



**AkvaPanInženjering**







**"AkvaPan inženjering" d.o.o.** was established in 1993 as the company in private ownership of Jadranka and Dragan Pantović.

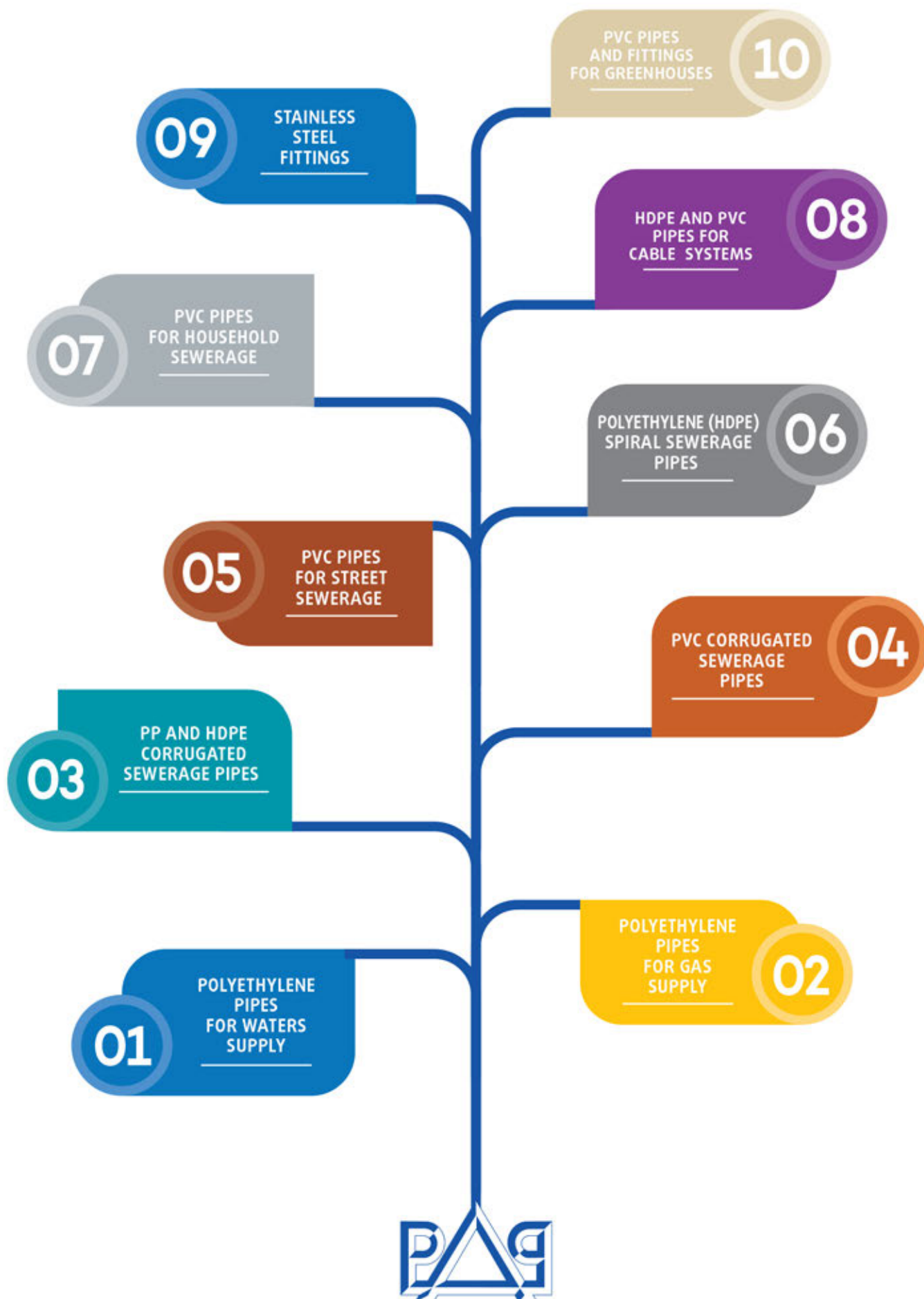
The company head office building, its production plant and the warehouse are located in Vranići near Čačak. The production hall and the indoor warehouse facility cover an area of around 3000 m<sup>2</sup>, while the outdoor storage space has an additional area of 5000 m<sup>2</sup>.

The company's main line of activity is production of PP, PVC and PE pipes. In order to diversify the production programme, we also deal in the production of PP, PVC and PE elements and PE manholes. In addition to this, we offer trading services for a complete range of water supply and sewerage systems. Our company is a supplier of a large number of public communal and construction enterprises in the wider field of water management. For the past ten years, we have been the main supplier of telecommunication pipes for the needs of "Telekom Srbija" AD.

The strategic orientation of the company is its continual development, advancement and increase of production capacities, resulting in a constant focus on targeting foreign markets. Having established collaboration with a number of companies in the countries of former Yugoslavia, we have managed to increase the share of export in our overall sales. Our commitment to the customers is a primary concern of all our employees. Quality is a category which the company accepts both as its philosophy and practice. This dedication has brought about a change in approach, habits and daily work of our employees, which has been attested by the integrated quality management system SRPS ISO 9001, SRPS ISO 14001 and SRPS OHSAS 18001.

Our customers deserve and have all our attention. We base our market competitiveness on careful observation of our customer's needs, with our daily commitment to keep the current and find new collaborators. By making the quality an undeniable category, we have equipped and accredited our own laboratory for testing the quality of the pipes in accordance with the SRPS ISO/IEC 17025 standard, in addition to the already established collaboration with the Belgrade Institute for Materials. In this way, we have managed to secure continuity in product attestation. All our products possess attest documentation of the accredited laboratory, while the telecommunication pipes possess certificates of the Republic Telecommunications Agency (RATEL).





AkvaPanInženjering



## AkvaPanInženjering

**Polyethylene pipes** for water supply are used for constructing water-supply systems and are made from high density polyethylene, PE80, PE100 and PE100-RC, in accordance with the SRPS EN 12201 (MRS  $\geq$  8 MPa, i.e. MRS  $\geq$  10 MPa) to a quality standard that guarantees undiminished strain resistance even after 50 years of use.

Polyethylene pipes are used for public, private and industrial water supply systems, including construction of underground, underwater and surface pipelines and water systems inside and outside buildings. Permanent and temporary heat load limits are 60°C and 80 °C, respectively.

The pipes are resistant to low temperatures, Owing to outstanding chemical resistance of HDPE, the material is highly resistant to strong acids and bases. In addition to this, the pipes are resistant to mild oxidants and reducing agents.

The advantages of the pipes produced from the PE80 and PE100 material include:

- The material is absolutely non-toxic and fully inert in contact with water,
- No impact on odour and taste of water
- No deposits of lime are formed and consequently there is no narrowing of the gauge of water passage over long-term use,
- UV-resistant and resistant to temperatures -30°C do +60°C,
- Very high resistance to abrasion
- Very low loss of pressure owing to friction coefficient 10 times lower than in steel pipes,
- Easy assembly,
- Easy for transport and handling.

The pipes made from PE100-RC are intended for installation in stone grounds, requiring no sand bed or backfilling of the trenches.

The advantages of pipes made from PE100-RC include:

- Resistance to pressure points,
- Resistance to rapid extension and spread of fissures,
- Highest level of product reliability,
- Compatibility with classical PE pipes.

The pipes are composed of a single layer of material, with a homogenous cross-section of the wall and smooth inner and outer surfaces. The colour of the pipes is black, with blue longitudinal co-extrusion lines.

Pipes supplied in diameter DN 20 - 110 (mm) can also be manufactured as two-ply pipes, with white inner surface.

The pipes bear the following permanent markings at every metre of length, in accordance with the

SRPS EN 12201-2:2014 Standard:

- Code of standard: SRPS EN 12201,
- Nominal diameter x wall thickness,
- SDR marking,
- Kind and type of material,
- Working pressure, PN,
- Producer's sign and year of production.

The nominal (outer) diameter ranges between DN 20 and DN 630 mm, where as the working pressure includes the options of 4, 6, 8, 10, 12.5, 16, 20,25 and 32 bar.

The pipes are packed in coils between 50 and 500 m of length (depending on the diameter and pressure). The coil drum requirement for the pipe is a diameter of at least 18 x d, in order to preserve the oval form of the pipe.

