

HDPE

Materials Selection



KAZANORGSINTEZ



HDPE

HIGH DENSITY POLYETHYLENE	GRADE	PE2NT21 - 13
HIGH DENSITY POLYETHYLENE	GRADE	PE2NT22 – 12
HIGH DENSITY POLYETHYLENE	GRADE	PE2NT74 – 15
HIGH DENSITY POLYETHYLENE	GRADE	PE2NT76 – 17
HIGH DENSITY POLYETHYLENE	GRADE	273 – 83
HIGH DENSITY POLYETHYLENE	GRADE	293 – 285D
HIGH DENSITY POLYETHYLENE	GRADE	273 – 285D
HIGH DENSITY POLYETHYLENE	GRADE	271 – 274K
HIGH DENSITY POLYETHYLENE	GRADE	273 – 79

PE 100 (Bimodal)

HIGH DENSITY POLYETHYLENE	TYPE PE100	GRADE	PE2NT11 – 9
HIGH DENSITY POLYETHYLENE	BIMODAL TYPE	GRADE	PE2NT11 – 285D




**HIGH DENSITY POLYETHYLENE
GRADE PE2NT21-13**
Injection molding
APPLICATION

Grade PE2NT21-13 is intended for further processing by injection moulding into articles for household and domestic use with increased cracking resistance such as bottle caps, box covers, caps, boxes, containers, trays, housewares, injection syringe parts and needles, toys.

TECHNICAL CHARACTERISTICS

	Parameter	Standard
1.	Density, kg/m ³ at 23°C at 20°C	948 - 955 950 - 957
2.	Melt flow index at 190°C and load of 2,16 kg, g/10 min	3.0 - 7.0
3.	Melt flow index spread within a batch, %, maximum	±15
4.	Number of inclusions, pieces, maximum	10
5.	Melt Flow Ratio (MFI 21.6 / MFI 2.16)	20 - 35
6.	Tensile yield strength, MPa minimum	25
7.	Rupture strength, % minimum	17
8.	Elongation at break, % minimum	-
9.	Cracking resistance, hours, minimum	30
10.	Weight content of pallets less than 2mm and more than 5 to 8 mm in size, %, maximum	1

Supply form: Pallets

Packing: Product is packed in polyethylene bags (one bag net weight 25.00 ±0,25kg) and stacked on flat pallets with shrink film. Maximum gross weight of a bundle is 2 tons.

Transport: by all modes of transport.

Storage: polyethylene shall be stored in enclosed dry space preventing from direct sunlight on shelves or pallets at least 5 cm from the floor and at least 1m from heaters, at a temperature max 30°C, relative humidity max 80%
Prior to processing bags with polymer shall be kept in production are for at least 12 hrs.

**HIGH DENSITY POLYETHYLENE
GRADE PE2NT22-12**
Injection molding
APPLICATION

Grade PE2NT22-12 is intended for further processing by injection moulding into articles for household and domestic use with increased cracking resistance such as bottle caps, box covers, caps, boxes, containers, trays, housewares, injection syringe parts and needles, toys.

TECHNICAL CHARACTERISTICS

	Parameter	Standard
1.	Density, kg/m ³ at 23°C at 20°C	958 - 965 960 - 966
2.	Melt flow index at 190°C and load of 2,16 kg. g/10 min	6.0 - 9.0
3.	Melt flow index spread within a batch, %, maximum	±15
4.	Number of inclusions, pieces, maximum	10
5.	Melt Flow Ratio (MFI 21.6 / MFI 2.16)	20 - 35
6.	Tensile yield strength, MPa minimum	28
7.	Rupture strength, % minimum	17
8.	Elongation at break, % minimum	-
9.	Cracking resistance, hours, minimum	-
10.	Weight content of pallets less than 2mm and more than 5 to 8 mm in size, %, maximum	1

Supply form: Pallets

Packing: Product is packed in polyethylene bags (one bag net weight 25.00 ±0,25kg) and stacked on flat pallets with shrink film. Maximum gross weight of a bundle is 2 tons.

Transport: by all modes of transport.

