Sewage and rainwater

Experience the leading GIGAPIPE System!

GIGAPIPE System
PP-System SN8
DN/ID 150 mm – DN/ID 1000 mm

made in Germany

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DROSSBACH corrugated GIGAPIPE Systems

Lighter, more solid and truly higher quality!

The innovative approach, Corrugated Pipe Solutions offered by DROSSBACH, is a contribution to solve the water problems caused by the fast increasing world population and the consequences of the global warming. Over the last decades DROSSBACH has gained experience in development and production of intelligent pipe systems and has thereby accumulated competence to present process optimised machines and pipe business orientated services. These are some of the established fundamentals of the successful cooperation with partners worldwide.

The consequences of the global warming, the further industrialisation, the strong increasing tourism and the progressive agglomeration are issues that require immediate efforts, while on the other hand these circumstances establish at the same time excellent chances.

Invest in the growth markets of today for tomorrow:
With DROSSBACH, the partner for sewage and rainwater drainage systems!

»The DROSSBACH GIGAPIPE System offers me leading pipe technology with unbeatable advantages in quality lifetime and profitability.«
TECHNICAL HIGHLIGHTS:

- Complete sewage and rainwater system with full fitting and shaft program from ID 150 mm up to ID 1000 mm
- Long-term tightness by SAFECONNEC
- Optimised pipe design for highly secure and flexible pipes
- Double wall pipe made of PP – high chemical resistance
- Long life time of approximately 75 until 100 years
- Resistant to high pressure jet cleaning systems (180 bar)
- Excellent hydraulic properties due to $K_D = 0.25$ mm
- No incrustation

All GIGAPIPE pipes are produced with DROSSBACH’s own corrugated plastic pipe machines of the HD series. Customers profit from the know-how of innovations and technology of DROSSBACH, especially in the production of large pipes, and benefit from the durable, quality-controlled GIGAPIPE pipes with their improved corrugated pipe technology.
DROSSBACH GIGAPIPE Systems

DIN EN 13476: 2007-08!

AVAILAE PIPE SIZES (DN/ID):
- 150 mm
- 200 mm
- 250 mm
- 300 mm
- 400 mm
- 500 mm
- 600 mm
- 800 mm
- 1000 mm

1. AREAS OF USE
- Sewerage
- Rainwater drainage
- Sewage and mixed water channels
- Various special solutions for industry and business
- Ground drainage
- Domestic drainage

2. STANDARDS
- The material PP guarantees high modules of elasticity (Young's) and ring stiffness of SN 8 following DIN EN ISO 9969
- Profiled wall range 5 following DIN 16961 ≥ 31.5 kN/m²
- Authorisation based on DIN 16961, DIN 19357 and DIN EN 13476
- Suitable for all bedding materials following DIN EN 1610
- Suitable for all normal pressure tests following DIN EN 1610

3. TRADEMARK
- GIGAPIPE

4. MATERIAL
- Pipes and moulded parts made of polypropylene (PP)

5. Quality Requirements
- General technical approval from the Deutsches Institute für Bautechnik (DIBt) in Berlin. DIBt Z-42.1-390

6. CHEMICAL RESISTANCE
- DIN 8061, leaflet 1
  - The pipes and moulded parts as well as sealing elements have a chemical resistance between pH 2 (acid) and 12 (alkaline).
  - GIGAPIPE is resistant to all sewage and ground substances following DIN 1986.

7. THERMAL STRESS
- GIGAPIPE pipes and moulded parts made of PP are used to channel sewage and rain water. The requirements of DIN EN 476 concerning the long-term temperature stress levels must be met: up to DN 150 +45°C and +35°C for larger measurements. The temperature ranges are between -25°C and +60°C.

8. COLOUR
- Black profile
- RAL turquoise blue inside (best colour for cameras)

9. IDENTIFICATION
- Pipe Identification following DIN EN 13476

10. NOMINAL MEASUREMENTS (DN)
- Measurements in mm ID range = interior measurements or nominal measurements: 150, 200, 250, 300, 400, 500, 600, 800, 1000

11. LENGTHS
- Standard length without in-line belling joint: 6000 mm
- Special lengths available on request

12. MARKINGS
- GIGAPIPE systems have co-extruded markings.
- These show which type of drainage pipe has been laid.
- Red – sewage and mixed water drain
- Blue – rainwater drain
- The co-extrusion process ensures durable markings.

13. ROOT RESISTANCE
- Tests following DIN 19537-2/DIN EN 681 prove the water tightness and root resistance

14. RECYCLING
- Almost all thermoplastics, which include PP, can be ground to form granules for processing new products.
Lighter

GIGAPIPE corrugated plastic pipes are lighter and at the same time more solid than common rigid pipes due to an improved corrugated pipe technology, developed at the DROSSBACH Innovation Centre. The exceptional lightweight GIGAPIPE is the result of less material used compared with smooth plastic pipes.