The selected nominal (outer) diameters and wall thickness dimensions, corresponding to the selected nominal pressures, are given in the table. The values presented in the tables and the pipe quality values are in accordance with the SRPS EN 12201 standard



# HDPE PE80

DN (mm)	PN 4 SDR 33		PN 6 SDR 22		PN 8 SDR 17		PN 10 SDR 13.6		PN 12.5 SDR 11		PN 16 SDR 9		PN 20 SDR 7.4	
	e	kg/m	e	kg/m	e	kg/m	e	kg/m	e	kg/m	e	kg/m	e	kg/m
20									2.00	0.12	2.30	0.13	3.00	0.15
25							2.00	0.15	2.30	0.17	3.00	0.20	3.50	0.24
32					2.00	0.20	2.40	0.23	3.00	0.28	3.60	0.33	4.40	0.39
40			2.00	0.24	2.40	0.30	3.00	0.36	3.70	0.43	4.50	0.51	5.50	0.60
50			2.40	0.37	3.00	0.45	3.70	0.55	4.60	0.67	5.60	0.79	6.90	0.94
63			3.00	0.58	3.80	0.72	4.70	0.87	5.80	1.05	7.10	1.26	8.60	1.47
75			3.60	0.83	4.50	1.02	5.60	1.24	6.80	1.47	8.40	1.76	10.30	2.09
90			4.30	1.18	5.40	1.46	6.70	1.77	8.20	2.12	10.10	2.54	12.30	3.00
110			5.30	1.77	6.60	2.17	8.10	2.62	10.00	3.14	12.30	3.78	15.10	4.49
125			6.00	2.27	7.40	2.76	9.20	3.37	11.40	4.08	14.00	4.87	17.10	5.77
140			6.70	2.83	8.30	3.46	10.30	4.22	12.70	5.08	15.70	6.11	19.20	7.25
160			7.70	3.72	9.50	4.52	11.80	5.50	14.60	6.66	17.90	7.96	21.90	9.44
180			8.60	4.67	10.70	5.71	13.30	6.98	16.40	8.42	20.10	10.10	24.60	11.90
200			9.60	5.78	11.90	7.05	14.70	8.56	18.20	10.40	22.40	12.40	27.40	14.80
225			10.80	7.30	13.40	8.93	16.60	10.90	20.50	13.10	25.20	15.80	30.80	18.60
250			11.90	8.93	14.80	11.00	18.40	13.40	22.70	16.20	27.90	19.40	34.20	23.00
280			13.40	11.30	16.60	13.70	20.60	16.80	25.40	20.30	31.30	24.30	38.30	28.90
315	9.70	9.37	15.00	14.20	18.70	17.40	23.20	21.20	28.60	25.60	35.20	30.80	43.10	36.50
355	10.90	11.80	16.90	18.00	21.10	22.10	26.10	26.90	32.20	32.50	39.70	39.10	48.50	46.30
400	12.30	15.10	19.10	22.90	23.70	28.00	29.40	34.10	36.30	41.30	44.70	49.60	54.70	58.80
450	13.80	19.00	21.50	28.90	26.70	35.40	33.10	43.20	40.90	52.30	50.30	62.70	61.50	74.40
500	15.30	23.40	23.90	35.70	29.70	43.80	36.80	53.30	45.40	64.50	55.80	77.30		
560	17.20	29.40	26.70	44.70	33.20	54.80	41.20	66.90	50.80	80.80				
630	19.30	37.10	30.00	56.40	37.40	69.40	46.30	84.60	57.20	102.00				

DN – spoljni prečnik • e – debljina zida • PN – pritisak • SDR – odnos spolnjeg prečnika i debljine zida

# HDPE PE100

DN (mm)	PN 4 SDR 41		PN 6 SDR 27.6		PN 8 SDR 21		PN 10 SDR 17		PN 12.5 SDR 13.6		PN 16 SDR 11		PN 20 SDR 9		PN 25 SDR 7.4	
	e	kg/m	e	kg/m	e	kg/m	e	kg/m	e	kg/m	e	kg/m	e	kg/m	e	kg/m
20											2.00	0.12	2.30	0.13	3.00	0.15
25									2.00	0.15	2.30	0.17	3.00	0.20	3.50	0.24
32							2.00	0.19	2.40	0.23	3.00	0.27	3.60	0.33	4.40	0.38
40					2.00	0.24	2.40	0.29	3.00	0.34	3.70	0.43	4.50	0.57	5.50	0.60
50			2.00	0.31	2.40	0.37	3.00	0.45	3.70	0.55	4.60	0.67	5.60	0.79	6.90	0.94
63			2.50	0.49	3.00	0.58	3.80	0.72	4.70	0.87	5.80	1.05	7.10	1.26	8.60	1.47
75			2.90	0.67	3.60	0.83	4.50	1.02	5.60	1.24	6.80	1.47	8.40	1.76	10.30	2.09
90			3.50	0.98	4.30	1.18	5.40	1.46	6.70	1.77	8.20	2.12	10.10	2.54	12.30	3.00
110			4.20	1.43	5.30	1.77	6.60	2.17	8.10	2.62	10.00	3.14	12.30	3.78	15.10	4.49
125			4.80	1.84	6.00	2.27	7.40	2.76	9.20	3.37	11.40	4.08	14.00	4.87	17.10	5.77
140			5.40	2.32	6.70	2.83	8.30	3.46	10.30	4.22	12.70	5.08	15.70	6.11	19.20	7.25
160			6.20	3.04	7.70	3.72	9.50	4.52	11.80	5.50	14.60	6.67	17.90	7.96	21.90	9.44
180			6.90	3.79	8.60	4.67	10.70	5.71	13.30	6.98	16.40	8.42	20.10	10.10	24.60	11.90
200			7.70	4.69	9.60	5.78	11.90	7.05	14.70	8.56	18.20	10.40	22.40	12.40	27.40	14.80
225			8.60	5.89	10.80	7.30	13.40	8.93	16.60	10.90	20.50	13.10	25.20	15.80	30.80	18.60
250			9.60	7.30	11.90	8.93	14.80	11.00	18.40	13.40	22.70	16.20	27.90	19.40	34.20	23.00
280			10.70	9.10	13.40	11.30	16.60	13.70	20.60	16.80	25.40	20.30	31.30	24.30	38.30	28.90
315	7.70	7.52	12.10	11.60	15.00	14.20	18.70	17.40	23.20	21.20	28.60	25.60	35.20	30.80	43.10	36.50
355	8.70	9.55	13.60	14.60	16.90	18.00	21.10	22.10	26.10	26.90	32.20	32.50	39.70	39.10	48.50	46.30
400	9.80	12.10	15.30	18.60	19.10	22.90	23.70	28.00	29.40	36.30	36.30	41.30	44.70	49.60	54.70	58.80
450	11.00	15.30	17.20	23.50	21.50	28.90	26.70	35.40	33.10	40.90	40.90	52.30	50.30	62.70	61.50	74.40
500	12.30	19.00	19.10	28.90	23.90	35.70	29.70	43.80	36.80	45.40	45.40	64.50	55.80	77.30	68.30	91.80
560	13.70	23.60	21.40	36.20	26.70	44.70	33.20	54.80	41.20	66.90	50.80	80.80	62.50	97.00		
630	15.40	29.90	24.10	45.90	30.00	56.40	37.40	69.40	46.30	84.60	57.20	102.00				

DN – spoljni prečnik • e – debljina zida • PN – pritisak • SDR – odnos spolnjeg prečnika i debljine zida



Polyethylene is a sturdy and flexible material which must be handled with care. Pipes must not be dragged over the ground and rough surfaces. Polyethylene pipes are stored under a roof or in the open air, owing to high resistance to UV radiation and temperatures between  $-30^{\circ}\text{C}$  and  $+60^{\circ}\text{C}$ . The pipes are laid in the ground, inside trenches of a varying depth, depending on the type of the pipe and the ground, in accordance with the project designer's specifications. When laid in soil, the depth of the trench ranges between 0.8 m and 1.2 m, depending on the configuration of the ground and the pipe diameter



Connection of a pipeline is by the means of flexible or fixed connections.

- Flexible joints are connections with fittings, fasteners and flanges.
- Fixed joints are performed using butt welding or electro-fusion welding.

Our company uses modern, attested equipment and certified welders for butt welding of water pipes.

Installation of pipelines is performed in accordance with Standard SRPS EN 805.

