

# magnoplast

## INSTRUCTION



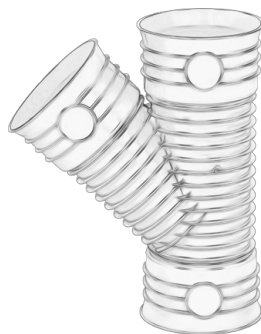
## MAGNACOR

## OUTDOOR SEWAGE SYSTEM

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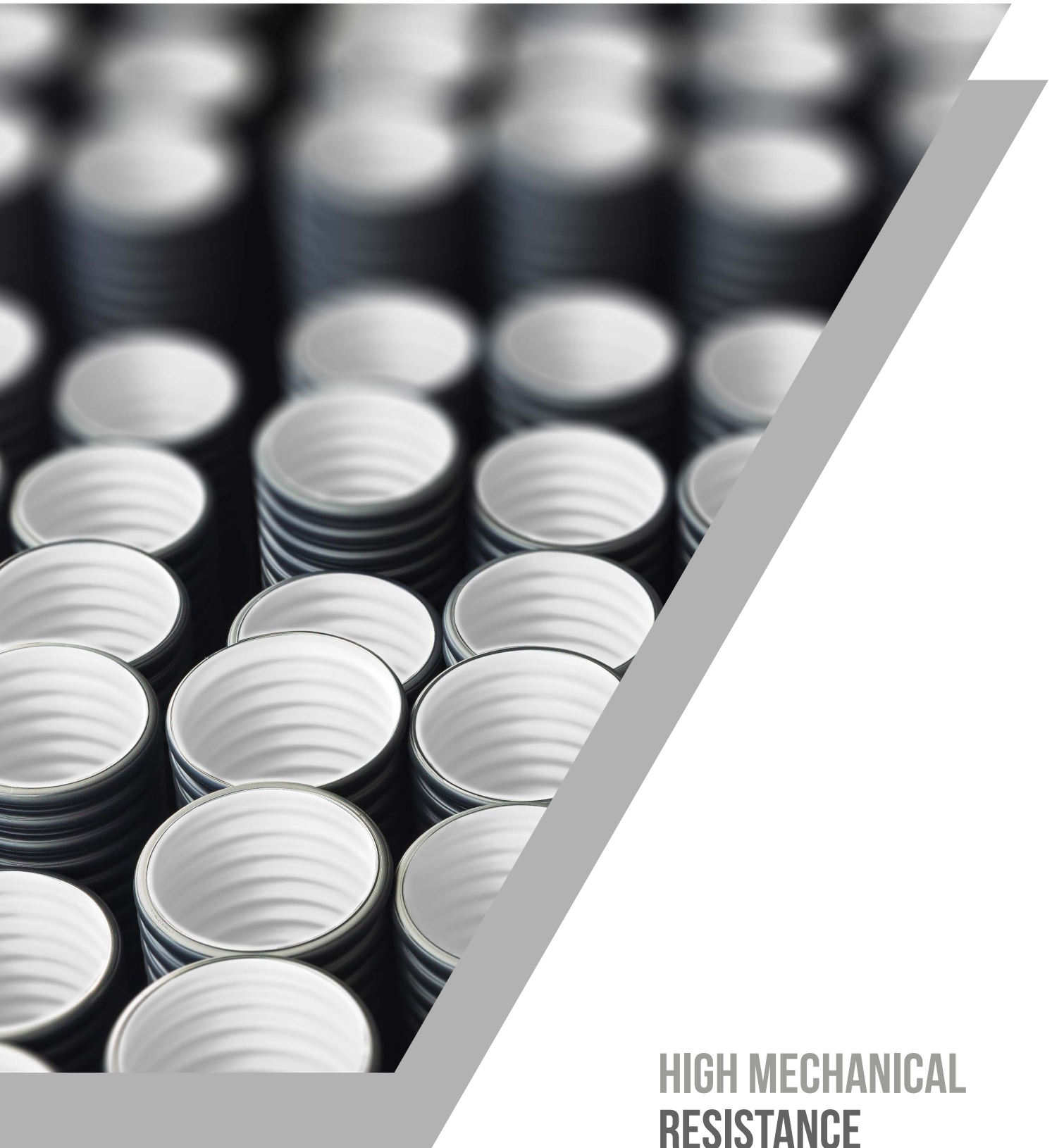
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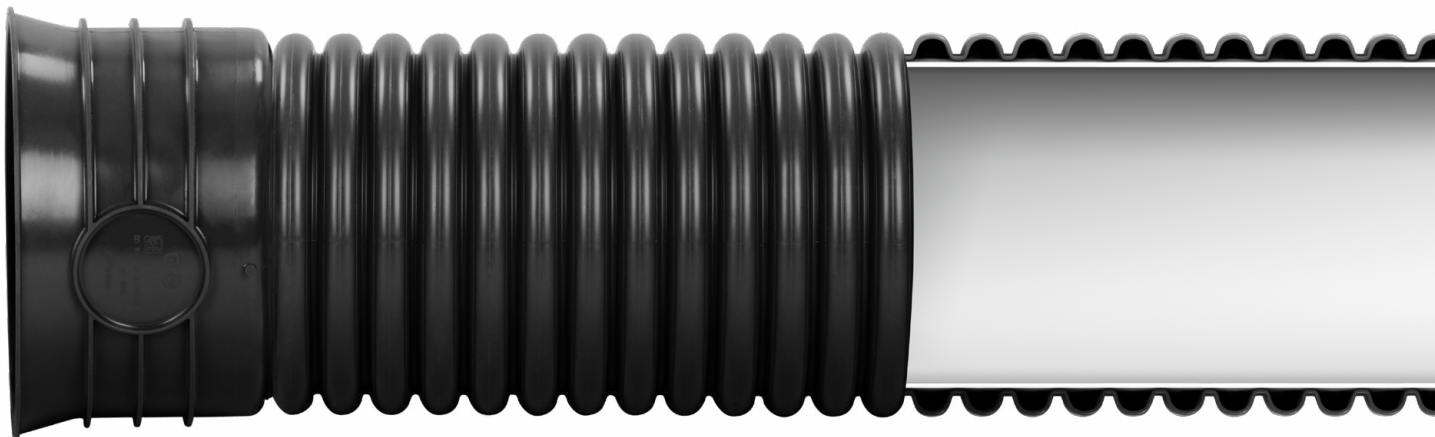
**MAGNACOR**



**HIGH MECHANICAL  
RESISTANCE**

# INTRODUCTION

**MAGNACOR** is a system of polypropylene pipes and fittings produced by extrusion, injection moulding and extrusion welding that meets the requirements of PN-EN 13476-3+A1:2020. The system components feature a double-walled structure, which means they are significantly lighter than sewer elements made of stoneware or concrete, but also PVC-U and PE, and at the same time have a high ring stiffness of SN8 kN/m<sup>2</sup>, SN10 kN/m<sup>2</sup> or SN12 kN/m<sup>2</sup>. Due to the use of polypropylene and a special wall structure, the system is easy to install, has high mechanical strength and increased chemical and thermal resistance, and its lifetime is estimated at a minimum of 100 years. The outstanding properties of the material obtained from polymerisation of polypropylene are the reason why products made of PP are so successful on the market, and their popularity is growing rapidly in relation to traditional solutions made of PVC-U, stoneware or concrete.



