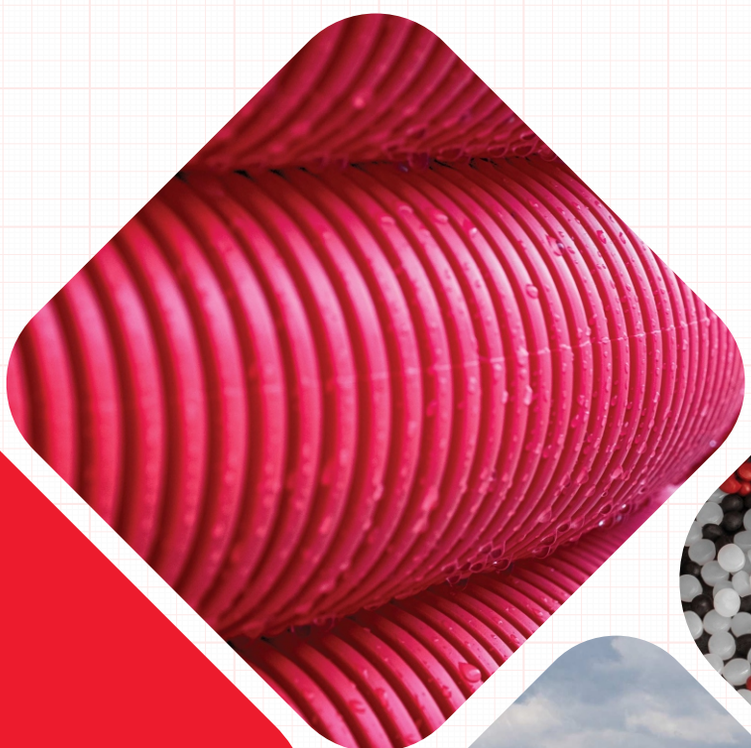
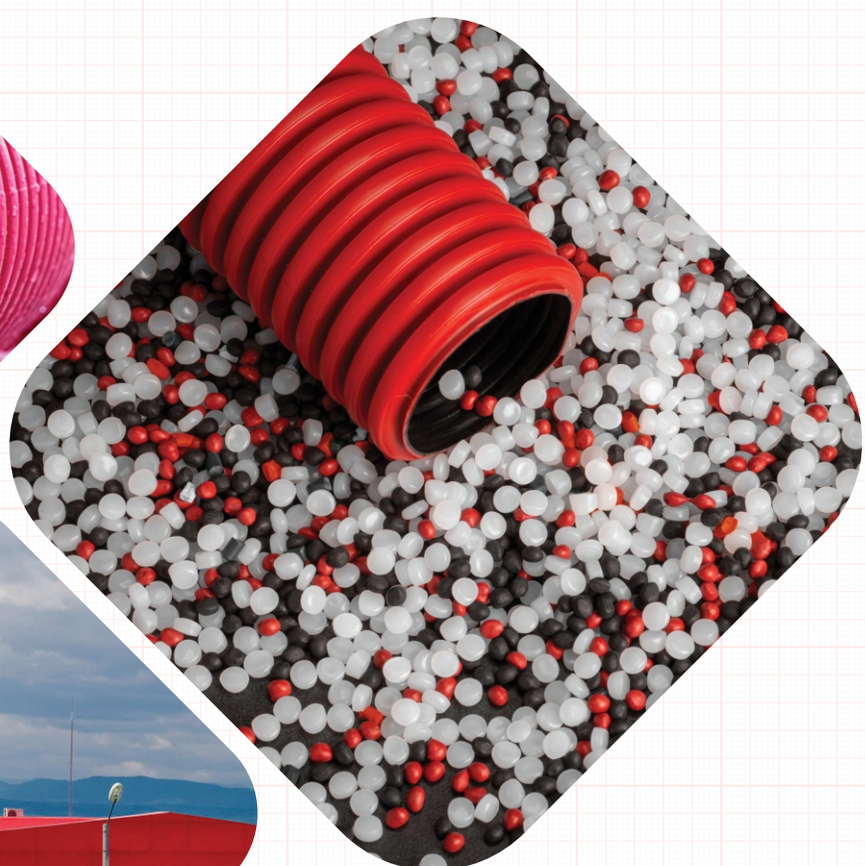
TehnoWorld
A CRH COMPANY

Pipes and accessories for electrical cable protection and telecommunications





Pipes and accessories for electrical cable protection and telecommunications

TehnoWorld

TehnoWorld is a factory producing high density polyethylene, polypropylene and PVC-U pipes in Romania.
The project began in 2003, when the foundations were laid by a team of engineers and dedicated people convinced that performance can be achieved through organization, work and discipline.
Today, these values are the basis of a team united as a family, a team that is responsible for the growth of the factory and its position among the most modern and efficient pipe factories in Europe.
The quality of the products, the compliance with the time limits and the consultancy services offered are the reasons why the partners and collaborators choose TehnoWorld.

Factory

Total area: 96,000 m2.
Storage platforms: 78,500 m2.
4 production halls of ~ 9500 m2.

