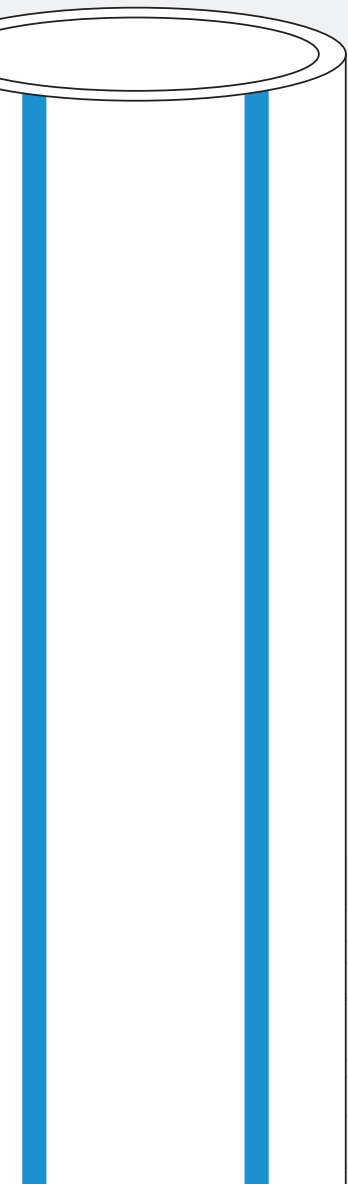


INSTALLATION SYSTEM  
***vargoplen***

**WATER**

SMOOTH PE PIPES FOR DRINKING WATER SUPPLY

Technology  
and tradition.



CATALOGUE 08/2022

Complete solutions for  
**sewage, water / gas supply,  
drainage and cable protection**





*INSTALLATION SYSTEM*  
***vargoplen***

**DRINKING WATER**

PIPES ***PE 100***

PIPES ***PROTECT***

PIPES ***STRONG***

PIPES ***SPECIAL***

## Installation system

Installation system **vargoplen** offers a comprehensive range of polyethylene pressure and non-pressure pipes made of PE 100 and PE 100-RC materials intended for the distribution of drinking water, gas, drainage of waste and rainwater, and for the construction of submarine outlets. **vargoplen** pipes are produced in a wide range of dimensions and pressure load tolerances.

Comparing PE 100 and PE 100-RC materials, all mechanical and physical characteristics of PE 100 material are satisfied by PE 100-RC material. The essential difference is the high resistance of the PE 100-RC material to external and internal loads once the pipe is installed in the ground and in operation.

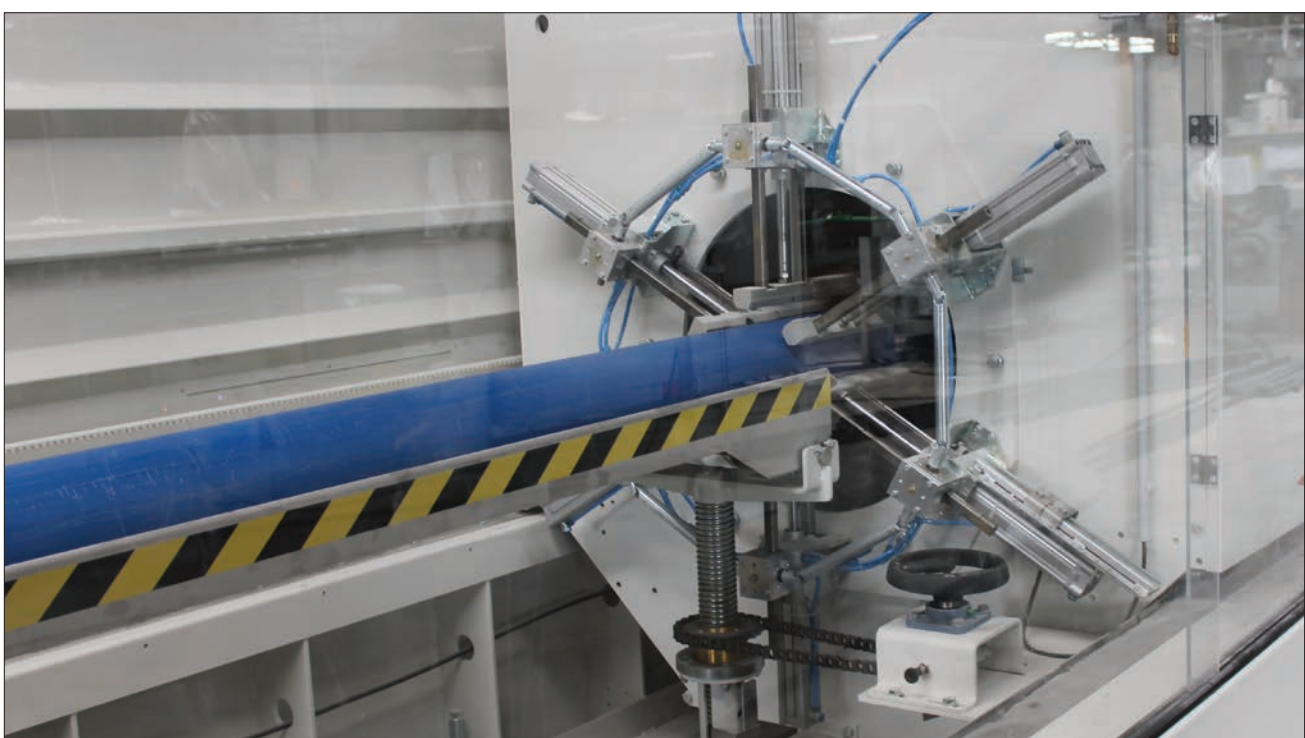
## Description and application of **vargoplen** pipes

Polyethylene (PE) is the most widespread and well-known plastic material, and pipe systems made of PE 100 and PE 100-RC materials, such as **vargoplen** installation system, are most suitable for pressure systems due to their elasticity and resistance to stress.

The report of the Croatian Institute of Public Health confirmed that PE-HD PE100 and PE 100-RC materials, from which **vargoplen** pipes are made, are completely neutral, and that the pipes are safe for the supply and distribution of drinking water.

Basic division of **vargoplen** pipes by application:

- pressurized water supply
- pressurized gas pipeline
- irrigation systems
- pressurized sewage
- non-pressurized sewage
- pipes for fish farms
- other (submarine drains, cable protection...)



## Advantages of *vargoplen PE 100* pipes

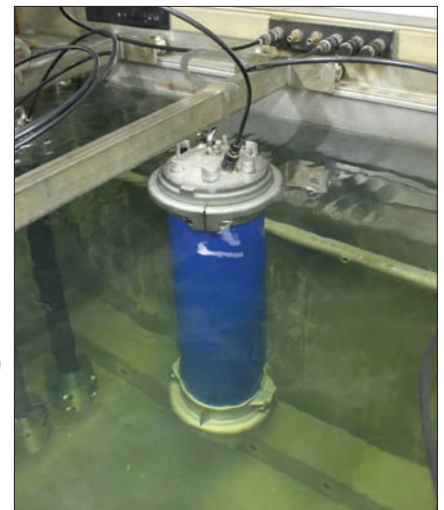
- They are made of harmless, healthy, corrosion-resistant material that can be recycled,
- Long service life of the pipe, which is up to 100 years,
- Homogeneous production material with excellent hydraulic properties, without the need for protective coatings or internal linings,
- A wide range of connection fittings,
- Pipes are factory-produced in 100 m coils and 12 m straight length, and can be produced in other lengths (6 m, 13 m, 200 m, 250 m and 300 m) at the customer's request and needs,
- Lower weight of the pipe (kg/m) compared to pipes of other materials,
- They allow a bending radius of 12d, which reduces the need to use connecting parts,
- The possibility of connection by detachable (mechanical and flange connection) and non-detachable methods (butt welding and connection with electrofusion fittings),
- Simple processing, cutting and joining of pipes, which facilitates installation.

## Quality control

In addition to the production process we have ensured a continuous monitoring of the production process quality control, starting from control of raw material to testing the quality of final products. Testings are performed in the company's laboratory, which is equipped with testing devices of renowned producers, sufficient to examine all the mechanical and physical characteristic of both, raw materials and finished products, in accordance with specified requirements of the standard HRN EN 12201-1, -2, which defines this type of product.

