Funke info

The Funke Kunststoffe GmbH magazine

Funke Gruppe

Special edition

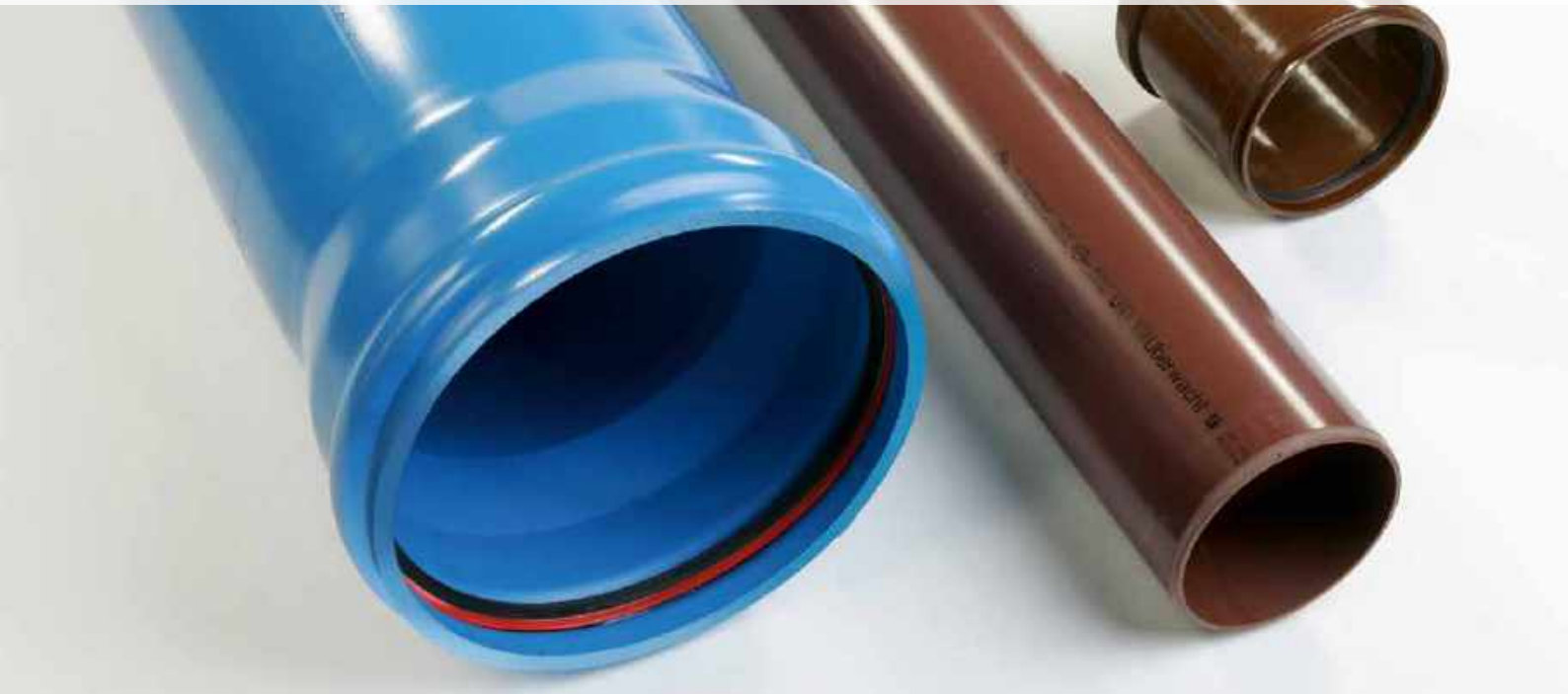
The success story:
An underground drainage pipe system sets standards

The starting signal:
The colours blue and brown conquer the market

The material:
Plastic simplifies civil engineering

25 years
HS®-Underground Drainage Pipes

A milestone in terms of functionality and quality



www.funkegruppe.com

Foreword

For a long time, the majority of rainwater and wastewater pipes were made from concrete, clay or cast iron. Nowadays, these traditional materials are increasingly being replaced by plastic sewer pipe systems – including those made from PVC-U. There are good reasons for this development. Their low weight makes handling easier on the construction site, while high resistance to chemical influences and corrosion as well as optimal hydraulic properties ensure that sewer systems constructed from plastic pipes also meet the requirements of durability and low maintenance.

The HS®-Underground Pipe System, which Funke introduced 25 years ago, is a product with extraordinary performance parameters that can be used to carry out almost all tasks that arise in the construction of modern sewer systems.

However, it is not only its excellent material properties and innovations such as the colour coding of pipes for rainwater and waste water that have contributed to the success of the HS®-Underground Drainage Pipe. The system concept in particular – which plays an essential role in the philosophy of the family business in Hamm, Germany – has won over both drainage professionals and users. A constantly growing range of products over the years has made it clear that Funke always keeps its eyes on the ball and thinks ahead.

Examples of this include its many solutions from the areas of property drainage, sewer connections, flexible couplings and chamber systems. In its current form, the HS®-Underground Drainage Pipe System is one of the most comprehensive and powerful systems available on the market. In this special edition of Funke info, we would like to present how our products are developed, from the initial idea and market launch to current innovations.

We hope that you find this journey through time captivating!