TehnoWorld - Product Range

- Smooth HDPE pipe for pressurized networks with diameters between ⌀16 ÷ ⌀1200 and nominal pressure between PN4 ÷ PN32. The pipe can be used for the transport and distribution of drinking water, raw water, natural gas, biogas and other pressurized fluids.
  HDPE pipes can be:
  -Single layer - made of HDPE - PE 80, PE 100, PE 100 RC;
  -Double layer - PE 100, PE 100 RC with PE 100 RC and PE 100, PE 100 RC with PP protective layer.
- HDPE and PP corrugated pipe for culverts, sewerage and drainage networks;
- HDPE corrugated pipe for electrical cables protection;
- PVC-U pipe for external sewerage;
- Electrofusion fittings, injected, compression manufactured for HDPE pressurized networks;
- PE / OL transition fittings, risers;
- PVC fittings;
- HDPE and PP inspection and connection chambers;
- HDPE / PP manholes for special applications - leachate, pumping stations, etc.;
- Thermoplastic welding machines;
- Power and welding generators, welding accessories;
- Valves, taps, hydrants, pumps, fountains, etc.;

Summary

ELCOR

TÜVRheinland CERTIFIED

Product Certification
BUREAU VERITAS Certification

ELCOR is a complete and modern electrical and telecommunications cable protection system. Whether you want to build a private network or a metropolitan network, ELCOR is the right solution for:

- buried low and medium voltage networks;
- buried street lighting networks;
- buried telephone and fibre-optic networks;
- street and urban signalling networks;
- cable management in civil and industrial construction.

ELCOR corrugated pipe in double layer: the outer wall is corrugated and the inner wall is smooth. The aim of the outer wall is to provide compressive and impact strength and preserve the integrity of the system under the action of static or dynamic external loads, while the inner wall provides a smooth sliding action when pulling cables.

The special production process (co-extrusion and corrugation) ensures a perfect bond between the two walls.

ELCOR corrugated pipe - section

de = outside diameter;

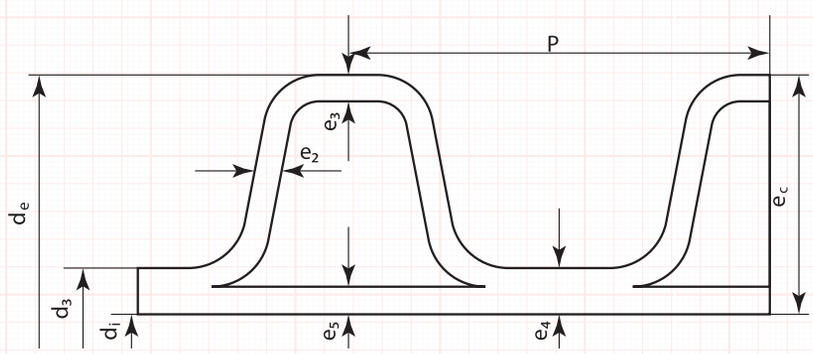
di = inside diameter, larger than the minimum diameter indicated by the standard;

e5 = thickness of the inner wall;

e4 = joint wall;

P = distance between corrugations;

ec = height of corrugation.



ELCOR

ADVANTAGES

Strength

The Elcor range provides excellent impact and compression strength thanks to the special double wall design and the material - high density polyethylene.

Flexibility

Elcor pipes can adapt to any desired spatial configuration.

Ease of fitting and installation:

- direct installation in trench without sand bed;
- direct installation in concrete;
- coupling sleeve;

Reliability

ELCOR electrical and telecommunications cable protection systems have a minimum service life of 50 years. The systems retain their functional and constructional characteristics throughout their service life. The ELCOR system can be used in the temperature range of -40 ~ + 60 degrees Celsius.

Efficiency in installation and maintenance

- lightweight;
- easy to handle and mount;
- requires no maintenance;
- possibility to use spacers for a very good distribution of multiple routes.

Resistance to chemical agents and fire

- halogen-free material;
- corrosion resistant;
- zero asbestos content;
- the possibility of being used in the chemical industry;
- used in buried systems, does not raise fire safety concerns;
- does not propagate flame.

Versatility

- can also be used to protect water, gas and compressed air pipes;
- can be used in indoor ventilation systems;
- can be adapted to outdoor laying thanks to superior UV stabilisation;
- when installing it is recommended to lay an additional pipe for future extensions.

ELCOR 450 N
double-walled HDPE corrugated pipe

Description

Double-walled corrugated high density polyethylene pipe for the protection of buried electrical and telecommunication cables.

Regulations

SR EN 61386-1, SR EN 61386-24, ENEL DS 4247 RO, European low and medium voltage Directive 2014 / 35 / UE.

Integrated quality management system

Certified for Quality Management System according to ISO 9001, ISO 14001, ISO 45001, system that guarantees the quality of products and services offered.

Manufacturing

It is a high-density polyethylene pipe made of 2 distinct walls welded together by co-extrusion. The outer wall is corrugated and gives high mechanical strength and the inner wall is smooth and facilitates the passage of cables.

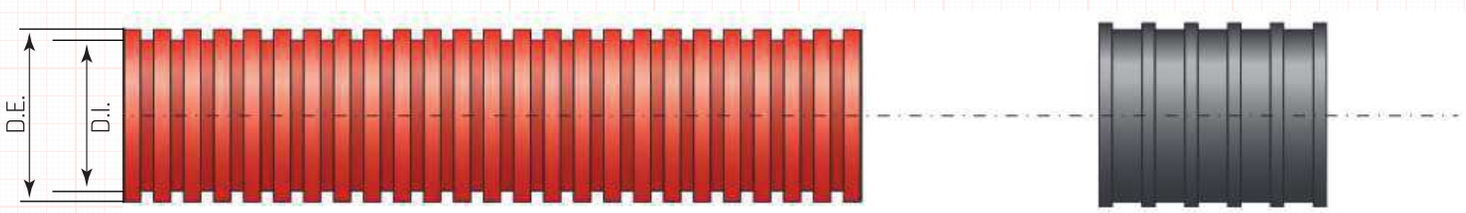
In series production the outer wall is red/black, the inner wall black. Other colours for both walls are available on request.

