

PRODUCT CATALOGUE

HIGH DENSITY POLYETHYLENE





WHY CHOOSE MOL GROUP?



WE PROVIDE RELIABILITY OF SUPPLY

As an integrated oil, gas and petrochemicals company, we can rely on the efficiency benefits of the refinery integration process:

- ▶ Secured feedstock supply
- ▶ Robust financial background
- ▶ Strong position in the regional markets
- ▶ **High-quality** products provided by **state-of-the-art technologies**



WE INTEND TO BE YOUR PARTNER IN CARBON FOOTPRINT REDUCTION

- ▶ By offering **sustainable materials**
- ▶ By converting ~2 m tons of fuels to more valuable petrochemical feedstock by 2030
- ▶ Through **investments using highly efficient technologies** that integrate circular economy technologies into our core business: Danube refinery acquired the **Together for Sustainability** and the Tiszaújváros petrochemicals site got the **ISCC+ certification**
- ▶ Through bio and waste-based streams in production and scaling-up recycling



YOU CAN FIND US EVERYWHERE

- ▶ **Our offices are located in nine European countries**, including Hungary, Slovakia, Austria, Germany, Italy, Poland, Romania, Croatia and Ukraine

POLYETHYLENE CHARACTERISTICS

MOLECULAR AND CRYSTAL STRUCTURE, DENSITY

Polyethylene macromolecules and their co-polymers build chains consisting of thousands of $-CH_2-$ units. Depending upon polymerisation, this chain develops different branches | **FIG. 1** |.

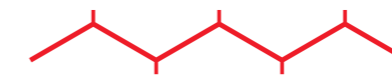
Owing to its molecular structure with branches of chain length, LDPE is referred to as branched polyethylene. In contrast with this, medium and high density grades have only short branches on their chains and are referred to as linear polyethylene. LDPE has long chain branches, which themselves are branched as well. These products are manufactured in a high pressure process (>1000 bar). Linear polyethylene is produced in a low pressure process (by Phillips grades about 40 bar and by Mitsui grades about 10 bar). Hexene-1 (Phillips grades) and butene-1 or propene (Mitsui grades) co-monomer built in the chain of these polyethylene grades produces side chains.

| **FIG. 1** | THE SCHEMATIC DIAGRAMS DEMONSTRATE THE STRUCTURE AND NUMBER OF BRANCHES OF VARIOUS POLYETHYLENE GRADES.



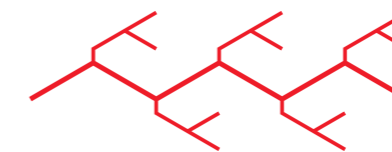
HDPE

Density: 0.94–0.97 g/cm³
Melting point (DTA): 123–128°C



MDPE

Density: 0.93–0.94 g/cm³
Melting point (DTA): 117–123°C



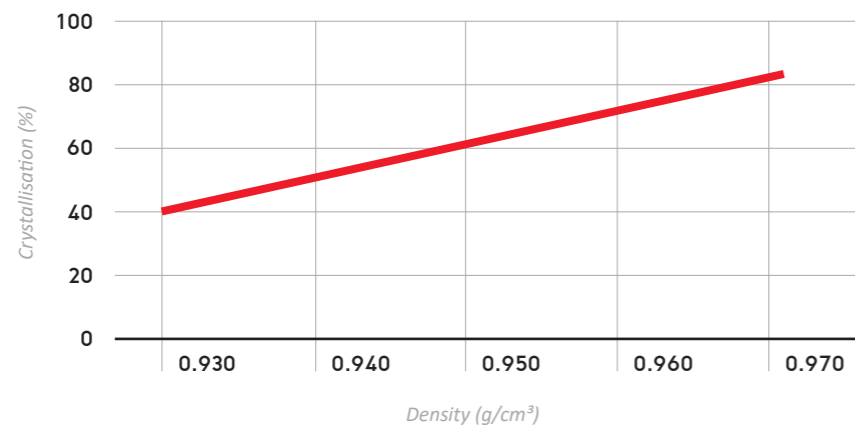
LDPE

Density: 0.91–0.925 g/cm³
Melting point (DTA): 105–115°C

The number of side chains is proportional to the amount of co-monomer built in the chain. As a result of the built-in co-monomer, the density and the degree of crystallinity will decrease. Polyethylene density (0.910–0.970 g/cm³) and molecular weight depend on polymerisation circumstances to some extent. Melt flow rate and density are characteristic indicatives of the polyethylene grade. Higher density is associated with a higher crystallisation and a lower number of branches.