Kind regards,

Dieter Jungmann,
Head of Civil Engineering

Imprint

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25 years of the HS®-Underground Drainage Pipe System

Setting standards right from the beginning

1994 HS®-Underground Drainage Pipes DN/OD 250 and 300

1998 HS®-Underground Drainage Pipes

1996 HS®-Underground Drainage Pipes

2018 HS®-Underground Drainag Pipes DN/OD 630

2015 HS®-Underground Drainage Pipes SN 16

2010 HS®-Underground Drainage Pipe DN/OD 400

2004 HS®-Underground Drainage Pipes

2009 HS®-Underground Drainage Pipes DN/OD 100 to 800

The development of the HS®-Underground Drainage Pipe System is closely connected with the history of Funke Kunststoffe GmbH. Developed and introduced to the market 25 years ago, it is a prime example of the comprehensive expertise and innovative strength of a traditional family-owned company that presents a large number of new developments 'from sewer connections to sewer pipes' to the market every year.

Implementing what the market needs

These products usually have one thing in common: they combine high quality with easy handling and a long service life. Funke products are not created on a drawing board, but in the field and by means of direct communication between Funke technicians and the Funke sales team with drainage professionals and users. The requirements become clear in the dialogue with construction partners – be it for the further development of existing solutions or for products that have to be developed from scratch.

Colour coding ensures easy classification

This approach has played a major role in the success story of the HS®-Underground Drainage Pipe System. An example of this is the revolutionary idea of producing HS®-Underground Drainage Pipes in the colours blue and brown. Pipes and fittings can still be identified without any issues even many years after installation due to their colour coding in blue (rainwater) and brown (waste water).

Outstanding product characteristics

The HS®-Pipe has also been a pioneer in other respects: all HS®-Pipes and HS®-Fittings have increased walls and come with increased ring stiffness. They are therefore also suitable for laying under public traffic areas (HA 20 from 0.5 m laying depth) according to DIN EN 1610.

High acceptance

Advantages and product properties such as these have contributed to the high acceptance that the HS®-Underground Drainage Pipe System enjoys among building principals and users. The system has proven itself in many civil engineering projects. It is easy and flexible to handle and also economical to use. This has been demonstrated, among other things, by an assessment of the Federal and State Working Group on Water/LAWA, which assumes a depreciation period of 50 – 80 (100) years. The product also has the approval of the Deutsches Institut für Bautechnik (German Centre of Competence for Construction; DIBt) and is WRc approved.

Launched in 1993 with nominal diameters of 160 and 200

The colours **blue** and **brown** conquer the market

With the idea of creating a pipe system in different colours, Funke took on a pioneering role.

Requirements for the technology and economic efficiency of pipe systems have changed considerably in recent decades. In addition to series-produced pipes, building principals and contractors expect an extensive range of products with many fittings that facilitate safe, professional and efficient work. User-friendly pipe systems that prove their efficiency and quality both during installation and their service life are in demand. It is against this background that Funke launched the HS®-Underground Drainage Pipe System 25 years ago.

At the time of its market launch, only pipes in the nominal diameters DN/OD 160 and 200 were produced. These were accompanied by junctions and couplers for connecting the pipes. After the development of the appropriate moulding tools, production was carried out for the first time using the injection moulding process. From the very beginning, the fittings were manufactured in SDR 34 (SDR = outer pipe diameter/wall thickness).

Outstanding properties
At that time, HS®-Underground Drainage Pipes already offered a great number of the product properties that ultimately contributed to the system's triumphant success. PVC-U pipes and fittings with covers of 0.5 – 0.6 m for traffic loads up to HA 20 were now deployable. The measured ring stiffness was ≥ 12 kN/m^2. Their good hydraulics and level-invert connections ensured reliable water drainage. The root-resistant and root-tight pipe connections were impact-resistant and were quick and easy to install. The HS®-Underground Drainage Pipes of the first generation met the increased requirements of ATV-A 142 – pressure tightness up to 2.5 bar – and could therefore also be used in water catchment areas of zone II/III.

Faster and more flexible
It is worth mentioning that the HS®-Underground Drainage Pipes were plain-ended. This meant that there was no more offset in the socket area. The web construction in the double socket coupler – which is part of the product range – offered the installer additional reliability. The stop noise of the spigot end of the pipe on the central stop was clearly audible and signalled correct installation.

A pioneering idea
Funke also played a pioneering role with its idea to produce a pipe system in different colours. It has stood the test of time in the field and has been partly copied by other manufacturers. Due to the colouring of the HS®-Underground Drainage Pipe System in blue (rainwater) and brown (waste water), the pipes manufactured by Funke Kunststoffe GmbH can still be identified without any problems even many years after installation, both inside and outside.

One of the first schemes with HS®-Underground Drainage Pipes went swimmingly

HS®-Underground Drainage Pipes, fittings and more

A complete system that leaves

Over the years, many useful products have been added to the HS®-Underground Drainage Pipe System. Today, the user can avail themselves of a complete system with outstanding structural engineering properties in the nominal diameters DN/OD 110 to DN/OD 800. HS®-Underground Drainage Pipes are solid-wall pipes with increased walls made from PVC-U, manufactured in accordance with DIN EN 1401-1, but with an increased wall thickness and a minimum ring stiffness of 12 kN/m² (SN 12) or 16 kN/m² (SN 16).