**MAGNACOR** comes in diameters ranging from 160 to 800 mm and boasts excellent properties that can be attributed to polypropylene block copolymer. The pipes are manufactured by extrusion. The pipe wall consists of two layers: the inner smooth layer and the outer corrugated layer that are molecularly bonded together through an extrusion process to form a solid structure. The double wall gives excellent protection and reduces pipe weight, which means that the installation is much easier compared to other sewer systems. The smooth inner surface of the pipe creates minimal resistance to the flow of sewage. Even with extremely small pipeline gradients, it eliminates sedimentation and consequently prevents rotting or blockages. This reduces the effort (physical and financial) required to clean the network over many years of operation.

## ADVANTAGES OF THE SYSTEM

- High ring stiffness grade: SN8 kN/m<sup>2</sup>, SN10 kN/m<sup>2</sup> or SN12 kN/m<sup>2</sup>, heavy duty pipes
- Low pipe weight – PP pipes are more than twice as light as PVC-U pipes, lower transport costs and easier installation in the trench
- Chemical resistance to sewage within the pH range of 2 to 12 (in accordance with the ISO/TR 10358 report), including salt and winter road maintenance products
- Temperature resistance for waste water up to 90°C for continuous flow and 95°C for short term flow
- High mechanical resistance in negative temperatures (even down to -10°C), can be installed in winter conditions
- High compression and impact resistance of the pipe due to the pipe design and high quality raw material
- Convenient installation – the system includes pipes with and without socket and the necessary range of fittings: elbows, bends, tees and reducers
- Easy pipe-to-manhole connection – special pipe-to-manhole connectors for concrete walls
- Suitable for integration with smooth-walled drains
- Can be cut to any length and easily joined, without special tools thanks to the gasket and the wide range of fittings
- Active interaction with surrounding soil through corrugated pipe profile
- Resistance against chemical, biological and stress corrosion
- High longitudinal stiffness of pipe, easy to keep uniform gradient in the trench
- Outstanding abrasion resistance in accordance with PN-EN 13476

## APPLICATION

**The MAGNACOR sewage system** is designed for the construction of non-pressure sanitary, rainwater, general and drainage networks. It is used for discharging domestic and municipal sewage and for draining car parks, roads, motorways, airports and landfill sites. Owing to the properties of polypropylene, MAGNACOR can be installed in pipelines with high sewage temperature, directly behind expansion wells due to high resistance to low pH  $\geq 2$  (high concentration of hydrogen sulphide in the sewage), to discharge industrial sewage and as road culvert



The pipes are produced to SN 8 (8 kN/m<sup>2</sup>), SN 10 (10 kN/m<sup>2</sup>) and SN 12 (12 kN/m<sup>2</sup>) stiffness grades, available as 3- and 6-metre sections. The fittings, produced by injection moulding and extrusion welding, have a ribbed wall and a smooth socket. MAGNACOR pipes and fittings come in black on the outside and light grey on the inside. The smooth inner surface in light grey gives very good visibility when inspecting pipelines with a camera.

## DESIGN

The hydraulic calculation for the pipeline cross-sections involves determining the dimensions of the pipelines, the degree of filling with sewage and the flow velocity.

**The calculations are based on the design flow rate, the assumed pipeline gradient and the absolute roughness of the pipeline walls, assuming that:**

- the dimensions, shape, gradient and roughness and the assumed design flow rate do not change over the entire design length of the pipeline,
- all points of the stream cross-section show the same velocity.

Table 1 shows the maximum flow capacity of MAGNACOR pipes for domestic sewage systems for minimum gradient (at  $v = 0.8$  m/s) and maximum gradient (at  $v = 3$  m/s) that can be used to select the pipe diameter.

Diameter	Minimum domestic sewage system gradient	Maximum sewage flow rate in dm <sup>3</sup> /s	Maximum domestic sewage system gradient	Maximum sewage flow rate in dm <sup>3</sup> /s
160 mm	5,9 ‰	15	79 ‰	58
200 mm	4,0 ‰	26	54 ‰	99
250 mm	3,1 ‰	39	41 ‰	145
300 mm	2,4 ‰	56	33 ‰	210
400 mm	1,6 ‰	105	22 ‰	390
500 mm	1,3 ‰	160	17 ‰	590
600 mm	1,0 ‰	225	13 ‰	850
800 mm	0,7 ‰	400	9 ‰	1500

**Tab. 1.** Capacity of MAGNACOR pipes depending on the pipeline gradient

For storm drainage systems, the capacity will be higher, as the maximum sewage flow velocity can reach 5 m/s.

When designing a sewage system using MAGNACOR pipes with required minimum gradients, the values given in Table 2 can be used.

Diameter	Minimum domestic and industrial sewage system gradients $v = 0.8$ m/s	Minimum storm drainage system gradients $v = 0.7$ m/s
160 mm	5,9 ‰	4,5 ‰
200 mm	4,0 ‰	3,0 ‰
250 mm	3,1 ‰	2,4 ‰
300 mm	2,4 ‰	2,0 ‰
400 mm	1,6 ‰	1,3 ‰
500 mm	1,3 ‰	0,9 ‰
600 mm	1,0 ‰	0,8 ‰
800 mm	0,7 ‰	0,6 ‰