Polyethylene is a partially crystalline polymer. The relationship between crystallisation ratio and density of HDPE is shown in | FIG. 2 |. The proportion of crystalline matter part or the density decides the polyethylene's melting characteristic. The melting point rises with the increase in crystallinity and density. The melting point varies between the melting point of LDPE (ca. 110°C) and that of HDPE (ca. 128°C).

| FIG. 2 | DEGREE OF CRYSTALLINITY AS A FUNCTION OF DENSITY



MOLECULAR WEIGHT, MELT FLOW RATE, MELT VISCOSITY AND FLOW CHARACTERISTICS

Chain length, or the average molecular weight is one of the important characteristics indicative of the degree of linkage. Changes in the molecular weight will definitely change melt viscosity, highly effecting on the processing properties. A high molecular weight polymer has a high melt viscosity. To measure flow properties, a parameter melt flow rate is used according to ISO 1133. High melt flow rate means easy flowing and low molecular weight. Melt flow rate is defined by a one point method, a test that can be performed quite easily under laboratory circumstances. It is important, however, that the molecular weights, melt flow rates and flow characteristics of identical polyethylene grades manufactured in different processes may differ even though they have the same melt flow rate.

MOLECULAR WEIGHT DISTRIBUTION

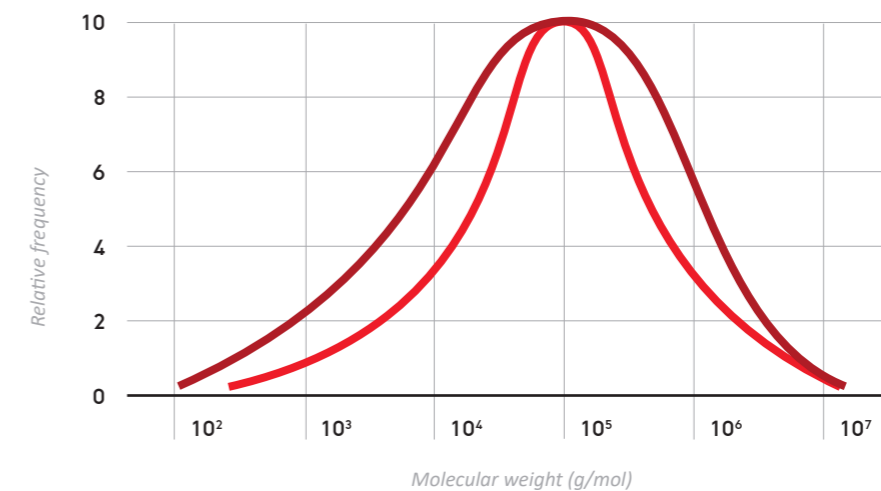
Polyethylene consists of molecules of different chain lengths, giving different molecular weights. This is clearly shown by the diagram demonstrating the frequencies of various molecular weight | FIG. 3 |. Molecular weight distribution influences both processing and end product properties. For example, a narrow molecular weight distribution is needed for the injection moulding of resins if the moulded parts are to be free from all distortion and internal stresses which might compromise their environmental stress cracking resistance (ESCR).

At the same time, a high molecular weight polyethylene with a wider molecular weight distribution is more suitable for the manufacture of blow moulded products, pipes and films. It should be remembered, however, that the low and medium molecular weight fractions account for easy processing. The high molecular weight fraction gives good mechanical properties (impact strength, creep and warp resistance and ESCR).

The narrower the molecular weight distribution

- ▶ The lower the internal stresses
- ▶ The higher the stretchability

| FIG. 3 | ■ NARROW MOLECULAR WEIGHT DISTRIBUTION
■ BROAD MOLECULAR WEIGHT DISTRIBUTION



The most important property of HDPE is its mechanical strength with easy processing capability, and this can be realized through bimodal high molecular weight HDPE. The low molecular weight component provides good processability, while the high molecular weight component gives excellent mechanical strength.