- Pipes DN/OD 110 to DN/OD 315 plain-ended
- DN/OD 400 to DN/OD 800 pipes with push-fit socket

In addition to pipes and fittings from the standard range, special components such as the VARIO socket, Demarcation chamber, level-invert junction, laser and access pipes and various bends and chambers for the most diverse areas of application –

Interior marking

25 years

HS®-Underground Drainage Pipes

not to mention accessories such as the HS®-Pipe Cutting and Chamfering Machine – contribute to the performance and versatility of the modern sewer pipe system.

Special seals
Pipes and fittings from DN/OD 110 to DN/OD 500 have a firmly inserted FE® seal or a fixed integrated CI® seal from DN/OD 630 to DN/OD 800.

Classification made easy
As colour coding in blue and brown had already ensured that the pipes were easy to identify since their market launch, Funke introduced a new type of internal marking for the HS®-Underground Drainage Pipe System in 2012. Since then, the pipes have featured continuous marking at three points on the inner wall, which, in addition to the name of the manufacturer, provides information on the ring stiffness and the production date.

Thanks to permanent embossing, which in contrast to a typographically produced inscription is still clearly legible even after years of use, Funke once again met the requirements and wishes of building principals, network operators and planners who most definitely want to know 'who installed what and when' in the sewer network during CCTV inspections.

nothing to be desired

HS®-Fittings

Available in **blue** and **brown**

25 years
HS®-Underground Drainage Pipes







25 years
HS®-Underground Drainage Pipes

Many advantages during installation

A sewer pipe system

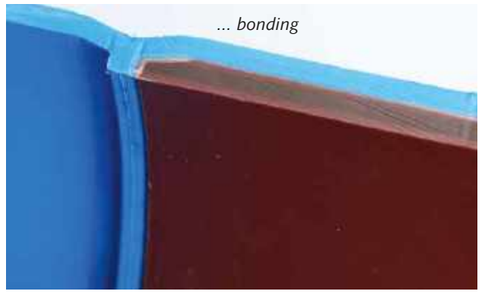
Pipes and fittings of the HS®-Underground Drainage Pipe System also show their advantages when laid in the trench. HS®-Pipes made from PCV-U are "flexible" and have a different static load-bearing behaviour to rigid pipes such as clay or concrete pipes. While in a rigid pipe the loads are concentrated above the pipe, the soil and traffic loads are largely transferred to the surrounding soil in a flexible pipe. If the loads are higher than expected or if the load situation changes over time, the result is only a slight increase in deformation for a flexible pipe. In contrast, stability failure and thus material breakage cannot be ruled out for rigid pipes.

Reduced wall thickness
What's more, due to the different elasticity moduli of PVC-U pipes, the wall thicknesses are significantly lower than those of PE or PP pipes. This means that the diameter/wall thickness ratio (SDR) is greater with the same or better ring stiffness of the pipe.

Advantages of the material
Due to its high hardness and robustness, PVC-U also has a significantly lower creep tendency than PP and PE. Unlike polyolefins, which can only be welded, PVC-U can be both welded and bonded. As a result of the higher modulus of elasticity, PVC-U pipes have much higher longitudinal bending stiffness than PP pipes, which minimises the risk of lower pipe bends, for example.

The total deformation of a plastic pipe results from a spontaneous deformation and a time-dependent increase in deformation (creep deformation). As the creep factor of PVC-U is only half that of PP, the long-term deformation of a PVC-U pipe is always less than that of a PP pipe, even with identical spontaneous deformation.

Welding and ...



... bonding

Tests to determine longitudinal flexural strength

Combining plastics is a no-go
Combining different plastics is therefore strongly discouraged. Even if the pipe made from PVC-U and the fitting made from PP happen to have a similar ring stiffness in the short-term test, this will change after just a few hours.

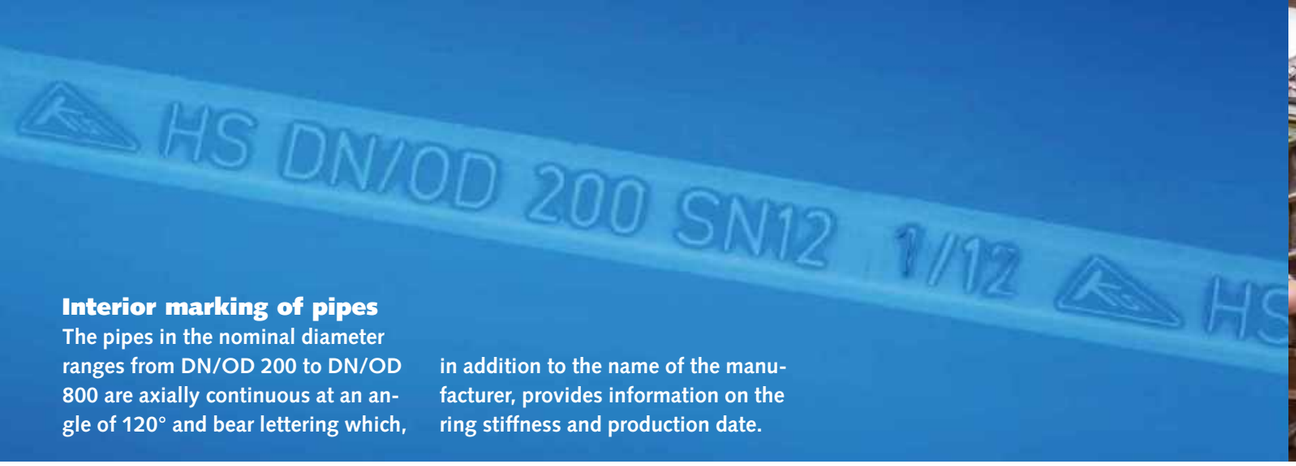
Wide range of accessories
The aforementioned advantages – as well as the lower weight or the low insertion forces – have a positive effect on handling in the pipe trench.