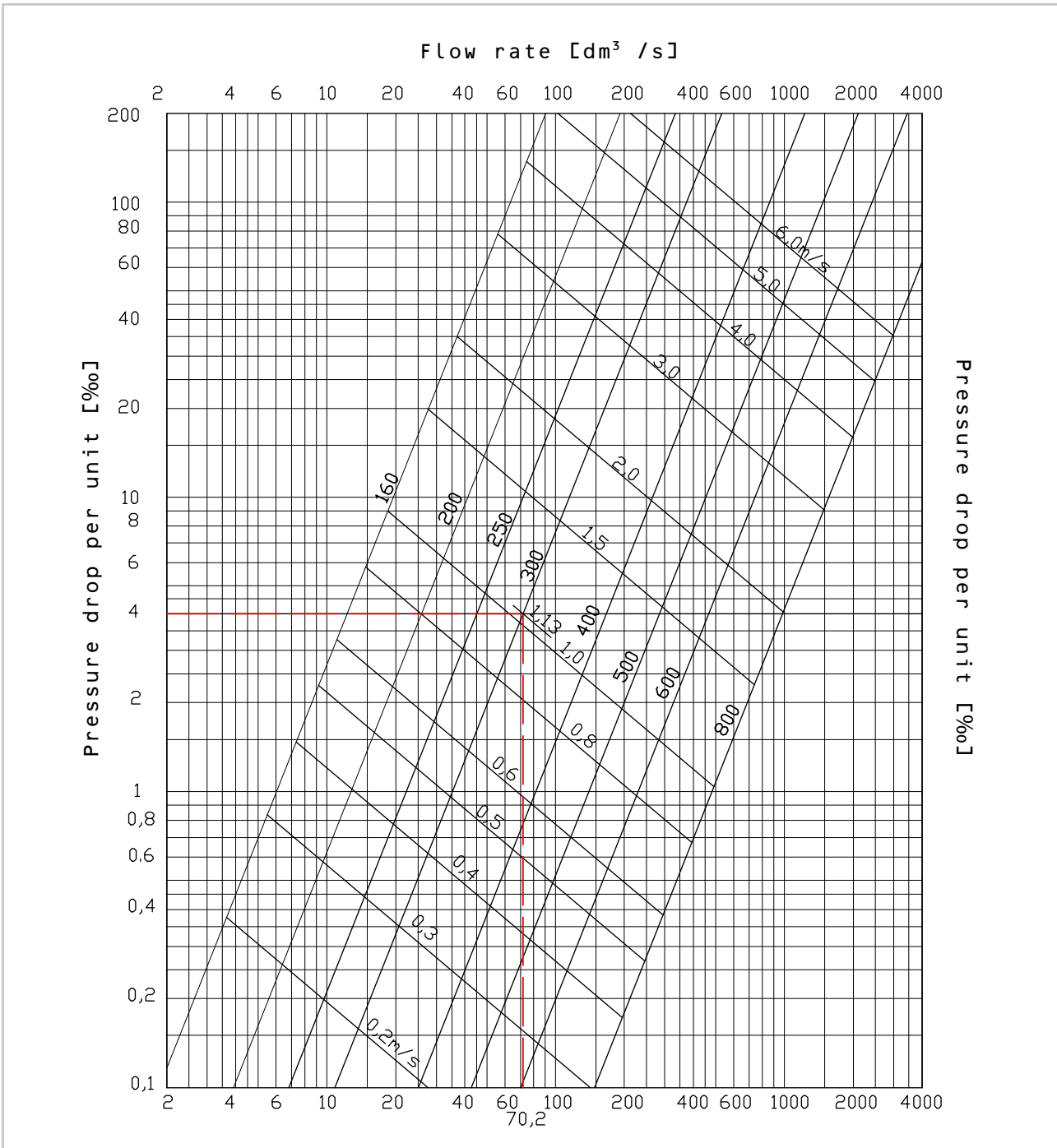
**Tab. 2.** Allowable minimum gradient values for individual MAGNACOR pipe diameters

However, using such small gradients should not be the standard procedure. The following formula is recommended for the design of the minimum pipeline gradient:

$$i = \frac{1}{d}, \text{ where } i [\text{‰}] - \text{gradient; } d - [\text{mm}] - \text{pipeline diameter.}$$



Due to the complexity of the formula for hydraulic calculation of gravity pipelines for MAGNACOR pipes, the following Nom. 1 nomogram is provided for the hydraulic calculation of fully filled double-wall pipes for an assumed roughness of  $k = 0.40$  mm (for pipelines with side inlets and manholes) and Nom. 2 nomogram for efficiency curves for circular cross-section.



**Nom.1 Nomogram for hydraulic calculation of fully filled double-wall pipes for a temperature of 10°C and a roughness of 0.40 mm**

**EXAMPLE****Data:**

- actual flow rate  $Q_a = 48 \text{ m}^3/\text{s}$
- assumed pipeline gradient  $4\text{‰}$
- assumed diameter  $300 \text{ mm}$

**Unknown:**

- sewage flow velocity
- sewage filling height

**Solution:**

A pipe diameter =  $300 \text{ mm}$  is selected from the nomogram for  $k = 0.4$ , with a total filling for  $i = 4\text{‰}$  and a minimum velocity range of  $0.8 \text{ m/s}$ . The flow and velocity at full fill are read off from the nomogram for  $k = 0.40 \text{ mm}$  for a  $\text{Ø}300 \text{ mm}$  pipe and a gradient of  $4\%$ :

$$Q_t = 70,2 \text{ dm}^3/\text{s}, \quad V_t = 1,03 \text{ m/s}$$

$$\text{Determine } \alpha = Q_a / Q_t = 48/70,2 = 0,68$$

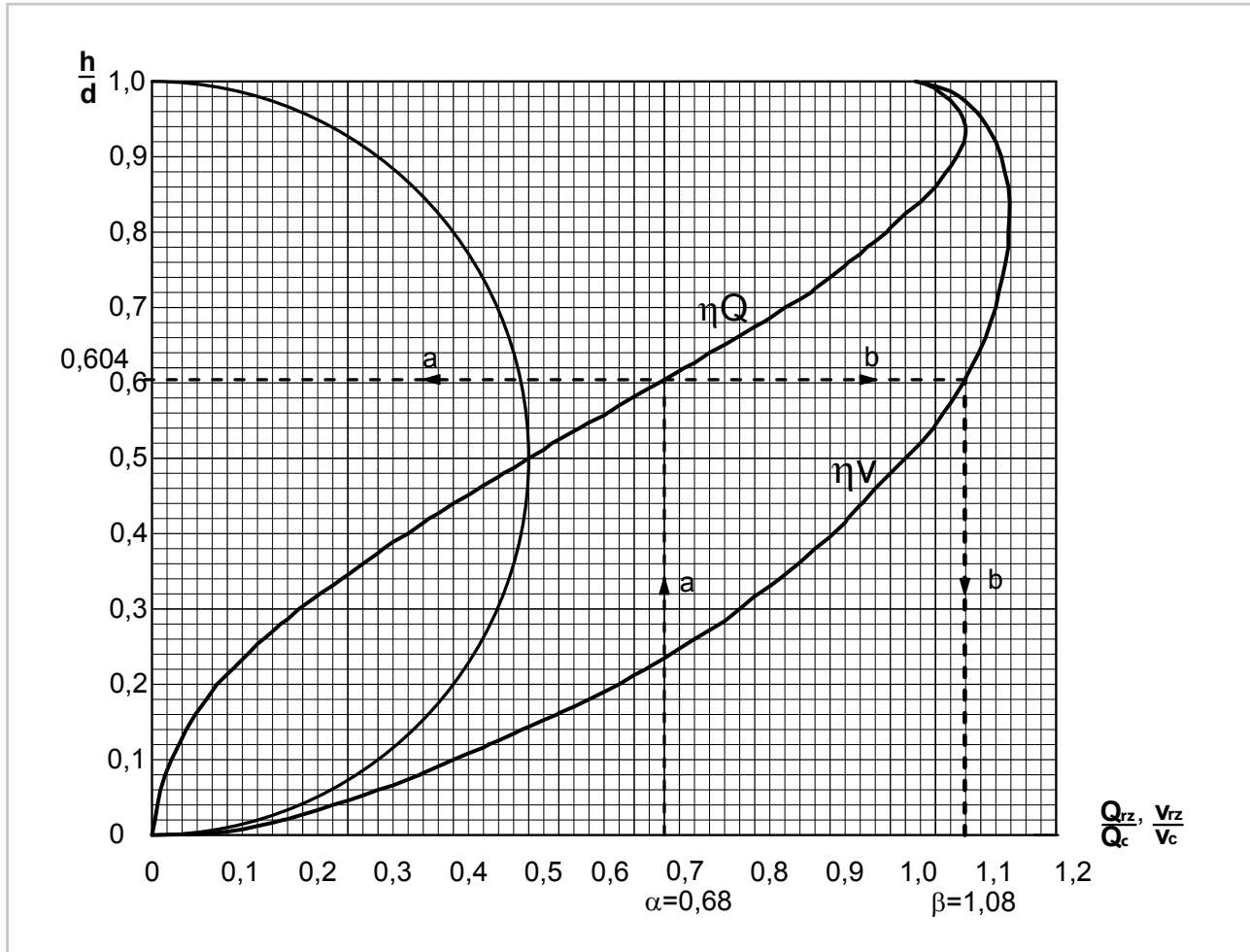
The following is taken from Nomogram 2 for the circular pipe efficiency curves for  $\alpha$ , as indicated by the arrows:

