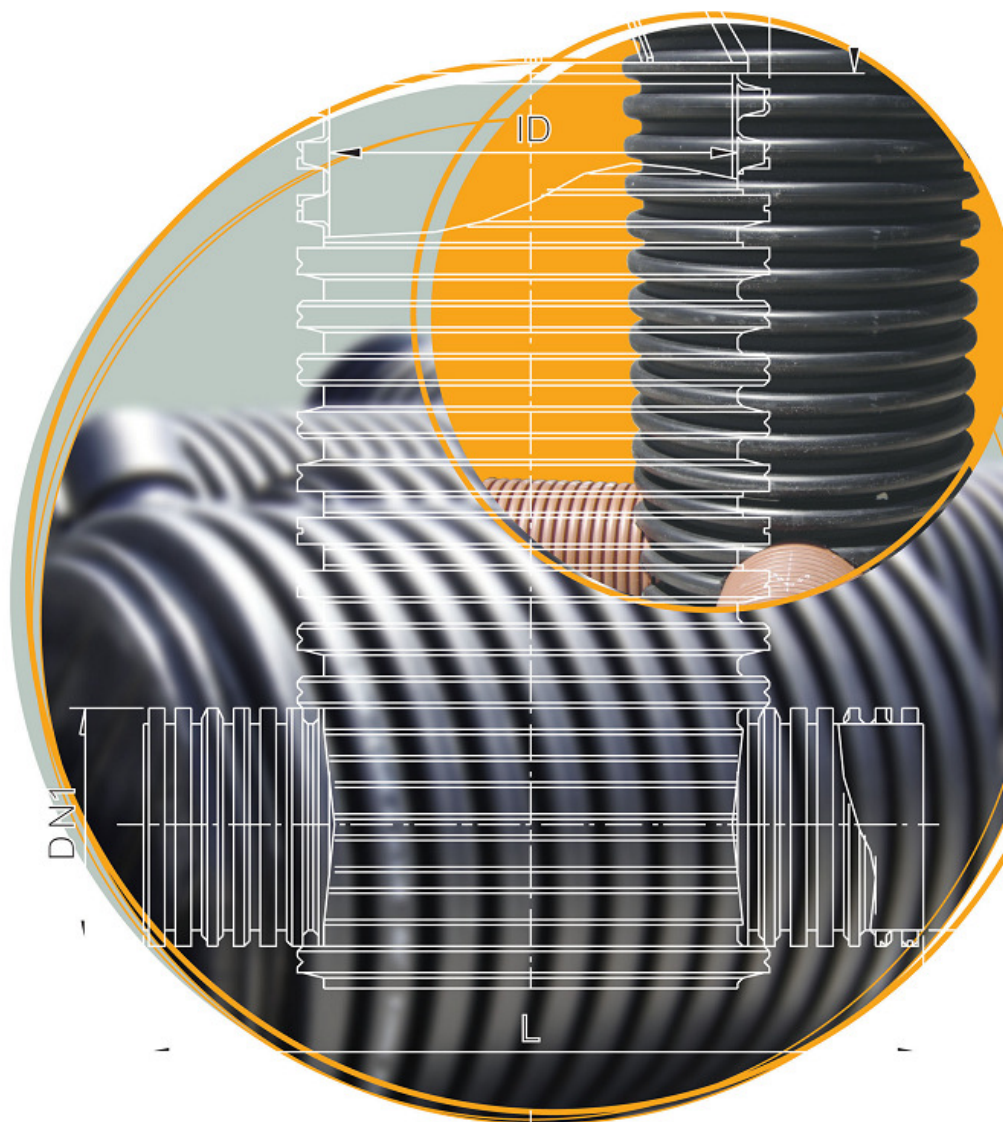




PEHD and PP manholes and inspection chambers according to EN 13598-2





PEHD and PP manholes and inspection chambers according to EN 13598-2

✓ PURPOSE

Kemoplast d.o.o. offers high quality PE and PP manholes according to **EN 13598-2:2009¹**

Manholes as the integral parts of sewerage system provide easy access for maintenance, inspection, cleaning or repairing of sewerage and drainage systems, as well as for technically correct sewerage system joining, direction changing, changing the falls and profiles.