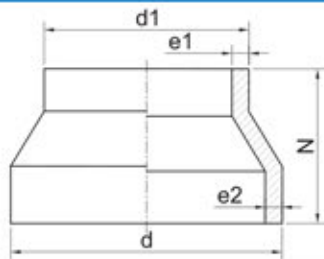
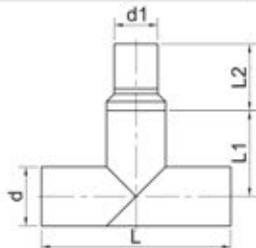
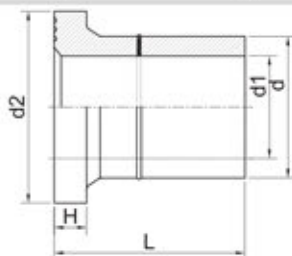
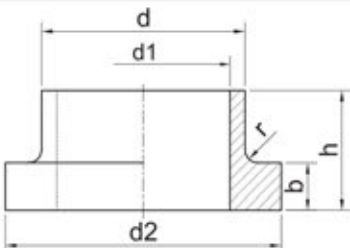
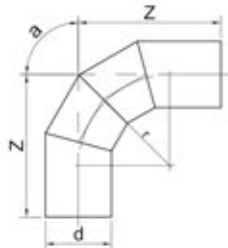
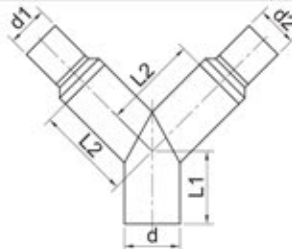
The lowest temperature for outdoor installation is  $+5^{\circ}\text{C}$ . Following the installation, the pipeline is tested using the procedure defined by the designer, in accordance with SRPS EN 805, point 11.

#### PE fitting:

The PE fitting and PE pipes are made using the same material, which enables a highly secure and efficient jointing. The standard groups of products of pre-fabricated fittings include: fastener, elbow, straight and V joints, as well as reducing joints. Tailor-made element designed in accordance with the customers' requirements are also supplied. Once completed, every pipeline must undergo a pressure test, in order to secure the complete tightness of the pipes, connector, fittings and other components



Name	Drawing	Description
PE 100 T joint () PN10/16		PE T component for butt welding, diameter range DN 63 - N 630 for pressures of PN10 and PN16 or more, according to customers' requirements.
PE 100 K joint O PN10/16		PE K component for butt welding, diameter range DN 110 - DN 200 for pressure of PN 10 and PN 16 or more, according to customers' requirements.
PE 100 TT component DN() PN10/16		PETT component for butt welding, diameter range DN U.O - DN 500 for pressures PN 10 and PN 16 or more, according to customers' requirements.
PE 100 Plug DNO PN10/16		PE PLUG component for butt welding, diameter range DN 50 - DN 500 for pressures PN 10 and PN 16 or more, according to customers' requirements.

Name	Drawing	Description
PE 100 Reducing joint DN/OD PN10/16		PE Reducing joint for butt welding, diameter range DN 63 - DN 500 for pressures of PN 10 and PN 16 or more, according to customers' requirements.
PE 100 T reducing piece DN() PN 10/16		PET reducing piece for butt welding, according to customers requirements.
PE 100 Fastener DN() PN 10/16		PE fastener for butt welding, diameter range DN 50 - DN 630, for pressures PN 10 and PN 16 or more, according to customers' requirements.
PE 100 Ring DN () PN 10/16		PE Ring for butt welding, diameter range of DN 50 - DN 630 for pressures PN 10 and PN 16 or more, according to customers' requirements.
PE 100 elbow DN() PN10/16		PE elbow for butt welding, diameter range DN 40 - DN 630 for pressures PN 10 and PN 16 (11 to 90 degrees) or more, according to customers' requirements.
Tailor made connectors according to customers' requirements		A wide range of tailor-made connecting components are supplied to customers with special needs and requirements of their respective systems.



## AkvaPanInženjering

**Gas pipes** that are used in construction of gas pipelines, made of high-density polyethylene PE80 or PE100 ( $MRS \geq 8 \text{ MPa}$  i.e.  $MRS \geq 10 \text{ MPa}$ ), guaranteeing that the pipes will endure the same strain even after 50 years of exploitation. The production and quality control are in accordance with the national SRPS EN 1555 standard.

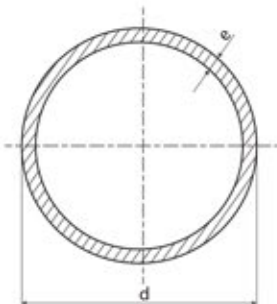
The material is non-toxic and easy for handling and transportation. The pipes are flexible and resistant to vibration, seismic shocks and shifting of soil. The allowed permanent temperature load is up to  $+60^\circ\text{C}$ , whereas temporary allowed load is up to  $+80^\circ\text{C}$ . Due to the low friction coefficient, the loss of pressure is also low. The pipes are joined (depending on the diameter) using connectors or welding, which can be either electro-fusion or butt welding.

Produced in the standard black colour, with co-extruded yellow lines, the pipes bear the following markings:

- Standard code: SRPS EN 1555
- Outer diameter,
- SDR marking,
- Kind and type of material,
- Marking: GAS,
- Manufacturer's sign,
- Year of production,
- Signs to mark the length of the coil, placed on a distance of 1m

The pipes have smooth outer and inner surfaces, and are produced in diameters ranging from DN 20 mm to DN 500 mm, for working pressures of 1, 4, 6 and 10 bar, depending on the class of the material used. The nominal diameter is the outer pipe diameter.

Polyethylene pipes of the diameter ranging from DN 20 to DN 110 are packed in coils between 50 and 200 m of length, while the larger-diameter pipes are supplied in 6m and 12m rods. The drum used to make the coil of the pipe must not have a diameter under  $18 \times d$ , fashioned so as to preserve the oval form of the pipe. The polyethylene pipes used for the supply of gaseous fuels can be laid under the ground and under water. The methods used for laying the pipes are defined in the 'Manual on Technical Norms for Design and Laying Distributive Gas Lines made of Polyethylene Pipes'.





# HDPE 80

de (mm)	SDR 17,6 (S - 8,3)			SDR 11 (S - 5)		
	PN 1			PN 4		
	e (mm)	Δs (mm)	kg / m	s (mm)	Δs (mm)	kg / m
20	2,30	+0,4	0,133	3,00	+0,4	0,163
25	2,30	+0,4	0,171	3,00	+0,4	0,211
32	2,30	+0,4	0,224	3,00	+0,4	0,279
40	2,30	+0,4	0,285	3,70	+0,5	0,430
50	2,90	+0,4	0,440	4,60	+0,6	0,666
63	3,60	+0,5	0,688	5,80	+0,7	1,05
75	4,30	+0,6	0,976	6,80	+0,8	1,47
90	5,20	+0,7	1,41	8,20	+1,0	2,12
110	6,30	+0,8	2,08	10,00	+1,1	3,14
125	7,10	+0,9	2,66	11,40	+1,3	4,08
140	8,00	+0,9	3,34	12,70	+1,4	5,08
160	9,10	+1,1	4,35	14,60	+1,6	6,67
180	10,30	+1,2	5,53	16,40	+1,8	8,42
200	11,40	+1,3	6,79	18,20	+2,0	10,40
225	12,80	+1,4	8,55	20,50	+2,2	13,10
250	14,20	+1,6	10,60	22,70	+2,4	16,20
280	15,90	+1,7	13,20	25,40	+2,7	20,30
315	17,90	+1,9	16,70	28,60	+3,0	25,60
355	20,20	+2,2	21,30	32,30	+3,4	32,60
400	22,80	+2,4	27,00	36,40	+3,8	41,40
450	25,60	+2,7	34,23	41,00	+4,2	52,83
500	28,50	+3,0	42,34	45,50	+4,5	65,15
560	31,70	+3,3	52,50	50,80	+5,2	80,08
630	35,70	+3,7	66,50	57,20	+5,9	102,37