In addition, Funke offers accessories tailored to its products that simplify work processes on the construction site. These include the HS®-Pipe Cutting and Chamfering Machine, with which HS®-Pipes made from PVC-U in the nominal diameter range from DN/OD 110 to DN/OD 315 and a maximum wall thickness of 15 mm can be cut to length and chamfered in one operation.

which has set standards

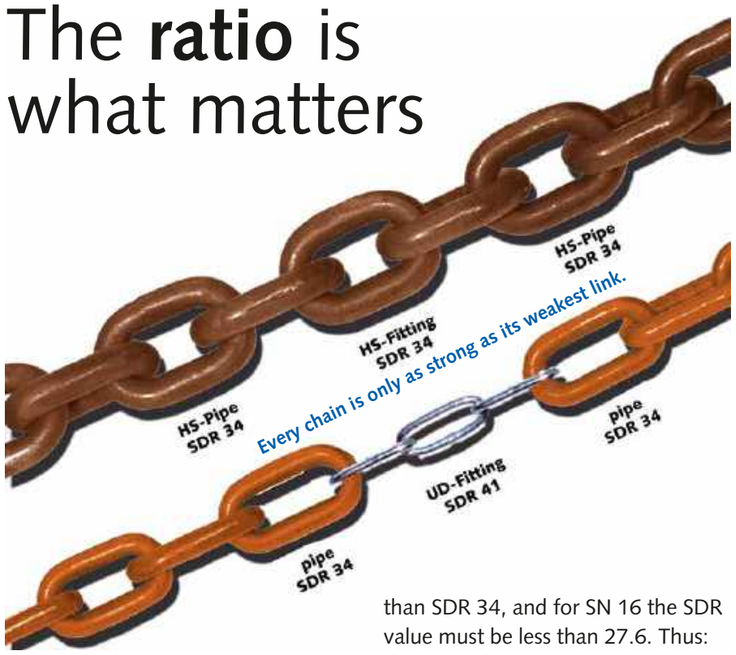
Professional installation
When installing the HS®-Pipes, the European installation standard DIN EN 1610 and the supplementary worksheet DWA-A 139 must be observed. Among other things, the area of the pipeline zone on both sides of the pipeline must be backfilled and compacted in even layers.

Simplified installation possible
Due to the increased walls of the SDR 34 design of HS®-Pipes and fittings, Funke recommends simplified installation in addition to DIN EN 1610 for pipes up to DN/OD 250, where a special compression of the haunch area can be foregone. Immediate filling of the upper bedding layer up to the top of the pipe prevents possible displacement of the pipe section during compaction and sufficient compaction of the haunch area is achieved by subsequent lateral compaction at 10 cm intervals on both sides of the pipe.



Interior marking of pipes
The pipes in the nominal diameter ranges from DN/OD 200 to DN/OD 800 are axially continuous at an angle of 120° and bear lettering which, in addition to the name of the manufacturer, provides information on the ring stiffness and production date.

The **ratio** is what matters



According to DIN EN 1401, the wall thickness, among many other specifications, is required for the minimum marking of pipes and fittings. The wall thickness is defined by the so-called Standard Dimension Ratio (SDR). This is the quotient determined from the ratio of the outside diameter and wall thickness of a pipe. For the same material (PVC-U) and thus the same modulus of elasticity, a constant SDR value can be assigned to each ring stiffness. The following applies to the material PVC-U: to achieve a ring stiffness of SN 4, the SDR value must be no greater than SDR 41 domestic drainage SN 8 is ensured with an SDR value of less than SDR 34, and for SN 16 the SDR value must be less than 27.6. Thus: the lower the SDR value, the thicker the pipe wall and the more stable the PVC-U pipe.

Mass equals class

"Flexible" pipes are characterised by the fact that they are able to withstand the stresses caused by soil and traffic loads by means of small deformations. However, sufficient stiffness and robustness is required for buried pipes to keep pipe deformations to a minimum. For HS®-Pipes, the deformations to be expected are a maximum of three to four per cent, even in the case of high traffic loads or large installation depths. This is ensured by continuously increased walls and a smooth-walled design for pipes and fittings. In most cases, it was only the ring stiffness (SN 2 to SN 16) that served as a parameter for the resistance of plastic pipes to these loads. Since the ring stiffness of a pipe or fittings can be increased not only by using more material, but also by using different wall structures (ribs/corrugations), this is only one design feature. If, on the other hand, the classification according to SDR is used, a clear statement can be made about the quality of pipes and fittings. Smooth-walled pipes have further significant advantages: high resistance to point loads due to the significantly greater wall thicknesses, optimal compaction of the entire pipe bedding zone – even directly on the pipe – and a high degree of longitudinal stiffness.