The following testing methods are performed:

- Melt mass flow test - MFR (HRN EN ISO 1133-1)
- Test methods for thermoplastics pipes longitudinal return (HRN EN ISO 2505)
- Testing of pipe resistance to internal pressure at constant temperature (HRN EN ISO 1167-1,-2)
- Density test (HRN EN ISO 1183-1)
- Pipe dimension testing (HRN EN ISO 3126 i HRN EN 12201-2)
- Examination of the appearance and color of pipes (HRN EN 12201-1,-2)



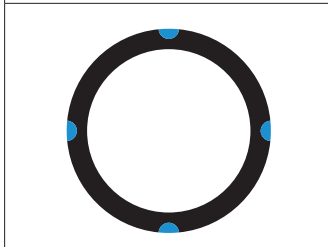
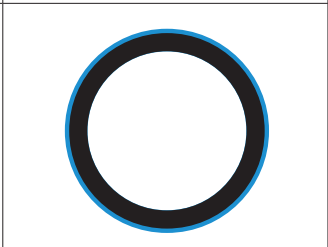
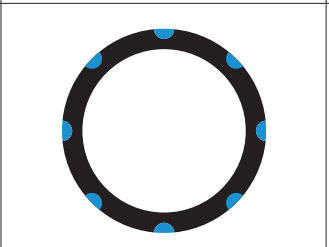
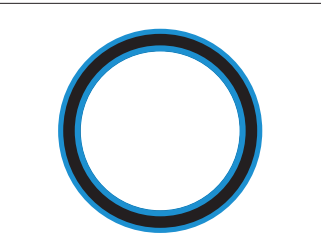
**Types of vargoplen WATER pipes**

**vargoplen** pipes are divided into single-layer and multilayer.

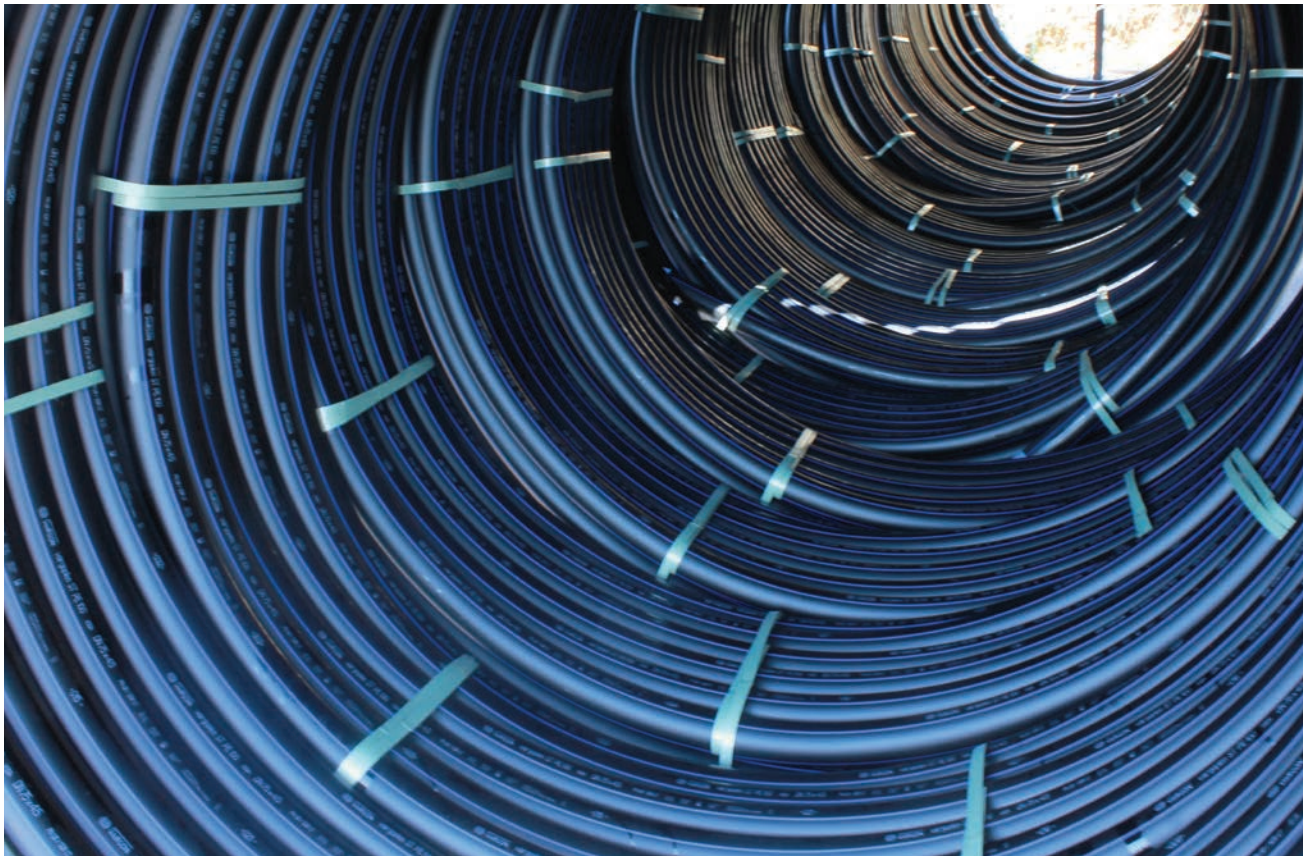
The group of single-layer pipes includes **vargoplen PE 100** and **vargoplen STRONG** water pipes.

The group of multilayer pipes includes **vargoplen PROTECT** and **vargoplen SPECIAL** water pipes.


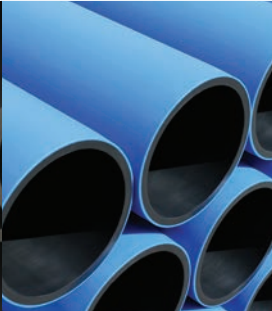


**DRINKING WATER PIPES**

<i>vargoplen PE 100</i>	<i>vargoplen PROTECT</i>	<i>vargoplen STRONG</i>	<i>vargoplen SPECIAL</i>
			
MATERIAL			
<b>PE 100</b>	<b>PE 100-RC PE 100</b>	<b>PE 100-RC</b>	<b>PE 100-RC SPECIAL PE 100-RC PE 100-RC</b>
100%	10% / 90%	100%	25% / 50% / 25%

Water pipes **vargoplen PE 100** are made of PE-HD PE 100 material in black color with four longitudinal lines in blue color and a printed length mark in meters. Pipes are delivered in coils from 100 m to 300 m, depending on the diameter of the pipe and straight in standard length of 12 m, and if required by the customer in lengths of 6 m and 13 m. Pipes are produced in accordance with the HRN EN 12201-1, -2 standard.



## Comparison of *vargoplen* WATER pipes

	<i>vargoplen</i> PE 100	<i>vargoplen</i> PROTECT	<i>vargoplen</i> STRONG	<i>vargoplen</i> SPECIAL
				
Medium	Drinking water	Drinking water	Drinking water	Drinking water
Pipe structure	Single-layer	Two-layer	Single-layer	Three-layer
Material	PE 100	PE 100 / PE 100-RC	PE 100-RC	PE 100-RC SPECIAL
Testing of RC material	-	-	-	PAS 1075
Conducted hours of material testing	-	-	-	≥ 8760 hours per batch of raw material according to PAS 1075
Special protective properties	no	yes	yes	yes
Laying procedure	Sand bedding	Open cut installation without sand bedding and alternative laying methods	Open cut installation without sand bedding and alternative laying methods	Open cut installation without sand bedding and alternative laying methods
Bedding	Sand	All types of material	All types of material	All types of material
Available diameters (DN/OD)	20-500	75-500	75-500	75-500
SDR	7,4-26	7,4-26	7,4-26	11-17
Service life	100 years	100 years	100 years	100 years

### PE 100-RC - resistance to crack

Costs, deadlines as well as the impact on the environment during construction affected investors to reconsider conventional installation methods and to turn to modern materials and technologies. The installation of PE pipes in sand bed or fine gravel, which used to be necessary, using pipes manufactured from the latest PE 100 RC materials is no longer necessary. Conventional pipelines made of PE 100 are exposed to higher stresses caused by stones, waste glass and other compacted materials in the ground when they are not placed in an adequate sand bedding. Combined with operating stresses (internal pressure, traffic and soil loads), point or linear forces acting directly on the pipe cause stress cracks (slow crack growth).

***vargoplen* PROTECT**, ***vargoplen* STRONG** and ***vargoplen* SPECIAL** pipes are co-extruded full-wall pipes with a dimensionally integrated external protective layer. These pipes are particularly resistant to the consequences following from scratches caused when no sand bedding is provided and to point loads that occur over a long period of time. Further development of RC material ensures that all requirements of modern and economical pipe laying are fulfilled. The production process ensures a service life of more than 100 years even with unconventional pipe laying (without a sand bedding). The new material, PE 100-RC, meets the high requirements of new pipeline laying methods described in DIN PAS 1075 (Publicly Available Specification), and long-term safety of use is ensured for users.

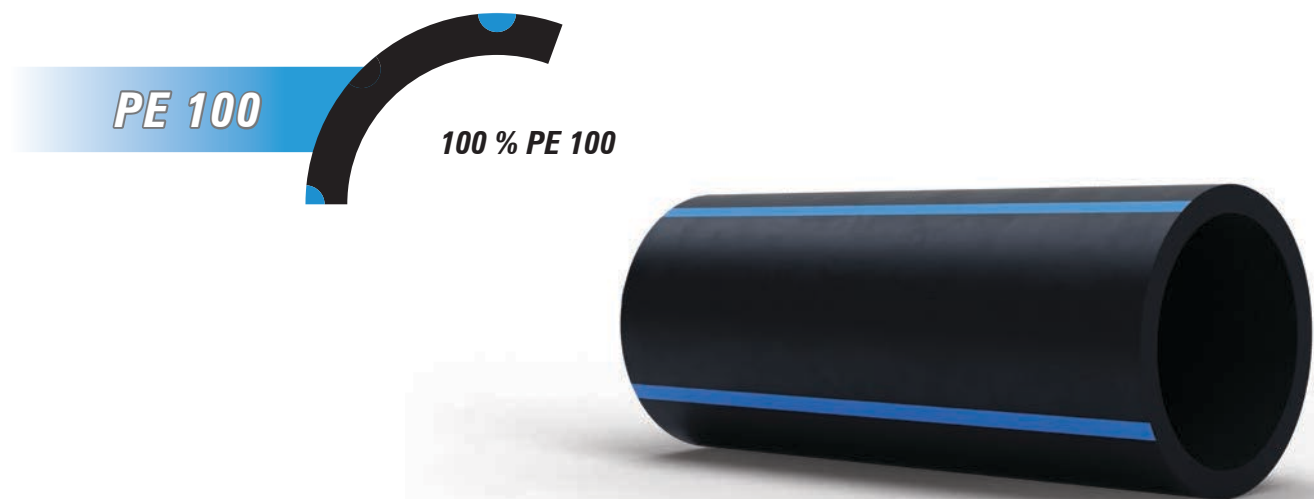
## PAS 1075 - RECOGNIZED QUALITY STANDARD FOR PE 100-RC PIPES IN TRENCHLESS PIPE LAYING

PAS 1075 (= Publicly Available Specification) is an advisory document that describes the requirements applicable to PE pipes that are installed using alternative pipe laying methods and whose service life lasts at least 100 years.