Marking elements: manufacturer and brand name, outside diameter, type of use N, reference standard, compressive strength class 450N/m¸.

The pipes packed in a bundle are fitted with P.E.T. or P.P. guide wire.

ELCOR 450 N corrugated pipe is supplied with a HDPE socket for joining.

D.E. mm	D.I. mm	Length of the bundle	Code	Transport (m/truck)
40	31	50	TR_PE_PROT_DE040_C-TW-C50	22000
50	40	50	TR_PE_PROT_DE050_C-TW-C50	18000
63	50	50	TR_PE_PROT_DE063_R-C50	11000
75	62	50	TR_PE_PROT_DE075_R-C50	7800
90	76	50	TR_PE_PROT_DE090_R-C50	6400
110	92	50	TR_PE_PROT_DE110_C-TW	4000
125	107	50	TR_PE_PROT_DE125_C-TW-C50	3750
140	122	50	TR_PE_PROT_DE140_C-TW-C50	2400
160	138	50	TR_PE_PROT_DE160_R-C50	2000
200	170	25	TR_PE_PROT_DE200_R-C25	1100



D.E. = Outer diameter;
D.I. = Inside diameter.

ELCOR 450 N
double-walled HDPE corrugated pipe

General features:

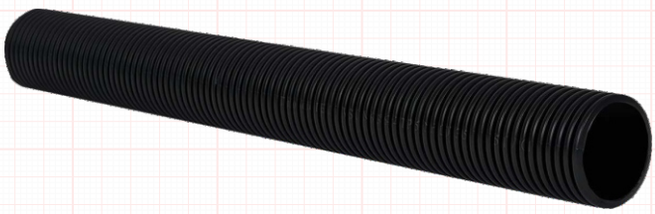
Structure	double-wall corrugated exterior and smooth interior
Use	buried electrical cable networks
Operating temperatures	- 50 / + 60 °C
Minimum radius of curvature	5 x Nominal Diameter
Compressive strength	450 N according to EN 61386 - 24 (with 5% diameter deformation)
Impact strength	normal type - N
Electrical insulation strength	> 100 Megaohm (MΩ)
Dielectric strength	> 800 Kv / cm
Resistance to chemical agents	excellent chemical resistance to most chemicals
UV resistance	12 months from date of production
Guarantee	24 months
Lifespan	50 years

Connecting socket
The click-on socket is made of HDPE and is equipped with a locking system that prevents pulling out.

D.E. mm	H mm	Code Mufă
40	31	MUFAR_DE0040EL
50	40	MUFAR_DE0050EL
63	50	MUFAR_DE0063EL
75	62	MUFAR_DE0075EL
90	76	MUFAR_DE0090EL
110	92	MUFAR_DE0110EL
125	107	MUFAR_DE0125
140	122	MUFAR_DE0140_PROT
160	138	MUFAR_DE0160_PROT
200	170	MUFAR_DE0200_PROT

Optionally, an elastomeric gasket can also be chosen to ensure sealing.

ELCOR 750 N
double-walled HDPE corrugated pipe



Description

Double-walled corrugated high density polyethylene pipe for cable protection. Series production - black outer wall, black inner wall. Other colours for both walls are available on request.

Regulations

SR EN 61386-1, SR EN 61386-24, ENEL DS 4235 RO, European low and medium voltage Directive 2014 / 35 / UE.

Integrated quality management system

Certified for Quality Management System according to ISO 9001, ISO 14001, and ISO 45001, a system that guarantees the quality of products and services offered.

Manufacturing

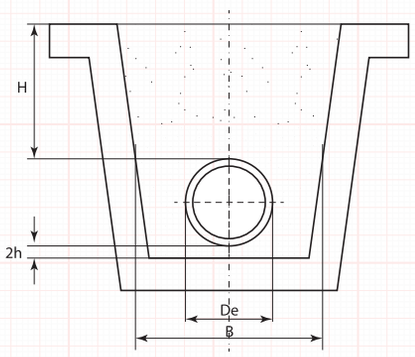
ELCOR 750 N - It is a high density polyethylene pipe made of 2 distinct walls welded together by co-extrusion. The outer wall is corrugated and gives high mechanical strength and the inner wall is smooth and facilitates the passage of cables. Marking elements: manufacturer and brand name, outside diameter, type of use N, reference standard, compressive strength class 750N/m^2.

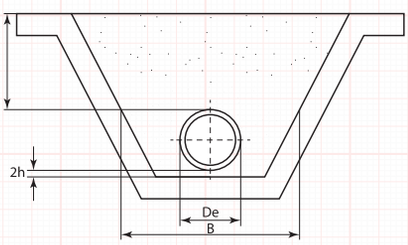
ELCOR 750 N UV - It is a high density polyethylene pipe made of 2 distinct walls welded together by co-extrusion. The outer wall is corrugated and gives high mechanical strength and the inner wall is smooth and facilitates the passage of cables. They contain added carbon black and stabilisers that protect them against atmospheric agents, external influences and especially UV rays, so no special storage measures are required. Marking elements: manufacturer and brand name, outer diameter, type of use N, reference standard, compressive strength class 750N UV/m^2.

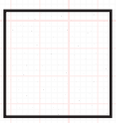
The pipes provided as bars are packed in palletised packs and are not provided with P.E.T. or P.P. guide wire.
ELCOR 750 N corrugated pipe is supplied with a HDPE socket for joining.