FIG. 4 | MOLECULAR WEIGHT DISTRIBUTION OF BIMODAL TYPE



OTHER PROPERTIES

SHRINKAGE

The shrinkage of finished products manufactured from HDPE takes place in the crystallisation phase. The extent of crystallisation depends on the processing parameters (temperature, pressure, throughput, thickness, cooling speed, etc.), but molecular structure (molecular weight and weight distribution) is a further factor having an effect on crystallisation. Shrinkage accounts 3–4% in pipe diameters. Shrinkage can be max. 5% in fittings made from pipe grades. Shrinkage can be exactly determined only after 24 hours following injection moulding, because after crystallisation and the compensation of the generated internal stresses will result in further dimensional changes in the finished products. The extent of after shrinkage is time and temperature dependent. After shrinkage time, when shrinkage can reach 1% max., can be reduced by increased storage temperatures.

WEATHER RESISTANCE

HDPE grades have a good resistance to light in the visible spectrum. However, when stored in the open air, they can get damaged by the combined effects of atmospheric oxygen and UV radiation. As a result, their durability and tensile strength lessen, and they may discolour. The useful life of polyethylene can be increased by two or four times with a UV stabiliser added to the blend. The great number of available UV stabilisers allows manufacturers to select the right grade to make a product most suitable for the weather conditions, end product and the environment of application. Special carbon blacks, the best UV stabilisers so far, can extend the useful lives of the products by 10–15 times when added in amounts of 2–3%. Pigments also can improve UV resistance, although, these additives may cause some undesirable side effects, as well.

APPLICATION

The wide range of grades and the careful selection of characteristics of the individual grades allow various applications including:

Blown film grades

for heavy duty bags, industrial bags, shopping bags, garbage bags and packaging films for medicines and foods

Blow moulding grades

to manufacture household plastic products, bottles and cans for foods including oils and large capacity barrels for household or industrial chemicals, corrugated pipes

Pipe grades

for non-pressure corrugated and protective pipes

Sheet extrusion grades

for sheets and thermoformed sheets

Injection moulding grades

for houseware and industrial packaging, consumer goods

Split film yarn

for agricultural packaging (raschel bag, round bale net)

CODING SYSTEM

TIPELIN IS THE REGISTERED TRADEMARK FOR MEDIUM AND HIGH DENSITY POLYETHYLENE GRADES (MDPE AND HDPE) PRODUCED BY MOL PETROCHEMICALS CO. LTD. ON TISZA SITE.

GRADES PRODUCED BY PHILLIPS TECHNOLOGY:

TIPELIN GRADES PRODUCED BY PHILLIPS TECHNOLOGY ARE IDENTIFIED BY A CODE SYSTEM CONSISTING OF TWO LETTERS AND FIVE DIGITS.

The **first letter** is for the application of the polymer

F = **Film**
B = **Blow moulding, corrugated pipes, sheets**

The **first and second digits** are identical with the second and the third decimals of the number indicating nominal density

The **fourth and fifth digits** identify the additive system in the polymer

FS 383 - 03

The **second letter** indicates the melt flow rate (MFR) range in g/10 min at 190°C and 2.16 kg

S < 0.20
A = 0.20–0.50
B = 0.50–1.0

The **third digit** is an internal plant code

GRADES PRODUCED BY MITSUI TECHNOLOGY:

TIPELIN HIGH DENSITY POLYETHYLENE GRADES PRODUCED BY MITSUI TECHNOLOGY ARE IDENTIFIED BY A CODE SYSTEM CONSISTING OF FOUR DIGITS AND ONE LETTER.