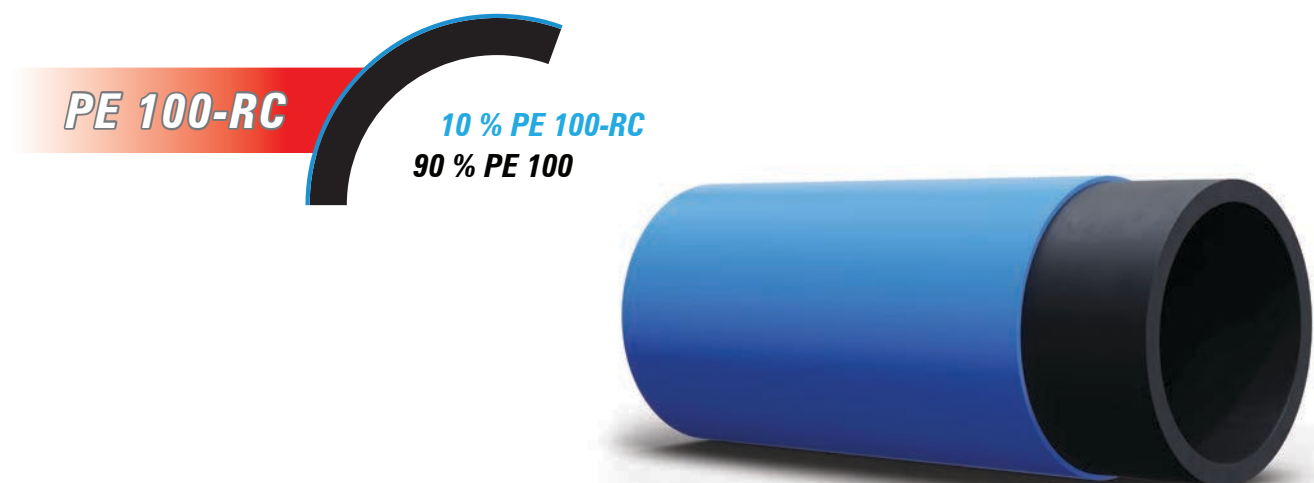
PAS 1075 defines a quality standard that complements the proven standards specified in DIN and DVGW, and determines which PE 100 materials meet certain requirements and can therefore be classified as PE 100-RC.

**vargoplen** installation system offers pipes that belong to **Type 2 (Multi-layer pipes with dimensionally integrated protective layers of PE 100-RC material)** described in DIN PAS 1075, titled "Pipes made of Polyethylene for alternative installation technologies - Dimensions, technical requirements and tests", and those are **vargoplen SPECIAL**.

**vargoplen PE 100** is a single-layer pipe made entirely of PE 100 material. The pipe is black and has four longitudinal blue lines.

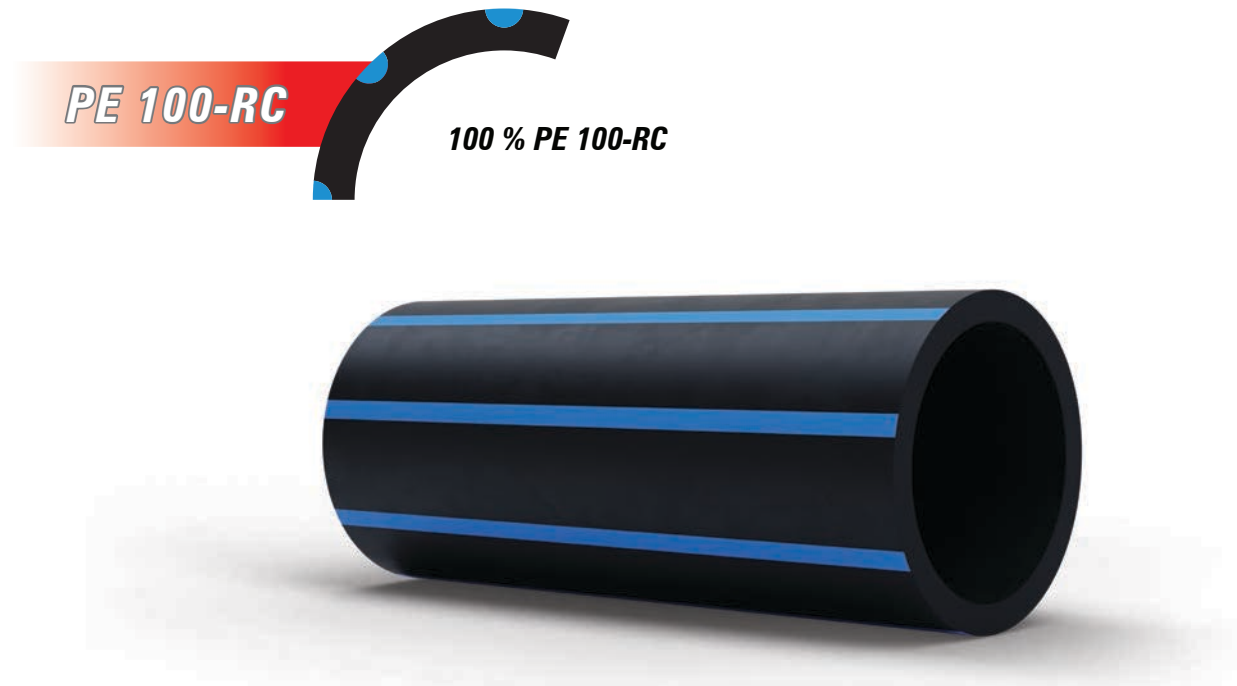


Pressurized two-layer pipe **vargoplen PROTECT** is made in combination of PE 100 and modern PE 100-RC material. The outer protective layer of the pipe is made of PE 100-RC in blue color and has excellent characteristics for point and linear loads. Both layers of pipe are made using the co-extrusion technique, and in this way they are connected into an inseparable whole. The ratio of layers is such that the outer layer, which is made of PE 100-RC material, is 10%, and the inner layer, made of PE 100 material, is 90% of the pipe and are part of the standard wall thickness, regardless of the pipe diameter.

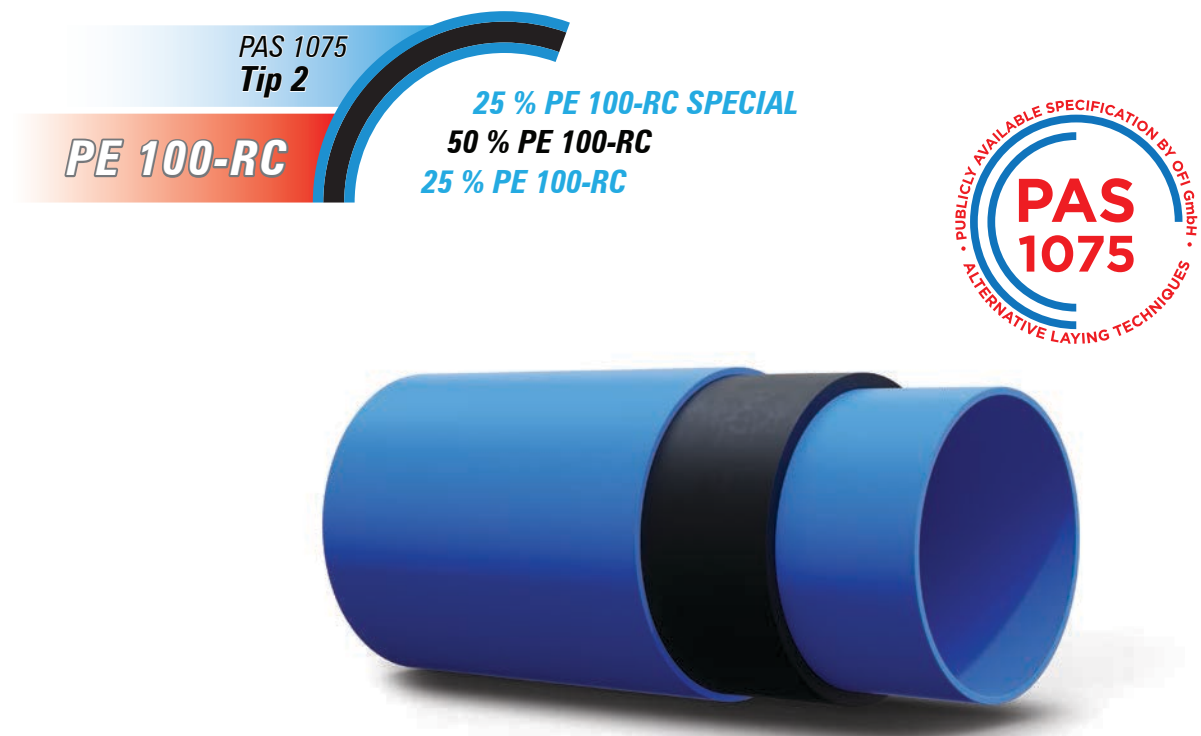




Pressurized single-layer pipe **vargoplen STRONG** is completely made of PE 100-RC material. The pipe is black and has eight longitudinal blue lines, and excellent exploitation characteristics for point and linear loads.



