



THE Sewerage Pipe

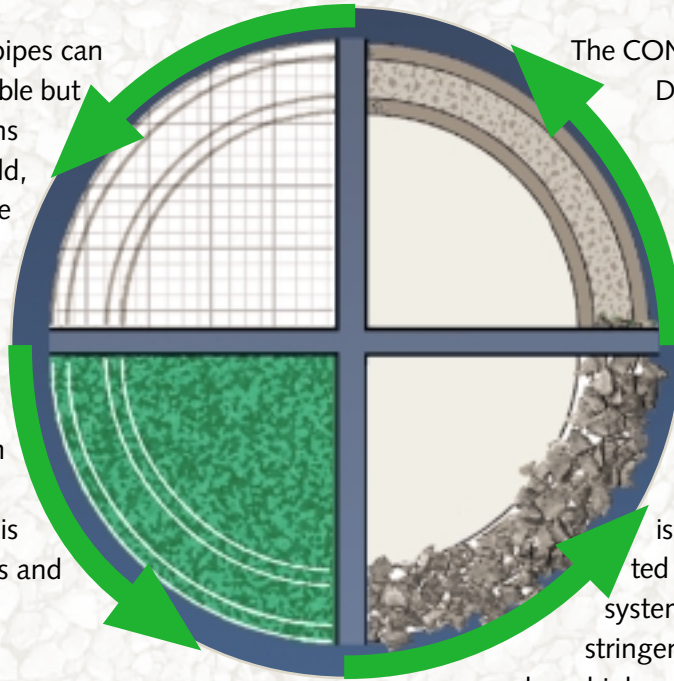
300 mm to 800 mm Sewerage
Pipes featuring the CONNEX®
CI Integral sealing system for
added security



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The Design

The design of structured wall pipes can be compared to the natural, stable but nevertheless flexible cell designs from the plant and animal world, such as bone structure, both have a similar principle. The internal cell structure is protected by a strong external shell both internally and externally. An exceptionally strong and compact structure is achieved in conjunction with both components. This moulding principle is used in the coextrusion process and employed in the production of CONNEX® pipes.



The Product

The CONNEX® pipe available from DN 300 - DN 800 provides contractors with an alternative to traditional pipe materials such as concrete and clay. The product can be laid at depth of 0.8 to 6.0 metres and if installed in accordance with EN 1610 a load SLW 60 can be achieved (SN 8/SDR 34). The pipe is supplied with the integrated dual component CI sealing system and hence meets all the stringent standards required by a modern, high performance sewerage pipe. The system also has many economical advantages.

Production Cycle

The diagram represents the production cycle of the CONNEX® pipes. Following the mixing and conscientious use of raw materials the PVC granulate is extruded to form the pipe by the coextrusion process then evaluated in various technical tests and subsequently used in harmony with the environment for many years.

The Material

CONNEX® is produced using PVC-U. This tried and tested material has been successfully used in the production of sewer and drainage pipes and consists of 57% mineral salt and 43% mineral oil. The ratio of mineral oil usage is less than in other plastics (such as PP and PE). U stands for "unplasticized" indicating no plasticizers are used during production.



The Use of Raw Materials

Mineral salt
57%



Mineral oil
43%

The many advantages of PVC-U

- versatile
- durable
- robust
- saves raw materials
- not easily flammable
- recyclable
- very good value for money
- good ecological properties
- non-abrasive