Manholes are usually positioned on:

- the beginning of a channel
- where channel changes dimensions
- where channel changes direction
- for the change longitudinal fall of the channel
- for connections of the channel
- channels which are on routes for inspection and maintenance

Manholes are interpolated to the max. 50 m distance for profile Ø 250 to 600 mm, marked with figures for each branch separately, and all details are shown in drawings, attachments and cost.

✓ MATERIAL

Manholes are manufactured from high density polyethylene HDPE – **manhole MAPIKAN** or from polypropylene block-copolymer (PP-B) – **manhole TERAKAN**

The most important properties of the materials for application in sewerage systems are following:

Property	Unit	Value		Standard	
		HDPE	PP-B		
Density	kg/m ³	> 950	900	ISO 1183	
E-Modulus	MPa	800-1000	1700	ISO 527	
Yield strength	MPa	19	30	ISO 527	
Notched impact strength (Charpy)					
	+23°	kJ/m ²	12	70	ISO 179/1eA
	-23°	kJ/m ²		7	ISO 179/1eA
-50°	kJ/m ²	4,5		ISO 179/1eA	

Due to these properties, manhole made from HDPE and PP-B has low weight, high stiffness and excellent crack resistance.

¹ EN 13598-2:2009

Plastics piping systems for non-pressure underground drainage and sewerage -- Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) -- Part 2: Specifications for manholes and inspection chambers in traffic areas and deep underground installations (prEN 13598-2:2006)



PEHD and PP manholes and inspection chambers according to EN 13598-2

+ FEATURES AND BENEFITS

- **Durability**
With its lifespan of at least 100 years, the plastic manhole is far superior to traditional systems. You don't need to worry about any transport damage or damage caused by root growth. It is simply indestructible.
- **100% Watertight**
The plastic manholes are absolutely watertight -
- **Adaptability**
The manholes are designed so that they can be connected to every type of pipe - PVC, PE or PP pipes (smooth or with the structured-wall), concrete pipes, ductile pipes regardless to height of inlet and outlet connections and channel changes direction.
- **Low weight**
On average, plastic components only weigh around 5% of their concrete counterparts. This simplifies the whole process, i.e. handling, transportation and installation, as no heavy lifting gear is required – an enormous benefit when working in tight spaces or on difficult terrain.
- **Easy to install**
Easy installation due to the rubber ring push-fit system and reduction time of performance because making of concrete base and plating are not necessary.
- **Saving time**
The built-in manholes can be used immediately
- **Low costs of maintenance**
The smooth interior of manholes prevents the build-up of deposits, assuring low friction loss and high flow rates. These high flow rates continue for the life of the pipe system. Once installed, plastics manholes do not require maintenance for a very long time.
- **Environmental accessibility**
Water tightness prevents the surrounding soil contamination, and all materials and used pipes and fittings can easily be recycled and lead back into the production cycle.

✓ PRODUCTION TECHNOLOGY

The manholes are manufactured as complete units (monolithic construction). Manhole elements are interconnected by extrusion welding.

✓ QUALITY CONTROL

The testing laboratory performs several tests on each manufactured manhole:

- geometrical characteristics
- welded joints quality
- water tightness



page 3 of 11



PEHD and PP manholes and inspection chambers according to EN 13598-2



TECHNICAL INFORMATION

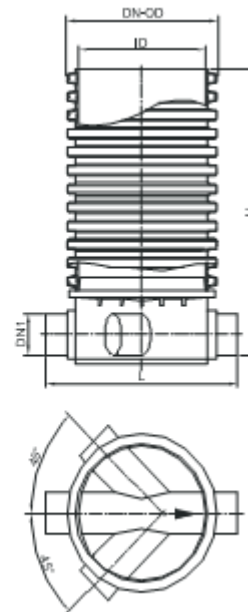
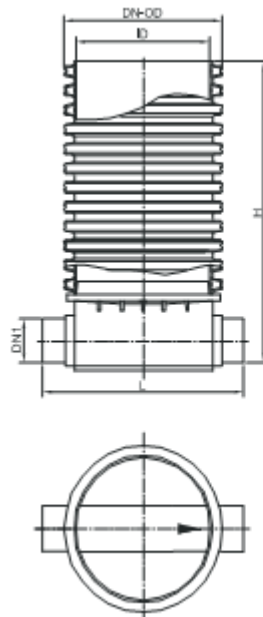
KEMOPLAST manholes are available as:

- manhole with flat top
- manhole with cone top

KEMOPLAST MANHOLES WITH FLAT TOP consist of two parts: the base, made by rotational mould technology or by extrusion welding and the body, made of MAPIKAN polyethylene corrugated pipe or TERAKAN polypropylene corrugated pipe. The base and body are interconnected by extrusion welding.