Pressurized three-layer pipe **vargoplen SPECIAL** is completely made of modern PE 100-RC materials. The outer protective layer of the pipe is made of a special PE 100-RC SPECIAL material in blue color that has excellent characteristics for point and linear loads. All pipe layers are made using the co-extrusion technique, and in this way they are connected into an inseparable whole. The ratio of the layers is such that the outer layer is 25%, the middle layer 50% and the inner layer 25% of the pipe and are part of the standard wall thickness regardless of the pipe diameter.

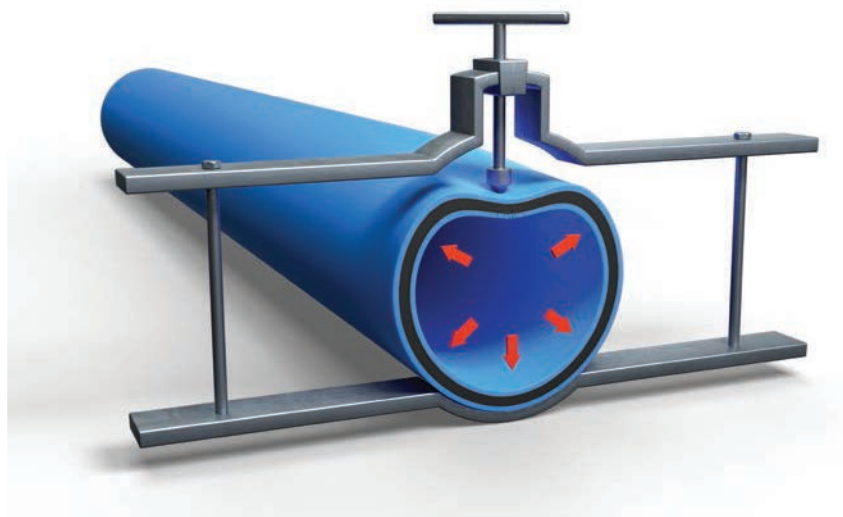


## Quality control and advantages of pipes made of PE 100-RC material

### Dr. Hessel's point load test

Dr. Hessel's point load test is used to determine a material's resistance to slow propagation of cracks. This accredited test procedure simulates the installation conditions that are frequently found with modern, trenchless installation processes, where a stone has the effect of an external point load on a pipe. The point load is applied in the laboratory using a steel prop with a diameter of 10 mm.

In order to cause a time-lapse effect, the test is carried out at a higher temperature (80 °C) and using a wetting agent (Arkopal N 100). At the same time, the pipes are subjected to internal pressure (test stress 4 MPa). The time until the appearance of stress cracks and the subsequent failure of the pipe by leakage is measured.



Standing times in the point load trial:

Temperature: 80 °C

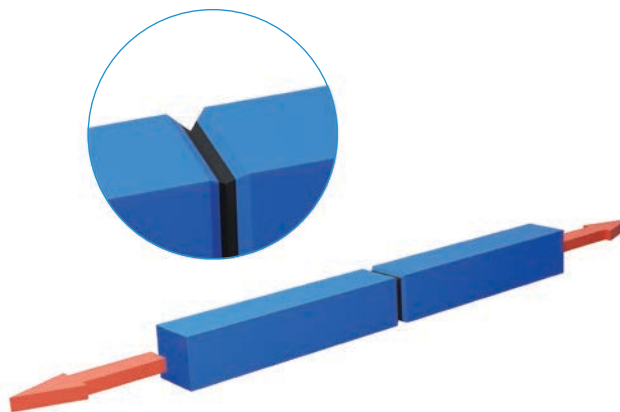
Stress: 4 N/mm<sup>2</sup>

Wetting agent: 2% Arkopal N 100

### FNCT (Full Notch Creep Test)

The test is carried out on the test sample as well as on the pipe itself. The test sample, measuring 10 x 10 x 100 mm, with a notch that runs circularly, perpendicular to the longitudinal axis (simulation of a crack), is exposed to a constant load (4 N/mm<sup>2</sup>) at an elevated temperature (80 °C) while under the influence of an Arkopal solution that promotes crack propagation.

The time is measured until the test sample breaks.



Advantages of **vargoplen PROTECT**, **vargoplen STRONG** and **vargoplen SPECIAL** pipes that ensure safety during installation:

- High resistance to point loads (e.g. stones, fragments)
- High resistance to slow crack growth
- Optimal choice for pipe-laying without sandbed and backfill
- Excavated soil can be used as backfill material
- They can be used for pipe-laying without trenches
- They can be butt-welded, EFW or connected mechanically
- Compatible with classic PE pipes
- For the pressure range from PN6 – PN25
- Large dimensional range from DN 75 – DN 500
- Pipe delivery in various lengths depending on the profile (coil, 6 m, 12 m)

## Installation of *vargoplen* WATER pipes

**vargoplen PE 100** pipes are installed using the classic method of laying (open laying), which requires the construction of a sand bed 10-15 cm high, and then backfilling with the same material up to a height of 15 cm above the pipe and only at the end with the material from the excavation of the trench. This method of installation is the safest for the pipe and ensures its durability, although it is more expensive and takes longer.

DN (mm)	trench width (m)		
	Supported trench	Unsupported trench	
		$\beta > 60$	$\beta \leq 60$
$\leq 225$	DN + 0,40	DN + 0,40	
$> 225 \leq 350$	DN + 0,50	DN + 0,50	DN + 0,40
$> 350 \leq 700$	DN + 0,70	DN + 0,70	DN + 0,40
$> 700 \leq 1200$	DN + 0,85	DN + 0,85	DN + 0,40
$> 1200$	DN + 1,00	DN + 1,00	DN + 0,40

Minimum width (bottom) of the trench depending on the outer pipe diameter (DN/OD) and the angle of the trench slope

New techniques of pipe laying that are more time and financially profitable have led to the development of pipes made of PE 100-RC material, and they include:

- Open trench without sand bedding
- Narrow trenching
- Ploughing
- HDD - Horizontal Directional Drilling
- Relining - repair of a damaged pipeline by inserting a new pipe through the old damaged pipe
- Pipe Bursting

For laying **vargoplen PROTECT**, **vargoplen STRONG** and **vargoplen SPECIAL** pipes there is no need to make a sand bed as the pipe can immediately be filled with material excavated from the trench. However, care should be taken that the damage to the outer layer of the pipe is not greater than 10% of the wall thickness. These new laying methods significantly reduce installation costs because the excavated material does not have to be transported to another location, but can be reused for backfilling. They are also beneficial for the environment and the population that is affected by the works due to the rehabilitation of pipelines because they shorten the laying time.



During installation, the rules on safety at work should be followed. The trench must be properly drained, and all joints should be left free until a leak test is performed.

One of the main advantages of polyethylene is, as mentioned earlier, its flexibility, which comes to the fore when laying and embedding pipelines. Pipes can be bent to a maximum radius of 12-20 times their outer diameter, which significantly reduces the use of connecting parts during design and execution. Tubes supplied in coils must always be unwind in the direction in which they are wound.

When laying pipeline, the external temperature should be taken into account due to the property of expansion. This material property is defined by the linear thermal expansion coefficient ( $0.20 \text{ mm/m} \times ^\circ\text{C}$ ). For example, a 1 m long pipe will elongate when the outside temperature rises, and shorten when the outside temperature drops by 0.2 mm per degree of temperature change.

Installation examples of **vargoplen PROTECT**, **vargoplen STRONG** and **vargoplen SPECIAL** pipes:

### Open trench without sand bedding

Given the proven resistance to slow crack growth, **vargoplen PROTECT**, **vargoplen STRONG** and **vargoplen SPECIAL** multilayer pipes, made of PE 100-RC material, are suitable for laying without a sand bed. The additional work of replacing the excavated material with a new sand bed in accordance with the HRN EN 805 standard is no longer necessary.

Advantages:

- Excavated material can be reused if properly compacted.
- Rationalization of time and costs due to material savings.
- Pipes **vargoplen PROTECT**, **vargoplen STRONG** and **vargoplen SPECIAL** are resistant to point and linear loads.