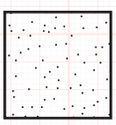
D.E. mm	D.I. mm	Bar length m	Transport (m/truck)	Code ELCOR 750 N	Code ELCOR 750 N UV
40	31	6	La cerere	TR_PE_PROT_DE040_B_EL	TR_UV_PE_PROT_DE040_B7-TW
50	40	6	La cerere	TR_PE_PROT_DE050_B-TW-06	TR_UV_PE_PROT_DE050_B7-TW
63	50	6	La cerere	TR_PE_PROT_DE063_B7-TW	TR_UV_PE_PROT_DE063_B7-TW
75	62	6	La cerere	TR_PE_PROT_DE075_N-B06	TR_UV_PE_PROT_DE075_B7-TW
90	76	6	La cerere	TR_PE_PROT_DE090_N-B06	TR_UV_PE_PROT_DE090_B7-TW
110	92	6	5472	TR_PE_PROT_DE110_B7-TW	TR_UV_PE_PROT_DE110_B7-TW
125	107	6	3672	TR_PE_PROT_DE125_B7-TW	TR_UV_PE_PROT_DE125_B7-TW
140	122	6	3600	TR_PE_PROT_DE140_B7-TW	TR_UV_PE_PROT_DE125_B7-TW
160	138	6	2496	TR_PE_PROT_DE160_B7-TW-B6	TR_UV_PE_PROT_DE160_B7-TW
200	170	6	1440	TR_PE_PROT_DE200_B7_TW	TR_UV_PE_PROT_DE200_B7-TW

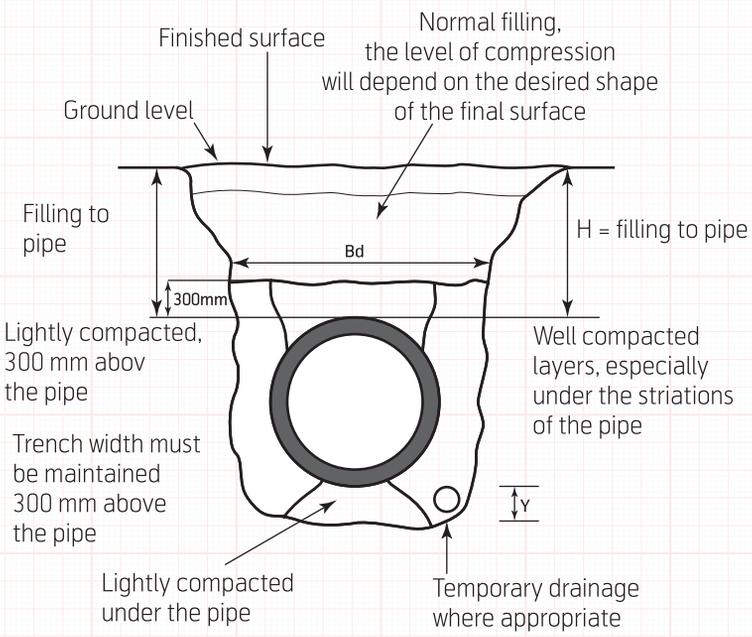
D.E. = Outer diameter; D.I. = Inside diameter.


H
2h
De
B


2h
De
B







Backfill

Trench backfilling is one of the most important steps in pipe installation, and a proper execution allows for perfect interaction between pipe and trench/bedding. Making the backfill in layers will allow the pipe to react correctly to ground movements or unexpected external loads.

The first layer is the bedding of the trench. The bedding material can include sand and gravel with a diameter of 10-15 mm. The thickness of the bed should be approx. 10 cm + 1/10 of the pipe diameter. Proper compaction of the bed is very important for the correct distribution of static and dynamic loads.

After laying the pipe, the side filling is carried out until the top of the pipe is covered. Side filling involves compaction on the side only and the material used can be the same as for the bedding, side compaction is intended to avoid transferring the dynamic loads generated by compaction directly to the pipe.

Side filling is carried out until a 10-15 cm layer of compacted backfill is obtained above the pipe generator.

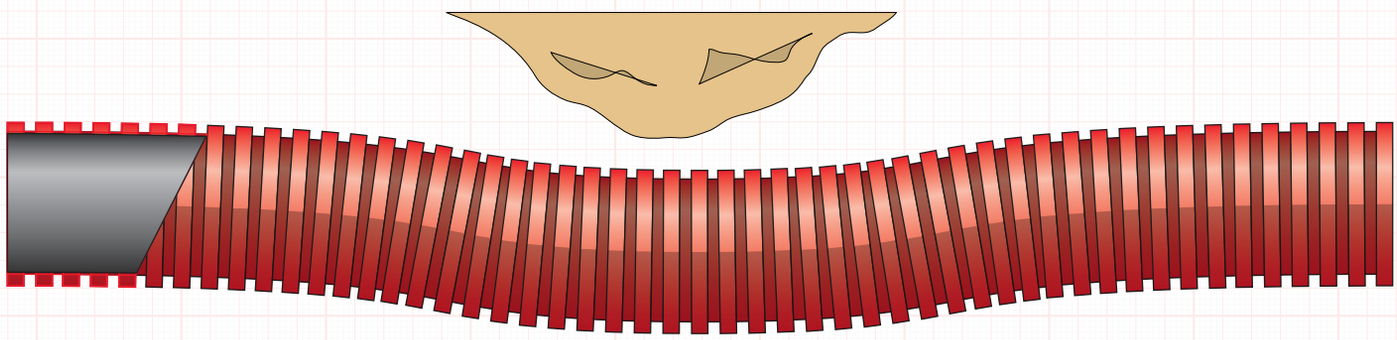
The rest of the backfill can be made with the excavated material, in successive layers of 30 cm, respecting the degree of compaction specified in the project. Only by applying the proper trench backfill methods can the maximum effect of the flexibility of HDPE corrugated pipes be achieved.

