DATA SHEET

High density polyethylene pipe intended for networks of water distribution and transport

Product identification

Pipes made of raw material HDPE PE112- MRS= 11.2 Mpa, HDPE PE100- MRS= 10Mpa, PE100RCMRS=10Mpa, HDPE PE80-MRS = 8Mpa, black color intended for applications under pressure and madeaccording to EN 12201-2:2024.

The products are intended for:

- Drinking water transport and distribution networks;
- Raw water transport networks;
- Sewage networks under pressure (by pressure/vacuum);
- Drainage networks;
- External hydrant supply networks for extinguishing fires.

Pipes made according to EN 12201-2:2024 will be used under the following conditions:

- Underground posing
- Extraterrestrial pose*
- Temperature regime 20oC*
- Maximum operating pressure up to 25 bars

*Temperatures between 20 ÷ 400C are possible with the application of pressure reduction coefficients.

SC TEHNO WORLD SRL has implemented and certified an integrated management system according to ISO9001:2015, ISO 14001:2015 and ISO 45001:2018.
The pipe is approved in Romania by Technical Approval, producer SC TEHNO WORLD SRL

Product standards

- EN 12201-1-2:2024 – "Sewage systems made of plastic materials, for water supply,fittings and exhaust systems under pressure - Polyethylene (PE)

- ISO 4427:2019 –" Sewage systems of plastic materials. Polyethylene pipes and fittings forwater supply"

- DIN 8074: 2011-"PE80/PE100 pipes. size

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Raw material

The raw material used in the production process is high density polyethylene (PEHD). Polyethylene belongs to a family of polymers called polyolefins.
Depending on the type of raw material usedextrusion, PEHD pipes produced by S.C. TEHNO WORLD S.R.L. are divided into: PE 80 pipes, PE 100 pipes,PE100RC pipes, PE112 pipes.
The raw material is supplied in granules and is produced by:

MANUFACTURER	PE TYPE	PE CODE
SABIC	PE 112	HDPE P 6006AD
SABIC	PE 100	Vestolen A 6060R Black
SABIC	PE 100	HDPE P 6006
BOREALIS	PE 100	HE 3490LS
LUONDELL BASELL	PE 100	Hostalen CRP 100 Black
BOREALIS	PE 80	HE 3470-LS
UNIPETROL RPA	PE 80	Liten PL 10
SABIC	PE 100-RC	Vestolen A Rely 5922 R 10000
BOREALIS	PE 100-RC	HE 3490 LS-H
BOREALIS	PE 100-RC	HE 3490 LS-HP
BOREALIS	PE 100-RC	HE 3490 LS-HW
LYONDELL BASELL	PE 100-RC	Hostalen CRP 100 CR Black

All the producing companies are certified and approved by international companies and the materials correspond to the conditions imposed by SR ISO 9080.

General characteristics

The HDPE pipe made according to SR EN 12201 is black in color, with coextruded stripes indicating the destination of the product*:

- Blue stripes: pipe intended for the transport of drinking water
- Brown stripes: sewage or drainage
- Green stripes: irrigation

*The color may vary depending on the national provisions and the customer's request
The pipes are produced by continuous extrusion, on fully automated lines. Internal and external surface athe pipes are smooth without bumps or cavities. All products are cleanly cut, perpendicular to the axis of the product.

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Effect on water quality/environment

All the products described in this sheet comply with the European Directives in the field of human protection, awork safety and do not produce a negative impact on the environment:

- European Directive EC 1935/2004
- European Directive EU 2011/10
- European Directive EC 2023/2006

Additionally, all raw material producers guarantee safety in terms of contact of the product with water intended for human consumption.