**a)**  $h/d_i = 0,604$ , because  $d_i = 300\text{mm}$  filling  $h = 181\text{mm}$

**b)**  $\beta = V_a / V_{\text{tot. vol.}} = 1,08$ , at  $V_{\text{total filling.}} = 1,03 \text{ m/s}$ ,  $V_a = 1,1 \text{ m/s}$

**Result:**

the correctness of the adopted pipe diameter  $\text{Ø} 300 \text{ mm}$  is confirmed at pipeline gradient  $i = 4\%$  and flow rate  $48 \text{ dm}^3/\text{s} \rightarrow$  sewage velocity will be  $1 \text{ m/s}$ , while filling  $h = 181 \text{ mm}$ , i.e.  $70\%$  of the pipeline filling.



Nom.2 Nomogram of the efficiency curves for a circular cross-section

## STORAGE

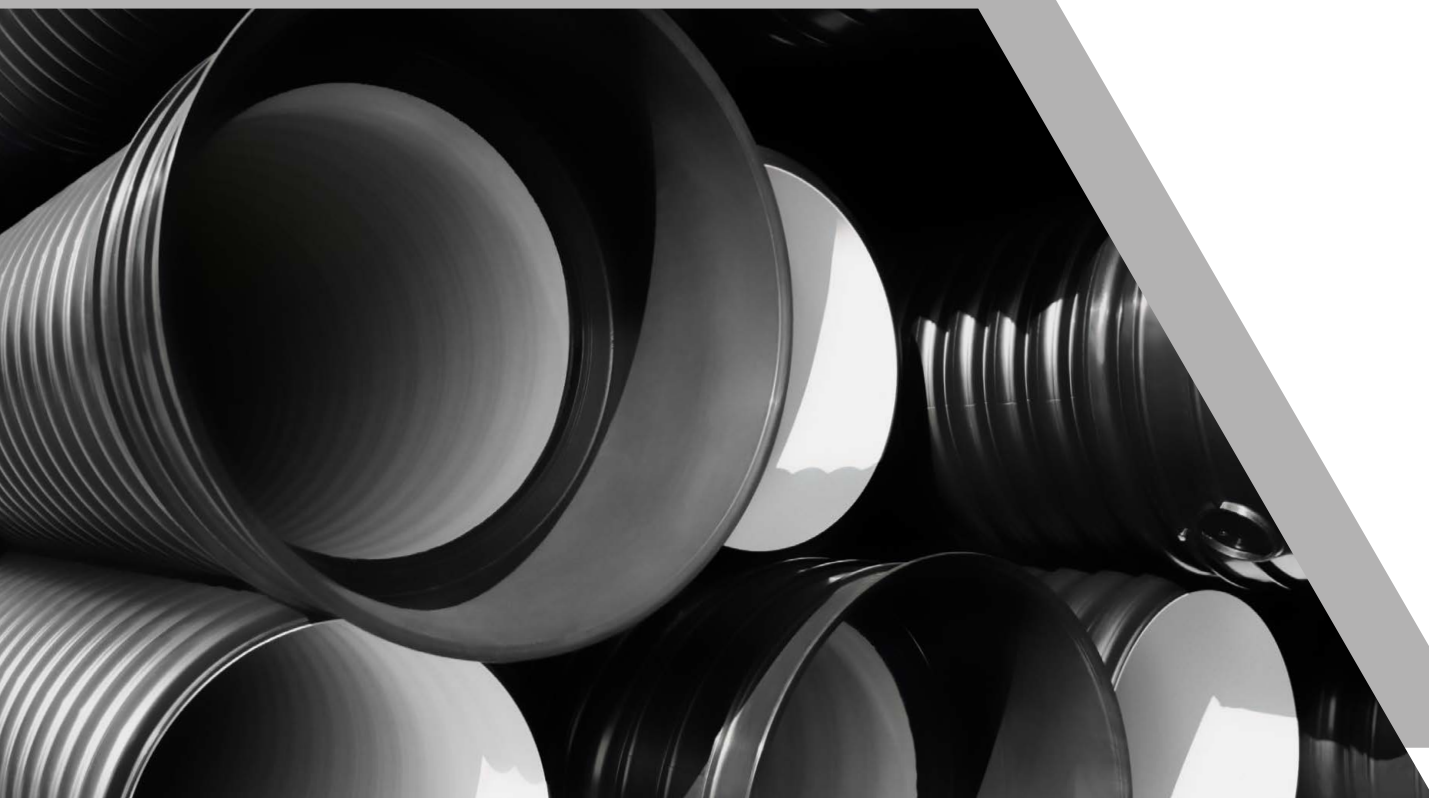
**MAGNACOR pipes should be stored horizontally on level ground free of stones and sharp objects, preferably in the original packaging.**

Care should be taken to ensure that, when storing pallets in a stack, the protection boards do not stand directly on the tube, but on the protection board of the pallets below. For loose pipe storage, wooden beams should be placed on the ground at a maximum distance of 2.0 metres to support the pipes. The number of pipes in a stack will depend on their diameter. MAGNACOR pipes and fittings can be stored in open yards, but the storage period should not exceed 1 year.

When stored in this way, the product should be protected from the harmful effects of precipitation and sunlight, which cause discolouration of the pipe. Studies have shown that even UV radiation over several years does not have a negative effect on the properties of the pipes and the expected service life, however, for aesthetic reasons protection with tarpaulin or black film is recommended.

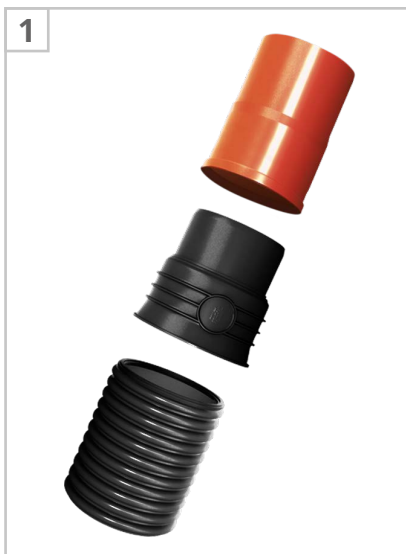
When the pipes are accepted on site, they should be visually inspected for damage.

Pipe diameter	Number of pipes on a pallet
160	35
200	20
250	12
300	9
400	4
500	2
600	2
800	2



## INSTALLATION

MAGNACOR pipes are connected by means of sockets on pipes or pipe fittings. The sealing of connections requires the use of an elastomer gasket, which is installed in the penultimate groove of the pipe, after thorough cleaning of both the interior of the socket and the gasket from any impurities.



1. The MAGNACOR pipe is connected to the smooth KG pipe using the MC-KGI transition fitting.



2. The pipes are connected by means of sockets on pipes or pipe fittings. An elastomeric gasket is required to seal the connections.