The **base** is manufactured by rotational mould technology (MAPIKAN manhole type A) or by extrusion welding (MAPIKAN manhole type B and TERAKAN manhole type B).

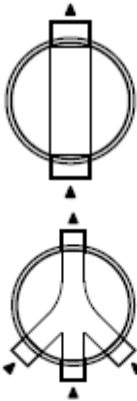
MAPIKAN manhole Type A has the rotomoulded base with the standard inlet-outlet connections to the base (PVC, PE smooth pipes or PE corrugated pipes MAPIKAN) ϕ 200, ϕ 250 and ϕ 315mm) – with one inlet and one outlet (180°) or 3 inlet (0°, 45° and 315°) and one outlet 180°.





PEHD and PP manholes and inspection chambers according to EN 13598-2

Configuration of the base for MAPIKAN manhole type A



Straight canal base

suitable for linear section, installed normally every 50 meters to enable easy cleaning with water jets

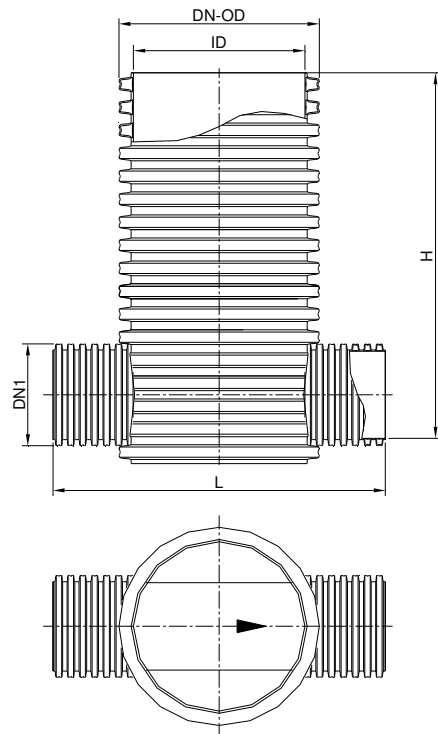
Angled canal base

to allow inspection at changes directions where cogging and obstruction are possible (available 45° and 90° in both right and left directions)

Table 1 - Pipes for MAPIKAN manhole Type A

Connecting pipe d (mm)	Nominal diameter of manhole DN (mm)		
	600	800	1000
d (mm)	Diameter of manhole OD/ID (mm)		
	800/678	1000/851	1200/1030
200	+	+	+
250	+	+	+
315		+	+

MAPIKAN manhole Type B and TERAkan manhole Type B has extrusion welded base with flat bottom which provide safe and fast installation of the connecting pipes (PVC, PE smooth pipes, PE corrugated pipes MAPIKAN or PP corrugated pipes TERAkan) with different profiles, longitudinal falls and channel directions.





PEHD and PP manholes and inspection chambers according to EN 13598-2

Table 2 - Length of the connection "l ± 50 (mm)" for the MAPIKAN manhole type B according to EN 12666 or EN 13476

Connection d (mm)	Nominal diameter of manhole DN (mm)			
	500	600	800	1000
	Diameter of manhole OD/ID (mm)			
	630/535	800/678	1000/851	1200/1030
160	300	300	300	300
180	500*	500*	500*	500*
200	500	500	500	500
225	500*	500*	500*	500*
250	500	500	500	500
280	500*	500*	500*	500*
315	500	500	500	500
355		500*	500*	500*
400		500	500	500
450		500*	500*	500*
500		700	700	700
630			700	700

* - dimensions on special request

Table 3 - Length of the connection "l ± 50 (mm)" for the TERAKAN manhole type B according to EN 12666 or EN 13476

connection d (mm)	Nominal diameter of manhole DN (mm)		
	600	800	1000
	Diameter of manhole OD/ID (mm)		
	695/612	928/816	1168/1026
200	500	500	500
250	500	500	500
300	500	500	500
400	500	500	500
500	700	700	700
600		700	700



PEHD and PP manholes and inspection chambers according to EN 13598-2

The **body of manhole** is practically a working chamber, whose height depends on the depth of shaft, used for the required procedures for workers to maintain and cleaning sewers. Specially formed ribbed surface of the body (corrugated

polyethylene pipe for the manhole MAPIKAN and polypropylene corrugated pipe for the manhole TERAKAN) allows the elimination additional load of the manhole and its anchoring, even in conditions of high groundwater levels.