SDR 34 fittings

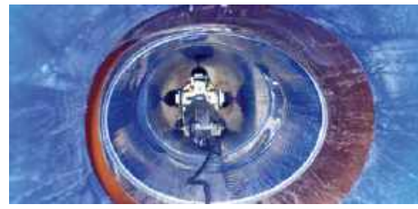
The respective product standards govern which fittings may be combined with which pipes. As a matter of principle, no material mix should be used within a pipeline (e.g., pipes made from PVC-U and fittings made from PP). Otherwise, the basic rule applies that for the same pipe wall thickness or SDR value, the fittings must have at least the same or greater (ring) stiffness than the pipe due to their geometry. According to DIN EN 1401-1, SDR 41 fittings with pipes up to a maximum of SN 8 and SDR 34 fittings with pipes up to SN 16 may be used. Consequently, SDR 34 fittings are used throughout for SN 12 and SN 16 pipe systems.

Tried-and-tested – **these pipes can withstand high loads**

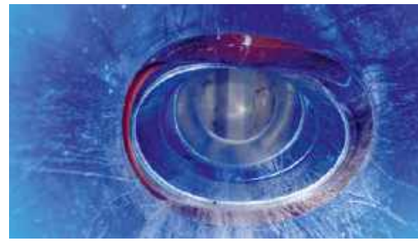
'It will all work out' has been the widespread opinion for years when it comes to installing plastic pipe systems made from PVC and when pipes and fittings with different ring stiffnesses or SDR classes have been laid. Particularly with regard to soil and traffic loads and potentially resulting deformations, Funke has always pointed to the importance of using equivalent products when creating a pipeline that is to function for many years without faults. For this reason, Funke Kunststoffe GmbH had the Materials Research and Testing Institute (MFPA) at the Bauhaus University Weimar carry out a sandbox test on a pipe construction in 2005. The aim was to investigate how fittings SDR 41 (UD-Junction) and SDR 34 (HS®-Junction) in combination with an HS®-Underground Drainage Pipe (SN 12, SDR series SDR 34) behave under incremental loads when installed.

The test involved installing a corresponding pipe section according to DIN EN 1610 in a sandbox. It consisted of steel sections and formwork panels and had the internal dimensions of 2.7 m x 1.8 m x 1,000 mm (L x W x H). It was backfilled and professionally compacted with G1 soil (non-cohesive sand and gravel) according to ATV-DVWK-A 127. The sandbox was placed in a load frame in which a hydraulic pressure cylinder was mounted. The force of the hydraulic cylinder was transmitted via an extension to a load plate (1.20 m x 0.40 m), which was positioned centrally on the backfill surface.

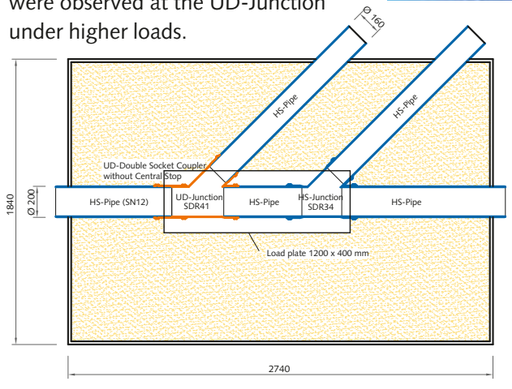
The results speak for themselves: there were continuous vertical deformations of the pipe construction in the area of the load plate relative to the load. Even at load level 1, the deformation of the UD-Junction (SDR 41) at 4.7 % was almost twice as large as the deformation of the HS®-Junction (SDR 34), which was 2.7 %. Even greater deformations were observed at the UD-Junction under higher loads.



Load level 1



Load level 2



Test set-up

Funke relies on PVC-U

Plastic simplifies civil engineering

Versatile, durable, safe, hygienic, light on raw materials, recyclable, efficient – these are just some of the terms that describe the outstanding product properties of PVC-U. And we could go on: it's impact resistant, chemically resistant, permanently sealed and easy to install.

Sophisticated solutions

This list makes it clear why more and more municipalities, utility companies, planners, network operators and civil engineering companies are opting for this material when it comes to the construction or renovation of pipeline infrastructure. The market demands cost-effective (sewer system) construction solutions that can be realised using technically sophisticated, affordable and ecologically optimised products. This is where the material PVC-U quite simply shows its strengths, even compared to PP or PE pipes and fittings – for example, when it comes to resource consumption. Only 43 % of the material consists of crude oil. In contrast, production of PP is based on 100 % crude oil. What's more, the production and processing of PVC-U requires little energy. Emissions and waste are at a low level compared to other materials.

Tested inside out

PVC-U is one of the oldest plastics and therefore – even after years of intensive discussion – today by far the most thoroughly investigated material in terms of its environmental relevance (from: Drucksache (German Parliament Document) 12/8260, German Bundestag, 12th parliamentary term). PVC-U contains no plasticisers.

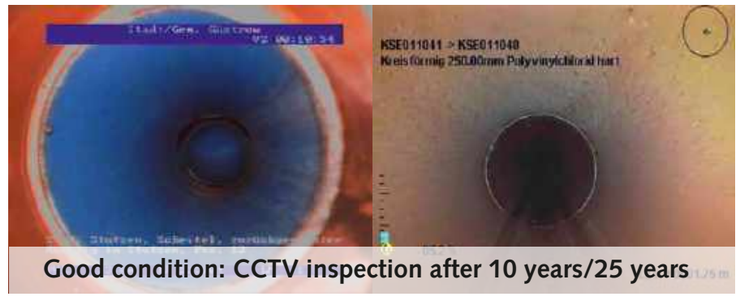
PVC-U is considered a resource-saving material. As early on as 1994, the plastic piping industry introduced a nationwide collection and recycling system in cooperation with the German Plastic Piping Association (Kunststoffrohrverband e.V.) and all manufacturers throughout Germany. Recycling is growing in its ecological and economic importance, especially in view of the continuously rising prices of raw materials in recent years. The pipe manufacturers bear the costs. There are no costs for retailers and customers.