3. The MAGNACOR pipe is connected to the SC manhole system using the MC-KGI transition fitting.

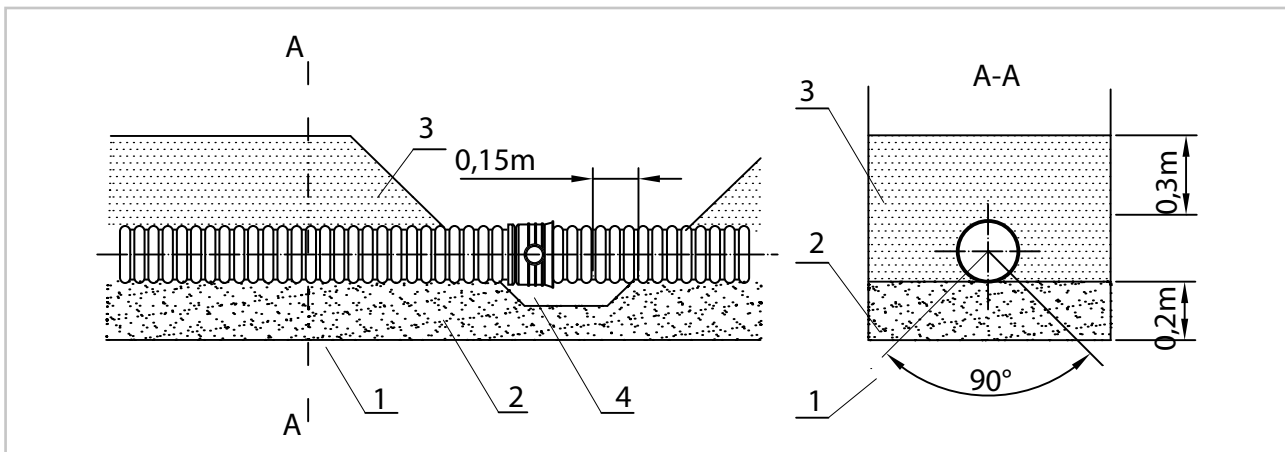
The seal should be coated with lubricant to achieve a tight fit. Pipes can be cut into smaller lengths using a hand or power saw directly on site. The cut is made in the groove of the pipe, perpendicular to its axis, and the cut surface is then thoroughly cleaned of chips. It is assumed that the installation of MAGNACOR pipes allows for a minimum of 20% time savings compared to other types of pipes. The pipes should be laid with the sockets in the opposite direction to the sewage flow. The MAGNACOR system can be freely combined using appropriate fittings with the KG smooth outdoor sewage system and the SC sewage manhole system offered by MAGNAPLAST. After completing the network, a leakage test must be carried out in accordance with PN-EN 1610.

## PIPE LAYING CONDITIONS

To show their full potential MAGNACOR, pipes require proper laying, backfilling, soil compaction and compliance with **PN-C-89224**. General guidelines:

1. **In all cases, the bottom of the trench must be levelled, cleared of stones and drained, and ballasted if required (the height of the ballast depends on the type of soil):**
  - a) **no ballast** - native soil (as per design requirements) with grain size up to  $\text{Ø}40$  mm – pipes to be laid at the bottom of the trench after preparation of the bearing,
  - b) **10 cm of ballast** with a grain size of up to  $\text{Ø}22$  mm for pipes of DN = 200 for dry soil and with a grain size of up to  $\text{Ø}40$  mm for pipes of DN >200 and up to DN  $\leq$  600,
  - c) **15 cm** with the same grain size as above for hydrated soil – earthworks to be carried out in a drained trench only,
  - d) **25 cm** in rocky soils or soils with grain sizes above  $\text{Ø}40$  mm.

The ballast should consist of loose soil, single or multifraction material, from coarse sand with low fine particle content, from sand-gravel or crushed aggregate with particle size from 2 mm to 40 mm. The ballast must be thoroughly compacted to a minimum of 0.85 by Proctor scale.



## 2. Backfilling procedure:

### a) backfilling of the perimeter zone:

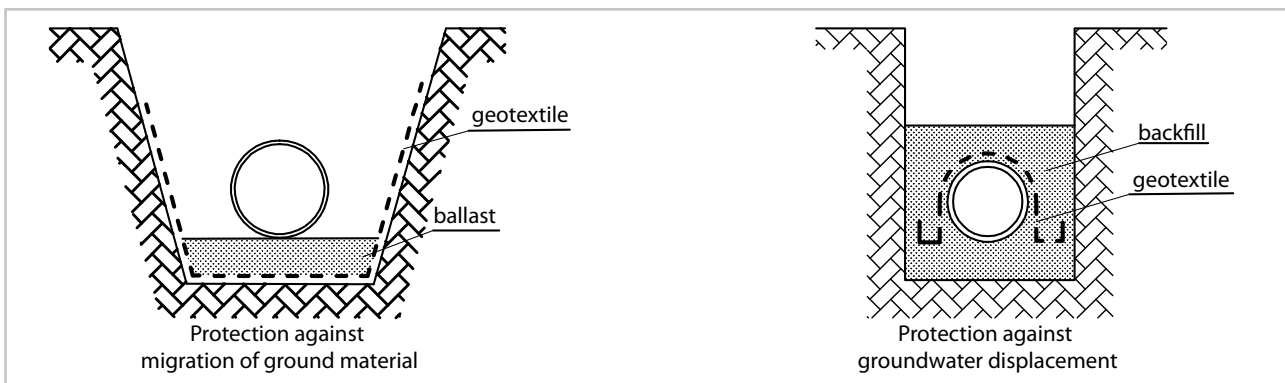
- The backfilling should consist of the same material as the bedding, spread symmetrically in 15 to 20 cm thick layers, with the soil being carefully compacted with light equipment (to the height of 1.0 m above the pipe) in such a way as not to cause excessive dynamic loads and not to allow the pipe to be moved.
- kuse light equipment,

### b) backfilling of the trench:

- The backfill material does not need to be selected as carefully as the backfill, but any large stones, organic material, tree roots, rubbish, etc. should be removed from the trench before backfilling.
- Backfilling should normally be carried out with mechanical equipment and the soil should be compacted in layers, taking into account site requirements, such as road positioning and the need for compaction to a minimum value of 0.95 on the Proctor scale.
- Backfilling in green areas should use native soil and does not require the degree of compaction otherwise required, such as in roads.

## SPECIAL PIPE LAYING CONDITIONS

### 1. Protection of the pipe against migration of ground material particles and against displacement by ground water



### 2. Pipes laid at freezing depth:

- The limitations for MAGNACOR pipe laid at freezing depth in areas without traffic load results from the necessity to use adequate thermal insulation. The insulation material can be polystyrene foam or, for example, expanded clay.
- In areas with heavy traffic, the minimum cover of MAGNACOR pipes is 1 m according to PN-C-89224, 0.8 m as recommended by TEPPFA and 0.5 m in line with the Scandinavian method (Molina). However, the aspect of thermal insulation and its compressive strength needs to be analysed. One simple solution is to use a loose material that is easy to compact, such as expanded clay or blast furnace slag. If the thermal insulation material has sharp edges, a sand backfill is required.