Storage: polyethylene shall be stored in enclosed dry space preventing from direct sunlight on shelves or pallets at least 5 cm from the floor and at least 1m from heaters, at a temperature max 30°C, relative humidity max 80%

Prior to processing bags with polymer shall be kept in production are for at least 12 hrs.

**HIGH DENSITY POLYETHYLENE
GRADE PE2NT74-15**
Blow Molding
APPLICATION

Grade PE2NT74-15 is intended for further processing by extrusion blow moulding method into domestic and industrial-use articles with a capacity of 3-20 liters such as flasks, water bottles, bottles for household chemistry and cosmetics.

TECHNICAL CHARACTERISTICS

	Parameter	Standard
1.	Density, kg/m ³ at 23°C at 20°C	946 - 953 949 - 955
2.	Melt flow index at 190°C and load of 49 N (5kgf), g/10 min	1.5 - 2.0
3.	Melt flow index spread within a batch, %, maximum	-
4.	Number of inclusions, pieces, maximum	-
5.	Weight content of ash, %, maximum	-
6.	Weight content of volatile substances, %, maximum	-
7.	Tensile yield strength, MPa minimum	26
8.	Rupture strength, MPa, minimum	30
9.	Elongation at break, %, minimum	750
10.	Cracking resistance, hours, minimum	60

Supply form: Pallets

Packing: Product is packed in polyethylene bags (one bag net weight 25.00 ±0,25kg) and stacked on flat pallets with shrink film. Maximum gross weight of a bundle is 2 tons.

Transport: by all modes of transport.

Storage: polyethylene shall be stored in enclosed dry space preventing from direct sunlight on shelves or pallets at least 5 cm from the floor and at least 1m from heaters, at a temperature max 30°C, relative humidity max 80%
Prior to processing bags with polymer shall be kept in production are for at least 12 hrs.

**HIGH DENSITY POLYETHYLENE
GRADE PE2NT76-17**
**Blow Molding
Film extrusion (blown)**
APPLICATION

Grade PE2NT76-17 is intended for further processing by extrusion blow moulding method into domestic and industrial-use articles with a capacity of up to 3 liters such as flasks, water bottles, bottles for household chemistry and cosmetics.

TECHNICAL CHARACTERISTICS

	Parameter	Standard
1.	Density, kg/m ³ at 23°C at 20°C	955 - 961 957 - 963
2.	Melt flow index at 190°C and load of 49 N (5kgf), g/10 min	2.3 – 3.3
3.	Melt flow index spread within a batch, %, maximum	±10
4.	Number of inclusions, pieces, maximum	5
5.	Weight content of ash, %, maximum	0.03
6.	Weight content of volatile substances, %, maximum	0.09
7.	Tensile yield strength, MPa minimum	26
8.	Rupture strength, MPa, minimum	30
9.	Elongation at break, %, minimum	750
10.	Cracking resistance, hours, minimum	30

Supply form: Pallets

Packing: Product is packed in polyethylene bags (one bag net weight 25.00 ±0,25kg) and stacked on flat pallets with shrink film. Maximum gross weight of a bundle is 2 tons.

Transport: by all modes of transport.

Storage: polyethylene shall be stored in enclosed dry space preventing from direct sunlight on shelves or pallets at least 5 cm from the floor and at least 1m from heaters, at a temperature max 30°C, relative humidity max 80%

Prior to processing bags with polymer shall be kept in production are for at least 12 hrs.

**HIGH DENSITY POLYETHYLENE
GRADE 273-83**
Blow Molding
APPLICATION

Grade 273-83 is intended to manufacture of industrial-use articles by means of extrusion and extrusion blow moulding (e.g. tanks, cans with a capacity of 5-20 l, intermediate bulk containers with a capacity of up to 200 liters), of cultural - and household-use articles including articles in contact with food. It can be used for manufacture of pipes and fittings, as well as for manufacture of various toys.