### Trenchless laying of pipes

#### Narrow trenching - for laying new pipes

This laying method is usually applied in rural areas and outside traffic zones. In this technique, a trencher is used to cut a trench into a soil, and the pipes are simultaneously placed at the bottom of the trench using a so-called installation box. Since the trench is not walkable in most cases, this box serves as a trench support in the pipeline installation. After the pipe is laid, the trench is mechanically backfilled and compacted with the previously excavated material, i.e. no sand is required.

Advantages:

- The method is suitable for all soil classes.
- Excavated soil can be reused.
- Quick method of laying new pipes.



#### Ploughing - for laying new pipes

Ploughing is the fastest and probably the most economical way of laying new pipes. The method does not cause any disturbances in the soil, which makes it very ecological. The soil is moved by the plow blade while the pipeline is assembled outside the trench and drawn into a cavity which is expanded by means of a displacer or led through an installation box to the bottom of an open trench, where it is then laid. In ploughing, the excavated soil is reused without any treatment, so it is necessary to use pipes with very good protection against point loads.

**vargoplen PROTECT**, **vargoplen STRONG** and **vargoplen SPECIAL** pipes ensure a long service life due to the proven high level of crack resistance.

Advantages:

- The impact on the soil is relatively low.
- It can be used up to class 5 soil.
- The most economical method of laying new pipes.



## HDD - Horizontal Directional Drilling

Horizontal directional drilling (HDD) is a method of installing underground pipelines using trenchless methods. It implies the use of a directional drilling machine and associated attachments. Soil is loosened and flushed out in various stages using a drilling fluid.

The first step is to create a pipe duct by means of a pilot bore. Then, in further steps the final pipe duct is widened and the pipe is introduced with the help of an insertion device.

Advantages:

- The method is suitable for all soil classes.
- Pipes **vargoplen PROTECT**, **vargoplen STRONG** and **vargoplen SPECIAL** fully meet the requirements for laying with the HDD method - regardless of the soil structure.
- Drilling is possible under roads, rivers, developed areas or areas in continuous use.



## Relining

Pipe lining, or relining, is a process of trenchless laying by which a continuous series of pipes that comes rolled up in a coil or is connected from several pipes is inserted into the existing pipeline. The annular space of the pipe entry into the old pipeline is usually filled with cement mortar, to ensure fixation within the old pipeline and to create better resistance to groundwater pressure.

Advantages:

- A small amount of excavated soil.
- Minimal use of machines.
- Fast method of installation / rehabilitation.
- Disturbance to residents and traffic reduced to a minimum.



## Pipe Bursting

The pipe bursting method involves restoring the pipeline with a trenchless technique along the same route. Using the conical head, the old pipe material is broken or cut and transferred radially into the surrounding soil. A new pipe with the same or larger nominal diameter is introduced in the same operation. As part of the static pipe bursting method, the old pipe is destroyed or moved by tensile forces that are transferred to the cone (steel cable or rod) or the pipe itself via the pulling medium.

Advantages:

- No annular loss of space.
- Increasing the pipe cross-section by up to two nominal diameters.
- Optimal insertion thanks to advantages of **vargoplen PROTECT**, **vargoplen STRONG** and **vargoplen SPECIAL** pipes.



## Pipe resistance during laying

Due to the excellent properties of PE 100-RC SPECIAL material, **vargoplen SPECIAL** pressure pipes have proven to be excellent for use in municipal works. **vargoplen SPECIAL** pipes are the best choice for conventional constructions with an open trench, as well as for the application of trenchless pipe laying. Trenchless pipe-laying techniques are associated with greater exploitation requirements and loads of plastic materials, so special attention must be paid to the optimal selection of pipes.

Due to its strength and characteristics **vargoplen SPECIAL** pipes do not need to be laid on a sand bed. However, not using a sand bed can lead to damage to the surface of the newly laid pipe, which should not be more than 10% of the wall thickness. Stones can also line or point load the outer wall of the pipe for a long period under loads such as working pressure, earth and traffic loads.

Thanks to the reinforced colored outer layer of **vargoplen SPECIAL** multilayer pipes, the overall condition and quality of the pipes can be assessed during construction work. Damage to the outer layer that is more than 10% of the standard wall thickness can be immediately determined by visual inspection.

**vargoplen SPECIAL** multilayer pipes with an integrated protective and functional layer within the wall dimensions allow the operator to fully monitor the quality by visual inspection during the entire service life of the pipeline.



**Visible line and point damage on the pipe surface**

## Joining technique

Connecting of **vargoplen PE 100** pipes is done in two ways, non-separable and separable process. Non-separable joining refers to butt welding and electrofusion welding, while separable joining refers to mechanical connecting.

Before starting the welding process, it is important to check and verify all the parameters:

- The welding environment should be over +5 °C and, if the weather is rainy or cold, it should be done in a sheltered area.
- Pipe ends should be closed to prevent air circulation and fast cooling.
- The welding zone should be clean and undamaged.

Butt welding is performed with a special device that prepares and heats the ends of two pipes and joins them under a certain pressure, thus creating a homogeneous joint that is as safe as the pipes themselves. Only pipes with the same wall thickness, i.e. the same SDR, can be joined with this welding method.



By electrofusion welding, the two ends of the pipe are joined by using an electrofusion fitting, which uses a heater through which electricity flows to achieve a leak-proof connection. The outer surface of pipe and the inner surface of the fitting are simultaneously heated with the help of current carried by the wires integrated in the fitting itself to a certain temperature, and in this way they are connected.

Small-diameter pipes are most often joined with electrofusion fittings, while for larger diameters, butt welding is recommended due to lower costs.



In addition to common measures of clean pipes during the welding process, particular attention should be paid to remove condensed water on the pipes and fittings.

Pipes **vargoplen PROTECT**, **vargoplen STRONG** and **vargoplen SPECIAL** can be connected in the same way as standard pipes made of PE 100 material.



Mechanical fittings are limited to smaller pipe diameters, and are mainly used for water supply.

Range of pipes by purpose, load and dimension

<b>PRESSURE PIPES - HRN EN 12201-2</b>									
<b>SDR</b>		<b>33</b>	<b>26</b>	<b>21</b>	<b>17</b>	<b>13,6</b>	<b>11</b>	<b>9</b>	<b>7,4</b>
S		16	12,5	10	8	6,3	5	4	3,2
<b>PE 100</b> C=1,25	<b>PN</b>	<b>5</b>	<b>6</b>	<b>8</b>	<b>10</b>	<b>12,5</b>	<b>16</b>	<b>20</b>	<b>25</b>
<b>DN</b> (mm)		S (mm)	S (mm)	S (mm)	S (mm)	S (mm)	S (mm)	S (mm)	S (mm)
20		-	-	-	-	-	2,0	2,3	3,0
25		-	-	-	-	2,0	2,3	3,0	3,5
32		-	-	-	2,0	2,4	3,0	3,6	4,4
40		-	-	2,0	2,4	3,0	3,7	4,5	5,5
50		-	2,0	2,4	3,0	3,7	4,6	5,6	6,9
63		-	2,5	3,0	3,8	4,7	5,8	7,1	8,6
75		-	2,9	3,6	4,5	5,6	6,8	8,4	10,3
90		-	3,5	4,3	5,4	6,7	8,2	10,1	12,3
110		-	4,2	5,3	6,6	8,1	10,0	12,3	15,1
125		-	4,8	6,0	7,4	9,2	11,4	14,0	17,1
140		-	5,4	6,7	8,3	10,3	12,7	15,7	19,2
160		-	6,2	7,7	9,5	11,8	14,6	17,9	21,9
180		-	6,9	8,6	10,7	13,3	16,4	20,1	24,6
200		-	7,7	9,6	11,9	14,7	18,2	22,4	27,4
225		-	8,6	10,8	13,4	16,6	20,5	25,2	30,8
250		-	9,6	11,9	14,8	18,4	22,7	27,9	34,2
280		-	10,7	13,4	16,6	20,6	25,4	31,3	38,3
315		9,7	12,1	15,0	18,7	23,2	28,6	35,2	43,1
355		10,9	13,6	16,9	21,1	26,1	32,2	39,7	48,5
400		12,3	15,3	19,1	23,7	29,4	36,3	44,7	54,7
450		13,8	17,2	21,5	26,7	33,1	40,9	50,3	61,5
500		15,3	19,1	23,9	29,7	36,8	45,4	55,8	-

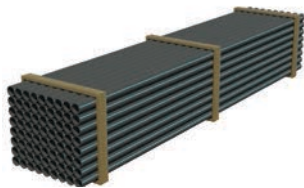


## Packaging

Due to practical reasons and easier handling and transport, **vargoplen PE 100** pipes are available in coils, straight lengths or both, depending on the diameter, while the pipes **vargoplen PROTECT**, **vargoplen STRONG** and **vargoplen SPECIAL** are available exclusively in straight lengths. Pipes with a diameter of DN 20 - DN 50 are delivered in coil, pipes with a diameter of DN 63 - DN 110 are delivered in coil and in straight lengths stacked in a bundle (pallet), and pipes with a diameter of DN 125 - DN 500 are delivered in straight lengths stacked in a bundle (palette). Pipes in straight lengths are 12 m long, and at the customer's request can be made in lengths of 6 m and 13 m. The ends of the pipes are secured with plugs to protect the interior from the impurities.



