods
			MAX	MIN	
Weight of unit	30,0	gr/m ²	33,0	27,0	PTS-L-002
Contents of a bundle	9,0	%	11,0	7,0	PTS-L-003
Width	50,0	mm	52,0	48,0	
Thickness	0,33	mm	0,37	0,29	PTS-L-007
Air permeability @ 100Pa	6400	L/m ² /s	7040	5760	PTS-L-0039
Extensibility:					
longitudinal	-	N/50 mm	-	50	PTS-L-015
transverse	-	N/50 mm	-	35	PTS-L-015
Diameter of elementary fiber	-	mkm	3,0	1,0	TDS 6943.2

Fiberglass for winding

Linear weight (tex)	Fiber diameter (µm)	Loss of ignition (%)	Humidity (%)
ISO 1889	ISO 1888	ISO 1887	ISO 3344
600	10-17	0,5	≤0,2
1200	10-17	0,5	≤0,2
2400	10-24	0,5	≤0,2
4800	10-24	0,5	≤0,2

Chemical composition

	«E» glass
SiO ₂	54,5
B ₂ O ₃	7,9
CaO	17,7
MgO	4,1
F ₂	0,2
K ₂ O	0,1
Na ₂ O	0,5
Al ₂ O ₃	14,9
Fe ₂ O ₃	0,1

Physical and mechanical properties

		«E» glass	
Specific breaking load	mN/tex	400	TDS 6943.10
Young's modulus	N/mm ²	73500	
Elongation at rupture	%	3,4 – 4,0	TDS 6943.10
Density	kg/dm ³	2,55 – 2,65	
Coefficient. Poisson	-	0,22	
Diameter of elementary fiber	mkm	10-24	TDS 6943.2
Coefficient of thermal expansion	m/m 0°C	5°·10 ⁻⁶	
Sagging	mm	Not more than 60	TDS 6943.12

Compatible with many resins.

There is no static electrification.

It does not crumble.

The glass fiber lubricant should ensure good wettability and impregnation with unsaturated polyester resins.

It is semitransparent.

Guaranteed shelf life - 12 months.

The properties of glass fibers are determined mainly by their chemical composition. Characterized by high heat resistance, low thermal conductivity, low coefficient of thermal expansion, high chemical resistance and mechanical strength.

Fiberglass for chopping

Linear weight (tex)	Fiber diameter (um)	Loss of ignition (%)	Humidity (%)
ISO 1389	ISO 1888	ISO 1887	ISO 3344
2400	17	0,5	≤0,15

Light snap.

There is no static electrification.

It does not crumble.

The glass fiber lubricant should ensure good wettability and impregnation with unsaturated polyester resins.

Uniform distribution.

Easily crumbles.

Guaranteed shelf life - 12 months.

Chemical composition

Table 36

	«E» glass
SiO ₂	54,5
B ₂ O ₃	7,9
CaO	17,7
MgO	4,1
F ₂	0,2
K ₂ O	0,1
Na ₂ O	0,5
Al ₂ O ₃	14,9
Fe ₂ O ₃	0,1

Physical and mechanical properties

		«E» glass	
Specific breaking load	mN/tex	400	TDS 6943.10
Young's modulus	N/mm ²	73500	
Elongation at rupture	%	3,4 – 4,0	TDS 6943.10
Coefficient. Poisson	-	0,22	
Diameter of elementary fiber	mkm	10-24	TDS 6943.2
Coefficient of thermal expansion	m/m 0°C	5°-10 ⁻⁶	
Rigidity	mm	80	TDS 6943.13, ISO 3375
Warranty period of storage	month	12	

Fibrous tissue

The unit weight of the uniform surface is -800 g / m².

The standard width is 120cm.

High mechanical strength.

The glass fiber lubricant should ensure good wettability and impregnation with unsaturated polyester resins.

Guaranteed shelf life - 12 months.

Mat of chopped strands

The weight of a uniform surface unit is 450 g / m².

The standard width is 120cm.

Good solubility with binder.

Semi-transparent, well impregnated with adhesive material.

Has high mechanical resistance.

The loss of ignition is 2.7-4.3%.

Tensile strength min 195N.

The length of fiberglass should be between 20-50mm.

To protect against moisture, good packaging is required.

The glass fiber lubricant should ensure good wettability and impregnation with unsaturated polyester resins.