The **first digit** indicates the melt flow rate (MFR) range in g/10 min at 190°C and 2.16 kg

1 = 5.0–10
2 = 3.0–5.0
3 = 1.0–3.0
5 = 0.40–1.0
6 = 0.20–0.40
7 = 0.05–0.20

Second, third and fourth digits are internal codes

7000F

Letters at the end of the grade name show main application of the grade

B = **Blow moulding**
F = **Film**
J = **Injection moulding**
M = **Pipe extrusion**
S = **Sheet extrusion, fiber**

BLOW MOULDING, PIPE AND SHEET GRADES

TYPICAL PROPERTIES, CANNOT BE CONSIDERED AS SPECIFICATION															
Grade/ Parameter	Melt Mass – Flow Rate (MFR)	Density 23°C ⁴	Tensile Stress at Yield ⁴	Tensile Strain at Yield ⁴	Tensile Stress at Break ⁴	Tensile Strain at Break ⁴	Flexural Modulus ⁴	Notched Izod Impact Strength ⁴	Vicat Softening Temperature ⁴	Hardness Shore D ⁴	ESCR F50 B method	OIT 200°C	Application		
Unit	g/10 min	kg/m ³	MPa	%	MPa	%	MPa	kJ/m ²	°C	–	h	min	–		
Test method	ISO 1133-1	ISO 1183-2	ISO 527-3	ISO 527-3	ISO 527-3	ISO 527-3	ISO 178	ISO 180/A	ISO 306/A 120	ISO 868	ASTM D 1693	EN 728	–		
BLOW MOULDING GRADES	UNIMODAL	TIPELIN BS 501-17	0.18 ¹ 0.94 ² 22 ³	950	26	12	25	1200	1350	15	128	64	100 ⁵	>5	Bottles and cans of max. 10 litre capacity for aggressive, household chemicals and detergents, corrugated pipes
		TIPELIN BS 520-14	0.10 ¹ 0.45 ² 10 ³	952	28	12	34	1500	1400	24	130	65	260 ⁵	40	Balloons and drums up to 220 l for aggressive industrial chemicals, thermoforming
		TIPELIN BS 502-43	0.20 ¹ 0.76 ² 19 ³	950	26	12	25	1300	1350	15	128	64	100 ⁵	90	Bottles and cans of max. 10 litre capacity for non-aggressive household chemicals and detergents, corrugated pipes
		TIPELIN BA 550-13	0.35 ¹ 1.5 ² 28 ³	954	29	11	21	1200	1500	14	130	65	40 ⁵	>5	Bottles and cans of max. 30 litre capacity for non-aggressive household chemicals, cosmetics and oils, corrugated pipes
		TIPELIN BB 620-17	0.65 ¹ 2.9 ² 50 ³	961	31	10	20	1200	1800	14.5	131	67	>13 ⁵	>5	Small bottles, corrugated pipes
	BIMODAL	TIPELIN 6000B	0.30 ¹ 1.3 ² 30 ³	958	30	10	20	1100	1700	8.5	129	66	150 ⁶	30	Thin walled bottles of max. 5 litre capacity for consumer goods (cosmetics, daily care), corrugated pipes
		TIPELIN 6010B	0.30 ¹ 1.3 ² 30 ³	958	30	10	20	1100	1700	8.5	129	66	150 ⁶	90	Thin walled bottles of max. 5 litre capacity with long colour stability, consumer goods (cosmetics, daily care)
		TIPELIN 6300B	0.30 ¹ 1.3 ² 30 ³	954	28	10	20	1100	1500	8.5	128	65	350 ⁶	30	Bottles and containers of max. 10 litre capacity for detergents and household chemicals, corrugated pipes
		TIPELIN 6301B	0.30 ¹ 1.3 ² 30 ³	954	28	10	20	1100	1500	8.5	128	65	300 ⁶	105	Bottles and containers up to 10 litre capacity for detergents and household chemicals, corrugated pipes
		TIPELIN 7300B	0.10 ¹ 0.40 ² 11 ³	954	28	11	30	1350	1500	15	129	65	>800 ⁶	50	Jerry can for aggressive industrial chemicals, sheet extrusion
PIPE AND SHEET GRADES	TIPELIN 7305B	8.5 ³	952	27	11	30	1400	1400	17	129	64	>1000 ⁶	70	Jerry cans for dangerous goods	
	TIPELIN 7700M	0.06 ¹ 0.26 ² 8.0 ³	948	24	12	33	1550	1250	21	127	63	>10000 ⁶	>100	Non-pressure pipes and sheet manufacturing	
	TIPELIN 7100S	0.12 ¹ 0.50 ² 13 ³	948	24	12	32	1500	1250	15.5	127	63	>10000 ⁶	120	Extrusion of sheets for industrial parts and for non-pressure pipe extrusion	
	TIPELIN 7111S	0.12 ¹ 0.50 ² 13 ³	948	24	12	32	1500	1250	15.5	127	63	>10000 ⁶	>120	Non-pressure pipes and sheet manufacturing	
	TIPELIN 6500E	0.3 ¹	950	26	11	29	1450	1250	10	126	–	>500 ⁶	>120	Microducts, optical fiber protection pipes	