Valid for SDR 11, SDR 13,6, SDR 17 (S5, S6,3, S8)



COIL DIMENSION / PIPE LENGTH IN COIL												
D mm	100 m			200 m			250 m			300 m		
	Dv mm	B mm	Du mm	Dv mm	B mm	Du mm	Dv mm	B mm	Du mm	Dv mm	B mm	Du mm
20	860	250	690	-	-	-	-	-	-	980	380	720
25	990	250	760	-	-	-	-	-	-	1130	380	760
32	1100	280	810	-	-	-	1250	380	810	-	-	-
40	1220	370	920	1380	380	900	-	-	-	-	-	-
50	1600	350	1240	-	-	-	-	-	-	-	-	-
63	1900	400	1460	-	-	-	-	-	-	-	-	-
75	2150	470	1650	-	-	-	-	-	-	-	-	-
90	2500	540	1900	-	-	-	-	-	-	-	-	-
110	2800	550	1900	-	-	-	-	-	-	-	-	-

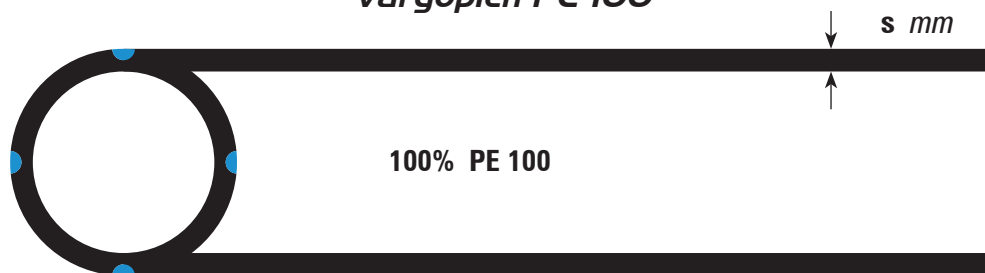
Dv: coil outer diameter, B: coil width, Du: coil inner diameter

PALLET DIMENSION / AMOUNT OF PIPES IN PALLET L = 12m					
D mm	S5, S6,3, S8				
	Bv x Hv mm	B x H mm	Length of pipes in pallet m	Amount of pipes in pallet pc	Amount of pipes in tow truck pcs / m
63	1185 x 600	1075 x 500	1788	149	894 / 10728
75	1150 x 565	1050 x 465	1140	95	570 / 6840
90	1180 x 660	1080 x 560	972	81	486 / 5832
110	1200 x 595	1100 x 495	576	48	288 / 3456
125	1165 x 660	1065 x 560	480	40	240 / 2880
140	1150 x 730	1050 x 630	420	35	210 / 2520
160	1140 x 680	1040 x 580	288	24	144 / 1728
180	1180 x 750	1080 x 650	264	22	132 / 1584
200	1200 x 650	1100 x 550	180	15	90 / 1080
225	1120 x 715	1020 x 615	144	12	72 / 864
250	1100 x 785	1000 x 685	132	11	66 / 792
280	1220 x 865	1120 x 765	132	11	66 / 792
315	1205 x 965	1105 x 865	108	9	36 / 432
355	1165 x 1070	1065 x 970	96	8	36 / 432
400	900 x 900	800 x 800	48	4	16 / 192
450	1000 x 550	900 x 450	24	2	20 / 240
500	1100 x 600	1000 x 500	24	2	20 / 240

Bv: pallet width, Hv: pallet height, B: width of pipes in pallet, H: height of pipes in pallet

FOR DRINKING WATER SUPPLY

vargoplen PE 100



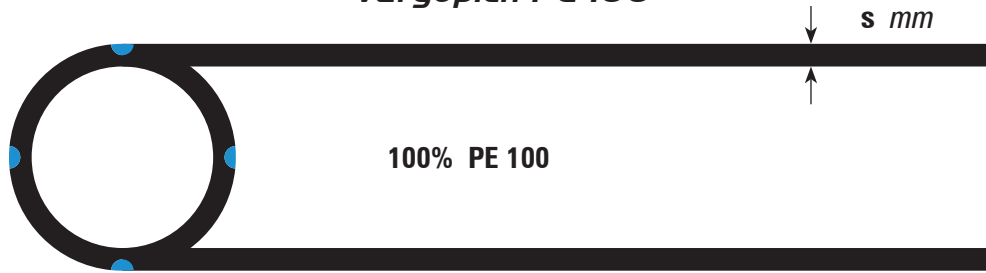
100% PE 100

DN mm	PN 6				PN 8				PN 10				PN 12,5			
	SDR 26 S12,5 (C=1.25)				SDR 21 S10 (C=1.25)				SDR 17 S8 (C=1.25)				SDR 13,6 S6,3 (C=1.25)			
	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	2,0	0,145	100	-
32	-	-	-	-	-	-	-	-	2,0	0,195	100	-	2,4	0,232	100	-
40	-	-	-	-	2,0	0,250	100	-	2,4	0,300	100	-	3,0	0,356	100	-
50	2,0	0,314	100	-	2,4	0,374	100	-	3,0	0,445	100	-	3,7	0,549	100	-
63	2,5	0,494	100	-	3,0	0,580	100	-	3,8	0,716	100	-	4,7	0,873	100	-
75	2,9	0,675	100	12	3,6	0,828	100	12	4,5	1,030	100	12	5,6	1,240	100	12
90	3,5	0,978	100	12	4,3	1,180	100	12	5,4	1,480	100	12	6,7	1,770	100	12
110	4,2	1,430	100	12	5,3	1,770	100	12	6,6	2,180	100	12	8,1	2,620	100	12
125	4,8	1,840	-	12	6,0	2,270	-	12	7,4	2,760	-	12	9,2	3,370	-	12
140	5,4	2,320	-	12	6,7	2,830	-	12	8,3	3,460	-	12	10,3	4,220	-	12
160	6,2	3,040	-	12	7,7	3,720	-	12	9,5	4,520	-	12	11,8	5,500	-	12
180	6,9	3,790	-	12	8,6	4,670	-	12	10,7	5,710	-	12	13,3	6,980	-	12
200	7,7	4,690	-	12	9,6	5,780	-	12	11,9	7,050	-	12	14,7	8,560	-	12
225	8,6	5,890	-	12	10,8	7,300	-	12	13,4	8,930	-	12	16,6	10,900	-	12
250	9,6	7,300	-	12	11,9	8,930	-	12	14,8	11,000	-	12	18,4	13,400	-	12
280	10,7	9,100	-	12	13,4	11,300	-	12	16,6	13,700	-	12	20,6	16,800	-	12
315	12,1	11,600	-	12	15,0	14,200	-	12	18,7	17,400	-	12	23,2	21,200	-	12
355	13,6	14,600	-	12	16,9	18,000	-	12	21,1	22,100	-	12	26,1	26,900	-	12
400	15,3	18,600	-	12	19,1	22,900	-	12	23,7	28,000	-	12	29,4	34,100	-	12
450	17,2	23,500	-	12	21,5	28,900	-	12	26,7	35,400	-	12	33,1	43,200	-	12
500					23,9	35,700	-	12	29,7	43,800	-	12	36,8	53,300	-	12

s: wall thickness, K: coil, P: straight length

**FOR DRINKING WATER SUPPLY**

*vargoplen PE 100*

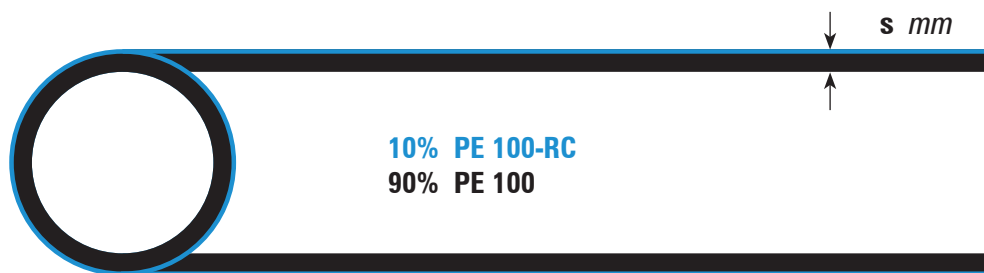


DN mm	PN 16				PN 20				PN 25			
	SDR 11 S5 (C=1.25)				SDR 9 S4 (C=1.25)				SDR 7,4 S3,2 (C=1.25)			
	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m
20	2,0	0,113	100	–	–	–	–	–	–	–	–	–
25	2,3	0,171	100	–	–	–	–	–	–	–	–	–
32	3,0	0,277	100	–	–	–	–	–	–	–	–	–
40	3,7	0,430	100	–	–	–	–	–	–	–	–	–
50	4,6	0,666	100	–	–	–	–	–	–	–	–	–
63	5,8	1,050	100	–	–	–	–	–	–	–	–	–
75	6,8	1,470	100	12	–	–	–	–	–	–	–	–
90	8,2	2,120	100	12	–	–	–	–	–	–	–	–
110	10,0	3,140	100	12	12,3	3,780	–	12	15,1	4,490	–	12
125	11,4	4,080	–	12	14,0	4,870	–	12	17,1	5,770	–	12
140	12,7	5,080	–	12	15,7	6,110	–	12	19,2	7,250	–	12
160	14,6	6,670	–	12	17,9	7,960	–	12	21,9	9,440	–	12
180	16,4	8,420	–	12	20,1	10,100	–	12	24,6	11,900	–	12
200	18,2	10,400	–	12	22,4	12,400	–	12	27,4	14,800	–	12
225	20,5	13,100	–	12	25,2	15,800	–	12	30,8	18,600	–	12
250	22,7	16,200	–	12	27,9	19,400	–	12	34,2	23,000	–	12
280	25,4	20,300	–	12	31,3	24,300	–	12	38,3	28,900	–	12
315	28,6	25,600	–	12	35,2	30,800	–	12	43,1	36,500	–	12
355	32,2	32,500	–	12	39,7	39,100	–	12	48,5	46,300	–	12
400	36,3	41,300	–	12	44,7	49,600	–	12	54,7	58,800	–	12
450	40,9	52,300	–	12	50,3	62,700	–	12	61,5	74,400	–	12
500	45,4	64,500	–	12								

