



FLOWTITE Pipe Systems

Other Technical Data
Gravity Sewer



Product Advantages

FLOWTITE Technology has been able to bring a product to the market that can provide a low cost, long-term piping solution to customers around the world. The long list of features and benefits add up to provide the optimum installed and life cycle cost system.

Features & Benefits

Corrosion-resistant

- Long, effective service-life materials
- No need for linings, coatings, cathodic protection, wraps or other forms of corrosion protection
- Low maintenance costs
- Hydraulic characteristics essentially constant over time

Light weight

(1/4 weight of ductile iron; 1/10 weight of concrete and clay)

- Low transport costs (nestable)
- Eliminates need for expensive pipe handling equipment

Short and long standard lengths

(up to 18 metres with individual lengths on request)

- Fewer joints reduce installation time
- More pipe per transport vehicle means lower delivery costs

Extremely smooth bore

- Low friction loss means lower operating costs
- Minimum slime build-up can help lower cleaning costs

Precision FLOWTITE COUPLING

with elastomeric gaskets

- Tight, efficient joints designed for coupling to eliminate infiltration and ex-filtration
- Ease of joining, reducing installation time
- Accommodates small changes in line direction without fittings or differential settlement

Flexible manufacturing

- Custom diameters can be process manufactured to provide maximum flow volumes with ease of installation for rehabilitation lining projects

High technology pipe design

- Lower wave celerity than other piping materials can mean less cost when designing for surge and water hammer pressures

High technology pipe manufacturing system

- High and consistent product quality worldwide which produces pipe ensures a reliable product that complies to stringent performance standards (AWWA, ASTM, DIN, EN, etc.)

- Quick and easy installation with construction site equipment due to light weight
- Fast installation with a reduced number of couplings due to pipe lengths up to 18 m
- simple and inexpensive tightness tests
- long usage with consistently high flow rates
- minimal effort for repairs and maintenance
- excellent corrosion resistance
- reinforced inner surface with a high resistance against abrasion

Due to these factors, projects made with FLOWTITE pipe systems are very economical and long-lasting with low maintenance efforts over the years.

Certificates and Approvals

FLOWTITE pipe systems have been tested and approved for the conveyance of gravity sewer lines meeting many of the world's leading authorities' and testing institutes' criteria, including:

- IRAM – Argentina
- ÖNORM – Austria
- BCCA – Belgium
- TPC – Belgium
- IGH – Bosnia
- ITC – Czech Republic
- VVUÚ – Czech Republic
- IGH – Croatia
- CSTB – France
- TÜV SÜD – Germany
- EMI – Hungary
- BIS – India
- Kiwa – Netherlands
- COBRTI INSTAL – Poland
- SERCON – Russia
- TÜV NORD – Saudi Arabia
- VÚSAPL – Slovakia
- ZAG – Slovenia
- SABS – South Africa
- ECA – Spain
- AENOR – Spain
- ARGE – Switzerland
- TÜV SÜD – Turkey
- Kitemark – United Arab Emirates

FLOWTITE pipe systems fulfil the product standards AWWA, ASTM, DIN, ISO and EN. Other local approvals are also available, dependent on country specific requirements. AMIANTIT is participating in the development of all these standards with representatives of all the worldwide organisations, thereby ensuring performance requirements will result in reliable products.

Quality Characteristics

Raw Materials

Raw materials are delivered with vendor certification demonstrating their compliance with FLOWTITE quality requirements. In addition, all raw materials are sample tested prior to their use. These tests ensure that the pipe materials comply with the specifications as stated. Raw materials should be, according to FLOWTITE quality requirements, pre-qualified in such a way that their suitability to be used in the process and in the final product is demonstrated.

Raw Materials used in pipe production are:

- Glass
- Resin
- Catalyst
- Sand
- Additives

Only FLOWTITE approved raw materials can be used for the production of the FLOWTITE pipe.

Glass

Glass is specified by tex which is = weight in grams/1000 meters length
Hoop roving: Continuous roving used in different tex for the production of the FLOWTITE pipe
Chop roving cut directly on the machine to provide strength in different directions.

Resin

Only qualified resin for the winding process. Usually it is delivered in drums or bulk. The resin is prepared in day tanks at the winder. Normal application temperature is 25°C. Resin is delivered from the producer and may be diluted before use on the winder with styrene to reach the required and acceptable viscosity, as defined by FLOWTITE Technology.

Catalyst

The right amount of catalyst is added to the resin for curing the mix right before application on the mandrel. Only approved catalysts are used in the manufacturing process of the FLOWTITE pipes.