25 years
HS®-Underground Drainage Pipes


Easy to install

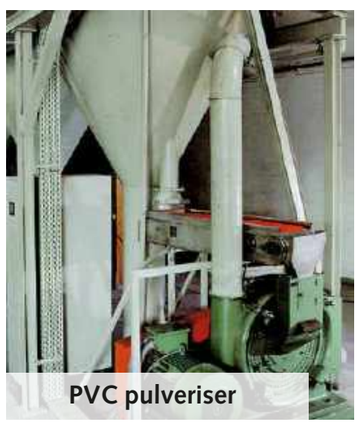

Readily available

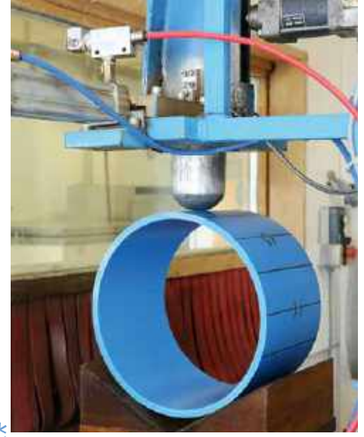

Fast installation



Good condition: CCTV inspection after 10 years/25 years


PVC recycling


PVC pulveriser



Ball drop test (step method) at -10 °C

IRO jetting test

Test SN 12/SN 16 kN

Made by Funke Tested HS®

Pipes and fittings from the HS®-Underground Drainage Pipe meet the highest quality standards. In the company's own and external laboratories, the entire pipe production process is checked regularly – from the raw materials, to the individual production steps, right through to the finished product. This ensures safe and efficient work processes on the construction site and contributes to the satisfaction of construction partners.

Ball drop test according to DIN EN ISO 3127
The resistance of the pipes to external impact stress is tested according to DIN EN ISO 3127. In this process, test objects in the form of pipe sections are subjected to the impact of a drop weight falling from a fixed height onto fixed points distributed around the circumference at a temperature of 0 °C. Taking the nominal pipe diameter DN/OD 250 as an example, this means that at 0 °C the test object is subjected to the impact of a drop weight of 2.5 kg from a height of 2 m.

Can be installed at temperatures as low as -10 °C
In order to determine the suitability of pipes for installation below the freezing point, it is possible to use the step method in accordance with DIN EN ISO 11173 for smooth-walled pipes in addition to the test method in accordance with DIN EN ISO 3127. The weight of the drop hammer for testing the nominal pipe diameter DN/OD 250 is 12.5 kg. After passing the test (an external test certificate), HS®-Pipes are marked with the corresponding ice crystal symbol and may be laid at temperatures as low as -10 °C.

Tightness of the joints
The tightness of the pipe joints is tested according to DIN EN 1277. The tightness of HS®-Pipe joints has been proven by an independent testing institute for both - 0.3 bar negative air pressure and an increased internal water pressure of 2.5 bar under all three conditions.

Can withstand high-pressure jetting
The most common type of sewer cleaning is high-pressure jetting. The water jets discharged from the flushing nozzle under pressure loosen deposits and transport them as a suspension to the starting chamber. The pipe material must be able to withstand the stresses of the water jets acting on the pipe wall. Tests carried out by the Civil Engineering Office of the City of Zurich in this respect showed that with the HD jetting method PVC-U sewer systems are not damaged up to a water pressure at the nozzle of 120 bar and a water volume flow of 300 L/min. This was also the result of a test conducted by IKT – Institut für Unterirdische Infrastruktur gGmbH, in which HS®-Pipes were tested according to DIN V 19 517 at a flushing pressure of 240 bar in 2002: the test was passed with flying colours! In 2018, the HS®-Underground Drainage Pipe was also successfully tested as part of the WRC approval (Water Research Centre) in the UK according to the Water Industry Specification (WiS 4-35-01) applicable there.

Diametrical Load Test
The ring stiffness (S) of a pipe is a characteristic value describing the resistance of an annulus against external strain. This is the basis of the classification into SN classes. The ring stiffness is determined through the diametrical load test pursuant to EN ISO 9969 where a pipe section of 30 cm length is positioned between two parallel arranged panels and charged

High pressure jetting resistance 2,600 psi = 180 bar according to Water Industry Specification (WiS) 4-35-01

25 years
HS®-Underground Drainage Pipes

quality ex works

With DIBt approval

In the field of development, production and distribution of components for wastewater disposal, roof drainage and stormwater treatment.

In addition, for most of Funke's products – including the pipes and fittings of the HS®-Underground Drainage Pipe System – a general building authority approval of Deutsches Institut für Bautechnik (German Centre of Competence for Construction; DIBt) has been obtained.

Added safety
This is a crucial aspect, as general building authority approval means additional safety for building principals and users.

HS®-Junction shear loading test

at a defined constant speed. The amount of force necessary to create a deformation of 3 % of the pipe wall diameter forms the basis of the determination of the ring stiffness.