# HDPE 100

de (mm)	SDR 17,6 (S - 8,3)			SDR 11 (S - 5)		
	PN 6			PN 10		
	e (mm)	Δs (mm)	kg / m	s (mm)	Δs (mm)	kg / m
20	-	-	-	3,00	+0,4	0,163
25	-	-	-	3,00	+0,4	0,211
32	2,30	+0,4	0,224	3,00	+0,4	0,279
40	2,30	+0,4	0,285	3,70	+0,5	0,430
50	2,90	+0,4	0,440	4,60	+0,6	0,666
63	3,60	+0,5	0,688	5,80	+0,7	1,05
75	4,30	+0,6	0,976	6,80	+0,8	1,47
90	5,20	+0,7	1,41	8,20	+1,0	2,12
110	6,30	+0,8	2,08	10,00	+1,1	3,14
125	7,10	+0,9	2,66	11,40	+1,3	4,08
140	8,00	+0,9	3,34	12,70	+1,4	5,08
160	9,10	+1,1	4,35	14,60	+1,6	6,67
180	10,30	+1,2	5,53	16,40	+1,8	8,42
200	11,40	+1,3	6,79	18,20	+2,0	10,40
225	12,80	+1,4	8,55	20,50	+2,2	13,10
250	14,20	+1,6	10,60	22,70	+2,4	16,20
280	15,90	+1,7	13,20	25,40	+2,7	20,30
315	17,90	+1,9	16,70	28,60	+3,0	25,60
355	20,20	+2,2	21,30	32,30	+3,4	32,60
400	22,80	+2,4	27,00	36,40	+3,8	41,40
450	25,60	+2,7	34,23	41,00	+4,2	52,83
500	28,50	+3,0	42,34	45,50	+4,5	65,15
560	31,70	+3,3	52,50	50,80	+5,2	80,08
630	35,70	+3,7	66,50	57,20	+5,9	102,37

## AkvaPanInženjering

**PP corrugated sewerage pipes for underground water drainage and pressure** - free sewerage systems are manufactured in a Block Copolymer polypropylene (PP) extrusion process, securing a high rigidity level.

Two-ply corrugated PP pipe consists of two layers of material. The outer wall of the pipe is made of two pipes, connected alongside the entire perimeter. The connection is executed in a special technological process.

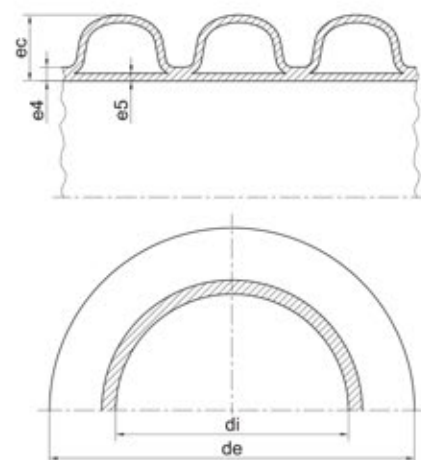
The outer corrugated wall of the pipe is black. The corrugated rings have an oblong trapezoid cross-section. The size of the rings and the distance of their separation are relative to the pipe diameter and the rigidity level. The inner side of the ring is hollow, and the inner surface of the pipe is smooth, coloured green. The nominal diameter of the pipe (DN) is the inner diameter (ID). Pipes supplied to diameter range DN 200 - 800 mm are manufactured as 6 m rods, with integrated connector.

The pipes bear permanent marking in accordance with SRPS EN 13476-3:2009 standard.

- Marking of standard: SRPS EN 13476,
- DN / ID,
- Kind and type of material,
- Sign SN,
- Manufacturer marking and year of manufacture.

Two-ply corrugated PP pipe is manufactured to different degrees of perimeter circumferential firmness, in accordance with SRPS EN ISO 9969. The standard firmness of the ring is 4 kN/m<sup>2</sup>, 8 kN/m<sup>2</sup> and 16 kN/m<sup>2</sup>.

Ring firmness of 10 kN/m<sup>2</sup> is supplied based on the customer's requirements. Corrugated PP pipes are an excellent choice when dealing with the highly demanding loads and site conditions.



ID (mm)	200	250	300	400	500	600	800
OD (mm)	225	282	339	452	565	678	906
e <sub>4</sub> (mm)	SN4	SN8	SN4	SN8	SN4	SN8	SN4
Minimum	1.50	1.80	2.00	2.50	3.00	3.50	4.50

Some of the advantages of two-ply corrugated PP pipes include:

- Long service life,
- Simple and safe handling and installation,
- Excellent hydraulic qualities,
- Excellent mechanical features – very high resistance to mechanical impact at low temperatures and excellent characteristics at high temperatures,
- High resistance to temperature changes – the pipes are resistant to temperatures of up to 60 °C, and temporarily of up to 90°C,
- High resistance to wear, contributing to low consumption over a long period of use ,
- Light weight of the pipes – enabling cost –efficient, simple and and safe handling and installation,
- Complete discharge system – all of the elements of the system are made from the same material,
- Flexibility in tailoring and connecting pipes – the pipes are conducive to all the standard methods of processing and jointing,
- Low cost for the entire system,
- Flexibility of the pipeline – stability when exposed to excessive load / pressure; even with a relatively thin over-layer, the pipeline is capable of sustaining deformations without suffering damage in its structure; tolerant to ground compaction.

The pipes must not be dragged over the ground or rough surfaces. Pipes made of PP are not affected by low temperatures, and there are no special requirements regarding handling at low temperatures. Polypropylene pipes may be stored under a roof shelter or in the open, owing to their high UV resistance.





**Two-ply corrugated PE pipes for underground drainage and pressure** - free sewerage systems are made by extrusion of high-density polyethylene. The pipe is made from two layers, with the ringed outer surface and the smooth inner surface. The two-ply corrugated PE pipe is made to a range of circumferential rigidity levels, in accordance with the standard SRPS EN ISO 9969. The standard circumferential rigidity values are 4 kN/m<sup>2</sup> and 8 kN/m<sup>2</sup> while a higher value of 10 kN/m<sup>2</sup> is supplied based on the customers' requirements. Corrugated PE pipes are an excellent choice for the most demanding loads and site conditions.

The nominal diameter of the pipe (DN) is the inner diameter (ID). Pipes having a diameter of between DN 50 and 160 (mm) are supplied in 25m and 50m coils, while the diameters of d DN 200 - DN 800 are supplied as straight 6m rods, with integrated connector. The pipes bear a permanent marking in accordance with SRPS EN 13470-3:2009.

- Standard marking: SRPS EN 13476,
- DN / ID,
- SN Marking,
- Kind and type of material,
- Manufacturer's marking and year of production.

Some of the advantages of PE pipes include :

- Excellent mechanical features – very high resistance to mechanical impact at low temperatures and excellent characteristics at high temperatures,
- High resistance of PE to temperature changes – the pipes are resistant to temperatures of up to 40 °C, and temporarily of up to 60°C,
- High resistance to wear, contributing to low consumption over a long period of use ,
- Light weight of the pipes – enabling cost –efficient, simple and and safe handling and installation,
- Flexibility in tailoring and connecting pipes – the pipes are conducive to all the standard methods of processing and joining,
- Low cost for the entire system,
- Flexibility of the pipeline – stability when exposed to excessive load / pressure; even with a relatively thin over-layer, the pipeline is capable of sustaining deformations without suffering damage in its structure; tolerant to ground compaction

The pipes must not be dragged over the ground or rough surfaces. Pipes made of PE are not affected by low temperatures, and there are no special requirements regarding handling at low temperatures.

Polypropylene pipes may be stored under a roof shelter or in the open, owing to their high UV resistance.

All of the PE pipes described above are also supplied as drainage pipes, based on the customers' requirements.

**Drainage pipes** provide optimum drainage of the sub-level and non-freezing levels of the soil. They are used to establish drainage systems in the course of construction works and closing of construction sites, by entering an existing course and transporting the water to the main outlet. The connectors are sand-tight, and no rubber sealing is necessary. The standard layout is 6 openings around the perimeter, arranged at 60°. relative to axis.

Partly perforated drainage and sewerage pipes are an ideal combination for collector systems utilising perforated pipes. Depending on the specific requirements, the pipes can be primed to collect any type and volume of surface water, transporting it to any distance. Rubber sealing is inserted in the first channel of the corrugated pipe, while the lubricated collar is pulled over the lubricated rubber ring.

Openings constitute >50cm<sup>2</sup>/m of the pipe area, allowing inlet of water. They are arranged symmetrically within each channel of the corrugated pipe. Mechanical laying of pipes is recommended as faster and more precise. In the course of laying, the pipes may be enclosed with filtering material, enabling an increased inlet rate and preventing clogging.





## AkvaPanInženjering

**Corrugated two-ply pipes for street sewerage** are manufactured using unplasticised polyvinyl-chloride (PVC-U) and their intended use is drainage of rainfall and sanitary sewage. Owing to the high quality of PVC as the building material, the pipes and connectors made from it are resistant to corrosion and negative chemical impact of acids, alkalis, salt compounds, bases, sulphates, alcohol and many other chemicals.