For the lower bedding, clean sand with a grain size of less than 20 mm should be used, very well compacted. It is recommended to use compacted sand with a grain size of 15 mm for the upper bedding of the side fill.

It is advisable not to use ground or recycled material for either the bedding or the side infill. Also, concrete props or concrete pipe fencing are not allowed. If for structural reasons it is necessary to use concrete, a well-compacted sand interlayer of at least 10 cm thickness plus 1/10 of the pipe diameter must be placed between the concrete and the pipe.

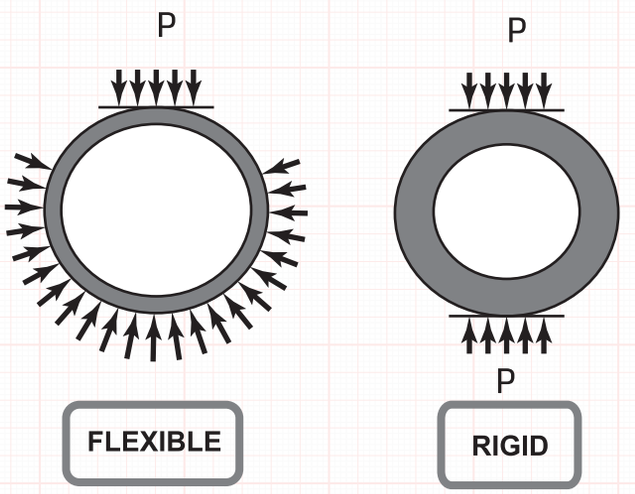
Before laying the cover layer, it must be ensured that all parts of the pipe are well supported; the sand layer must be carefully compacted to a height of at least half the pipe diameter. After this the normal covering of the trench can continue.

Thanks to their high flexibility, ELCOR protection pipes can be easily laid by adapting to the shape of the trench with ease.



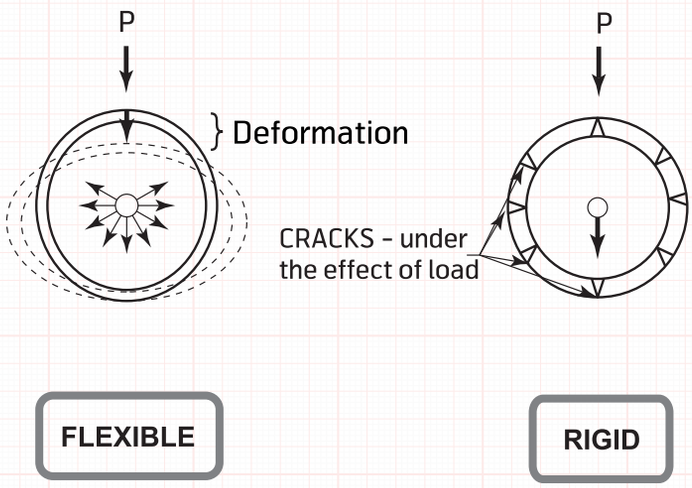
SOIL REACTION

Stress distribution in deformation stress under external load.



Soil reactions - load distribution for flexible and rigid structures: pipe-soil interaction.

No-failure deformation in flexible pipes and cracking in rigid pipes



Schematic representation of flexible and rigid pipe deformation

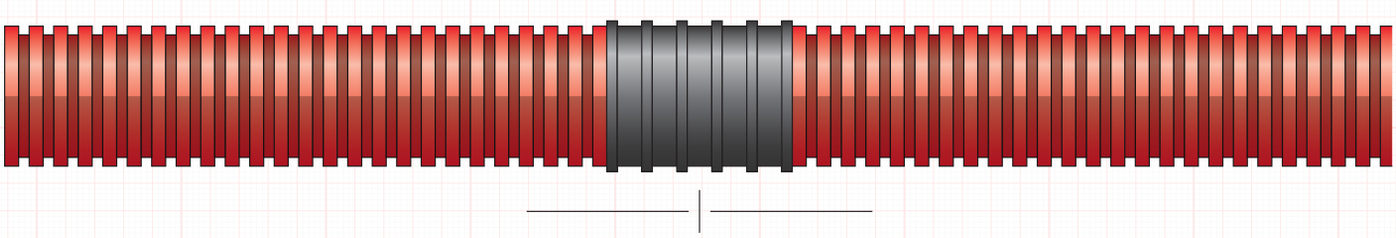
JOINING

The joining of corrugated pipes with each other and with pulling pipes or other special fittings is done by means of jointing sockets.

No welding or special adhesives are required due to the simple design of the socket. The fitting of the socket is done manually by push-ing on the pipe up to the level of the stops.

Joints between 2 sections of pipe are made manually, using the jointing sockets together with the respective bundles or bars, without the need for other equipment or preparation operations.

Due to the properties of polyethylene, ELCOR pipes are very flexible with the ability to adapt very well to the conditions of the laying ground, avoiding obstacles and eliminating bends and other special parts; the minimum bending radius of the pipes being 5 x diameter unlike rigid protection systems which need special parts and operations.