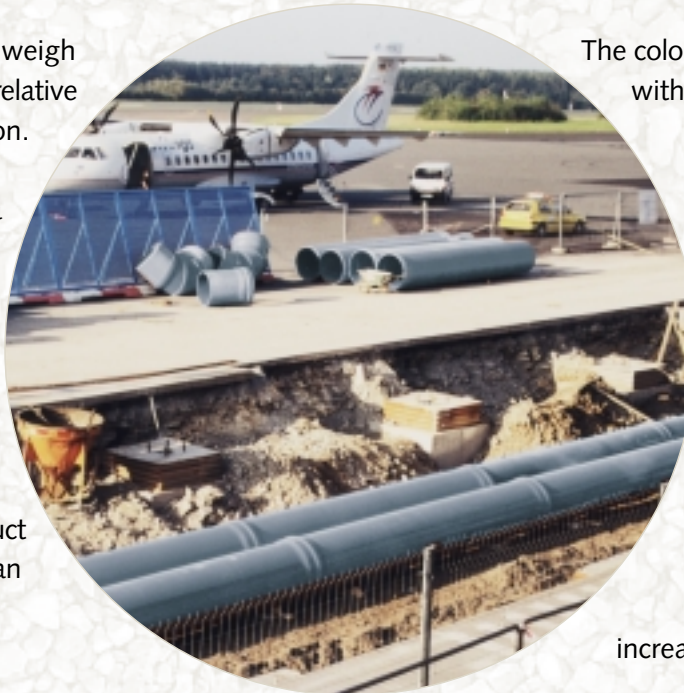
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Weight

CONNEX® pipes using PVC-U weigh much less than other materials relative to wall thickness and application. These advantages during installation are obvious, even a CONNEX® pipe of 6.0 metre length requires less mechanical lifting – an additional advantage of this system.

CONNEX® Pipes and Fittings DN 800

Approx. 120 metres of the product was used during extension of an airport in Germany.



The Colour

The colour of all pipes and fittings within the CONNEX® system correspond to RAL 7011 grey.

Cross-section of CONNEX® Pipes DN 300/DN 800

The inner skin (see below) is much thicker than the outer skin and as a result offers a level of strength and abrasion resistance in excess of required standards and increases resistance to internal rodding and jetting.

The CONNEX® Sewerage Pipe DN 800



CONNEX® bend DN 800, 33°



DN 300

Wall thickness: minimum of 9.2 mm



DN 800

Wall thickness: minimum of 23.3 mm

CONNEX® Pipes - Dimensional Data

DN	External diameter mm	Internal diameter mm	Min. wall thickness	Ring stiffness	Pipe length 1.5 metres including socket	Pipe length 3.0 metres including socket	Pipe length 6.0 metres including socket
300	315	297	9.2	SN 8	1.30 overall length	2.80 overall length	5.80 overall length
400	400	377	11.7	SN 8	1.28 overall length	2.78 overall length	5.78 overall length
500	500	470	14.6	SN 8	1.20 overall length	2.70 overall length	5.70 overall length
600	630	593	18.4	SN 8	1.16 overall length	2.66 overall length	5.66 overall length
700	710	668	20.7	SN 8	1.15 overall length	2.65 overall length	5.65 overall length
800	800	753	23.3	SN 8	1.12 overall length	2.62 overall length	5.62 overall length

Overall length = flow length

Ring stiffness in accordance with DIN ISO 9969



The Sealing System

The design of the CONNEX® CI sealing system comprises a dual component ring with added advantages for users. It has the following special features:

It is securely integrated into the pipe, cannot be removed and therefore cannot be forgotten during installation or displaced. The CONNEX® CI sealing system consists of a TPE polymer mix and a yellow restraining ring. It works by means of two sealing surfaces which guarantee a permanent level of water tightness even in deflection up to 3°. Pressure ratings of 0.5 bar normally required for all sewerage pipes are clearly exceeded. Contractors and water utilities can therefore fully rely on the CONNEX® CI sealing system. Once connected it fulfills its task over many decades without any reduction in performance.



Complete range of seals DN 300 - DN 800



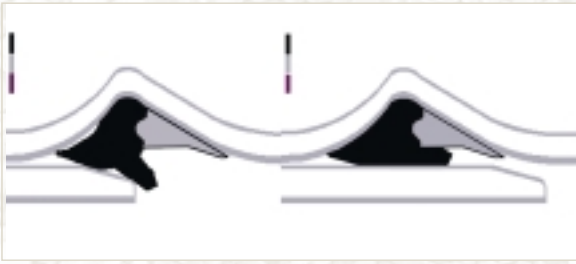
Cross-section showing moulded dual components



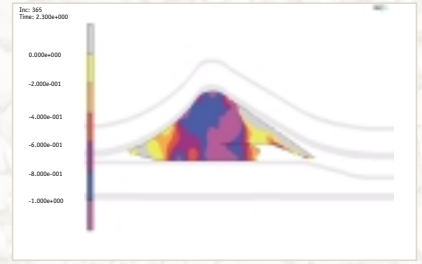
CONNEX® CI sealing system securely integrated in pipe socket