TECHNICAL CHARACTERISTICS

	Parameter	Standard
1.	Density, kg/m ³	0.950 - 0.955
2.	Melt flow index, g/cm ³	0.40 - 0.65
3.	Melt flow index spread within a batch, %, maximum	±10
4.	Number of inclusions, pieces, maximum	5
5.	Weight content of ash, %, maximum	0.04
6.	Weight content of volatile substances, %, maximum	0.09
7.	Tensile yield strength, MPa (kg/cm ²), minimum	22.6 (230)
8.	Rupture strength, MPa, (kg/cm ²), minimum	29.4 (300)
9.	Elongation at break, %, minimum	700

Supply form: Pallets

Packing: Product is packed in polyethylene bags (one bag net weight 25.00 ±0,25kg) and stacked on flat pallets with shrink film. Maximum gross weight of a bundle is 2 tons.

Transport: by all modes of transport.

Storage: polyethylene shall be stored in enclosed dry space preventing from direct sunlight on shelves or pallets at least 5 cm from the floor and at least 1m from heaters, at a temperature max 30°C, relative humidity max 80%

Prior to processing bags with polymer shall be kept in production area for at least 12 hrs.

**HIGH DENSITY POLYETHYLENE
GRADE 293-285 D**
Film Extrusion
APPLICATION

Grade 293-285D is intended for processing by extrusion method into film of minimum 5 μm thickness used for cold food packaging and other purposes such as bags, various packages.

TECHNICAL CHARACTERISTICS

	Parameter	Standard
1.	Density, kg/m^3	0.943 - 0.949
2.	Melt flow index, g/10 min	0.4 - 0.7
3.	Melt flow index spread within a batch, %, maximum	± 10
4.	Number of inclusions, pieces, maximum	3
5.	Weight content of ash, %, maximum	0.06
6.	Weight content of volatile substances, %, maximum	0.09
7.	Tensile yield strength, MPa, minimum	17
8.	Rupture strength, MPa, minimum	20.6
9.	Elongation at break, %, minimum	700

Supply form: Pallets

Packing: Product is packed in polyethylene bags (one bag net weight $25.00 \pm 0.25\text{kg}$) and stacked on flat pallets with shrink film. Maximum gross weight of a bundle is 2 tons.

Transport: by all modes of transport.

Storage: polyethylene shall be stored in enclosed dry space preventing from direct sunlight on shelves or pallets at least 5 cm from the floor and at least 1m from heaters, at a temperature max 30°C , relative humidity max 80%

Prior to processing bags with polymer shall be kept in production are for at least 12 hrs.

**HIGH DENSITY POLYETHYLENE
GRADE 273-285 D**
Film Extrusion
APPLICATION

Grade 273-285 D is intended for processing by extrusion method into film used for cold food packaging and other purposes such as bags, various packages.

TECHNICAL CHARACTERISTICS

	Parameter	Standard
1.	Density, kg/m ³	0.949 - 0.952
2.	Melt flow index, g/10 min	0.3 - 0.6
3.	Melt flow index spread within a batch, %, maximum	±10
4.	Number of inclusions, pieces, maximum	3
5.	Weight content of ash, %, maximum	0.04
6.	Weight content of volatile substances, %, maximum	0.09
7.	Tensile yield strength, MPa, minimum	19
8.	Rupture strength, MPa, minimum	21.6
9.	Elongation at break, %, minimum	700

Supply form: Pallets

Packing: Product is packed in polyethylene bags (one bag net weight 25.00 ±0,25kg) and stacked on flat pallets with shrink film. Maximum gross weight of a bundle is 2 tons.

Transport: by all modes of transport.

Storage: polyethylene shall be stored in enclosed dry space preventing from direct sunlight on shelves or pallets at least 5 cm from the floor and at least 1m from heaters, at a temperature max 30°C, relative humidity max 80%

Prior to processing bags with polymer shall be kept in production are for at least 12 hrs.



**POLYETHYLENE FOR CABLE INDUSTRY
GRADE 271-274K**

Cable Extrusion

APPLICATION

Grade 271-274K is intended for extrusion of insulation and shielding of cables.