NOTES

¹ MFR at 190°C and 2.16 kg

² MFR at 190°C and 5 kg

³ MFR at 190°C and 21.6 kg

⁴ Values have been measured on standard pressed specimens (ISO 293) conditioned at room temperature (ISO 291)

⁵ Values have been measured in 100% Igepal CO-630 on standard pressed specimens (ISO 293) conditioned at room temperature (ISO 291)

⁶ Values have been measured in 10% Igepal CO-630 on standard pressed specimens (ISO 293) conditioned at room temperature (ISO 291)

For the actual values and product portfolio please check www.molgroupchemicals.com

INJECTION MOULDING, FIBER AND FILM GRADES

TYPICAL PROPERTIES, CANNOT BE CONSIDERED AS SPECIFICATION

	Grade/ Parameter	Melt Mass – Flow Rate (MFR)	Density 23°C ⁴	Tensile Stress at Yield	Tensile Strain at Yield	Tensile Stress at Break	Tensile Strain at Break	Elmendorf Tear Resistance	Dart Drop (F50)	Flexural Modulus	Notched Izod Impact Strength	Spencer Impact Strength	Vicat Softening Tempera- ture	Hardness Shore D	ESCR F50 B method ⁷	OIT 200°C	Recom- mended film thickness	Application
	Unit	g/10 min	kg/m ³	MPa	%	MPa	%	cN	g	MPa	kJ/m ²	MPa	°C	–	h	min	mm	–
	Test method	ISO 1133-1	ISO 1183-2	ISO 527	ISO 527	ISO 527	ISO 527	ISO 6383-2	ISO 7765-1 method A	ISO 178	ISO 180/A	ASTM D 3420	ISO 306/A 120	ISO 868	ASTM D 1693	EN 728	–	–
INJECTION MOULDING GRADES	TIPELIN 3100J	2.0 ¹	952	25 ⁹	12 ⁹	25 ⁹	1100 ⁹	–	–	1000 ⁹	10 ⁹	–	127 ⁹	62 ⁹	20	60	–	Injection moulding and compression moulding, caps and closures for carbonated soft drinks, engineering and technical parts
	TIPELIN 1100J	8.0 ¹	961	28 ⁹	11 ⁹	11 ⁹	800 ⁹	–	–	1400 ⁹	4.5 ⁹	–	128 ⁹	63 ⁹	>3	35	–	Recommended for manufacturing daily necessities, kitchen housewares, boxes, crates, trays, toys, caps, cartridges
	TIPELIN 1108J	8.0 ¹	961	28 ⁹	11 ⁹	11 ⁹	800 ⁹	–	–	1400 ⁹	4.5 ⁹	–	127 ⁹	63 ⁹	>3	120	–	Recommended for manufacturing daily necessities, kitchen housewares, boxes, crates, trays, toys, caps, cartridges, contains UV stabilizer package
UNIMODAL	TIPELIN 5700S	0.50 ¹ 1.7 ² 25 ³	947	23/23 ⁶	–	46/45 ⁶	750/900 ⁶	17/150 ⁶	47 ⁶	1200 ⁴	10 ⁴	32 ⁶	126 ⁴	62 ⁴	–	100	Primer film: 0.06–0.12 Fibre: 0.018–0.025	Split yarn fibres for agricultural applications, films, bags
	TIPELIN FS 340-03	0.17 ¹ 0.78 ² 14 ³	935	22/17 ⁵	–	47/43 ⁵	700/800 ⁵	50/320 ⁵	86 ⁵	800 ⁴	–	34 ⁵	119 ⁴	60 ⁴	–	25	0.015–0.06	Heavy duty bags, industrial films, multilayer films, blend component for LDPE
	TIPELIN FA 381-10	0.28 ¹ 1.2 ² 21 ³	938	22/17 ⁵	–	47/43 ⁵	750/800 ³	50/360 ⁵	85 ⁵	850 ⁴	–	34 ⁵	121 ⁴	60 ⁴	–	25	0.015–0.06	Bags, shopping bags, multilayer films, blend component for LDPE
	TIPELIN FS 383-03	0.18 ¹ 0.80 ² 15 ³	938	23/18 ⁵	–	51/43 ⁵	700/800 ⁵	47/280 ⁵	90 ⁵	850 ⁴	–	34 ⁵	121 ⁴	60 ⁴	–	30	0.015–0.06	Bags, shopping bags, multilayer films, blend component for LDPE
	TIPELIN FS 471-02	0.18 ¹ 0.80 ² 15 ³	946	23/20 ⁵	–	51/43 ⁵	700/850 ⁵	23/300 ⁵	80 ⁵	1150 ⁴	–	34 ⁵	126 ⁴	63 ⁴	–	30	0.008–0.06	Extra thin packaging films, bags, shopping bags, garbage bags
	TIPELIN FB 472-02	0.69 ¹ 2.7 ² 40 ³	947	23/20 ⁵	–	46/37 ⁵	700/950 ⁵	25/230 ⁵	47 ⁵	1200 ⁴	–	28 ⁵	126 ⁴	63 ⁴	–	30	0.015–0.06	Bags, shopping bags, garbage bags, blend component for LDPE primarily for shrink film
	TIPELIN BB 620-17	0.65 ¹ 2.9 ² 50 ³	961	27/24 ⁵	–	38/23 ⁵	750/550 ⁵	12/100 ⁵	22 ⁵	1800 ⁴	–	10 ⁵	131 ⁴	67 ⁴	–	>5	–	Multilayer shrink films and packaging films, blend component for LDPE in core layer.
	TIPELIN 7000F	0.08 ¹ 0.30 ² 9.0 ³	955	27/24 ⁶	–	62/45 ⁶	500/550 ⁶	15/150 ⁶	200 ⁶	1500 ⁴	16 ⁴	85 ⁶	129 ⁴	64 ⁴	–	50	0.006–0.06	Ultra-thin film, merchandise bags, disposal waste bags
	TIPELIN 7500F	0.095 ¹ 0.30 ² 10 ³	952	26/21 ⁶	–	60/44 ⁶	500/600 ⁶	14/140 ⁶	180 ⁶	1400 ⁴	16 ⁴	85 ⁶	128 ⁴	64 ⁴	–	55	0.006–0.06	Ultra-thin film, merchandise bags, disposal waste bags