Monotube protection pipe

Description

The pipe is made from high-density polyethylene in a continuous extrusion process. Thanks to the raw material used, high-density polyethylene granules, the pipe has outstanding performance in use:
- very good wear resistance;
- low friction coefficients;
- electrical insulator characteristics;
- very good resistance to the action of chemical agents;
- very low roughness (smooth tubes);
- lightweight;
- safe and simple joining;
- high productivity in assembly;
- total safety within a wide range of non-toxicity standards;
- excellent stiffness-flexibility balance.

The outer and inner surfaces of the pipe shall be smooth, clean and free from any nicks, dents or other surface defects.
The cuts at the ends of the single-pipe pipes are straight, without burrs, dents or traces of chips.

Integrated quality management system

Certified for Quality Management System according to ISO 9001, ISO 14001 and ISO 45001, a system that guarantees the quality of products and services offered.

Diameter mm	Wall thickness mm	Code	Packing	Length m	Transport (m/truck)
20	1,9	TP_020_G1.9	Bundle	200	104000
	2,0	TP_020_G2.0	Bundle	200	
25	2,3	TP_025_G2.3	Bundle	200	67200
	3,0	TP_020_G3.0	Bundle	200	
32	2,0	TP_032_G2.0	Bundle	200	36000
	2,3	TP_032_G2.3	Bundle	200	
	3,0	TP_032_G3.0	Bundle	200	
40	2,3	TP_040_G2.3	Bundle	100	17600
	2,4	TP_040_G2.4	Bundle	100	
	3,0	TP_040_G3.0	Bundle	100	
	3,7	TP_040_G3.7	Bundle	100	
50	2,4	TP_050_G2.4	Bundle	100	9000
	3,0	TP_050_G3.0	Bundle	100	
63	3,0	TP_063_G3.0	Bundle	100	5000
	3,6	TP_063_G3.6	Bundle	100	
75	3,0	TP_075_G3.0	Bundle	100	3000
	4,3	TP_075_G4.3	Bundle	100	
90	4,3	TP_090_G4.3	Bundle	100	2500
	5,1	TP_090_G5.1	Bundle	100	
	8,2	TP_090_G8.2	Bundle	100	
110	6,3	TP_110_G6.3	Bundle	100	2000
	6,6	TP_110_G6.6	Bundle	100	
110	5,3	TP_110_G5.3	Bar	12	5088
125	6,0	TP_125_G6.0	Bar	12	3264
140	8,6	TP_140_G8.6	Bar	12	2760
160	9,5	TP_160_G9.5	Bar	12	2400

Other sizes of bundles and bars are available on request.

Physical and mechanical characteristics

Characteristic	Values	UM	Test method
Density	> 930	kg/m3	SR ISO 1183
Hot melt flow rate (MFR)	0.2 □ 1.4	g/10min	SR ISO 1133
Water content	< 300	mg/kg	SR ISO 15512
Content of volatile substances	< 350	mg/kg	SR EN 12099
Tensile strength resistance	> 20	MPa	ISO 6259
Tensile elongation at break	> 350	%	ISO 6259
Longitudinal contraction	max. 3	%	SR ISO 2505
Coefficient of linear expansion	0,00013		ASTM D 696

Colour

The colour of the pipes is black.

Marking

The pipes are marked each metre according to the model shown below: TW MONOTUB HDPE 40 x 2,3 lot: 464 date/turn length.

Installation

The temperature range for installation is -5°C to +50°C.
HDPE single-pipe pipes are suitable for installation:
- positioned in the telephone trunking system, including optical fibre
- positioned in open channel;
- installed in the channel by special means (mobile power plug, cutter, support cable, etc.);
- positioned in PVC pipelines in line with viaducts, bridges and tunnels;
- joining: □ by welding;

□ with mechanically tightened connections.

Cable junction and pulling manhole

Description

For the pipe system for electrical cable protection and fibre optic protection, a special manhole made of corrugated pipe with diameters from 400 mm to 1200 mm has been developed.

The main feature of this enclosure is that it offers connecting pieces for any diameter of protective pipe and the joint is made by means of a double socket, coupling or subsequent connection. This avoids adaptations and special parts that could either reduce the integrity of the system or excessively increase costs.

The use of the manholes also makes it possible to carry out network extensions or repairs to existing networks without the inconvenience of such work in an urban environment, such as special permits, traffic stoppages, destruction and repair of streets and pavements.

If pipes with sufficient internal cross-section are foreseen at the design stage, new cables can be laid in addition to the existing ones or several protective pipes can be laid from the outset to remain available for future use.

Composition

The manhole column
PE corrugated column with OD 1200 mm / OD 1000 mm / OD 800 mm / ID 600 mm / ID 500 mm / ID 400 mm with a standard height of 1 m. Other heights can also be made to special order. The outer wall is corrugated and the inner wall is smooth. The manhole is black on the outside and white or black on the inside.

Manhole bottom
The base of the manhole is flat polyethylene sheet welded to the manhole column.

Inlet/outlet connections:
a. Corrugated pipe connection socket diameters 40 mm - 200 mm;
b. One-pipe pipe casing diameters 32 mm - 63 mm;
c. Subsequent EPDM (Ethylene-Propylene-Diene-Monomer) rubber connection diameters 110 mm - 200 mm (optional, only for unforeseen site situations).

Manhole cover
The manhole cover in a roadway system can be made of composite material or cast iron. They will have load classes as required.

The non-road manhole cover is made of polyethylene sheet, has no lock and is installed directly on the manhole column by pressing.

