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M A N U A L

PRESSURE PIPES FOR WATER DISTRIBUTION AND SEWER SYSTEM

ROVOKAN

Valid since 1st July 2004

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1) INTRODUCTION

Pipes **ROVOKAN** are produced according to standard EN 12201-1:2012 and EN 12202-2:2014 from **PE-HD** (high density polyethylene), type **PE 80** or **PE 100** which is designed for water and sewage pipes for its specific characteristics. The pipes are black with blue (water) or brown (sewage) stripes.

2) APPLICATION

Pressure pipes **ROVOKAN** are specified for transport and distribution mainly in the ground of:

- Liquids to which is PE-HD resistant i.e. above all water, sewage water, water soluble substance (we recommend you to contact us for specific solutions)
- Salt, acids and lye solutions
- Petrol (gas) and mineral oils up to 40°C
- Food products (e.g. beer, wine, alcohol and milk)
- Water mixed with solid particles, e.g. sludge from sandpit and gravel pit
- Solid materials which doesn't produce static charge during transport

3) BENEFITS

Tightness, resistance to corroding process, resistance to mechanical damage (even at low temperatures), chemical resistance to most of solvents, acids, alkalis and oils; low weight, high flexibility and toughness, impact resistance and long design life.

PE material is characterized by good electro insulating and dielectric properties and high value of specific interface resistance.

4) TEMPERATURE AND PRESSURE

ROVOKAN pipes are specified for liquids transport of maximum temperature 40°C under the pressure of **0,6; 1,0 a 1,6 MPa** (6, 10, 16 bar.). Material can withstand also higher temperatures – up to 80°C for a short time period.

The pressure resistance decreases at higher temperatures. The design life of pipes is shorter if the pipes are used at higher temperatures and at full pressure load.

5) TRANSPORT, STORAGE AND MANIPULATION

The pipes must be stored and transported by laying on the ground with its all length to avoid its sagging and the mechanical damage. It is necessary to ensure pipes against shifts or damage by sharp subjects (e.g. at the loading and unloading or other manipulation). It is forbidden any moving onto sharp edges or stones.

If there is coil of pipe it can be transported vertically.

It is necessary to protect pipes from damage and contamination during storage. Therefore both **ROVOKAN** pipes ends must be protected by plastic stopper.

In bulk pipes can be stored maximal height 1 m. If pipes are stored on pallets the stiffening girders must lay on each other. Pipes **ROVOKAN** (**PE 80** and **PE 100**) can be stored in the outside conditions, the pipes are resistance to effects of UV radiation. Maximum storage period is **2 years** in the outside conditions**.**

It is necessary to protect pipes from the direct effects of heating source, contact with petrolic products, halogenated carbons and strong oxidizing reagent (e.g. nitrogen acid).

6) INSTALLATION – UNDERGROUND LAYING

ROVOKAN pipes are laid onto compacted sand or gravel-sand bedding which must be prepared alongside all pipelines. It is forbidden to lay it onto frozen ground and it is necessary to prevent any touch with stone edges.

After the lying is done the pipes are jointed. After that follows backfill with compaction along both sides of pipe and over the pipe **with minimum height 30 cm** over the upper side of pipe. While compacting it is necessary to prevent the pipe moving (horizontal and vertical). While lying in the ground it is necessary to prevent the soil washing of compacted backfill.

Minimal radius during the installation is recommended in the range about 20 to 18 multiple of the outer diameter of the duct (18-20x OD). We recommend bend radius with diameter at least of **20 D.**

7) PIPES JOINTING

ROVOKAN pipes are possible to joint by several methods: butt welding, fusion welding or by means of electro-fittings.

It is necessary during the welding to obey the instructions of the fittings producers and suppliers of welding equipment. **(There is no limitation in welding pipes and fittings of PE 80 and PE 100 together).** Pipes from **pressure PE-HD can't be bonded or welded with other types of PE** (e.g. **PE-LD**), **PP** or **PB** (which also used for pressure water distribution).

Pipes can be joined by the means of mechanical fittings either detachable or non-detachable. But it is necessary also obey the instructions of the fittings producers.

8) TECHNICAL PARAMETERS

SDR value – characteristic specification for pressure pipe. The value is the ratio between nominal outside diameter and the nominal wall thickness of the pipe. This value and material type determine pipe pressure series.

$$SDR = \frac{\text{nominal ø}}{\text{wall thickness}}$$

E.g.: pipes PE 80 PN 10 SDR = ø 90/ 8,2 = SDR 11

9) STANDARD AND AUTHORISATION

ROVOKAN pipes are produced according to EN 12201 standard for Plastics piping systems **PE 80** a **PE 100** for water supply.

Piping system was certified according to Czech act legislative n.22/ 1997 Sb. (about technical requirements for products) and amendment n.178/ 1997 Sb. in statutory text of amendment n.81/1999 and according to Czech act legislative 258/2000 Sb. (protection of public health) in AO 224 – ITC a.s. Zlín, Czech Republic. Declaration of conformity was issued and we can provide you assurance about "Declaration of conformity" upon your request.

Company **TIÚ-PLAST a.s.**, producer of **ROVOKAN** pipes is certified according to **ISO 9001:2016.**

10) PACKAGING

Pipes up to 90 mm of nominal diameter are regularly delivered in coils of 100 m length. It is possible all dimensions to be delivered also as the rods of 6 or 12 m length leid on the pallets.