Certified quality
Funke Kunststoffe GmbH is certified according to ISO 9001; the products developed and manufactured by the company meet the highest quality standards. This is proven by the test reports and certificates issued by external test laboratories and neutral institutes that are valid in Germany and abroad. These include the Materials Testing Office of North Rhine-Westphalia and IKT Gelsenkirchen.

Funke has also received a certificate for its production conditions. ISO 50001 is proof that the company operates an energy management system that complies with the standard

Tried-and-tested a thousand times

A quarter of a century ...

2001

Schmidhofen: In preparing the 'Schmidtackern' development area, the building principal and planner chose the HS®-Underground Drainage Pipe System – not least because of its structural advantages and blue and brown colour scheme.

Funke products: HS®-Underground Drainage Pipes DN/OD 250 in brown and HS®-Underground Drainage Pipes (blue and brown) DN/OD 160 for sewer connection pipes.

2007

Hambach: Quality and durability were the decisive factors in the development of the new development project 'An der Maibacher Strasse'. The HS®-Underground Drainage Pipe System impressed the construction partners above all in terms of tightness and resistance to root intrusion.

Funke products: HS®-Underground Drainage Pipes DN/OD 160 to 500 (blue and brown).

2006

Sendenhorst (Garrath): Selecting the HS®-Underground Drainage Pipe System has paid off for all parties involved in the development of the 'Garrath-Nord' development project – both in technical and economic terms.

Funke products: HS®-Underground Drainage Pipes (brown) DN/OD 200 and 250, HS®-Underground Drainage Pipes (blue and brown) DN/OD 160 and FABEKUN® Junction.

2008

Papenburg: Ring stiffness, colouring and flexible connection options were the reasons given for adopting the HS®-Underground Drainage Pipe System for the extension of Baudock II on the Meyer Werft premises.

Funke products: HS®-Underground Drainage Pipes DN/OD 315; FABEKUN® Junction DN/OD 160 and Complete Saddle Sets.

25 years
HS®-Underground Drainage Pipes

2009

Elmshorn: With respect to the typically flat area of land with a high groundwater level, the HS®-Underground Drainage Pipe System met all constructional requirements in terms of stability and flexibility during the development of the 'Am Hasenbusch' project.

Funke products: HS®-Underground Drainage Pipes DN/OD 160 to 400 (blue and brown).

2010

Geiselwind: The drainage professionals used plastic pipes for the first time for the renewal of the sewer network and the sewer connections in the old town area of Geiselwind.

Funke products: HS®-Underground Drainage Pipes DN/OD 200 (external water pipes), DN/OD 160 (sewer connections) and DN/OD 315, 400, 500 and 600 (combined sewer pipe).

2012

Ahlen: The building principal and planner opted for the HS®-Underground Drainage Pipe System because of the structural conditions – for example, a shallow base depth of 1.50 m made it difficult to integrate the sewer connection pipes.

Funke products: HS®-Underground Drainage Pipes DN/OD 250 (brown) and DN/OD 500 (blue); HS®-VARIO Socket.

2012

Bad Krozingen: The HS®-Underground Drainage Pipe System was used to provide all solutions from sewer connections to sewer pipes in the development of the 'Kurgarten' construction area.

Funke products: HS®-Underground Drainage Pipes DN/OD 250 (brown), DN/OD 250 to 600 (blue), DN/OD 160 (blue and brown); CONNEX Junction.

… Quality in the pipe trench

Neubeckum: Partly slotted pipes for the drainage of the cycle path and roadway were laid in Ostenfelder Strasse. The pipes were particularly well received due to their excellent hydraulic properties and a ring stiffness of ≥ 10.5 kN/m².

Funke products: HS®-Partly Slotted Pipes DN/OD 250.

Oftersheim: During a sewer renovation in Goethestrasse, the HS®-Underground Drainage Pipes and fittings impressed due to their easy handling, even in tricky connection situations, as well as their comprehensive range of accessories.

Funke products: HS®-Underground Drainage Pipe DN/OD 160, 315 and 500; HS®-VARIO Socket; VPC®-Pipe Coupling; CONNEX Junction.

Leutkirch: Given the tight time window for the development of the residential area ‘Beim Marienhof’, the building principal and planners insisted on an easy to lay, flexible and durable sewer pipe system.

Funke products: HS®-Underground Drainage Pipes DN/OD 250, 315 and 400 (brown); HS®-Underground Drainage Pipes DN/OD 315 and 400 (blue); FABEKUN Junction; Funke Internal Backdrop (ILA).

Blindheim: 15 households in the Berghausen district were connected to the sewerage system using HS®-Underground Drainage Pipes as a result of their good material properties and good hydraulics.

Funke products: HS®-Underground Drainage Pipes DN/OD 200 to 500; CONNEX Junctions; Funke Internal Backdrop (ILA).

Hoetmar: In creating a junction to connect a double dwelling house to the sewer system, the building principal wanted to play it safe and opted for the flexible and sustainable HS®-Underground Drainage Pipe System.

Funke products: HS®-Underground Drainage Pipes DN/OD 110 and 125 as well as bends, junctions and reducers; HS®-Demarcation Chamber.

Markt Euerdorf: Due to the extremely rocky ground and with a view to carrying out construction work in the existing building according to a tight schedule, the HS®-Underground Drainage Pipe System was used to rehabilitate wastewater and rainwater pipes as well as sewer connections.