### 3. High groundwater level:

- MAGNACOR pipe laying requires a drained trench. Trench draining may involve the following methods: removal of water from the trench as it is deepened using pumps located at the top of the trench; the horizontal drainage method (involving the laying of a horizontal drain with water being discharged into collection wells located along the trench); the depression method (involving the lowering of the static level of the ground water table using a depression well or needle-filters).

## CERTIFICATES

The MAGNACOR system has been approved for marketing and general use in the construction industry based on the following standards and approvals:

- **National Declarations of Performance to Polish Standards 13476-3**
- **Polish Standard PN-EN 13476-3+A1**
- **National Technical Assessment IBDiM-KOT 2018/0198**
- **National Technical Assessment ITB-KOT 2018/0653**
- **National Technical Assessment ITB-KOT 2019/1185**
- **Certificate of Conformity of the Central Mining Institute CZ/1966**
- **Technical Opinion of the Central Mining Institute on the application of MAGNACOR pipes and fittings in areas affected by mining damage**
- **INSTA-CERT Certificate (Nordic Poly Mark)**

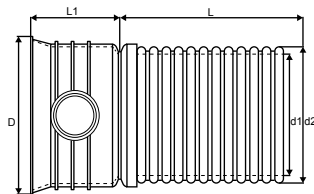




**PRODUCT  
CATALOGUE**

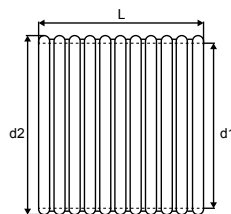
**MC**

## SOCKET PIPES WITHOUT GASKET SN 8 (MCEM)



DN / ID (OD) [mm]	d1 [mm]	d2 [mm]	D [mm]	L [mm]	L1 [mm]	Art. no.
160 (OD)	138	160	183	3000	107	82028
160 (OD)	138	160	183	6000	107	82045
200	197	226	259	3000	152	83028
200	197	226	259	6000	152	83045
250	249	284	320	3000	181	84028
250	249	284	320	6000	181	84045
300	297	339	386	3000	218	85028
300	297	339	386	6000	218	85045
400	396	453	506	3000	223	86028
400	396	453	506	6000	223	86045
500	500	573	635	3000	264	87028
500	500	573	635	6000	264	87045
600	598	683	765	3000	329	88028
600	598	683	765	6000	329	88045
800	796	903	970	3000	301	89028
800	796	903	970	6000	301	89045

## PIPES WITHOUT SOCKET SN 8 (MCEL)

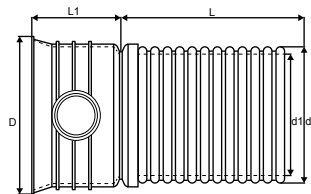


DN / ID (OD) [mm]	d1 [mm]	d2 [mm]	L [mm]	Art. no.
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200	197	226	6000	83090
250	249	284	6000	84090
300	297	339	6000	85090
400	396	453	6000	86090
500	500	573	6000	87090
600	598	683	6000	88090
800	796	903	6000	89090

## SOCKET PIPES WITHOUT GASKET SN 10 (MCCEM)

DN / ID (OD) [mm]	d1 [mm]	d2 [mm]	D [mm]	L [mm]	L1 [mm]	Art. no.
160 (OD)	138	160	183	3000	107	82029*
160 (OD)	138	160	183	6000	107	82046*
200	197	226	259	3000	152	83029*
200	197	226	259	6000	152	83046*
250	249	284	320	3000	181	84029*
250	249	284	320	6000	181	84046*
300	297	339	386	3000	218	85029*
300	297	339	386	6000	218	85046*
400	396	453	506	3000	223	86029*
400	396	453	506	6000	223	86046*
500	500	573	635	3000	264	87029*
500	500	573	635	6000	264	87046*
600	598	683	765	3000	329	88029*
600	598	683	765	6000	329	88046*
800	796	903	970	3000	301	89029*
800	796	903	970	6000	301	89046*

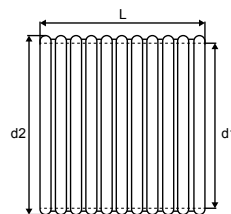
\*products available on request



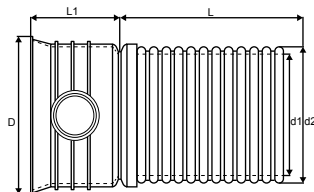
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200	197	226	6000	83091*
250	249	284	6000	84091*
300	297	339	6000	85091*
400	396	453	6000	86091*
500	500	573	6000	87091*
600	598	683	6000	88091*
800	796	903	6000	89091*

\*products available on request



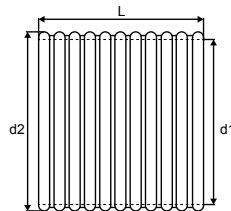
## SOCKET PIPES WITHOUT GASKET SN 12 (MCCEM)



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160 (OD)	138	160	183	3000	107	82030*
160 (OD)	138	160	183	6000	107	82047*
200	197	226	259	3000	152	83030*
200	197	226	259	6000	152	83047*
250	249	284	320	3000	181	84030*
250	249	284	320	6000	181	84047*
300	297	339	386	3000	218	85030*
300	297	339	386	6000	218	85047*
400	396	453	506	3000	223	86030*
400	396	453	506	6000	223	86047*
500	500	573	635	3000	264	87030*
500	500	573	635	6000	264	87047*
600	598	683	765	3000	329	88030*
600	598	683	765	6000	329	88047*
800	796	903	970	3000	301	89030*
800	796	903	970	6000	301	89047*

\*products available on request

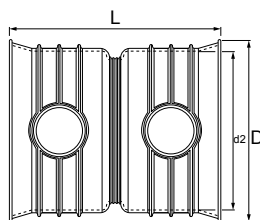
## PIPES WITHOUT SOCKET SN 12 (MCCL)



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200	197	226	6000	83092*
250	249	284	6000	84092*
300	297	339	6000	85092*
400	396	453	6000	86092*
500	500	573	6000	87092*
600	598	683	6000	88092*
800	796	903	6000	89092*

\*products available on request

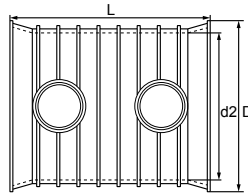
## DOUBLE SOCKET (MCMM)



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160 (OD)	183	160	214	82200
200	259	226	304	83200
250	320	284	358	84200
300	386	339	434	85200
400	506	453	444	86200
500	635	573	528	87200
600	765	683	658	88200
800	970	915	602	89200

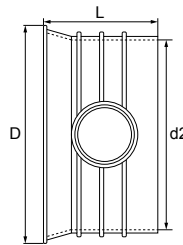
## SLEEVE (MCU)

DN / ID (OD) [mm]	D [mm]	d2 [mm]	L [mm]	Art. no.
160 (OD)	183	160	214	82180
200	259	226	306	83180
250	320	284	360	84180
300	386	339	438	85180
400	506	453	448	86180
500	635	573	500	87180
600	765	683	620	88180
800	970	915	600	89180