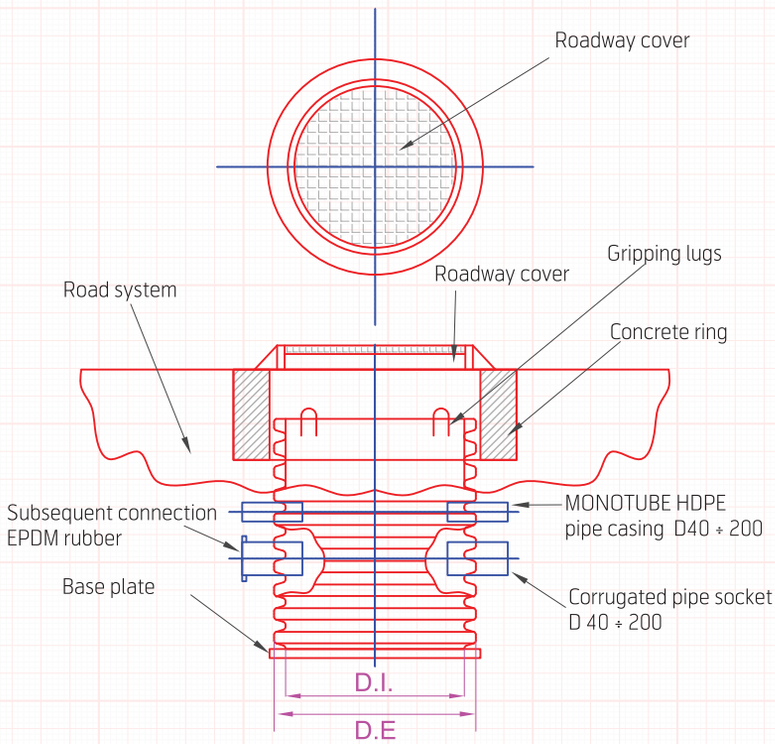
Note: The manhole is not equipped with a cover, this is ordered separately.

Installation

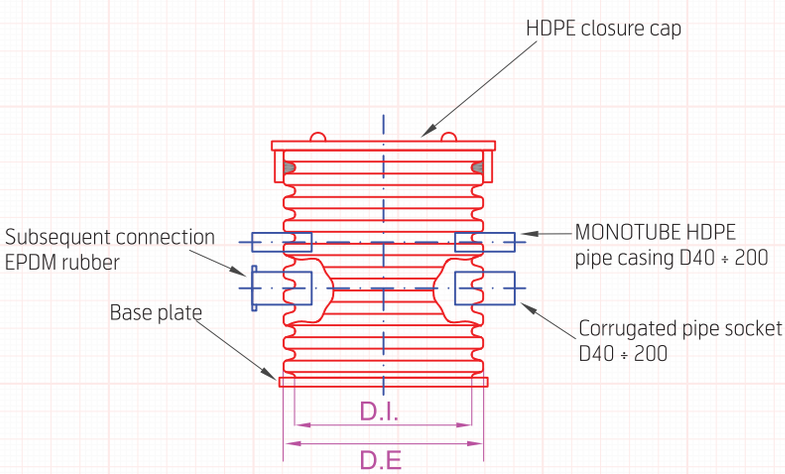
Buried, according to EN 1295.

General installation recommendations:
- Handling of the manholes shall be done with care to avoid damage.
- When excavating for the positioning of the manhole, a width shall be taken into account to ensure a minimum lateral distance between the manhole column and the native soil.
- A stable foundation will be provided to avoid displacement of the manhole over time due to subsidence.
- Particular attention shall be paid to aligning the manhole with the pipe network and ensuring verticality.
- Around the body of the manhole, up to the surface, compacted material will be filled in layers of maximum 15 cm, minimum 85% compaction (Standard Proctor Density).
- During compaction operations, special care must be taken not to damage or puncture the components of the manhole .

Details of the manhole in road system



Details of the manhole in non-road system



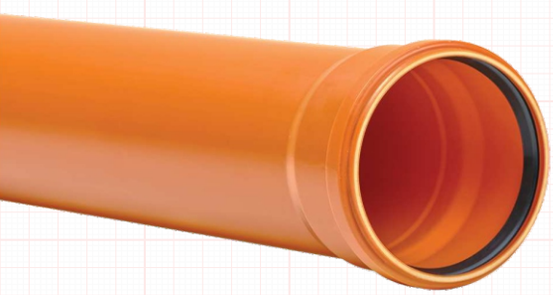
Fortline PVC pipe

The pipes made of PVC are rigid and are used to create network systems for the protection of electrical cables installed underground in residential or industrial areas and provide mechanical, electrical and corrosion protection.

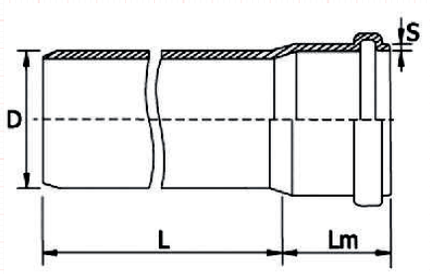
Multilayer PVC pipes are manufactured in compliance with **SR EN 61386 - 1 and SR EN 61386-24**.