NOTES

¹ MFR at 190°C and 2.16 kg

² MFR at 190°C and 5 kg

³ MFR at 190°C and 21.6 kg

⁴ Values have been measured on standard pressed specimens (ISO 293) conditioned at room temperature (ISO 291)

⁵ The thickness of the film: 0.025 mm for the mechanical measurement (MD/TD: MD = machine direction, TD = trans direction), blow up ratio 4:1

⁶ The thickness of the film: 0.015 mm for the mechanical measurement (MD/TD: MD = machine direction, TD = trans direction), blow up ratio 4:1

⁷ Values have been measured in 100% Igepal CO-630 on standard pressed specimens (ISO 293) conditioned at room temperature (ISO 291)

⁸ Values have been measured in 10% Igepal CO-630 on standard pressed specimens (ISO 293) conditioned at room temperature (ISO 291)

⁹ Values have been measured on standard injection moulded specimens (ISO 294-1) conditioned at room temperature (ISO 291)

For the actual values and product portfolio please check www.molgroupchemicals.com

PROCESSING CONDITIONS OF TIPELIN MDPE AND HDPE GRADES

FILM MANUFACTURING

Considering their characteristics, TIPELIN film grades are medium and high density polyethylenes with a typically wide molecular weight distribution. To manufacture these grades a HDPE processing unit with a 0.7–1.2 mm die gap and melt temperatures of 200–220°C are recommended. To reach optimum mechanical properties a high blow up ratio (*minimum 4:1*) should be applied.