Funke products: HS®-Underground Drainage Pipes (16 kN/m²) DN/OD 250 and DN/OD 315 to 800; HS®-Couplers; HS®-VARIO Socket; VPC®-Pipe Coupling.

Wabern: The rainwater drainage system was rebuilt as part of the construction of a new shredder and storage area for green waste on a landfill site. The difficult subsoil posed a particular challenge.

Funke products: HS®-Underground Drainage Pipes DN/OD 160 to 710.

Weinstadt: Based on the positive experience gained during previous civil engineering measures, the building principal opted for the HS®-Underground Drainage Pipe System in the development of the new construction project Halde V.

Funke products: HS®-Underground Drainage Pipes DN/OD 160 to 500 (blue and brown); Funke Plastic Chambers DN 1000.

25 years of the HS®-Underground Drainage Pipe System

We're delighted

25 years
HS®-Underground Drainage Pipes

In our opinion, the Funke HS®-Underground Drainage Pipe System is one of the best pipe systems on the market. As the word 'system' implies, the HS® system, together with its components, is up to tackling all challenges faced by drainage technology for gravity pipelines. Thanks to the extensive range of accessories from Funke, the 'open' system is also compatible with other pipe materials and systems. Since its foundation in 2000, the engineering offices of agc-gruppe have been using the HS® system among others – and so far there have been neither complaints nor returns. Aspects such as sustainability and stability of value are ensured and underscored by the HS®-Underground Drainage Pipe System.

Dipl.-Ing. Jens Lüdecke,
agc - aqua geo consult gmbh, Kassel, Germany

We use the HS®-Underground Drainage Pipe System from Funke Kunststoffe GmbH in our region because we attach great importance to future-proof, technically sophisticated and high-quality sewer systems.

Frank Sauer,
Head of Investments/GIS,
Drinking Water and Wastewater Association,
Eisenach-Erbstromtal, Germany

I was instantly impressed by the HS®-Underground Drainage Pipe System. The simple but ingenious colour differentiation of waste water and rainwater makes it easier for all parties involved (drainage professionals, construction company, user) to correctly construct, control and use the sewer system. I like to use the variant with a ring stiffness of 16 kN/m² in the context of developments where the necessary cover is often lacking during construction work. The system – which now boasts an extensive product range for various requirements – means that good solutions can always be found for many situations that arise in construction projects – and it's been like this for the last 25 years.

André Leson (Town Planning Officer),
Department 3 – Planning, Building, Environment, town of Oelde

Funke sewer pipes and accessories are bona fide problem solvers on and around sewer construction sites: simply lay and walk away – that's quality as promised by Funke!

Achim Rehm,
Technical Director, Building Authority,
Municipality of Schwanau

Pipes made from various different materials are found in the subsoil and have to be connected or newly manufactured in the case of repairs or new junction lines. Funke distinguished itself in the run-up by inquiring and developing individual solutions together with the user. The results included the FABEKUN Junction and the VPC®-Pipe Coupling. The HS®-Underground Drainage Pipe System with its blue and brown pipes is also worth mentioning – with respect to heavy wear, aggressive wastewater, pipe corrosion, movements in the underground and root ingrowths, Funke recognised a gap in the market and now offers a purposeful solution to those who need it. Not only that, but it supplies products such as road gullies or chambers and thus a solution for practically all requirements and dimensions. Companies commissioned by us are usually full of praise after their initial experience with Funke products. They point out, for example, the lightness of the material and ease of handling, time saved and reduced use of equipment.

Jochen Weller, Administrator,
Local Building Authority for Civil Engineering and Road Construction,
Municipal Administration Durmersheim

The HS®-Underground Drainage Pipe System

The advantages

- Interior marking of pipes DN/OD 200 – 800
- Long service life
- Over 90 years of experience with PVC-U
- No corrosion
- High pressure jetting resistance (WRc and ISO-tested, CEN/TR 14920)
- 100 % recyclable
- Ring stiffness ≥ 12 kN/m² / ≥ 16 kN/m²
- High strength pipes and fittings
- Tight up to 2.5 bar
- Low installation costs
- pH range from 2 to 12
- Highly resistant to chemicals
- Firmly inserted FE®-Seal (oil-resistant according to DIN EN 681.2 WH)
- Nominal diameters ranging from DN/OD 110 to DN/OD 800
- Complete range of drainage fittings with a wide variety of accessories
- Can be installed at temperatures as low as -10 °C
- Installation depth from 0.5 to 6 m / HA 20 (SN 12)
- Installation depth from 0.45 to 8 m / HA 20 (SN 16)
- Overall length 0.5 to 5 m
- Special components are manufactured on request
- Flexible connection options with the HS®-VARIO Socket
- Subsequent embedding of pipelines with CONNEX Junction is possible
- Different chambers for various applications
- Easy classification with blue and brown colours – inside and outside
- Root-proof and root-tight
- Perfect hydraulics

Further information

Would you like to know more about the range of the HS®-Underground Drainage Pipe System? You can request further information on the following products and topics from us for free.

- HS®-Underground Drainage Pipe System, fittings and special solutions
- HS®-Chambers
- HS®-Demarcation Chamber
- HS®-VARIO Socket
- HS®-Laser and Access Pipe
- HS®-Adhesive Saddle for liners
- HS®-Vario Connection

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