The PVC-U quality has been set in accordance with the SRPS EN 13476-3 and DIN 1696 standards.

Double-wall pipes reinforced with outer rings are up to 40% lighter (depending on the diameter) than PVC UK pipes of an equal intended use. Owing to the smooth inner surface, they possess very good hydraulic features and a low friction rate. In addition to this, they provide very good electrical insulation.

The pipes are easy to install and have a very long service life, with minimum maintenance requirements. They are not suitable for disposal of waste water with a high content of petrol, acetone and benzene (organic solvents).

Inter-connecting of the pipes is via the integrated collar and the rubber sealant ring. The pipes can be permanently applied within the temperature range between 0°C and +60°C and are manufactured to the standard firmness standards of SN4 (4kN/m<sup>2</sup>) and SN8 (8kN/m<sup>2</sup>), while non-standard rigidity of up to SN10 can be supplied based on a special requirement.

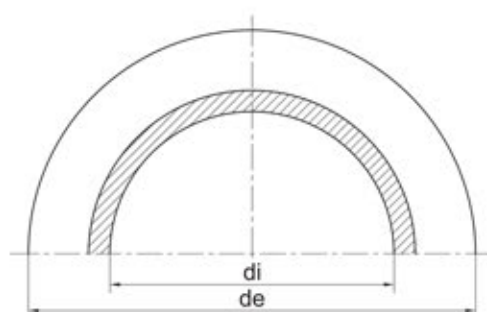
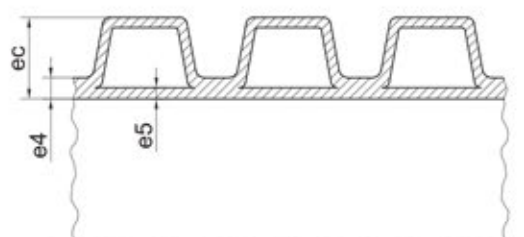
The nominal (outer) diameters of the pipes are between DN 200 and DN 500 mm and are supplied in lengths between 1 m and 6 m, in accordance with the clients requirements.

Corrugated PVC pipes are produced in red-brown colour (RAL 8023) and bear the following markings:

- Standard marking: SRPS EN 13476-3,
- Outer diameter DN/OD,
- Type of material: PVC-U,
- SN Marking,
- Manufacturer's marking,
- Year of manufacture.

DN (mm)	ID (mm)	OD (mm)	E4 (mm)
200	184	200,6	1,4
250	225	250,8	1,7
315	287	316	1,9
400	362	401	2,3
500	453	501	2,8

It is recommended that all the works of laying the pipeline be performed by professional staff adequately trained for this type of operations. The depth of the pipeline trench ranges from 1 m to 6 m, depending on the ground features and characteristics of the pipe. When laying the pipes in the trench, it is necessary to take into consideration the expected dilatation. Installation is to be performed in accordance with standard SRPS EN 1610. When lying the pipes inside the trench, it is necessary to start from the lowest point of the trench and move upwards towards the highest point. A cut in the pipe must be performed in a straight line.





The connections along the pipeline are performed using the integrated collar and the sealing rings. The minimum outer air temperature for installation of pipes is +5°C. The pipes must not be dragged over the ground or any other surface. In addition to this, PVC has a low resistance to low temperatures, so that special attention must be paid when manipulating the pipes at temperatures below 0°C.

Although UV radiation does not have an impact on the physical and mechanical characteristics of PVC pipes, it does reduce the durability of the colour, so PVC pipes ought to be protected from UV radiation. According to the customers' requirements, welded connectors for street sewerage are also produced as shown in the table below.



Name	Drawing	Description
PVC UK corrugated WELDED ELBOW DN /SN		PVC UK corrugated elbow – welded, diameter range DN 160 - DN 400, class SN2 and SN4, 11- 90 degrees.
PVC UK corrugated WELDED V JOINT DN/ SN		PVC UK corrugated welded V joint, diameter range DN 160 - DN 400, class SN2 and SN4.
PVC UK corrugated WELDED STRAIGHT JOINT		PVC UK corrugated welded straight joint, diameter range DN 160 - DN 400, class SN2 and SN4.
PVC UK corrugated WELDED REDUCING JOINT DN/SN		PVC UK corrugated welded reducing joint, diameter range DN 200 - DN 400, class SN2 and SN4.
PVC UK corrugated WELDED SLIDING JOINT		PVC UK corrugated welded sliding joint, diameter range DN 160 - DN 400, class SN2 and SN4.

## AkvaPanInženjering

**Pipes for street sewage systems** are made of unplasticised polyvinyl-chloride (PVC-U), reinforced by the added stabilisers and additives. The PVC-U quality has been set in accordance with the SRPS EN 1401 standard. Owing to the high quality of PVC as the building material, the pipes and connectors made from it are resistant to corrosion and negative chemical impact of acids, alkalis, salt compounds, bases, sulphates, alcohol and many other chemicals. The pipes can be permanently applied within the temperature range between 0°C and +60°C. Resistant to mechanical impact, they also provide very good electrical insulation and have an exploitation period of over 50 years. The pipes are not suitable for disposal of waste waters with a high content of petrol, acetone and benzene.

PVC UK pipes and connectors are ideal for pipelines installed underground or on the ground surface, laid on free flat surfaces, used for the disposal of waste water and rainfall. They are also utilised for industrial purposes, for the disposal of industrial waste waters and are equally suitable for free (gravitational) flow systems, as well as for low-pressure systems. The pipes are manufactured to the SN2 and SN4 quality standard. The choice of quality depends on the place of installation and type of base surface. The useful length of the pipe is the length of the pipe without the depth of the collar.

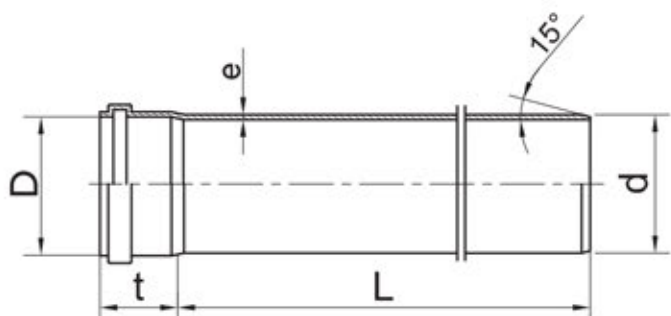
PVC UK pipes are manufactured in red-brown colour (RAL 8023), bearing the following markings:

- Standard marking: SRPS EN 1401
- Outer diameter x wall thickness,
- Type of material: PVC-U,
- SN marking,
- Manufacturer's sign,
- Year of manufacture.



PVC UK cevi SN2 (S-25)				
de (mm)	e (mm)	D (mm)	t (mm)	Težina (kg/m)
160	3,2	184	86	2,41
200	3,9	225	106	3,62
250	4,9	286	128	5,75
315	6,2	355	155	9,01
400	7,8	448	183	14,5

PVC UK cevi SN4 (S-20)				
de (mm)	e (mm)	D (mm)	t (mm)	Težina (kg/m)
160	3,6	184	86	2,95
200	4,9	225	106	4,50
250	6,2	286	128	7,02
315	7,7	355	155	11,07
400	9,8	448	183	17,81



The nominal (outer) diameters of the pipes are between DN 100 and DN 400 (mm) and are supplied in lengths between 1000 mm and 6000 mm, with SN2 and SN4 circumferential rigidity

It is recommended that all the works, including laying of the pipeline be performed by professional staff specialising in this type of work. The depth of the trench where the pipeline is laid may vary from 1m to 6m, depending on the type of the soil, as well as the characteristics and the diameter of the pipe itself. When laying the pipe, it is necessary to take into consideration the dilatation. Installations are performed in accordance with SRPS EN 1610 standard.

Inside the trench, the pipes are always laid from the lowest point of the trench bottom, moving up to the highest. Cuts are always performed as a straight line, and the pipes are joined manually. The connections along the pipeline are performed using the integrated collar and the sealing rings. The minimum outer air temperature for installation of pipes is +5°C.