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Load-carrying pipes capacity is calculated for the standard truck (cca 100 m^3 space). Pipes as rods are stored in pallets, always 2 next to each other, 2 behind each other and 2 on each other. There is together 8 pallets in one truck.

Pipes length (m) per one truck – coils

ø	items	m
25	300	30.000
32	280	28.000
40	130	13.000
50	100	10.000
63	78	7.800
75	30	3.000
90	21	2.100
110	15	1.500

Guidance Table – Pipes length (m) per one truck – rods on pallets

ø	items	m
63	664	**3.984**
75	544	**3.264**
90	464	**2.784**

110	384	**2.304**
160	160	**960**

Guidance Table – number of 6 meter long rods per pallet

ø	items	m
63	**83**	498
75	**68**	408
90	**58**	348
110	**48**	288
160	**20**	120

Pipes of 25 and 32 mm diameter are regularly packed into the bunch of 10 rods. Pipes of 40 and 50 mm are regularly packed into the bunch of 5 rods.

11) COIL DIMENSIONS OF PE-HD PIPES

Dimensions of 100 m pipe coils **ROVOKAN**

ø	Outer diameter of coil (m)	Coil thickness (m)
25	1,10	0,32
32	1,14	0,32
40	1,14	0,32
50	1,40	0,39
63	2,45	0,39
75	2,50	0,42
90	2,56	0,52
110	2,64	0,70

12) CHEMICAL RESISTANCE OF ROVOKAN PIPES

Common chemicals

Chemical substance	concentration	Chemical resistance
acids		
Acetic acid	80 – 100%	excellent
Citric acid		excellent
Chromic acid	10 – 50%	good, week at 40°C
Formic acid	100%	excellent
Hydrochloric acid	10 – 35%	excellent
Hydrofluoric acid	40 – 70%	excellent
Nitric acid	25 %	excellent
Nitric acid	50%	week
Phosphor hydrogen	Over 75%	No resistance
Phosphor hydrogen	50%	good
Stearic acid	100%	excellent
Sulphuric acid	70%	excellent
Sulphuric acid	98%	week
Sulphuric acid	oleum	No resistance
Alkali		
Ammonium hydroxide	30%	excellent
Calcium hydroxide	30%	excellent
Potassium hydroxide	30%	excellent
Sodium hydroxide	30%	excellent
Household chemicals		
Bleachers		excellent
Laundry detergent		excellent
Chemical detergent		good
Hand cream		excellent
Dyes		excellent
Make-up		excellent
Nail-varnish		week
hairspray		excellent
Shampoo		excellent
Polish		good
Soap		excellent
Iodine solution		good
Turpentine		week
Waxes		excellent
Oils		
Camphor oil		week
Oil in transformers		good
Etheric fruit oils		good
Cotton seed oil		good
Engine oil		good
Linseed oil		good

Industry chemicals

Chemical substance	Concentration	Chemical resistance
Acetone		good
Ammonium nitrate	Saturated solution	excellent
Amyl acetate	100%	good
Amyl alcohol	100%	good
Amyl chloride	100%	week
Benzaldehyde		good
Benzol		week
Boric acid		good
Butyl alcohol		excellent
Calcium Chloride	Saturated solution	excellent
Carbon Chloride		week
Chlorbenzol		week
Chloroform		week
Cyclohexanon		excellent
Dibutylether		good
Dichlor-ethylen		No resistance
Diethylenglykol		excellent
Ethylenglycol		excellent
Ethyl acetate	100%	good
Ethanol	100%	excellent
Diethyl ether		week
Ethylenchloride		week
Formaldehyde	10 – 40%	good
Fural	100%	good
Gas oil		good
Glycerine		excellent
Glycol		excellent
Heptane		good
Capron acid		good
Hydrogen peroxide	30%	excellent
Hydrogen peroxide	90%	week
Iodine		good
Isobutanol		good
Isopropanol		good
Kerosine		good
Mercury		excellent
Methanol		excellent
Methylenchloride		week
Mineral oil		good
Natural gas		good
Gasoline		good
Vaseline		good
Phenol		good
Phthalic acid		good
Phtalanhydride		good
Propanol		excellent
Silver nitrate		excellent
Perchlorethylene		week
Trichlorethylene		No resistant
Toluene		No resistant

13) GUARANTEE

The producer guarantee 30 years of faultless operation for **ROVOKAN pipes.** This guarantee is provided to all customers who buy any length of **ROVOKAN** pipes and fill the guarantee card (company name, address, business identification). After this process the customer receives the certificate.

If the customer claims pipes **TIÚ-PLAST a. s.,** the company requests upon the customer these documents:

1) Conforming document that the product was produced in **TIÚ-PLAST** a.s. company.
2) Observance of all rule of manipulation, storage, underground laying and jointing referred to this manual which is valid to the delivery date
3) Record of observance of all rules written above which is conducted by the independent specialist for underground laying of PE water pipes or by the specialist of TIÚ-PLAST a.s.
4) Other documents clarifying any contradictions (e.g. a note of products takeover, exemplary claims solutions etc.)

Attention!

The guarantee doesn't refer to pipes **ROVOKAN** damage which are caused by not observing the rules of manipulation etc. according to manual and any damage caused by third party (namely damage during excavation work, mining operations etc.)