s: wall thickness, K: coil, P: straight length

FOR DRINKING WATER SUPPLY

vargoplen **PROTECT**

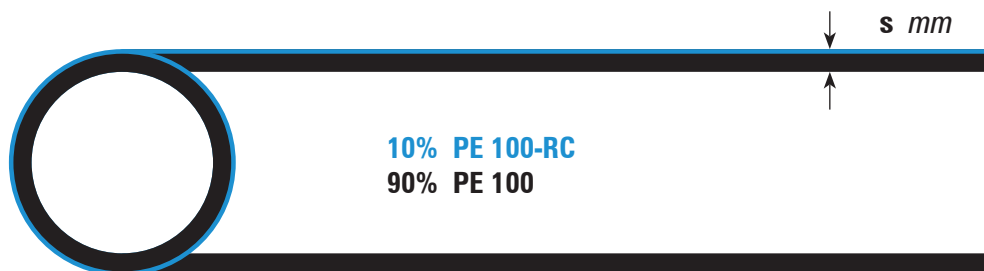


DN mm	PN 6				PN 8				PN 10				PN 12,5			
	SDR 26 S12,5 (C=1.25)				SDR 21 S10 (C=1.25)				SDR 17 S8 (C=1.25)				SDR 13,6 S6,3 (C=1.25)			
	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m
75	2,9	0,675	100	12	3,6	0,828	100	12	4,5	1,030	100	12	5,6	1,240	100	12
90	3,5	0,978	100	12	4,3	1,180	100	12	5,4	1,480	100	12	6,7	1,770	100	12
110	4,2	1,430	100	12	5,3	1,770	100	12	6,6	2,180	100	12	8,1	2,620	100	12
125	4,8	1,840	–	12	6,0	2,270	–	12	7,4	2,760	–	12	9,2	3,370	–	12
140	5,4	2,320	–	12	6,7	2,830	–	12	8,3	3,460	–	12	10,3	4,220	–	12
160	6,2	3,040	–	12	7,7	3,720	–	12	9,5	4,520	–	12	11,8	5,500	–	12
180	6,9	3,790	–	12	8,6	4,670	–	12	10,7	5,710	–	12	13,3	6,980	–	12
200	7,7	4,690	–	12	9,6	5,780	–	12	11,9	7,050	–	12	14,7	8,560	–	12
225	8,6	5,890	–	12	10,8	7,300	–	12	13,4	8,930	–	12	16,6	10,900	–	12
250	9,6	7,300	–	12	11,9	8,930	–	12	14,8	11,000	–	12	18,4	13,400	–	12
280	10,7	9,100	–	12	13,4	11,300	–	12	16,6	13,700	–	12	20,6	16,800	–	12
315	12,1	11,600	–	12	15,0	14,200	–	12	18,7	17,400	–	12	23,2	21,200	–	12
355	13,6	14,600	–	12	16,9	18,000	–	12	21,1	22,100	–	12	26,1	26,900	–	12
400	15,3	18,600	–	12	19,1	22,900	–	12	23,7	28,000	–	12	29,4	34,100	–	12
450	17,2	23,500	–	12	21,5	28,900	–	12	26,7	35,400	–	12	33,1	43,200	–	12
500					23,9	35,700	–	12	29,7	43,800	–	12	36,8	53,300	–	12

s: wall thickness, K: coil, P: straight length

FOR DRINKING WATER SUPPLY

vargoplen **PROTECT**

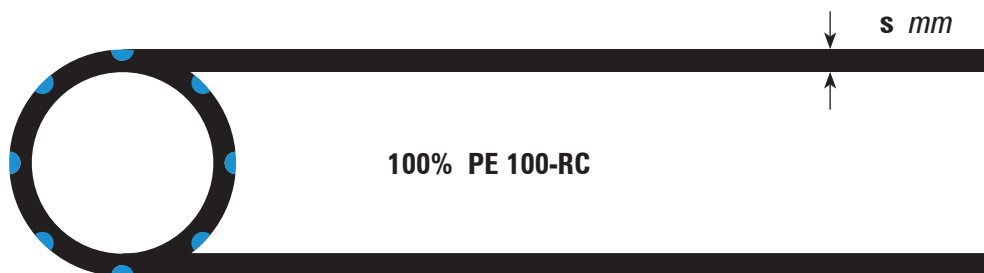


DN mm	PN 16				PN 20				PN 25			
	SDR 11 S5 (C=1.25)				SDR 9 S4 (C=1.25)				SDR 7,4 S3,2 (C=1.25)			
	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m
75	6,8	1,470	100	12	-	-	-	-	-	-	-	-
90	8,2	2,120	100	12	-	-	-	-	-	-	-	-
110	10,0	3,140	100	12	12,3	3,780	-	12	15,1	4,490	-	12
125	11,4	4,080	-	12	14,0	4,870	-	12	17,1	5,770	-	12
140	12,7	5,080	-	12	15,7	6,110	-	12	19,2	7,250	-	12
160	14,6	6,670	-	12	17,9	7,960	-	12	21,9	9,440	-	12
180	16,4	8,420	-	12	20,1	10,100	-	12	24,6	11,900	-	12
200	18,2	10,400	-	12	22,4	12,400	-	12	27,4	14,800	-	12
225	20,5	13,100	-	12	25,2	15,800	-	12	30,8	18,600	-	12
250	22,7	16,200	-	12	27,9	19,400	-	12	34,2	23,000	-	12
280	25,4	20,300	-	12	31,3	24,300	-	12	38,3	28,900	-	12
315	28,6	25,600	-	12	35,2	30,800	-	12	43,1	36,500	-	12
355	32,2	32,500	-	12	39,7	39,100	-	12	48,5	46,300	-	12
400	36,3	41,300	-	12	44,7	49,600	-	12	54,7	58,800	-	12
450	40,9	52,300	-	12	50,3	62,700	-	12	61,5	74,400	-	12
500	45,4	64,500	-	12								

s: wall thickness, K: coil, P: straight length

FOR DRINKING WATER SUPPLY

**vargoplen STRONG**

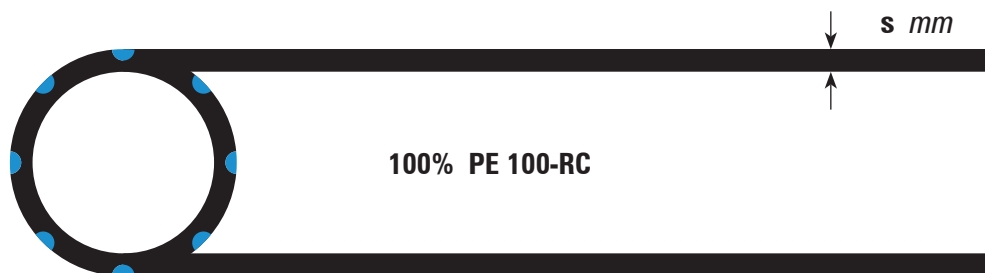


DN mm	PN 6				PN 8				PN 10				PN 12,5			
	SDR 26 S12,5 (C=1.25)				SDR 21 S10 (C=1.25)				SDR 17 S8 (C=1.25)				SDR 13,6 S6,3 (C=1.25)			
	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m
75	2,9	0,675	100	12	3,6	0,828	100	12	4,5	1,030	100	12	5,6	1,240	100	12
90	3,5	0,978	100	12	4,3	1,180	100	12	5,4	1,480	100	12	6,7	1,770	100	12
110	4,2	1,430	100	12	5,3	1,770	100	12	6,6	2,180	100	12	8,1	2,620	100	12
125	4,8	1,840	–	12	6,0	2,270	–	12	7,4	2,760	–	12	9,2	3,370	–	12
140	5,4	2,320	–	12	6,7	2,830	–	12	8,3	3,460	–	12	10,3	4,220	–	12
160	6,2	3,040	–	12	7,7	3,720	–	12	9,5	4,520	–	12	11,8	5,500	–	12
180	6,9	3,790	–	12	8,6	4,670	–	12	10,7	5,710	–	12	13,3	6,980	–	12
200	7,7	4,690	–	12	9,6	5,780	–	12	11,9	7,050	–	12	14,7	8,560	–	12
225	8,6	5,890	–	12	10,8	7,300	–	12	13,4	8,930	–	12	16,6	10,900	–	12
250	9,6	7,300	–	12	11,9	8,930	–	12	14,8	11,000	–	12	18,4	13,400	–	12
280	10,7	9,100	–	12	13,4	11,300	–	12	16,6	13,700	–	12	20,6	16,800	–	12
315	12,1	11,600	–	12	15,0	14,200	–	12	18,7	17,400	–	12	23,2	21,200	–	12
355	13,6	14,600	–	12	16,9	18,000	–	12	21,1	22,100	–	12	26,1	26,900	–	12
400	15,3	18,600	–	12	19,1	22,900	–	12	23,7	28,000	–	12	29,4	34,100	–	12
450	17,2	23,500	–	12	21,5	28,900	–	12	26,7	35,400	–	12	33,1	43,200	–	12
500					23,9	35,700	–	12	29,7	43,800	–	12	36,8	53,300	–	12