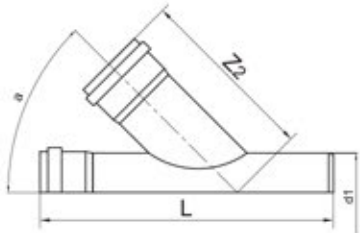
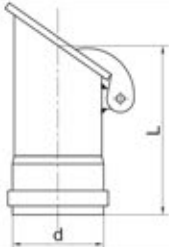
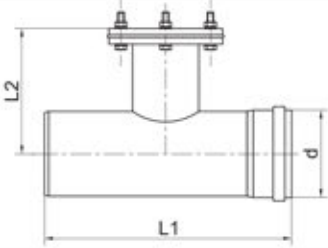
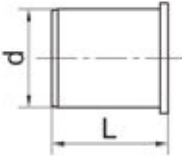
The pipes must not be dragged over the ground or rough surfaces. PVC has a low resistance to low temperatures and special care is needed for any handling at a below-zero temperature.

PVC pipes ought to be protected against UV radiation. Although UV radiation has no effect on its physical or mechanical features, it does have an impact on the durability of the colour.



According to the customers' requirements, connectors for street sewerage are also produced as shown in the table below:

Name	Drawing	Description
PVC UK WELDED ELBOW DN / SN		PVC UK ELBOW -WELDED, diameter range DN 160- DN 400, class SN2 and SN4, 11 - 90 degrees.
PVC UK WELDED V JOINT DN / SN		PVC UK WELDED V JOINT, diameter range DN 160 - DN 400, class SN2 and SN4.
PVC UK WELDED STRAIGHT JOINT		PVC UK WELDED STRAIGHT JOINT, diameter range DN 160 - DN 400, class SN2 and SN4.
PVC UK WELDED REDUCING JOINT DN / SN		PVC UK WELDED REDUCING JOINT, diameter range DN 200 - DN 400, class SN2 and SN4.
PVC UK WELDED SLIDING JOINT		PVC UK WELDED SLIDING JOINT, diameter range DN 160 - DN 400, class SN2 and SN4.

Naziv	Tehnički crtež	Opis
PVC UK WELDED SADDLE		PVC UK WELDED SADDLE SN4, diameter range DN 110 - DN 400, CLASS SN4
PVC UK WELDED MICA FLAP		PVC UK WELDED MICA FLAP, diameter range DN 110 - DN 400
PVC UK WELDED FIXING JOINT		PVC UK WELDED FIXING JOINT, diameter range DN 160 - DN 400
PVC UK PLUG		PVC UK PLUG, diameter range DN 160 - DN 400





## AkvaPanInženjering

**Polyethylene (PEHD) spiral pipes** are a high-quality, practical and safe solution for wastewater disposal, as well as a very good investment over a longer period of time. They are generally regarded as the best choice for the street sewage systems, reflecting our attitude of caring for the public health and environmental protection. Owing to the advanced modern extrusion technology, the spiral pipes are both lighter and firmer in comparison with the smooth PVC pipes, which makes them easier for transportation and handling during the installation of pipelines, eventually enabling improved cost and time-efficiency. Considering their excellent elasticity and high rigidity of the rings, they can also endure higher stress than smooth PVC pipes.

Spiral pipes possess very good hydraulic characteristics. The spiral-shaped extruded outer wall of the pipe, in combination with the smooth inner surface, yielding a small friction coefficient, are a guarantee that of residue-free utilisation over a very long period of use. At the same time, it is possible to perform high-pressure wash-outs, owing to the features of polyethylene and the efficient pipe construction. The pipes are produced in accordance with the SRPS EN 13476-2 standard for the circumferential rigidity classes of SN4 (4kN/m<sup>2</sup>) and in accordance with the SRPS EN ISO 9969 standard for SN8 (8kN/m<sup>2</sup>). Higher values of circumferential rigidity are also produced to customer's order, for non-standard projects.

The inside diameters are in the range between ID300 and ID1200, and the standard supplied lengths are between 6 m and 12 m. The pipes are resistant to abrasion, aggressive wastewater and chemical impacts. At the same time, they are highly resistant to mechanical shifts of the soil. Their intended use is for underground pipelines, used for disposal of wastewater and surface rainfall.

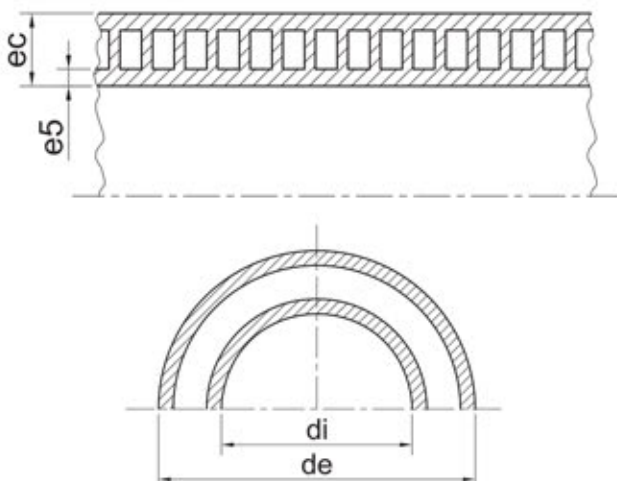


The pipelines are in compliance with the EN 13476-2 standard, resistant to corrosion in contact with water, within a large scope of pH values, including the household wastewater, as well as surface and underground waters. In the situations when the pipelines constructed in accordance with these standards are intended for disposal of water containing a certain amount of chemical pollution, such as industrial wastewater, it is necessary to take into consideration the factors of heat and chemicals resistance.

The pipe connections are performed by:

- extrusion welding on the outer surface, for pipe diameters between DN 300 and DN 1200 mm,
- extrusion welding on the inside and outer surface, for pipe diameters between DN 800 and DN 1200 mm,
- Heat-shrinking foil, for pipe diameters between DN 300 and DN 1200,
- Electrofusion coupling from DN 300 to DN 1200.

All of the listed methods of connection guarantee simplicity and efficiency in laying and maintenance of the pipeline.



	E5	SN 4	SN 8
DN / ID (mm)	OD (mm)	OD (mm)	OD (mm)
300	1,7	330	338
400	2,3	438	450
500	3,0	550	562
600	3,5	662	678
700	4,5	778	788
800	4,5	888	900
900	5,0	1000	1024
1000	5,0	1100	1124
1200	5,0	1324	1350

## AkvaPanInženjering

**Pipes for domestic sewage systems** are made of unplasticised polyvinyl-chloride (PVC-U) with the addition of stabilisers and additives, intended for disposal of all types of waste water in residential and industrial buildings, as well as for disposal of rainfall inside and outside buildings. PVC-U quality is set in accordance with the DIN 19531 standard.

Pipes and the connecting elements made of PVC-U are resistant to corrosion and aggressive chemical impact of acids, alkalis, sulphates, alcohols, salt compounds and many other types of chemicals. They provide good electrical insulation and can be permanently applied within the temperature range of between 0°C and + 60 °C. The pipes have a service life of over 50 years. The pipes are not suitable for disposal of waste waters with a high content of petrol, acetone and benzene (organic solvents). The connections are made using a socket fitting and a rubber ring, securing full tightness of joints.

Ideal for pipelines installed underground or on the ground surface, laid on free flat surfaces, for the disposal of waste water and rainfall. They are also utilised for industrial purposes, for the disposal of industrial waste waters that have no negative impact on PVC; equally suitable for free (gravitational) flow systems, as well as for low-pressure systems. Pipes for household sewage systems are produced with the socket fitting (collar). The useful length of the pipe with the socket fitting is its length without the length of the collar depth.