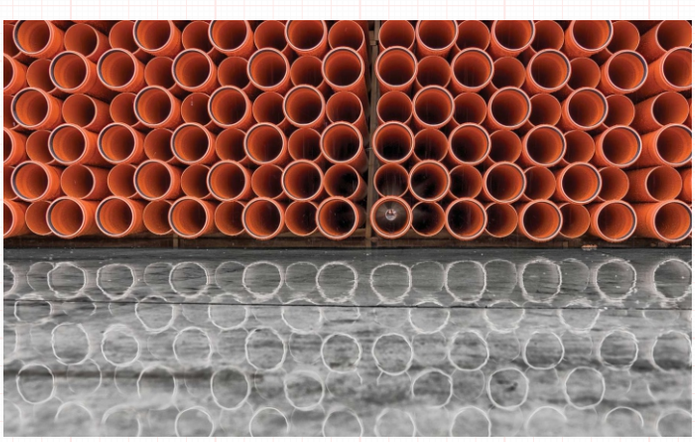
Pipes are produced by continuous extrusion on fully automated lines. The internal and external surface of the pipe is smooth with no dents or cavities. All products are cut cleanly, perpendicular to the product axis.

The pipes are fitted with a coextruded socket and gasket. The standard lengths in which the products are delivered are 1, 2, 3, 4 and 6 m.
Other lengths are possible on request.

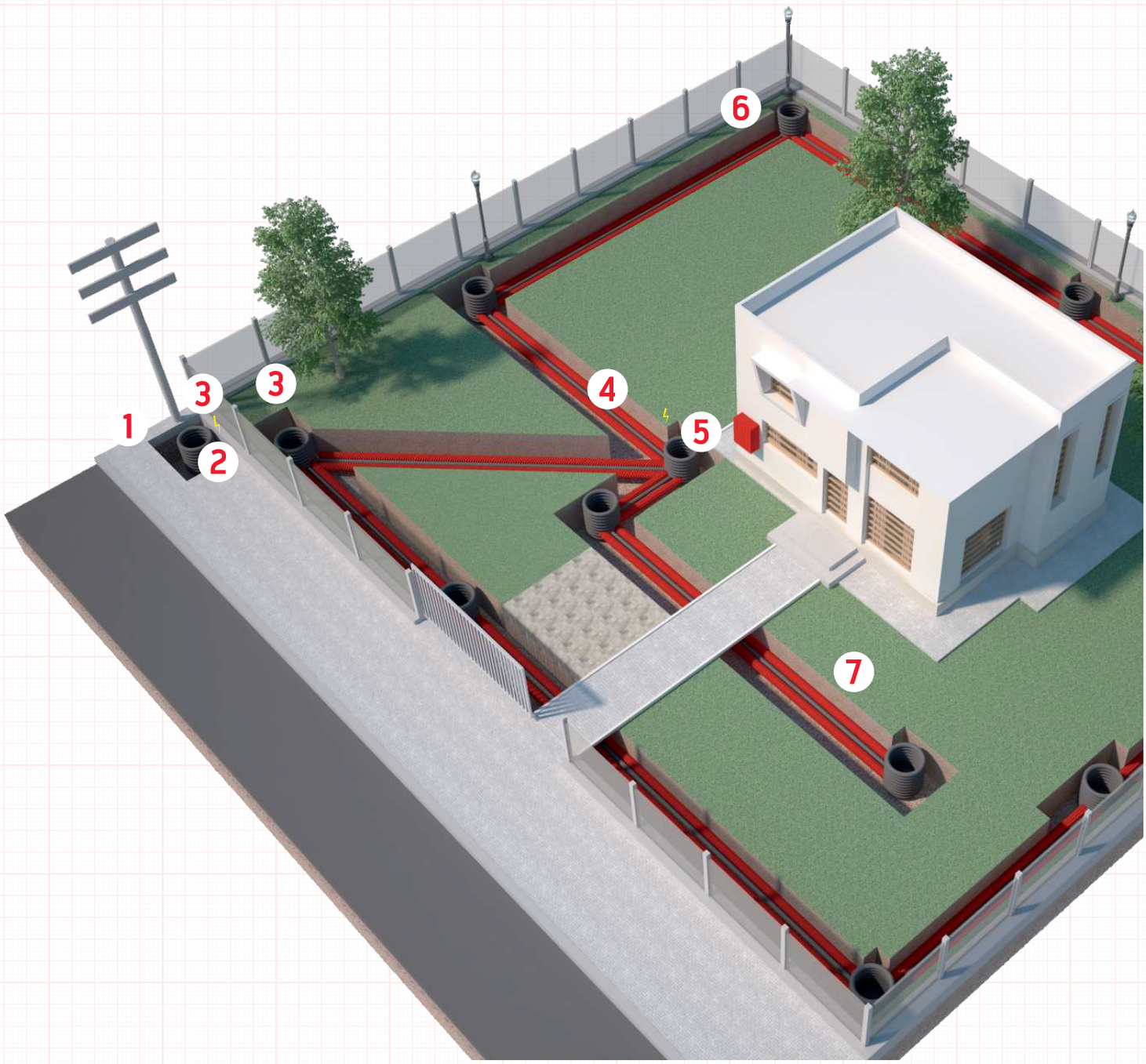


Outer diameter	450 N	750 N	Socket length
D mm	Thickness S(mm)	Thickness S(mm)	Lm (mm)
110	3.2	3.2	57.5
125	3.2	3.2	63.6
160	4.0	4.7	76.3
200	4.9	5.9	90.4





ELCOR - BURIED CABLE MANAGEMENT



Caption

1. Pole - transformer - recess
2. Meter - BMP
3. Manhole access: energy, telephone, internet, television, etc.
4. Internal distribution manhole
5. General switchboard
6. Lighting - video surveillance - external 230V socket
7. Future extensions

SC Tehno World SRL
1616 DN2E km 2, City of Baia,
727020 Suceava, Romania
E: office@tehnoworld.ro
www.tehnoworld.ro