## WALL SLEEVE (MCF)

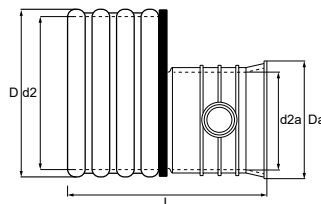
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160 (OD)	183	160	110	82620
200	259	226	153	83620
250	320	284	180	84620
300	386	339	219	85620
400	506	453	224	86620
500	635	573	250	87620
600	765	683	310	88620
800	970	915	600	89620



## REDUCER (MCR-BK)

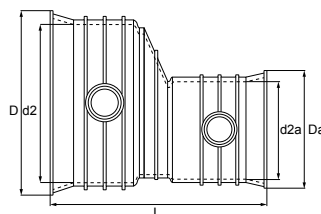
DN1/ DN2 [mm]	D [mm]	d2 [mm]	L [mm]	Da [mm]	d2a [mm]	Art. no.
250/200	284	249	333	226	259	88910*
300/200	340	297	371	226	259	88915*
300/250	340	297	398	284	320	88920*
400/250	453	396	400	284	320	88925*
400/300	453	396	439	339	386	88930*
500/300	573	500	479	339	386	88935*
500/400	573	500	484	453	506	88940*
600/400	683	598	544	453	506	88945*
600/500	683	598	570	573	535	88950*

\*products available on request

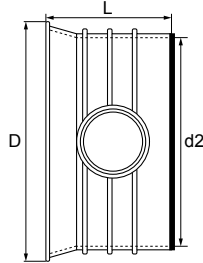


## REDUCER (MCR-BK)

DN1/ DN2 [mm]	D [mm]	d2 [mm]	L [mm]	Da [mm]	d2a [mm]	Art. no.
250/200	320	284	359	259	226	84280
300/200	386	339	380	259	226	85285
300/250	386	339	425	320	284	85280
400/200	506	453	384	259	226	86270
400/250	506	453	411	320	284	86275
400/300	506	453	498	386	339	86280
500/400	635	573	531	506	453	87280
600/500	765	683	635	635	573	88280
800/600	970	915	640	765	683	88286

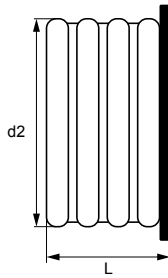


## END CAP (MCK)



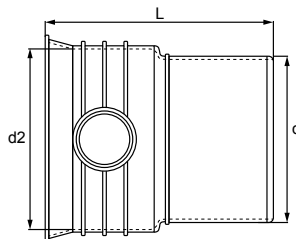
DN / ID (OD) [mm]	D [mm]	d2 [mm]	L [mm]	Art. no.
160 (OD)	183	160	107	82240
200	259	226	162	83240
250	320	284	189	84240
300	386	339	227	85240
400	506	453	232	86240
500	635	573	274	87240
600	765	683	339	88240
800	970	915	300	88250

## PLUG (MCM)



DN / ID (OD) [mm]	d2 [mm]	L [mm]	Art. no.
160 (OD)	160	120	82220
200	226	155	83220
250	284	180	84220
300	339	218	85220
400	453	220	86220
500	573	260	87220
600	683	320	88220
800	905	265	88230

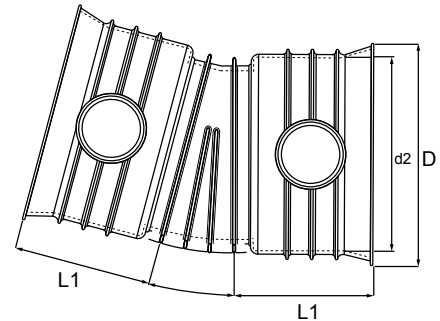
## CONNECTOR TO KG PIPE (MC-KGI)



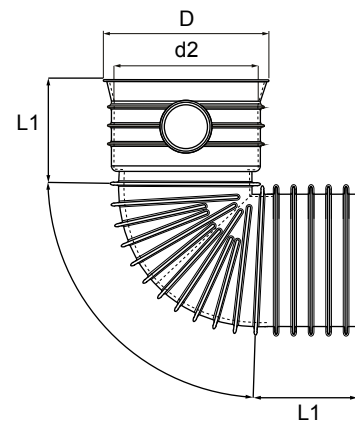
DN / ID (OD) [mm]	d [mm]	d2 [mm]	L [mm]	Art. no.
160 (OD)	160	161	230	82230
200	200	226	315	83230
250	250	284	353	84230
300	315	340	411	85230
400	400	453	446	86230
500	500	572	518	87230

# BENDS (MCB)

DN / ID [mm]	D [mm]	d2 [mm]	$\alpha$	L1 [mm]	Art. no.
200	259	226	15°	163	83100
250	320	284	15°	195	84100
300	386	339	15°	231	85100
400	506	453	15°	253	86100
200	259	226	30°	163	83110
250	320	284	30°	195	84110
300	386	339	30°	231	85110
400	506	453	30°	253	86110
200	259	226	45°	163	83120
250	320	284	45°	195	84120
300	386	339	45°	231	85120
400	506	453	45°	253	86120
200	259	226	90°	163	83130
250	320	284	90°	195	84130
300	386	339	90°	231	85130
400	506	453	90°	253	86130



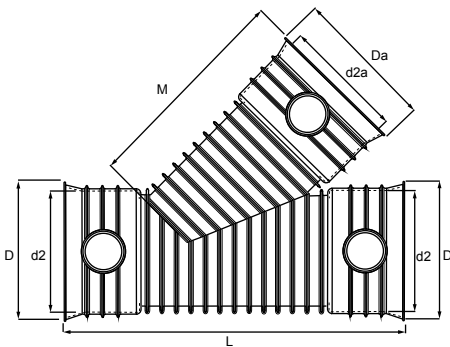
DN / ID [mm]	D [mm]	d2 [mm]	$\alpha$	L1 [mm]	Art. no.
500	635	573	15°	279	87100
600	765	683	15°	362	86100
800	970	915	15°	301	88140
500	635	573	30°	279	87110
600	765	683	30°	362	88110
800	970	915	30°	301	88145
500	635	573	45°	279	87120
600	765	683	45°	362	88120
800	970	915	45°	301	88150
500	635	573	90°	279	87130
600	765	683	90°	362	88130
800	970	915	90°	301	88155



## BRANCH FOR MAGNACOR 45° (MCEA)



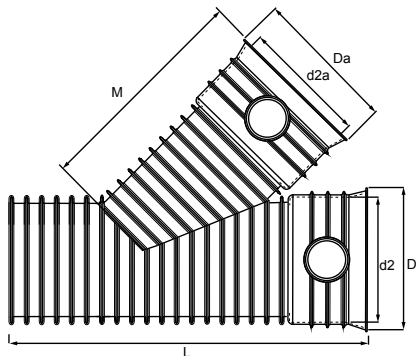
DN1/DN2 [mm]	D [mm]	d2 [mm]	M [mm]	Da [mm]	d2a [mm]	L [mm]	Art. no.
MCEA 200/200	259	226	395	259	226	630	81330
MCEA 250/200	320	284	410	259	226	770	82330
MCEA 250/250	320	284	480	320	284	770	82340