TECHNICAL CHARACTERISTICS

	Parameter	Standard
1.	Density, kg/m ³	950 - 955
2.	Melt flow index, g/10 min: at load of 2.16kg at load of 5.0kg	0.30 – 65
3.	Melt flow index spread within a batch, %, maximum	±10
4.	Number of inclusions, pieces, maximum	10
5.	Weight content of ash, %, maximum	0.050
6.	Weight content of volatile substances, %, maximum	0.10
7.	Stress cracking resistance, hours, minimum	500
8.	Tensile yield strength, MPa minimum	22.6
9.	Rupture strength, MPa, minimum	21.6
10.	Elongation at break, %, minimum	700
11.	Wight content of extractable substances, %, minimum	Not specified
12.	Thermal oxidation resistance, hours, minimum	Not specified
13.	Photo-oxidation resistance, hours, minimum	Not specified.

Supply form: Pallets

Packing: Product is packed in polyethylene bags (one bag net weight 25.00 ±0,25kg) and stacked on flat pallets with shrink film. Maximum gross weight of a bundle is 2 tons.

Transport: by all modes of transport.

Storage: polyethylene shall be stored in enclosed dry space preventing from direct sunlight on shelves or pallets at least 5 cm from the floor and at least 1m from heaters, at a temperature max 30°C, relative humidity max 80%
Prior to processing bags with polymer shall be kept in production are for at least 12 hrs.



**POLYETHYLENE FOR CABLE INDUSTRY
GRADE 273-79**

Sheath Extrusion

APPLICATION

HDPE grade 273-79 is a high quality material, intended for production of industrial Pipes and Cables sheathing. It is made available primarily in black color and offers outstanding process and mechanical performances

TECHNICAL CHARACTERISTICS

	Parameter	Standard
1.	Density, kg/m ³	0.957 -0.964
2.	Melt flow index (MFI), at 190°C, g/10 min	0.30 –0.50
3.	Melt flow index ratio at N. 2.16kg load MFI (5)	20 -45
4.	Melt flow index spread within a batch % minimum	±10
5.	Number of inclusions, pieces, maximum	Not standardized
6.	Mass fraction of ash, %, maximum	0.04
7.	Mass fraction of volatiles %, maximum	0.09
8.	Tensile yield strength, MPa minimum	21.6 (220)
9.	Rupture strength, % minimum	24.5 (250)
10.	Elongation at break, %, minimum	700

Supply form: Pallets

Packing: Product is packed in polyethylene bags (one bag net weight 25.00 ±0,25kg) and stacked on flat pallets with shrink film. Maximum gross weight of a bundle is 2 tons.

Transport: by all modes of transport.

Storage: polyethylene shall be stored in enclosed dry space preventing from direct sunlight on shelves or pallets at least 5 cm from the floor and at least 1m from heaters, at a temperature max 30°C, relative humidity max 80% Prior to processing bags with polymer shall be kept in production are for at least 12 hrs.

**HIGH DENSITY POLYETHYLENE
TYPE PE 100 GRADE PE2NT11-9**
Pipe Extrusion
APPLICATION

Bimodal HDPE composition PE100 **Grade PE2NT11-9** is intended for production of pipes and fittings to gas distribution networks as well as pressure pipes and fittings to domestic water supply systems.

TECHNICAL CHARACTERISTICS

	Parameter	Standard
1.	Density, kg/m ³ at 23°C at 20°C	Minimum 930 956 – 962
2.	Thermal stability (oxidation induction time) ¹⁾ at 200°C ²⁾ , min, minimum	20
3.	Melt flow index (MFI) at 190°C, g/10 min a) at load of 212 N (2,16kgf) b) at load of 49 N (5kgf), minimum	6 - 8 0,12
4.	Melt flow index spread (MFI 5) within a batch, %	±20
5.	Weight content of volatile substances ³⁾ , mg/kg	≤ 350
6.	Water content ⁴⁾ , mg/kg	≤ 300
7.	Weight content of carbon black, %, within limits	2.0 - 2.5
8.	Carbon black distribution ⁵⁾	Class ≤ 3, Type A.1, A.2, A.3 or B
9.	Gas condensate (gas components) resistance ⁶⁾ (at 80°C and circular stress 2.0 MPa (on pipes d32 mm SDR 11), test duration of 20 h	Without destruction
10.	Resistance to rapid crack propagation (critical pressure pc, MPa) (e ≥ 20mm) (dn: 225 mm SDR 11) for C=2 (strength factor)	MOP/2.4 - 0.072
11.	Resistance to slow crack propagation (dn:110 mm SDR 11) ⁷⁾ , test duration of 500 hours	Without destruction in the course of testing
12.	Tensile resistance of butt welded joint at 23 °C (dn:110 mm with SDR 11), failure mode	Ductile-compliant brittle-non-compliant
13.	Durability at constant internal pressure (confirmation of classification) at 20 °C on pipes d 32mm with SDR 11 at initial stress, h, minimum 12.0 MPa 11.1 MPa	100 2500
14.	Classification (lower confidence limit of long-term durability), σ LCL, MPa	≥10