Dimensional range

The range of pipes produced by Tehnoworld: 20-1200 mm in the following SDRs:

PE 80	SDR 6 (PN 25), SDR 7.4 (PN 20), SDR 9 (PN 16), SDR 11(PN 12.5), SDR 13.6 (PN10), SDR 17 (PN 8), SDR 17.6 (PN 6), SDR 21 (PN 6), SDR 26 (PN 5), SDR 33(PN4), SDR 41(PN 3.2)
PE 100 / PE 112 PE 100RC	SDR 7.4 (PN 25), SDR 9(PN 20), SDR 11 (PN 16), SDR 13.6 (PN 12.5), SDR 17(PN 10), SDR 21 (PN 8), SDR 26 (PN 6), SDR 41 (PN 4)

Physical-mechanical characteristics

Features	Method	UM	Value
Melt flow index (MFR) (5 kg/190 °C)	ISO 1133	g/10min	0.20-0.30
Density	ISO 1183	g/cm^3	0.955-0.965
Tensile yield strength (23 °C)	ISO 6259	MPa	23-25
Elastic mode (23°C)	ISO 527	MPa	1050-1100
Elongation at break (23°C)	ISO 6259	%	≥350
Oxidation induction time (210°C)	ISO 11357	min	>10
Carbon black content	ISO 6964	%	2-2.5
Carbon black dispersion	ISO 18553	Grade	<3
Hydrostatic resistance to 20^{0}C	ISO 1167	PE100/PE100RC -12 Mpa	≥100h
		PE80 – 10 Mpa	≥100h

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Hydrostatic resistance to 80⁰C	ISO 1167	PE100/PE100RC -5.4 Mpa	≥165h
		PE80: 4,5 MPa	≥165h
		PE100/PE100RC -12Mpa	≥1000h
		PE80: 4,5MPa	≥1000h
Longitudinal reversion	EN ISO 2505	%	≤3
Resistance to slow clack propagation, NPT test, PE80/PE100	ISO 13479	h	≥500h Without breaking during test
Resistance to slow clack propagation, ANPT test, PE100RC	ISO 13479	h	≥300h Without breaking during test
SCG resistance – reinforcement module PE100RC	ISO 18488	Mpa, 80°C	>50
Effect on water quality		Without harmful effects, as they are defined in the regulations in force	
Coefficient of linear expansion		mm/m·C	0.2

Temperature	Coefficient
20°C	1.00
30°C	0.87
40°C	0.74

Pressure reduction coefficient depending on the temperature.

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Chemical properties

Chemical resistance 20°C		Chemical resistance 20°C	
Acetic acid	S	Gasoline	S
Frozen acetic acid	S	Gelatin	S
Acetone	L	Glycerin	S
Air	S	Glucose	S
Apple juice	S	Hydrogen	S
Benzalaldehyde	S	Hydrogen Peroxide ≤30%	S
Benzeen	L	Liquid ammonia	S
Beer	S	Maleic Acid	S
Borax	S	Methane	S
Boric Acid	S	Milk	S
Butane	S	Mineral Oils	S
Calcium Carbonate	S	Naphthalene	NS
Chlorine dioxide	NS	Nitric Acid ≤25%	S
Chlorine aqueous soluti	L	Oxygen	S
Chloroform	NS	Phosphoric acid	S
Citric acid	S	Sodium chloride	S
Ethanol	S	Sodium hydroxide ≤40%	S
Ethylene glycol	S	Sulfur dioxide	S
Iron chloride	S	Sulfuric acid ≤50%	S
		Sulfurous acid ≤50%	S
		Vinegar	S
		Wines and spirits	S

SIMBOLURI:

1. S-Satisfacator
2. L-Limitat
3. NS-Nesatisfacator

*Date oferite de producatorii de materii prime

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Marking

Pipe marking is made every meter in accordance with the SR EN 12201 standard so that the name of the manufacturer, the production lot, the type of polyethylene PE112/ PE100 RC / PE 100, PE 80), nominal pressure value, outer diameter, thickness and SDR can be identified.

Packing and Delivery

Packing will be done so that during transport, handling and storage, damage to the pipes is avoided.
Depending on the form of delivery, PEHD pipes can be produced in:
- bars - usually 12m long, and other lengths can be made upon request (13m, 13.4m, 6m, etc.);
- coils - for pipes with diameters between D20-110mm with a length of 25m, 50m, 100m or 200m.

On request, other lengths agreed between the client and the manufacturer can be made.
All delivered products are accompanied by quality documents, the declaration of conformity and other specific documents required from a legislative point of view.