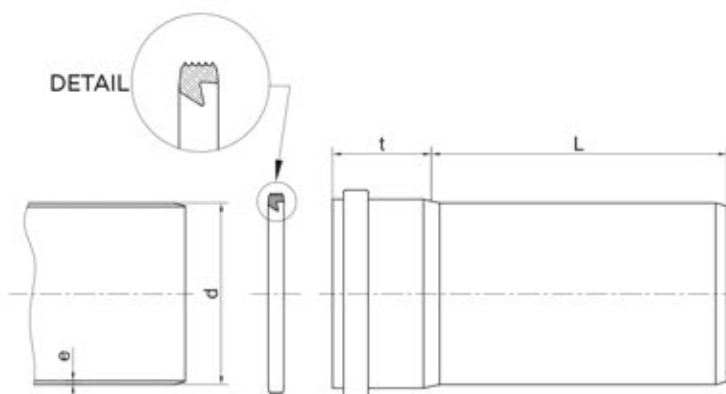
PVC KK pipes are light-grey colour (RAL 7011) and bear the following markings:

- Code of standard: DIN 19531,
- Type of material,
- Outer diameter,
- Manufacturer's sign and year of production




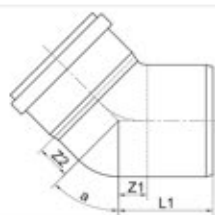

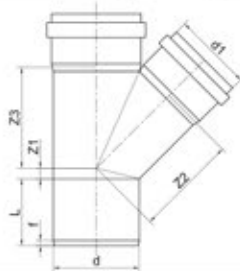

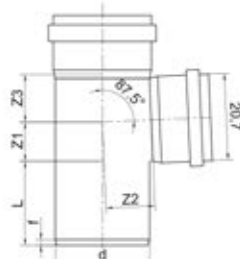

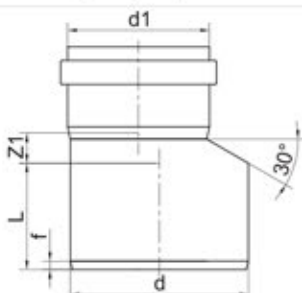

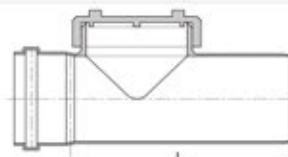

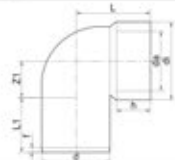

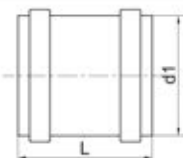


de/e (mm)		de/e (mm)		de/e (mm)		de/e (mm)		de/e (mm)	
50/1,8		75/1,8		110/2,2		125/2,5		160/3,2	
L (mm)	Težina (kg/kom)	L (mm)	Težina (kg/kom)	L (mm)	Težina (kg/kom)	L (mm)	Težina (kg/kom)	L (mm)	Težina (kg/kom)
250	0,122	250	0,196	250	0,365	250	0,495	250	0,843
500	0,228	500	0,356	500	0,655	500	0,865	500	1,445
1000	0,439	1000	0,677	1000	1,234	1000	1,605	1000	2,650
2000	0,861	2000	1,319	2000	2,393	2000	3,084	2000	5,059
3000	1,283	3000	1,961	3000	3,552	3000	4,503	3000	7,468
4000	1,705	4000	2,603	4000	4,711	4000	6,042	4000	9,877
5000	2,127	5000	3,245	5000	5,870	5000	7,521	5000	12,286

The outer diameter of the pipes ranges between DN 50 and DN 160 mm, and they are supplied in lengths of between 250 mm and 5000 mm. Owing to integrated collars, installation of pipes and connecting elements of a household sewage system is very simple and quick.





# HOUSEHOLD SEWERAGE - FITTINGS

FITTINGS		° / DN	DN					
			50	75	110	125	160	
ELBOW		45°	●	●	●	●	●	
		90°	●	●	●	●	●	
V JOINT		DN50	●					
		DN75	●	●				
		DN110	●	●	●			
		DN125				●		
		DN160			●	●	●	
STRAIGHT JOINT		DN50	●					
		DN75	●	●				
		DN110	●	●	●			
		DN125				●		
		DN160			●	●	●	
REDUCTION PP		DN50						
		DN75	●					
		DN110	●	●				
		DN125			●			
		DN160			●			
ACCESS JOINT		DN 110 DN 125 DN 160						
L JOINT		DN 50						
SLIDING JOINT		DN50	●					
		DN75		●				
		DN110			●			
		DN125				●		
		DN160					●	
DOUBLE SLEEVE		DN50	●					
		DN75		●				
		DN110			●			
		DN125				●		
		DN160					●	

## AkvaPanInženjering

Polyethylene pipes are used as channels for optical cables (as casing for optical cable, providing protection for telecommunication and electrical power cables. They are black, with the smooth outer and grooved inner surface, supplied in a range of diameters, from DN 20 to DN 110 mm and used at the working pressure of 6 bar. The nominal diameter is the outer diameter of the pipe. They are supplied in the form of straight rods, 6 m and 12 m long, as well as in coils (according to the customer's requirements).

The following permanent markings are placed at a distance of 1 m of the pipe:

- Kind and type of material,
- Outer diameter and wall thickness, in mm,
- Name of manufacturer,
- Number of machine,
- Date of manufacture (month and year),
- The pipes are marked at distances of 1m.

Production and quality control are in compliance with the following relevant standards:

- SRPS EN 12201,
- Technical Conditions regulating the polyethylene pipes of small diameter, for cable-type sewage, "PTT Vesnik" No. 25/87,
- Technical Conditions regulating the polyethylene pipes of small diameter, for cable-type sewage, "PTT Vesnik" No. 8/75



To this purpose and based on the customer's requirement, we also offer pipes of different pressure values and nominal diameters. These options are not included in the table below

DN (mm)	Weight (kg/m)	e (mm)	Δe (mm)
20	0.120	2.0	+0.3
25	0.15	2	+0.3
32	0.198	2.0	+0.4
40	0.300	2.4	+0.5
50	0.450	3.0	+0.5
63	0.71	3.8	+0.6
75	1.01	4.5	+0.7
90	1.390	5.1	+0.8
110	2.080	6.3	+0.9

RATEL certificate: 1-06-3454-437/08 • ZJPTT attest: 021-6381/01

Owing to many advantages over other types of materials, Polyethylene pipes are becoming increasingly popular with users. While they are easy to transport and install, they can be very well adapted to various requirements of the site of installation and have a low coefficient of friction, thus yielding low levels of pressure loss.





Laying in the ground is performed inside trenches at varying depths, taking into consideration the type of the pipe and the type of the supporting soil, in accordance with the engineer's specifications. The minimum depth for underground installation of the pipes is 0.6 -1 m.

The pipeline is installed at air temperature of at least + 5°C.

Connections options include flexible joints (PE and PP connectors) and fixed joints (electro-fusion and butt welding).



#### PVC pipes for protection of cables

PVC for protection of telephone and electrical power-supply cables are made from hardened PVC in yellow or red colour. The pipes are supplied as 4 m or 6m rods, or according to the customers' specifications. The integrated collar on one side is used for jointing.

Fittings of various forms are used in laying the PVC pipeline: PVC Plug, PVC Inlet, PVC Comb and PVC Shield. The pipes are manufactured to the standards of EN 1401, EN 13476 and "PTT Vesnik" No. 6173 – Technical Conditions for PVC Pipes and Connectors for Cable Systems.

DN (mm)	ID (mm)	Weight (kg/m)	e (mm)	Δe (mm)
50	46.4	0,376	1,8	+ 0,4
75	70.4	0,81	2,3	+ 0,5
110	103.6	1,48	3,2	+ 0,5

RATEL certificate: 1-06-3454-1144-2/08 • ZJPTT attest: 021-6381/01



## AkvaPanInženjering

**Stainless steel fixing fittings (NP fittings)** are used for fixing flaws in a pipeline, in the event of a damaged or broken pipe, leakage of non-aggressive liquids, as well as for joining pipe without an integrated collar. The NP fitting encircles and clamps the damaged section of the pipe, sealing it and permanently stopping the leakage, i.e. enabling free flow of the water inside the pipe. NP fittings are easily installed, minimising the costs and time for repair. Capable of sustaining a pressure of up to 40 bar, NP fittings are resistant to mechanical impact, corrosion and chemical impact as well. NP fittings are made from stainless steel (tin sheets, bolts, nuts and washers) of C 4580 quality standard, while the rubber pads are made to EPDM 8food industry rubber) standard. The quality of the material is defined by the SRPS EN 10088 (1-3) standard, with testing conducted in accordance with SRPS EN 12266 standard.