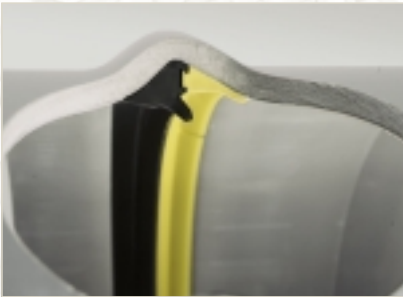
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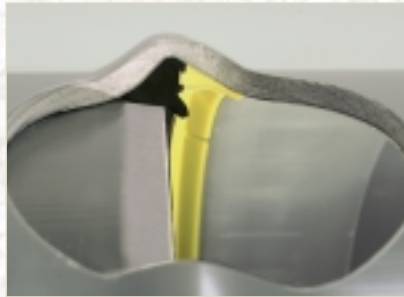
Pressure distribution indication of CONNEX® CI sealing system during the installation



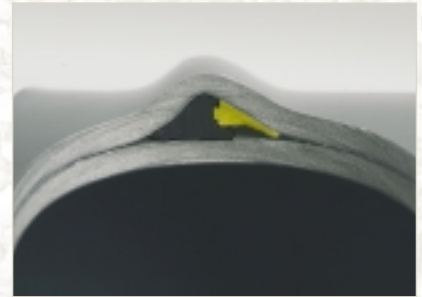
Pressure distribution indication of CONNEX® CI sealing system by zones during the installation



Cross-section of seal housing



Cross-section showing connection of chamfered spigot end of CONNEX® pipe



Cross-section of completed connection using CONNEX® CI sealing system



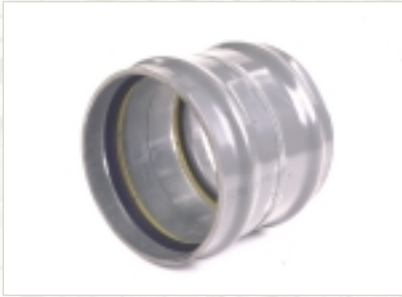
The Fittings

Fittings for the CONNEX® range are available in all diameters. They are produced with the same wall thickness as corresponding pipes and also incorporate the CONNEX® CI sealing system.

Long radius bends are available in 33°, 22° and 11° - ideal for slight changes in direction instead of expensive manhole construction, therefore enabling longer pipe runs.



Bends 33°/22°/11°



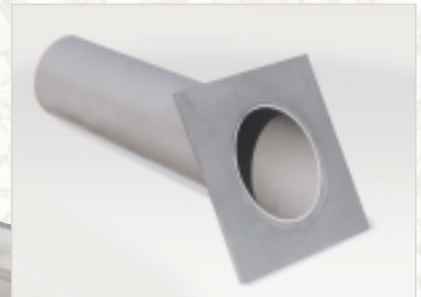
Repair Coupler



Junction 45°



Socket plug



60° Outfall pipe



The CONNEX® Junction
An additional benefit of the system is the CONNEX® junction DN 200/150. This offers contractors a quick, cost effective and simple method of making new connections on existing sewers, or instead of junctions on new sewers (further details available on request).



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Applications

CONNEX® pipes and fittings can be used in many applications due to the high level of ring stiffness (SN 8 / SDR 34).



Main Application Areas

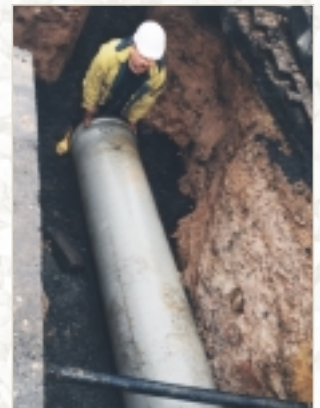
- Combined sewers
- Foul sewers
- Surface water sewers

Installation

All previous experience indicates the CONNEX® pipe system has proved itself during installation. It's increased strength, even when laid using poor backfill, it's lighter weight, and the new CONNEX® CI sealing system offer real advantages. When used in built up areas the 3.0 m length pipes have proved invaluable during installation. All these many advantages make the CONNEX® system more economically sensible.