Table 4 - Technical properties for the body of the manholes

Property	unit	MAPIKAN			TERAKAN		
Class		SN4			SN8		
Ring stiffness	kN/mm ²	4			8		
DN_{manhole} (mm)	mm	600	800	1000	600	800	1000
OD_{manhole} (mm)	mm	800	1000	1200	695	928	1168
ID_{manhole} (mm)	mm	678	851	1030	612	816	1026
Rib width	mm	89	99	111	800	100	133

Construction of the manhole with flat top allows easy height adjustment directly at the construction site. Shortening must be performed using a fine-toothed saw (manual or electrical). The cut must be straight. The cut is done only through a corrugation valley (see Table 4 - rib width).



PEHD and PP manholes and inspection chambers according to EN 13598-2

KEMOPLAST MANHOLES WITH CONE TOP consists of 3 elements: manhole base, made by rotational mould technology or by extrusion welding and the body, made of MAPIKAN polyethylene corrugated pipe or TERAKAN polypropylene corrugated pipe and cone top.

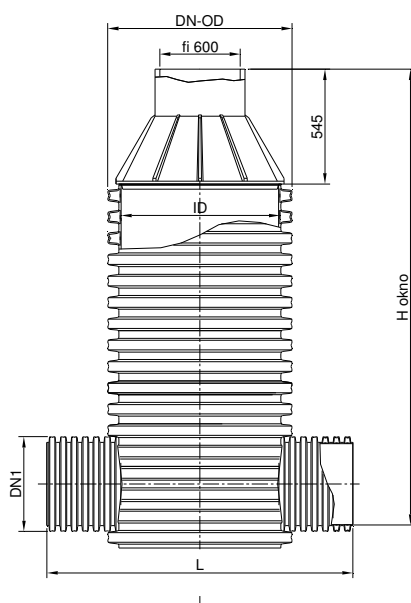
The cone top is made of polyethylene (for MAPIKAN manhole) or polypropylene (for TERAKAN manhole) by rotational moulding technology. It reduces manhole diameter from 1000mm and 800mm to 600mm (exit dimension). We can offer two types of the cone tops: eccentric cone top for the manhole DN 1000, and concentric cone top for the manhole DN 800. Properties of the base and the body are the same as for manholes with flat tops. The cone top is interconnected with the body by extrusion welding.

Construction of the manhole with cone top allows easy height adjustment directly at

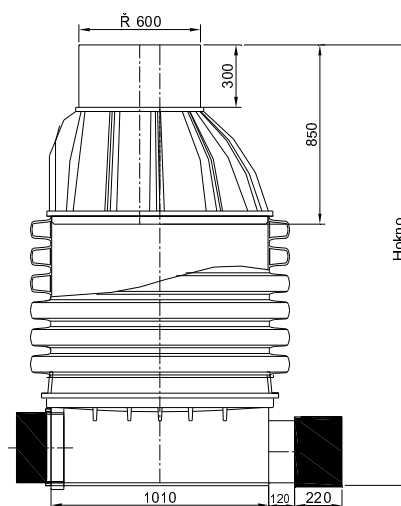
the construction site. Shortening must be performed using a fine-toothed saw (manual or electrical). The cut must be straight. The cut is done only through the flat part of cone top max 10 cm.

Manholes are not supplied with built-in ladder because of simply maintenance (see Maintenance of sewerage). Coming down in the manhole is possible with mobile telescopic ladder or using a factory-built PE-ladder in the manhole MAPIKAN or AL-ladder in the manhole TERAKAN (on special request).

It is possible to make extra pipe connections DN 110, 160 or 200mm at the construction site drilling the hole ("in situ") by special drilling crown. For extra pipe connection on the manholes must be used KEMOPLAST inlet gaskets DN 110, 160 or 200mm. They are easy to install and safe thanks to their double lip design.