Generally, the frost line height is 5–8 times of the die diameter. TIPELIN FS 340-03, FS 383-03, FA 381-10 and FB 472-02 may be processed on machines designed for LDPE as LDPE, LLDPE or other blends containing HDPE. Depending on the extruder design and processing conditions, the film thickness range can be 0.007–0.200 mm.

PIPE AND SHEET EXTRUSION

Pipes and sheets can be manufactured from TIPELIN grades in a profile extrusion process. For the extrusion of TIPELIN profiles, screw of at least 20 D, shorter compression zone (*1-3 D*) and a 2–2.5 compression ratio should be applied. The constant pitch of the screw should be equal with or less than the diameter. Recommended processing temperatures are 170–220°C for extrusion.

BLOW MOULDING

TIPELIN blow moulding grades are high density polyethylenes with typically low MFR and a wide molecular weight distribution. TIPELIN blow moulding grades process well on extruders whose screw is not less than 20 D, constant pitch is equivalent with or less than diameter, compression zone is shorter (*1-2 D*) and where compression ratio is 2.5–3. Recommended melt temperatures are 180–220°C.

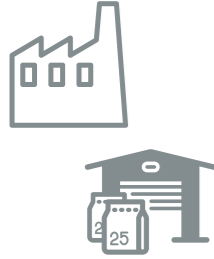
PHYSICAL PROPERTIES*

Quantity	Method	Value	Unit
Thermal expansion (20°C)	ASTM D696	12.6×10^{-5}	°C ⁻¹
Thermal conductivity (20°C)	ISO 8302	0.48	W/(m·K)
Thermal conductivity (150°C)	ISO 8302	0.2	W/(m·K)
Electric resistivity	DIN IEC 93	10^{13} – 10^{16}	Ohm·m
Dielectric constant (1 MHz)	ASTM D150	2.4	–
Specific heat	ASTM C351	1800–2700	J/kg·K
Melting temperature	Internal method (DSC)	125–135	°C
Glass transitional temperature	ASTM E1356	–80	°C
Breakdown potential	IEC 243-1	17.7–19.7	kV/mm
Dielectric loss factor	ASTM D150	0.0005–0.0008	
Friction coefficient	ASTM D1894	0.25–0.3	
Refraction index	ISO 489	1.52–1.53	
Shrinkage	ISO 294-4	2.4–4.0	%
Water absorption	ASTM D570	0.01–0.015	%
Fatigue	ASTM D671	18–20	MPa

* These physical values are based on literature data. The values can change with different types, these values are not specified and not guaranteed

STORAGE & HANDLING

PACKAGING



- ▶ 25 kg polyethylene bags
- ▶ Transported on shrink-wrapped or stretch-wrapped pallets
 - eligible load of polymer 1375 kg
- ▶ Adhesive is used between the bags in case of TIPELIN to avoid their slipping
 - pay attention during the removal of the bags from the pallets
 - lift the bag at first without rotation
- ▶ Heat-treated pallets from PRS
 - a member of the Faber Halbertma Group, operating a pooling system that collects the pallets after use and organises reuse as part of a sustainable, circular system
 - PRS pallets remain the property of PRS at all times

TRANSPORTATION



- ▶ By truck
- ▶ Road silo
- ▶ Rail silo
- ▶ For details please see [Services](#) on www.molgroupchemicals.com

STORAGE



- ▶ Polyethylene is a combustible substance
 - adhere to the fire safety rules
- ▶ Do not store polyethylene in conditions of high humidity and fluctuating temperatures
 - atmospheric moisture can condense inside the packing
 - if it happens, dry the pellets before use
- ▶ Do not expose to UV radiation and temperatures above 40°C
- ▶ The producer does not take responsibility for any damages caused by adverse storage

STATEMENTS

REACH COMPLIANCE



- ▶ Polymers are exempt from registration
- ▶ SLOVNAFT, a.s. and MOL Petrochemicals Co. Ltd. use REACH-compliant raw materials (monomers and relevant additives)
- ▶ TIPELIN grades do not contain any substances specifically identified as SVHC at levels greater than 0.1%
- ▶ For more detailed information see [REACH/SVHC](#) statement on www.molgroupchemicals.com

APPLICATION FOR FOODS



- ▶ Most TIPELIN grades satisfy the regulations applied by European countries (EEC)
- ▶ In case of country-specific regulations or food industrial product licenses, contact MOL Petrochemicals Co. Ltd. and SLOVNAFT, a.s. for special information
- ▶ For more detailed information related to product safety, see [Declaration data sheets](#) on www.molgroupchemicals.com

SAFETY



- ▶ Polyethylene is not regarded as hazardous material when in contact with the skin or inhaled
- ▶ Any contact with the molten polymer or the inhalation of the released gases should be avoided during processing
- ▶ Install exhaust unit over processing machine and secure good ventilation of the area.
- ▶ For further information see [Material Safety Data Sheets](#) on www.molgroupchemicals.com.