Correct application of lubrication CONNEX® CI sealing system, socket and spigot of pipe



Easy handling of CONNEX® pipe



Ease of connection of CONNEX® pipes



Quick and simple installation

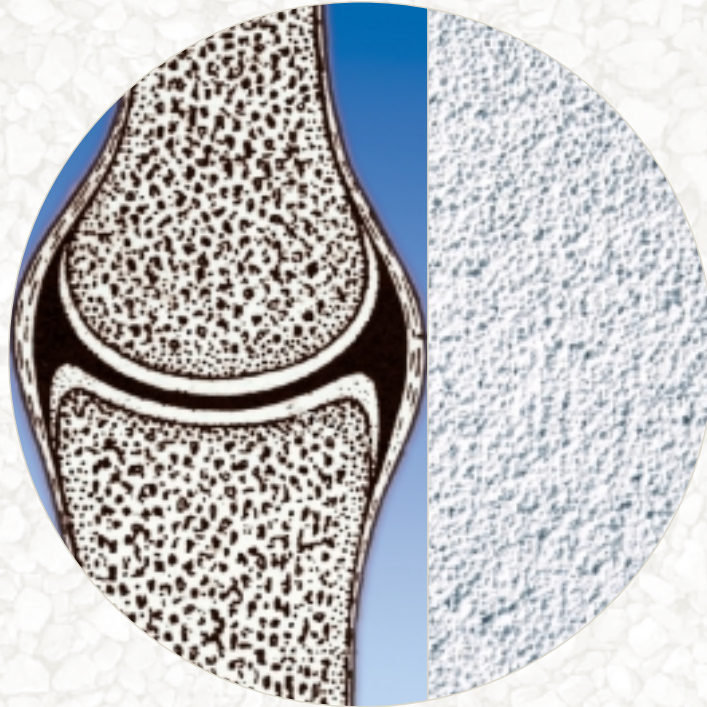


Manhole connection using CONNEX® pipes



Only light machinery required during installation

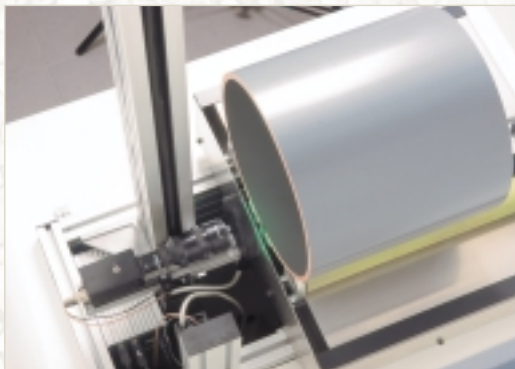
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*Cell structures offer guarantees of high load bearing capacity
 Left: cell structure of a bone,
 Right: cell structure of a building block made of concrete.
 The internal layer of CONNEX® pipes is similarly constructed.*

Quality Assurance

Funke Kunststoffe GmbH is certified in accordance with ISO EN 9001:2000 and carries out constant and continual testing on all products in its own in-house laboratory as part of its quality assurance programme. Modern equipment and technical expertise guarantee the constant high quality of the CONNEX® system as well as all other products. During these tests particular attention is paid to the inner foam structure of the pipe. The data obtained is constantly checked and transferred online to the extruders control module in order to ensure high quality production.



Quality testing



Important control data

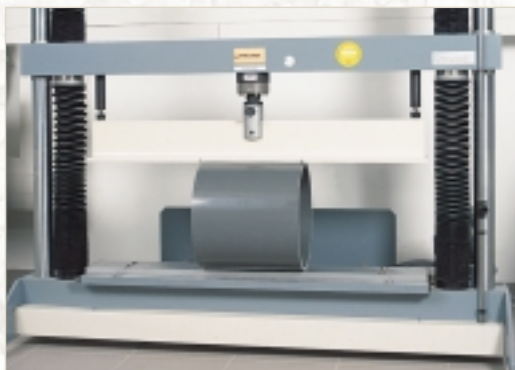
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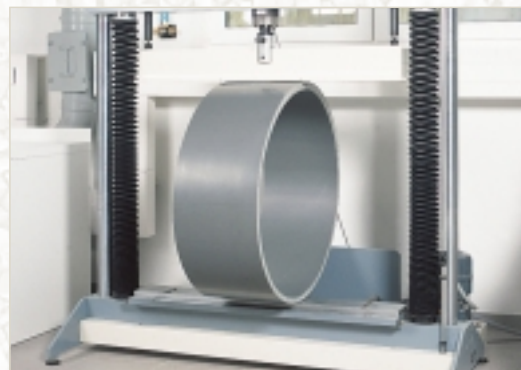
Impact test in accordance with EN 744 at 0°C