The manhole with concentric cone top



The manhole with eccentric cone top

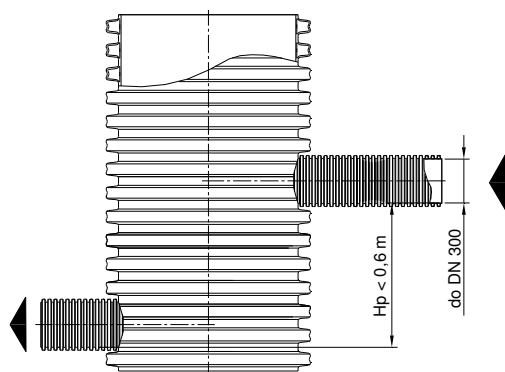


PEHD and PP manholes and inspection chambers according to EN 13598-2

CASCADE MANHOLES

Cascade manholes allow channel connections on coordinates above bottoms. These manholes are manufactured as standard manholes in two ways:

- **break inside the manhole** – for inlet connections till DN 300 if the height of the cascade inlet-outlet < 0,6m
- **break outside the manhole** – for inlet connections above DN 200 if the height of the cascade inlet-outlet 0,6 – 1,5m. In this case creates backdrop (bypass)

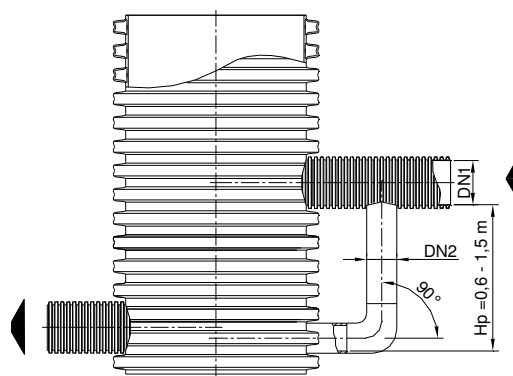


Standard cascade manhole

Cascade can be made on appropriate heights and angles in relation the flow profile according to the project requirements. Backdrop (bypass) duct is manufactured from HDPE smooth pipes

duct through which water flows with smaller flow. Water flows with higher flow through the both ducts, but in this case, water which falls, falls on the water in the bottom of the manhole, which reduces direct blows of water on the structure of the manhole.

The purpose of the backdrop (bypass) duct is to ensure normal revision of the channel with the smaller flow. Backdrop (bypass) duct must have DN₂ smaller than supply duct (see table 5).



Backdrop manhole

(Backdrop manhole MAPIKAN) or PP smooth pipes (Backdrop manhole TERAkan) together with compatible fittings. The parameters for the cascade given in Table 5:

Table 5

Height of the cascade Hp (m)	Supply channel DN ₁ (mm)	Backdrop (bypass) duct	
		DN ₂ (mm)	α (°)
0,6 – 1,5	200	150	90
0,6 – 1,5	250	200	90
0,6 – 1,5	300	250	90
0,6 – 1,5	400	315	90
0,6 – 1,5	500	400	90