## BRANCH FOR MAGNACOR 45° (MCEA)



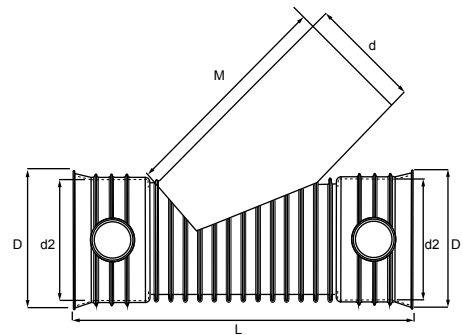
DN1/DN2 [mm]	D [mm]	d2 [mm]	M [mm]	Da [mm]	d2a [mm]	L [mm]	Art. no.
MCEA 300/200	386	339	450	259	226	860	83330
MCEA 300/250	386	339	530	320	284	910	83340
MCEA 300/300	386	339	650	386	339	1050	83350
MCEA 400/200	506	453	450	259	226	850	84330
MCEA 400/250	506	453	530	320	284	910	84340
MCEA 400/300	506	453	615	386	339	1030	84350
MCEA 400/400	506	453	730	506	453	1270	84360
MCEA 500/200	635	573	450	259	226	950	85330
MCEA 500/300	635	573	615	386	339	1090	85350
MCEA 600/200	765	683	450	259	226	1100	86330
MCEA 600/300	765	683	615	386	339	1280	86350
MCEA 800/300	970	915	615	386	339	1400	86370





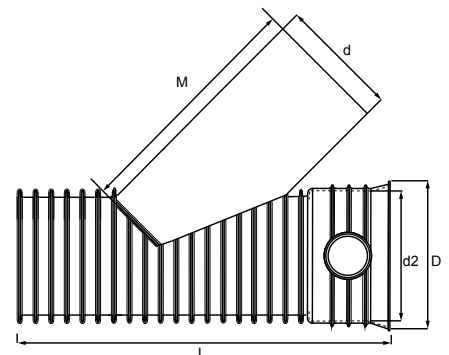
## BRANCH FOR KG 45° (MCEA-KG)

DN1/DN2 [mm]	D [mm]	d2 [mm]	M [mm]	d [mm]	L [mm]	Art. no.
MCEA-KG 200/200	259	226	345	200	630	81335
MCEA-KG 250/200	320	284	410	200	770	82335
MCEA-KG 250/250	320	284	425	250	770	82345

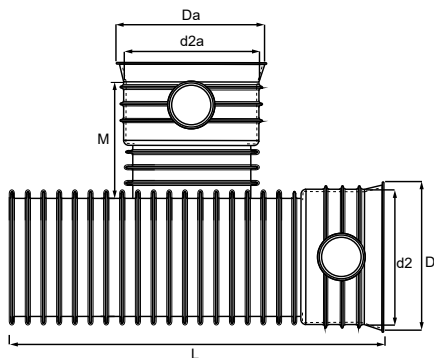


## BRANCH FOR KG 45° (MCEA-KG)

DN1/DN2 [mm]	D [mm]	d2 [mm]	M [mm]	d [mm]	L [mm]	Art. no.
MCEA-KG 250/160	320	284	330	160	700	82325
MCEA-KG 300/160	386	339	330	160	780	83325
MCEA-KG 300/200	386	339	380	200	860	83335
MCEA-KG 300/250	386	339	450	250	910	83345
MCEA-KG 400/200	506	453	380	200	850	84335
MCEA-KG 400/250	506	453	450	250	910	84345
MCEA-KG 500/200	635	573	380	200	950	85335
MCEA-KG 600/200	765	683	380	200	1100	86335
MCEA-KG 600/250	765	683	450	250	1190	86345
MCEA-KG 800/200	970	915	380	200	1400	86390



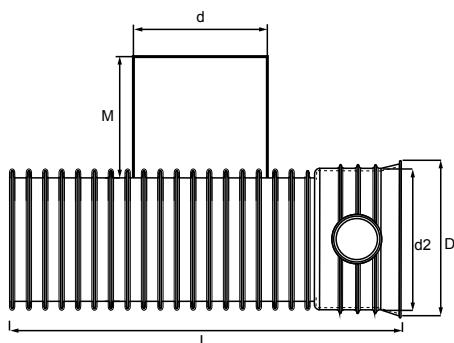
## TEE FOR MAGNACOR 90° (MCEA)



DN1/DN2 [mm]	D [mm]	d2 [mm]	M [mm]	Da [mm]	d2a [mm]	L [mm]	Art. no.
MCEA 200/200	259	226	215	259	226	600	81331*
MCEA 250/250	320	284	250	320	284	770	82341*
MCEA 250/200	320	284	220	259	226	630	82331*
MCEA 300/200	386	339	220	259	226	700	83331*
MCEA 300/250	386	339	250	320	284	740	83341*
MCEA 300/300	386	339	300	386	339	870	83351*
MCEA 400/200	506	453	220	259	226	745	84331*
MCEA 400/250	506	453	250	320	284	800	84341*
MCEA 400/300	506	453	290	386	339	860	84351*
MCEA 400/400	506	453	330	506	453	970	84361*
MCEA 500/200	635	573	220	259	226	810	85331*
MCEA 500/300	635	573	290	386	339	950	86351*
MCEA 600/200	765	683	220	259	226	935	86331*
MCEA 600/300	765	683	290	386	339	1110	86351*
MCEA 800/300	970	915	300	386	339	1350	86400*

\*products available on request

## TEE FOR KG 90° (MCEA-KG)



DN1/DN2 [mm]	D [mm]	d2 [mm]	M [mm]	d [mm]	L [mm]	Art. no.
MCEA-KG 200/200	259	226	180	200	620	81336*
MCEA-KG 250/250	320	284	200	250	700	82346*
MCEA-KG 250/200	320	284	180	200	630	82336*
MCEA-KG 300/200	386	339	180	200	700	83336*
MCEA-KG 300/250	386	339	200	250	740	83346*
MCEA-KG 400/200	506	453	180	200	745	84336*
MCEA-KG 400/250	506	453	200	250	800	84346*
MCEA-KG 500/200	635	573	180	200	810	85336*
MCEA-KG 600/200	765	683	180	200	935	86336*
MCEA-KG 600/250	765	683	200	250	1020	86346*
MCEA-KG 800/200	970	915	180	200	1200	86420*

\*products available on request

## PIPE GASKET (MC)

DN / ID (OD) [mm]	Art. no.
160 (OD)	7225
200	7235
250	7245
300	7255
400	7265
500	7275
600	7285
800	7295





HTPLUS INDOOR LOW- NOISE SEWAGE SYSTEM



ULTRA dB SOUNDPROOF INDOOR SEWAGE SYSTEM



SKOLAN dB THICK-WALLED, SOUNDPROOF SEWAGE SYSTEM



KG PVC-U OUTDOOR SEWERAGE SYSTEM



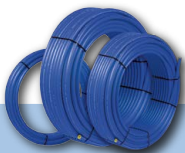
PP OUTDOOR SEWAGE SYSTEM MAGNACOR



KG 2000 PP SN 10 / SN 16 OUTDOOR SEWAGE SYSTEM



SEWERAGE CHAMBERS SYSTEM (SC)



POLYETHYLENE (PE) PRESSURE PIPES



DRAINAGE (DR) SYSTEMS