The fitting is composed of:

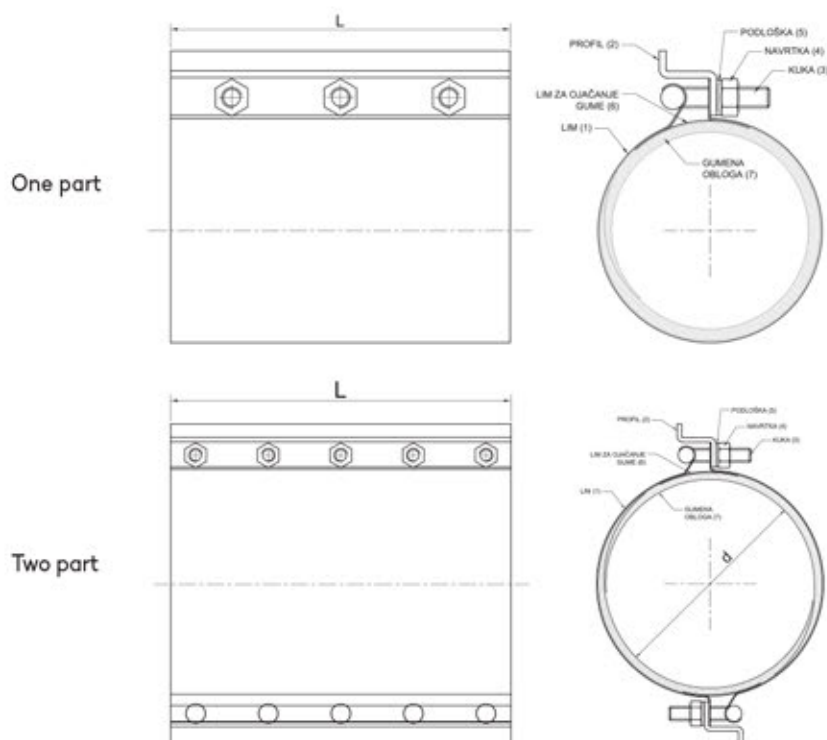
- Rubber padding lining the pipe (of sufficient firmness and elasticity to enable tight and comprehensive grasp of the pipe surface),
- Metal shield (pressing the rubber pad against the pipe surface),
- Clamping system (a set of bolts with specially shaped head to fit into the profile at the end of the shield, preventing the opening of the bracket at tightening and securing an even pull of the bracket).

There are two types of NP joints, depending on the type and outer diameter of the pipe:

- For DN 20 - DN 63 (N1 - N4) – one-part L=100mm,
- For DN 50 - DN 180 (M1 - M16) – one-part L=200mm,
- For DN 200 - DN 500 (L1 - L18) – two-part L=300mm.

### Placing an NP fitting:

Clean the pipe removing any mechanical impurities, then mark the place where the NP fitting will be placed, so that the damaged part lies in the mid-section of the fitting. Apply potassium soap of the outer part of the sealing rubber, then place the NP fitting around the pipe. Proceed with even tightening of all the bolts, to close the NP fitting. While tightening, apply moderate strokes with a plastic mallet over the surface of the NP fitting.





Number	PVC / PE PIPES	CAST IRON PIPES	ASBESTOS – CEMENT PIPES		$\Delta yE$
	PN 6-10 bara	PN 10 bara	PN 10 bara	PN 16 bara	
N 1	Ø20	Ø20			100
N 2	Ø25	Ø25			
N 3	Ø32	Ø32			
N 4	Ø40	Ø40			
M 1	Ø50				200
M 2	Ø63	Ø50	Ø50	Ø50	
M 3	Ø75	Ø60	Ø60	Ø60	
M 4	Ø90				
M 5		Ø80	Ø80	Ø80	
M 6	Ø110				
M 7		Ø100	Ø100		
M 8	Ø125			Ø100	
M 9	Ø140				
M 10		Ø125	Ø125		
M 11				Ø125	
M 12	Ø160				
M 13		Ø150			
M 14			Ø150		
M 15	Ø180				
M 16				Ø150	

Number	PVC / PE PIPES	CAST IRON PIPES	ASBESTOS – CEMENT PIPES		$\Delta yE$
	PN 6-10 bara	PN 10 bara	PN 10 bara	PN 16 bara	
L 1	Ø200				300
L 2	Ø225	Ø200			
L 3			Ø200		
L 4	Ø250			Ø200	
L 5	Ø280	Ø250			
L 6			Ø250		
L 7				Ø250	
L 8	Ø315				
L 9		Ø300			
L 10			Ø300		
L 11	Ø355			Ø300	
L 12		Ø350			
L 13	Ø400		Ø350		
L 14				Ø350	
L 15		Ø400			
L 16			Ø400		
L 17				Ø400	
L 18	Ø500				

## AkvaPan Inženjering

**PVC pipes for greenhouses** are made to 40mm diameter, and are supplied in lengths of 8m, in white colour. The pipes are primarily intended for plastic tunnel structure, but can also be used for other purposes (as long-lasting supports for creeping plants). Owing to the light weight, they are easily transported and installed. PVC pipes for greenhouses are resistant to rain and cold weather, as well as to sunshine and UV radiation.

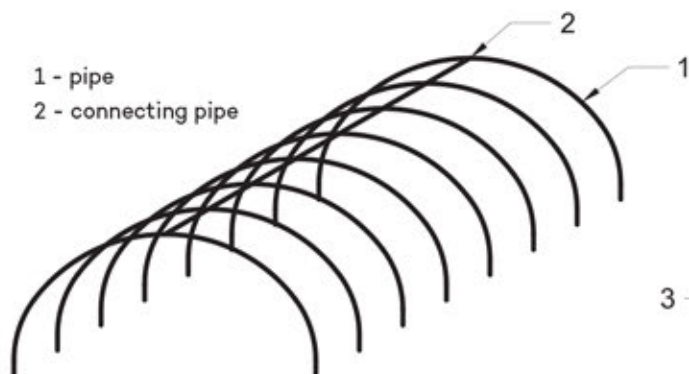
AkvaPan Inženjering d.o.o. provides its customers with all the necessary components for mounting a tunnel structure: PVC pipes, metal fittings and PE posts.



### Instructions for mounting a greenhouse - plastic tunnel

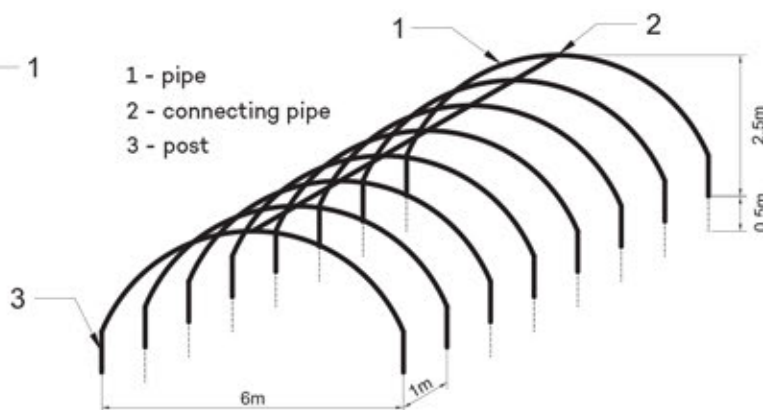
#### Mounting without posts

Measure the area to determine the places for the structure, and then stick the end of the 8m pipe (1) into the ground (20 cm in depth). The lateral pipes are connected using the connecting pipe (2) and metal fittings. Each third pipe is reinforced with a wooden post. After setting up the structure, it is covered with 8m wide plastic foil. The remaining 20 cm wide strip of loose plastic foil on both edges is covered with earth, for additional reinforcement.



#### Mounting with posts

A post (3) is nailed into the ground (app. 40 cm - 50 cm in depth) and the pipe (1) is placed by inserting the end of the post into it, all the way to the limiter. Proceed with mounting in the same way as without the posts. This method allows a more efficient utilisation of the width of the tunnel, since the vertical position of the posts makes it possible to use the edges of the tunnel for planting. In addition to this, wooden posts are not required. The front and the back of the tunnel are also closed with plastic foil.







"Akvapan inženjering" d.o.o. provides its customers with services of transportation of purchased product. Our offer includes a full range of water-supply and sewerage components and materials (hydrants, valves, fittings, manhole covers, ring connectors, brackets, etc.)



In addition to pipes and fittings from its production range Akvapan inženjering offers its customers with services of welding of polyethylene pipes for water supply and sewerage, delivered at construction sites around Serbia and the wider region.

Welding is performed by expert teams, specially trained for work in the field and challenging conditions.

The welding machines and the equipment possess attestation and certification for joining pipes up to DN 630 diameter.





## AkvaPanInženjering







## AkvaPanInženjering

---

Address: Put za Milićevce br. 14  
32205 Trbušani, Čačak, Srbija  
Telephone: +381 32 392 371, +381 32 392 372  
Fax: +381 32 392 370  
E-mail: [office@akvapan.com](mailto:office@akvapan.com)

**[www.akvapan.com](http://www.akvapan.com)**

Tax ID No. 100895181  
Reg. No. 06793045  
SD: 2221



**AkvaPanInženjering**

[www.akvaplan.com](http://www.akvaplan.com)