Handling

All pipes must be handled with the utmost care, taking into accound the following rules, to avoid damage to the suface:

- The use of elevators for the transport of tied bars or bars packed in wooden grates.
- Do not use chains or cables for handling or connectiong pipes;
- When using ropes or belts to handle the pipes, they will be clean, without sand, stones or other hard materials that, in contact with the pipe, can damage it. Textile strips with a width of 10 mm are usually used;
- Avoid rubbing the tubes in areas with asperities, which can damage the external surface;
- The arms of the elevator must support the pipe as close as possible to its center of gravity, thus avoiding falling and/or dangerous situations for the operators;
- The loading and handling devices - the elevators parts in contact with the pipe, must be protected with wood or polyethylene;
- When the transport is done with elevators, either for tubes in bars or in coils, quick start and high speed must be avoided, which can cause the tubes to become unbalanced, the consequence being their fall, causing damage to the external surface and causing dangerous situations for workers.

Storage

When choosing storage solutions, the action of ultraviolet radiation on the material should be considered. Stacking, either for bars or for coils, must be done using flat support surfaces (in general, wooden supports, a bed of sand or sawdust are preferred), clean, without sharp parts and without containing substances that could attack the polyethylene.
Stacking area must be free of sharp stones in particular.
The maximum time allowed, during which black polyethylene pipes can be stored outdoors and exposed to sunlight, without protection, is 24 months from the date of production. When the pipes are stored in open space for long periods of time, it is recommended to be protected from direct sunlight.

Connecting pipes

BUTT WELD The joining of HDPE pipes or fittings by butt welding procedure or electro-fusion is achieved by the homogeneous fusion of the material under the influence of temperature and pressure. This type of welding is made with thermocouples made up of stainless steel or aluminum alloy plate covered with a layer of PTFE (polytetrafluoroethylene) and glass fiber or with a layer of non-stick paint. These elements are heated using electrical resistances with automatic temperature regulation.	1.Injected fittings 2. Segmentated fittings 3. Adapters and flanges 
ELECTROFUSION WELDING For this type of procedure, fittings are used that have inserted an electrical resistance. During welding and after inserting the ends pipes in the fitting, electric current is applied to the resistance in the fitting to melt the surrounding plastic. The heat expands the inner layer of the fitting pushing it into the pipe to reach the joining pressure requested.	4. Fittings 
MECHANICAL JOINT The advantages of COMPRESSION fittings CONSISTS IN SIMPLICITY ANDQUICK CONNECTION, THEIR REPEATED USE, as well as ITHEIR RESISTANCE TO CORROSION AND ULTRAVIOLET RADIATION. Does not existNO NEED TO USE SPECIAL DEVICES AT THE TIMEINSTALLATIONS.A WIDE RANGE OF COMPRESSION FITTINGS CAN SOLVE MOSTMANY PROBLEMS, MAKING CONNECTIONS IN THE NETWORKS OFWATER SUPPLY, supply systems ON THE SITES OFBUILDINGS, irrigation systems, etc.	5. Compression Fittings 

Also, the fittings can be made from PE 80/PE100/PE 112 pipe according to the requirements of the task book, for butt welding. The installation and testing of PE pipe systems used for the transport of liquids under pressure will be performed in accordance with the national standards in force.

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Bend radius

Pipes can be bent "cold" during assembly, taking into account the relationship between the minimum bending radius and the SDR of the pipes avoiding joints with fittings and pressure reductions on the respective sections.

SDR	"At cold" bend radius
7, 7.3, 9	20 x DE
11, 13.5	25 x DE
17, 21	27 x DE
26	34 x DE
32.5	42 x DE
41	52 x DE
Fitting or flange in curvature	100 x DE

Warranty and lifetime

The warranty period is 24 months from delivery.

Lifetime of the pipes depends largely in working pressure and temperature. Used at 20°C, minimum lifetime is estimated at over 50 years for PE80/PE100/PE112 pipes and 100 years for PE100RC, under the conditions of compliance with the rules of commisioning according to manufacturers instructions.

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