More solid

Due to the remarkable elasticity and ring stiffness of the innovative corrugated pipe profile, GIGAPIPE corrugated plastic pipes are more resilient than regular pipes.

Long-term tightness

DROSSBACH developed a special socket technology which ensures a short-term tightness of 2.5 bars and a long-term tightness for your reliability.

SAFECONNEC:
Innovative technology to secure long-term tightness.

The secret of the superior long-term water tightness of all DROSSBACH plastic pipes is the innovative SAFECONNEC technology. It reinforces the plastic pipe joints at the most important and critical points to ensure the outstanding long-term resistance and tightness. Moreover an extraordinary strengthening process ensures the necessary long-term resistance of the joint against deformation and leaks with an externally welded reinforcement ring.

It holds!
SAFECONNEC reinforces the critical points on plastic belling joints to ensure a long-term watertight connection. The wrapper technology, a reinforcement process, provides the required permanent seal via a highly rigid reinforcement band welded to the pipe.

Highlights
- Long-lasting watertight in-line belling joint
- Fulfills the latest standard (e.g. DIN EN 13476 Part 1-3)
- Insoluble special strengthening band welded onto external surface to eliminate typical long-term creeping of plastics
- In-line belling joint so no trough required

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**Application and areas of use**

The construction of the pipe walls and the material PP guarantees a perfect balance of ring stiffness and ring flexibility. The static verification comes from examples of static calculations. The GIGAPIPE system can therefore be used where traffic load is high. In the area of HLC 60, values were determined which allowed problem-free laying of GIGAPIPE with low coverage of e.g. 0.5 m and high coverage of e.g. 6 m. Should an individual static verification be required DROSSBACH provides this through a static calculation.

- Sewerage
- Rainwater drainage
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**Abrasion behaviour**

The abrasion behaviour of GIGAPIPE pipes has been tested in comparison to pipes made of other materials following the Darmstadt method. The results of this test have been, that sewage pipes made of plastic or PP always have the lowest abrasion values. PP especially has best abrasion values.

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**Best abrasion values with PP!**

![Abrasion on pipes following the Darmstadt method.](image)

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**DROSSBACH GIGAPIPE Systems**

Best abrasion values with PP!
Ring Flexibility

The relaxation capacity of GIGAPIPE in sewage systems means that when under pressure, e.g., through wrong loads caused by movement or ground slippage, the pipes remain elastic and stay in shape. The load is carried back to the ground. Should this deformation occur over a longer period the tension in the pipe relaxes until there is virtually no tension left. Rigid pipes, on the other hand, take on the load and cracks begin to appear which can lead to a not functioning pipe at all.

Difference between resistant to bending and flexible pipes:

- **Resistant to bending:** All loads (static and dynamic) carried by the pipe.
- **Flexible pipes:** All loads carried by the soil around the pipe, pipe is stress less.
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Water tightness, approved under tough conditions!

Water tightness of pipes, moulded parts and connections:

- Water tightness with internal pressure
- Pipes and moulded parts:
  All tested pipes and moulded parts must be watertight.
- Bent pipes:
  All connections on bent pipes must be long-term watertight under internal excess pressure from water of min 0.5 bars and also have to be short-term watertight with an internal pressure of 2.5 bars.
- Deformed pipes:
  All connections on deformed pipes must be long-term watertight under internal excess pressure from water of min 0.5 bars and also have to be short-term watertight with an internal pressure of 2.5 bars.
- Bent and deformed pipes:
  All pipe connections must be watertight.

Flexible pipe: deformed especially in the pipe shaft

The drawing shows that flexible pipes adapt to uneven ground or displacement. The GIGAPIPE system remain undamaged – the system remains tight.

Rigid pipes react to uneven ground or displacement as a whole pipe. The lack of flexibility together with a relatively small socket can lead to leaks.
The pipe wall roughness of GIGAPIPE, like all plastic pipes due to their very smooth pore-free internal surface, is between 0.005 and 0.05 mm. The influence of connections, diversions, shafts etc must be taken as a correction value in the regulatory roughness calculation $k_b$ for streaming technology. Comprehensive information about this can be found in the datasheet ATV-DWK-A 110 "Hydraulische Dimensionierung und Leistungsnachweis von Regenabwasserkanälen und -leitungen" (hydraulic dimensions and performance of rainwater channels and pipes) (3rd edition 09/2001). The flow amounts for GIGAPIPE for a roughness value of 0.25 mm corresponding to the ATV-A 241 requirement for e.g. transport channels with shafts can be seen below.
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Technical Details of the system parts!