The Impact Test

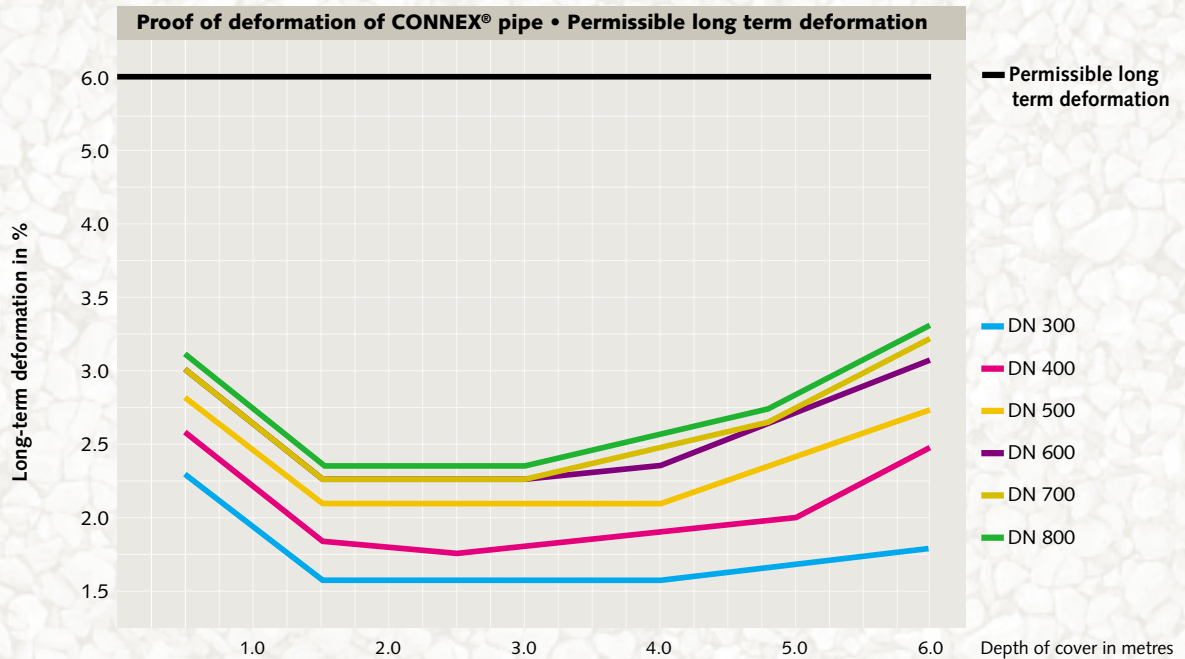
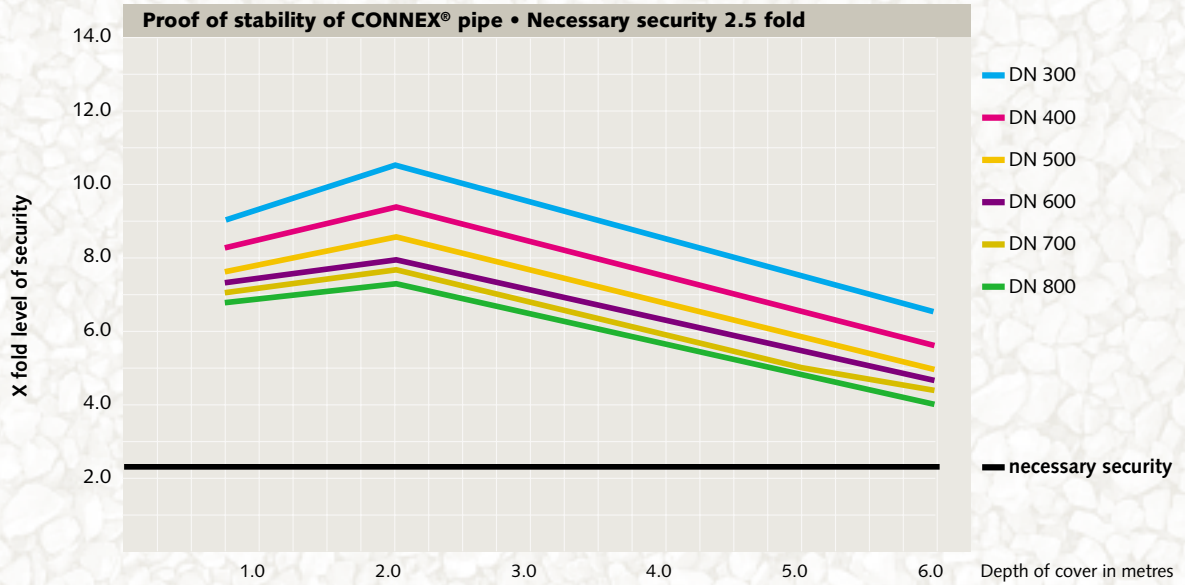
In order to meet the requirements of the European market CONNEX® pipes are subjected to rigorous tests in accordance with EN 1401. In this case a weight, which is defined according to the nominal diameter of the pipe, is dropped onto the outer wall of the pipe from a stipulated height at both room temperature and at 0°.