RECYCLING



- ▶ Polyethylene resins are suitable for recycling using modern recycling methods.
- ▶ In-house production waste should be kept clean to facilitate direct recycling.

DISCLAIMER

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CERTIFICATES

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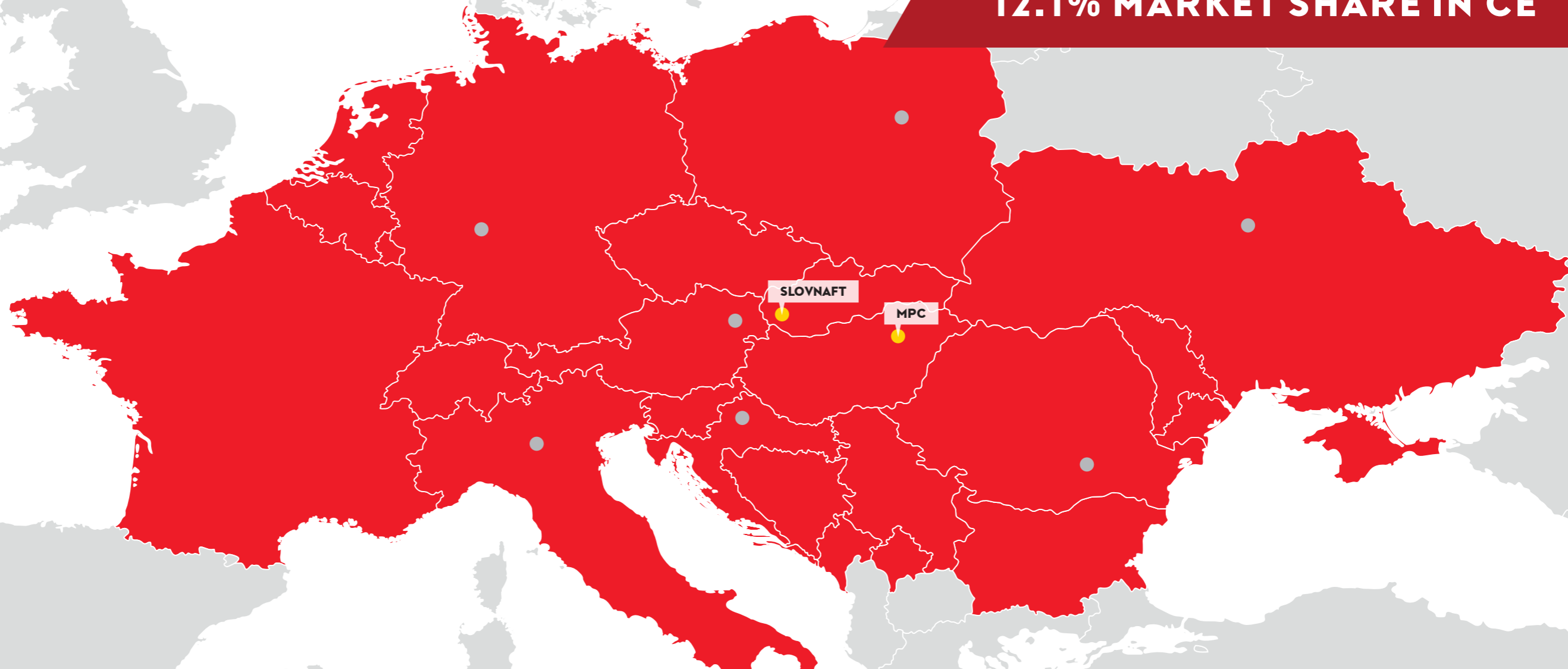
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