s: wall thickness, K: coil, P: straight length

FOR DRINKING WATER SUPPLY

**vargoplen STRONG**

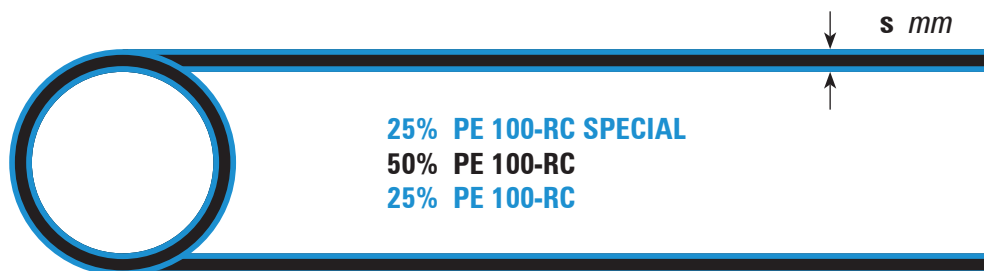


DN mm	PN 16				PN 20				PN 25			
	SDR 11 S5 (C=1.25)				SDR 9 S4 (C=1.25)				SDR 7,4 S3,2 (C=1.25)			
	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m
75	6,8	1,470	100	12	–	–	–	–	–	–	–	–
90	8,2	2,120	100	12	–	–	–	–	–	–	–	–
110	10,0	3,140	100	12	12,3	3,780	–	12	15,1	4,490	–	12
125	11,4	4,080	–	12	14,0	4,870	–	12	17,1	5,770	–	12
140	12,7	5,080	–	12	15,7	6,110	–	12	19,2	7,250	–	12
160	14,6	6,670	–	12	17,9	7,960	–	12	21,9	9,440	–	12
180	16,4	8,420	–	12	20,1	10,100	–	12	24,6	11,900	–	12
200	18,2	10,400	–	12	22,4	12,400	–	12	27,4	14,800	–	12
225	20,5	13,100	–	12	25,2	15,800	–	12	30,8	18,600	–	12
250	22,7	16,200	–	12	27,9	19,400	–	12	34,2	23,000	–	12
280	25,4	20,300	–	12	31,3	24,300	–	12	38,3	28,900	–	12
315	28,6	25,600	–	12	35,2	30,800	–	12	43,1	36,500	–	12
355	32,2	32,500	–	12	39,7	39,100	–	12	48,5	46,300	–	12
400	36,3	41,300	–	12	44,7	49,600	–	12	54,7	58,800	–	12
450	40,9	52,300	–	12	50,3	62,700	–	12	61,5	74,400	–	12
500	45,4	64,500	–	12								

s: wall thickness, K: coil, P: straight length

FOR DRINKING WATER SUPPLY

vargoplen **SPECIAL**



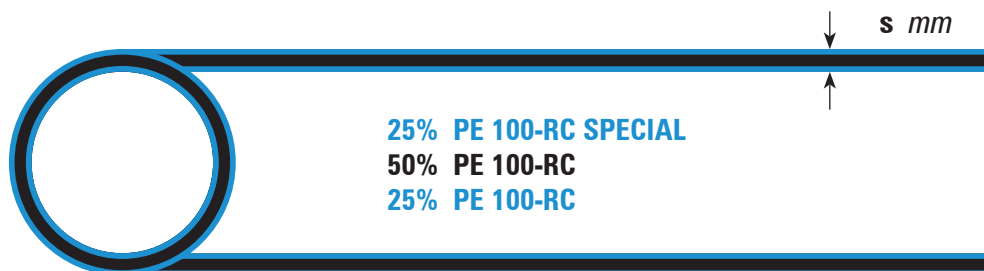
DN mm	PN 6				PN 8				PN 10				PN 12,5			
	SDR 26 S12,5 (C=1.25)				SDR 21 S10 (C=1.25)				SDR 17 S8 (C=1.25)				SDR 13,6 S6,3 (C=1.25)			
	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m
75	2,9	0,675	100	12	3,6	0,828	100	12	4,5	1,030	100	12	5,6	1,240	100	12
90	3,5	0,978	100	12	4,3	1,180	100	12	5,4	1,480	100	12	6,7	1,770	100	12
110	4,2	1,430	100	12	5,3	1,770	100	12	6,6	2,180	100	12	8,1	2,620	100	12
125	4,8	1,840	–	12	6,0	2,270	–	12	7,4	2,760	–	12	9,2	3,370	–	12
140	5,4	2,320	–	12	6,7	2,830	–	12	8,3	3,460	–	12	10,3	4,220	–	12
160	6,2	3,040	–	12	7,7	3,720	–	12	9,5	4,520	–	12	11,8	5,500	–	12
180	6,9	3,790	–	12	8,6	4,670	–	12	10,7	5,710	–	12	13,3	6,980	–	12
200	7,7	4,690	–	12	9,6	5,780	–	12	11,9	7,050	–	12	14,7	8,560	–	12
225	8,6	5,890	–	12	10,8	7,300	–	12	13,4	8,930	–	12	16,6	10,900	–	12
250	9,6	7,300	–	12	11,9	8,930	–	12	14,8	11,000	–	12	18,4	13,400	–	12
280	10,7	9,100	–	12	13,4	11,300	–	12	16,6	13,700	–	12	20,6	16,800	–	12
315	12,1	11,600	–	12	15,0	14,200	–	12	18,7	17,400	–	12	23,2	21,200	–	12
355	13,6	14,600	–	12	16,9	18,000	–	12	21,1	22,100	–	12	26,1	26,900	–	12
400	15,3	18,600	–	12	19,1	22,900	–	12	23,7	28,000	–	12	29,4	34,100	–	12
450	17,2	23,500	–	12	21,5	28,900	–	12	26,7	35,400	–	12	33,1	43,200	–	12
500					23,9	35,700	–	12	29,7	43,800	–	12	36,8	53,300	–	12

s: wall thickness, K: coil, P: straight length



FOR DRINKING WATER SUPPLY

vargoplen **SPECIAL**



DN mm	PN 16				PN 20				PN 25			
	SDR 11 S5 (C=1.25)				SDR 9 S4 (C=1.25)				SDR 7,4 S3,2 (C=1.25)			
	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m	s mm	Weight kg/m	K m	P m
75	6,8	1,470	100	12	–	–	–	–	–	–	–	–
90	8,2	2,120	100	12	–	–	–	–	–	–	–	–
110	10,0	3,140	100	12	12,3	3,780	–	12	15,1	4,490	–	12
125	11,4	4,080	–	12	14,0	4,870	–	12	17,1	5,770	–	12
140	12,7	5,080	–	12	15,7	6,110	–	12	19,2	7,250	–	12
160	14,6	6,670	–	12	17,9	7,960	–	12	21,9	9,440	–	12
180	16,4	8,420	–	12	20,1	10,100	–	12	24,6	11,900	–	12
200	18,2	10,400	–	12	22,4	12,400	–	12	27,4	14,800	–	12
225	20,5	13,100	–	12	25,2	15,800	–	12	30,8	18,600	–	12
250	22,7	16,200	–	12	27,9	19,400	–	12	34,2	23,000	–	12
280	25,4	20,300	–	12	31,3	24,300	–	12	38,3	28,900	–	12
315	28,6	25,600	–	12	35,2	30,800	–	12	43,1	36,500	–	12
355	32,2	32,500	–	12	39,7	39,100	–	12	48,5	46,300	–	12
400	36,3	41,300	–	12	44,7	49,600	–	12	54,7	58,800	–	12
450	40,9	52,300	–	12	50,3	62,700	–	12	61,5	74,400	–	12
500	45,4	64,500	–	12								

s: wall thickness, K: coil, P: straight length





*vargokal*

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*vargokal PLUS*

HOUSE SEWAGE SYSTEM - LOW NOISE

*vargokal ULTRA*

HOUSE SEWAGE SYSTEM - SILENT

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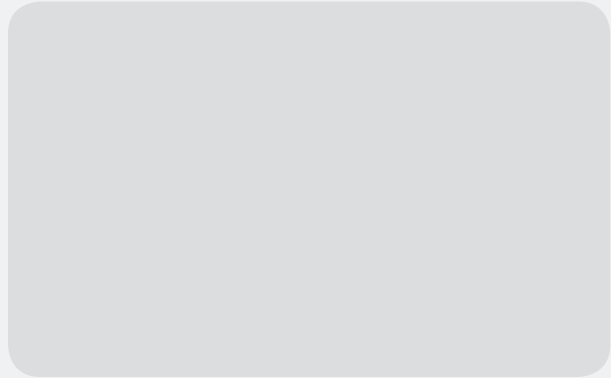
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