Load test on CONNEX® pipe DN 300



Load test on CONNEX® pipe DN 800



Installation and load parameters • Depth of cover 0.8 to 6.0 metres			
Support angle		180°	
Working load		SLW 60	
Ground conditions	Solid ground	G3	(cohesive)
	Embedment	G1	(not cohesive)
	Main backfill	G1	(not cohesive)
Compactness	Solid ground	90%	
Ground conditions	Embedment	95%	
	Surcharge	95%	
	Installation conditions	Main backfill	A1
Embedding conditions		B1	compacted against solid ground

Carry out installation in accordance with EN 1610





Many Advantages!

- High quality product.
- Available in 1.5 m, 3.0 m and 6.0 m including socket.
- Lightweight, with precision socket design to speed installation.
- Less excavation required than traditional materials
- Increased wall strength with ring stiffness to SN 8 (SLW 60 0.8 metres to 6.0 metres).
- Available from DN 300 to DN 800 with complete range of fittings.
- Secure integrated dual component sealing ring which cannot be removed.
- Joints offer permanent seal with no infiltration.
- All fittings supplied with wall thickness corresponding to pipe.
- Long radius bends available in 33°, 22° and 11° to allow slight direction changes and reduce need for costly manhole construction.
- CONNEX® junctions available for quick and easy lateral connections.
- CONNEX® system resistant to root intrusion.
- Durable system providing an average serviceable life of 50-80 years in accordance with LAWA directive of 1999.
- Excellent chemical resistance to acids, alkalis of pH range 2 to 12.
- Ideal for foul sewer system due to smooth bore providing excellent flow and resistance to blockage.
- One material (PVC-U) used proving to be ideally recyclable.
- CONNEX® pipes can accommodate up to 3° deflection of spigot end pipe in socket without reduction in seal quality.
- Outfalls can be achieved with specially designed 60° outfall pipe.

The Packaging

In the case of the packaging consideration is also given to economic and ecological factors.



CONNEX® pipe packaging DN 300 to DN 500



CONNEX® pipe packaging DN 600 to DN 800, length 3.0 metres



CONNEX® pipe packaging DN 600 to DN 800, length 6.0 metres

The Certificates

CONNEX® pipes and fittings meet the requirements of the European standardisation for SN 8 sewer pipes.

CONNEX® Pipe Test Certificates



NF certificate



SKZ certificate

Test Certificates of the CONNEX® CI Sealing System



British Standard Institution (BSI) certificate



SIS SAQ certificate

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