TYPE PE 100 GRADE PE2NT11-9

notes and test description

Notes:

- 1) Test atmosphere – oxygen, sample weight – (15 ± 2) mg.
- 2) it is permissible to carry out testing at 210 0 C or 220 0 C . In the event of disagreement, tests shall be carries out at 200 0 C .
- 3) Test result is not a rejecting one.
- 4) Water content shall be determined if weight content of volatile substances exceeds the set standard. At that, the difference between the obtained value of weight content of volatile substances and that of weight content of water shall not exceed 350 mg/kg. Requirement to water content in the composition is applied to the manufacturer at production stage, to the consumer – at processing stage (if water content exceeds the limiting value, then the material has to be dried prior to use).
- 5) In the event of disagreement, test samples shall be manufactured by pressing method.
- 6) 50% n-decane (98%) and 50% 1,3,5- trimethylbenzene by weight.
- 7) Internal pressure – 9.2 bar, test medium – water in water.

Supply form: Pallets

Packing: Product is packed in polyethylene bags (one bag net weight 25.00 \pm 0,25kg) and stacked on flat pallets with shrink film. Maximum gross weight of a bundle is 2 tons.

Transport: by all modes of transport.

Storage: polyethylene shall be stored in enclosed dry space preventing from direct sunlight on shelves or pallets at least 5 cm from the floor and at least 1m from heaters, at a temperature max 30°C, relative humidity max 80%

Prior to processing bags with polymer shall be kept in production are for at least 12 hrs.

**HIGH DENSITY POLYETHYLENE BIMODAL TYPE
GRADE PE2NT11-285D**
**Pipe Extrusion
Film extrusion**

APPLICATION

Grade PE2NT11-285D is intended for production of pipes and fittings, including domestic water supply systems, compositions for marking stripes, blow-moulded articles as well as for production of heavy duty PE films with minimum thickness of 20 μm .

TECHNICAL CHARACTERISTICS

	Parameter	Standard
1.	Density, kg/m^3 at 23°C at 20°C	947 - 950 949 - 952
2.	Melt flow index at 190°C, at load of 21.6 kgf, g/10 min	6 – 11
3.	Melt flow index spread (MFI 21,6) within a batch, %, maximum	± 10
4.	Tensile yield strength, MPa minimum	20
5.	Elongation at break, %, minimum	600
6.	Weight content of volatile substances, mg/kg, maximum	350
7.	Thermal stability at 200°C, min, minimum	20
8.	Durability at constant internal pressure at 80 °C, at initial stress in pipe wall 4.0 MPa (on pipes d110 SDR 11), h, minimum	165
9.	Durability at constant internal pressure at 80 °C, at initial stress in pipe wall 2.8 MPa (on pipes d110 SDR 11),h, minimum	1000
10.	Durability at constant internal pressure at 20 °C on pipes d32 mm SDR 11 at initial stress, h, minimum 12.4 MPa 11.6 MPa	100 2500

Note: Parameter 6 shall be determined by the processor when introducing polyethylene into production in order to make a decision on the necessity of preliminary drying and its modes. Test result is not a rejecting one.

Supply form: Pallets

Packing: Product is packed in polyethylene bags (one bag net weight 25.00 $\pm 0,25\text{kg}$) and stacked on flat pallets with shrink film. Maximum gross weight of a bundle is 2 tons.

Transport: by all modes of transport.

Storage: polyethylene shall be stored in enclosed dry space preventing from direct sunlight on shelves or pallets at least 5 cm from the floor and at least 1m from heaters, at a temperature max 30°C, relative humidity max 80%

Prior to processing bags with polymer shall be kept in production are for at least 12 hrs.



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