Drossbach offers the complete sewage and rainwater system with a full fitting and shaft program from ID 150 mm up to ID 1000 mm, which is shown beneath. Due to the secure and fast installation of all different system parts, construction times can be reduced to a minimum and costs can be saved.
**DROSSBACH GIGAPIPE Systems**

**Easy and simple jointing!**

**Application:**
GIGAPIPE sewage and rainwater pipes are used as underground gravity lines, as well as for other non-pressure purposes that are of similar design while not exceeding: pH-value 2 (acidic) to pH-value 12 (alkaline), with a continuous operating temperature of maximum 35° Centigrade.

**General installation rules and standards:**
- DIN EN 1610 (10/97): Installation and examination of sewer pipes and channels (earlier DIN 4033)
- ATV - worksheet A 139 (10/88): Guideline for production of drainage lines and channels
- DIN in 1986/1 to part 4: Drainage systems for buildings and plots
- ZTV A-StB 97 (1997): Additional technical contract conditions and guidelines for excavations in areas with traffic
- DIN 4124 (08/1981): Excavations and slopes, trench widths and shuttering requirements

**GIGAPIPE pipes installation:**
Jointing of GIGAPIPE pipes is very easy and simple. GIGAPIPE pipes have an integrated in-line belling on one side, and a flat end on the other side. Pipes are jointed by simple inserting (no need for welding). There have been developed special tools, designed for easy and timesaving assembling.

1. Apply lubricant to the inside of the belling.
2. Insert the flat end of the pipe into the belling.
3. Put the second part of the tool between the ribs on the other pipe. Place the tool so that the first notch enters the stud.
4. Move the levers forwards and backwards.
5. Pipes are jointed when inserted pipe enters to the end of the belling.
DROSSBACH GIGAPIPE Systems

Bedding layers for perfect pipe support!

Together with the lower bedding layer [a] the upper bedding layer [b] forms the pipe support, which requires careful implementation and compacting in accordance with the load calculations. The thickness [b] of the upper bedding results in the bedding or support angle. This term is still widespread and characterises in an easily conceivable manner the bearing capacity of the bedding. For GIGAPIPE-PP, the following table shows the relation between the easily measurable thickness [b] of the upper bedding and the bedding angle. The main compression directly above the pipe should be placed at first with a minimum coverage "c" of 20 - 30 cm above the pipe end. The sewage pipe system GIGAPIPE-PP must be secured sideways at a high level in front of the compression.

Upper bedding layer "b" in mm for GIGAPIPE-PP

<table>
<thead>
<tr>
<th>Nominal width in (mm)</th>
<th>90°</th>
<th>120°</th>
<th>180°</th>
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<tbody>
<tr>
<td>ID OD</td>
<td>K = 0.25</td>
<td>K = 0.50</td>
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<tr>
<td>150</td>
<td>169</td>
<td>25</td>
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<td>200</td>
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<td>136</td>
<td>227</td>
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<tr>
<td>1000</td>
<td>1134</td>
<td>170</td>
<td>284</td>
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</tbody>
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Making of pipe trenches under DIN EN 1610

Nominal Bedding angle [°]

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K = the quotient from bedding layer and OD of the pipe

Our sample static calculation is based on the following initial values:

- Load: SLW 60 with asphalt or concrete road, no additional surface loads
- Solid ground: G3 / 97%
- Pipe bedding (pipeline zone): G2 / 95%
- Cover (main backfill): G3 / 92%
- Single trenches, slope angle 90° or dam yield
- No groundwater

Cover condition A1:
Trench backfill compacted in layers against the undisturbed soil without proof of the degree of compacting; applies to beam planking (Berlin-type sheeting) or insulating yield.

Bedding condition B1:
Bedding compacted in layers against the undisturbed soil or compacted in layers against the dam yield without proof of the degree of compacting; applies to beam planking (Berlin-type sheeting). Foundation like solid soil. Not to be placed on concrete! (This applies in principle to all flexible pipes, i.e. all plastic pipes)
Due to the broad experience in long-term tight corrugated pipe systems, high-quality plastic pipe manufacturing facilities as well as lasting pipe business services, DROSSBACH and its partners offers customer-orientated solutions. Furthermore close contacts to long-term partners verify DROSSBACH’s high reputation world-wide.

DROSSBACH technology is used all over the world in different applications like sewage, storm water, drainage and cable protection. The combination of continuous improvements, innovative thinking and synergies of win-win partnerships is playing an important role in order to get a leading position in the corrugated pipe business.

Made in Germany

Pars Ethylene Kish Co. is one of the major manufacturers of Polyethylene Pipes in Iran and the MIDDLE EAST, cooperating in the majority of the national projects.

Pars Ethylene Kish designs and manufactures one of the MIDDLE EAST’S largest and most diverse lines of polyethylene piping systems—pipe, valves, fittings, auxiliary components and tools—all engineered from the ground up to handle the full range of today’s municipal, industrial, commercial and residential applications.

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