Guaranteed shelf life - 12 months.

Control additives and auxiliary materials

Styrene

Unsaturated hydrocarbon, which is a transparent colorless liquid with a characteristic odor under normal conditions. Tkip 145.2 ° C (760 mm Hg), the refractive index $n_{p20} = 1.5469$.

Styrene should not contain impurities, such as benzaldehyde, toluene, xylene.

Density, g / cm³ - 0.906.

Mass fraction of styrene,%, not less than - 99.8.

Mass fraction of phenylacetylene, % - 0.01.

Mass fraction of methyl ethylacrolein, % not more than - 0,006.

Mass fraction of divinylbenzene, % - 0.0005.

Mass fraction of acetophenol, % not more than - 0,006.

Mass fraction of carbonyl compounds, %, not more than - 0.01.

Mass fraction of polymerized styrene, % - 0.001.

Mass fraction of stabilizer, %, not less than - 0.0005.

Guaranteed shelf life - 12 months.

Polyester film

Products, on a teraphthalic base, thin, is an unsaturated polyester.

The thickness of the material is 21, 23, 36 microns.

The width should be no more than 60mm and not less than 50mm.

Stability in styrene: lavyan film when in styrene for 30min. should not be subject to change.

Humidity is not more than 1%.

At 50 ° C at nominal width, the extensibility should be 1N / mm.

Promoter D

N.N-Ethylacetamide

The liquid is yellow. The content of the main substance is 97.0% min.

Physical properties:

Density, 20 ° C 994kg / m³.

The melting point is below 73 ° C.

The flash point is 94 ° C.

Autoignition temperature is 220 ° C.

Guaranteed shelf life - 12 months.

Catalyst nl-49p

Cobalt (II) 2-ethylhexane, 1% Co in the solvent.

Composition 90% of TCI, 4% of white spirit.

Appearance - a transparent, bluish-violet liquid.

The cobalt content is $1.00 \pm 0.05\%$.

Density, 20 ° C - 949 kg / m³.

Viscosity, 20 ° C - 7MPa × cm.

The flash point is 89 ° C.

The autoignition temperature is not determined.

Shelf life - 12 months.

Catalyst nl-51p

Cobalt (II) 2-ethylhexane, 6% Co, in a solvent.

The composition is 40% TXIB, 25% white spirit.

Appearance - a transparent, bluish-violet liquid.

The cobalt content is $6.00 \pm 0.1\%$.

Density, 20 ° C - 963kg / m³.

Viscosity, 20 ° C - 16 mPas. S.

The flash point is 72 ° C.

The autoignition temperature is not determined.

Guaranteed shelf life - 12 months.

ButanoxM-50

Methyl ethyl ketone, peroxide in dimethyl phthalate.

The peroxide content is 33%.

Composition 63% DMF, 4% IEC + water.

Appearance is a clear, colorless liquid.

Total active oxygen is 8,8-9.9%.

Density, 20 ° C - 1180kg / m³.

The viscosity is 24 mPas.

The flash point is above 60 ° C.

The autoignition temperature is 260 ° C.

Guaranteed shelf life - 12 months.

Silica gel (Airosil)

Indicators	Value.	90	130	150	200	300	380
Attitude to water	Hydrophilic						
Appearance	loose						
Surface by BET	m ² /g	90±15	130±25	150±15	200±25	300±30	380±30
The average value of primary particles	nanometer	20	16	14	12	7	7
Density of tamping	r/n r/n	ca.80 -	ca.50 ca.120	ca.50 ca.120	ca.50 ca.120	ca.50 ca.120	ca.50 ca.120
packed goods (V marking)	%	<1	<1,5	<0,5	<1,5	<1,5	<1,5
Loss on drying (2 hours at 1050C) after leaving the factory	%	<1	<1	<1	<1	<2	<2,5
Losses during roasting (2 hours at 1000C)	3,6-4,5	3,6-4,3	3,6-4,3	3,6-4,3	3,6-4,3	3,6-4,3	3,6-4,3
SiO ₂	%	>99.8	>99.8	>99.8	>99.8	>99.8	>99.8
Al ₂ O ₃	%	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fe ₂ O ₃	%	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
TiO ₂	%	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
HCl	%	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Residue after sieving (according to Mocker, 45 µm)	%	<0,05	<0,05	<0,05	<0,05	<0,05	<0,05