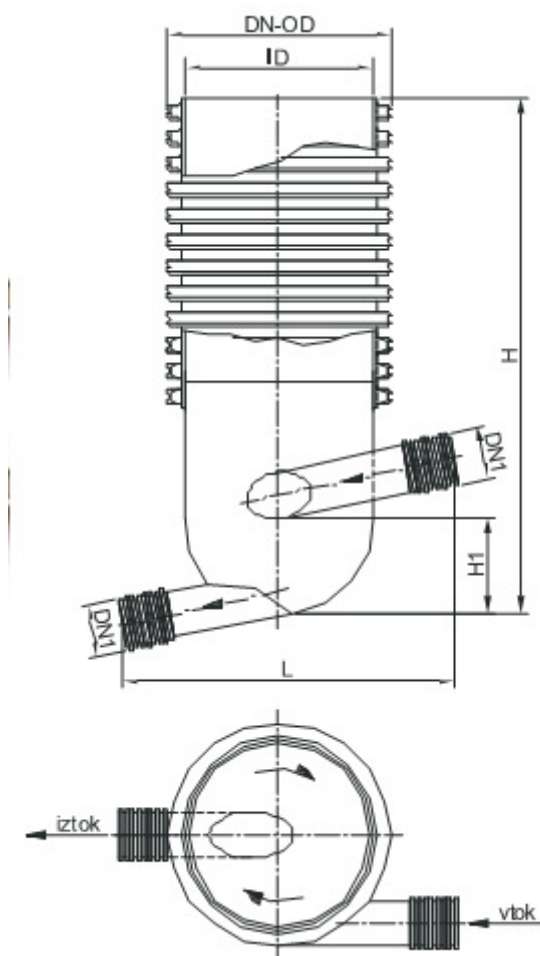
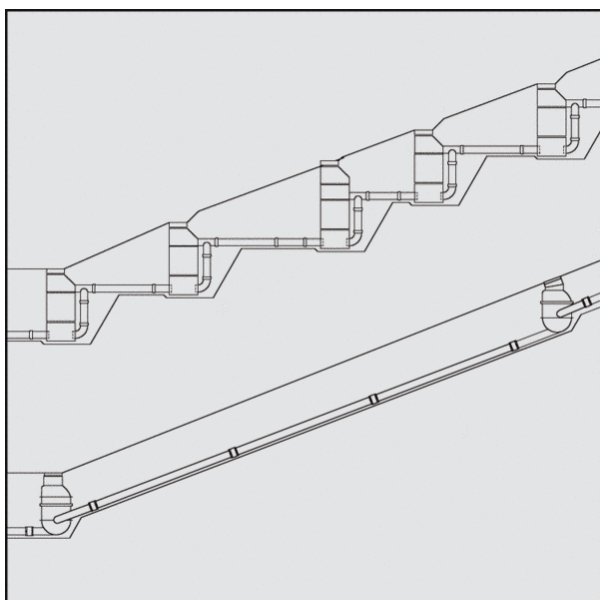


PEHD and PP manholes and inspection chambers according to EN 13598-2

ENERGY COMPENSATING MANHOLES

Energy compensating manholes (manholes with self-cleaning spherical base) are used in strongly inclined areas (e.g. mountain drainage)

instead of installation cascade manholes in the series which require short manhole intervals, a very long route and very deep trenches.



Manhole with self-cleaning spherical base and tangential inlet

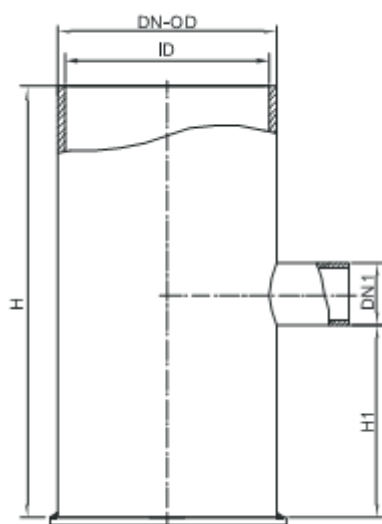


PEHD and PP manholes and inspection chambers according to EN 13598-2

ROAD GULLIES

KEMOPLAST road gullies drain surface water from pedestrian areas, cycle paths, car parks, petrol stations airports and industrial areas, separate the water from dirt and provide access

to the surface or road drainage system for inspection and cleaning. Gullies are available in a wide variety, combining high resistance with low weight.



PE road gully

DN-OD (mm)	ID (mm)	DN1 (mm)	H1 (mm)	H (m)
400	375	* 160	300 – 900	0,75 – 2,25
		* 200	300 – 900	
		250	300 – 900	
450	422	* 160	300 – 900	1,0 – 2,5
		* 200	300 – 900	
		* 250	300 – 900	
		250	300 - 900	
500	469	* 160	300 – 900	1,0 – 3,0
		* 200	300 – 900	
		* 250	300 – 900	
		* 315	300 – 900	
		250	300 – 900	
		315	300 - 900	
630	591	* 160	300 – 900	1,0 – 3,0
		* 200	300 – 900	
		* 250	300 – 900	
		* 315	300 – 900	
		250	300 – 900	
		315	300 - 900	

* Connection for MAPIKAN or TERAKAN pipe
 ϕ 160-315

Gullies can be installed with inlet bellow pavement and inlet bellow roadway

Edition 01/2010

page 11 of 11