Sand

Sand is added to the core of the pipe and the inner layer of couplings. High quality silica sand must be within the FLOWTITE specifications for approved raw material.

Additives

Additives like the accelerator are mixed with resin in the daytanks.

Physical Properties

The manufactured pipe's hoop and axial load capacities are verified on a routine basis. In addition, pipe stiffness and deflection tests are carried out in accordance with our internal FLOWTITE quality regulations.

Finished Pipe Properties

100% of all finished pipes for gravity sewer are checked for the following:

- Visual inspection
- Wall thickness
- Section length
- Diameter

Other Quality Characteristics

More detailed information about many other quality characteristics such as:

- Long-term Ring Bending
- Hydro-testing
- Surge and Water Hammer
- Load Capacity Values
- Hoop Tensile Load Capacity
- Axial Tensile Load Capacity
- Flow Velocity
- UV Resistance
- Poisson's Ratio
- Flow Coefficients
- Abrasion Resistance

can be found in our brochure "Technical Characteristics" of FLOWTITE pipes.

Product Range

FLOWTITE sewer pipe systems are supplied in nominal diameters ranging from DN 100 up to DN 4000 mm. The **standard** diameter range in mm is defined as below:

100 · 150 · 200 · 250 · 300 · 350 · 400 · 450 · 500 · 600 · 700 · 800 · 900 · 1000
1100 · 1200 · 1400 · 1600 · 1800 · 2000 · 2200 · 2400 · 2600 · 2800 · 3000

The locally manufactured standard diameter range varies according to manufacturing facilities. For detailed information, please do not hesitate to contact your on-site contact. Larger diameters than DN 3000 up to 4000 mm and other diameters are available on request.

Stiffness Classes

FLOWTITE pipe systems show the following specific initial stiffness (EI/D^3) expressed in N/m^2 and the FLOWTITE standard is defined as follows:

Stiffness Class SN	initial Ring Stiffness (N/m^2)
2500	2500
5000	5000
10000	10000

Table Stiffness Class

Other stiffness classes are available on request. We also supply custom-designed pipe systems with a stiffness tailored to the needs of the project.

Pressure

Our FLOWTITE pipe systems for gravity sewer applications are supplied in the standard pressure class 1.

Custom-designed pipes with pressure tailored to the needs of the project are available on request.

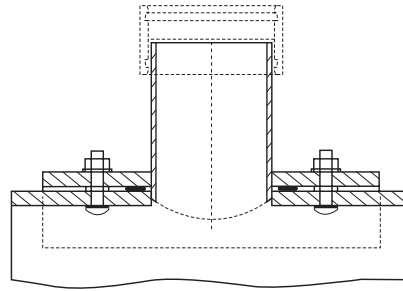
Length

Our FLOWTITE Pipes for gravity sewer are available in standard length of 3, 6, 12 m. Other tailor-made lengths are available on request.

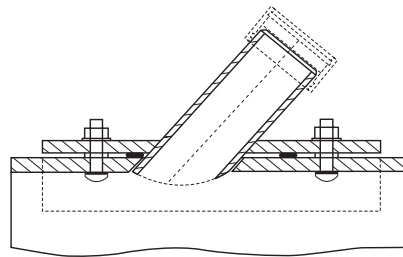
Saddle Pieces – Bolted & Glued –

Saddle pieces allow branch connections on existing GRP gravity sewer pipelines.

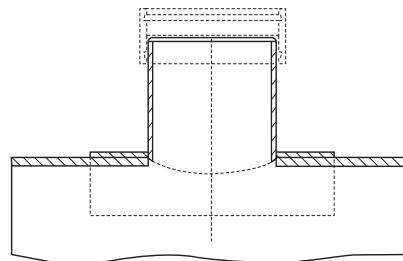
Saddle pieces are available with 90° and 45° branches and a combination of different materials such as GRP, PVC or Clay is also possible. The installation is carried out with stainless steel bolts and rubber gaskets or as glued connection.



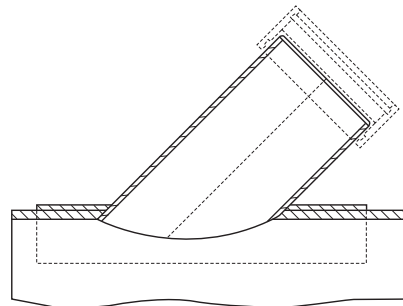
Saddle Pieces 90° – Bolted



Saddle Pieces 45° – Bolted

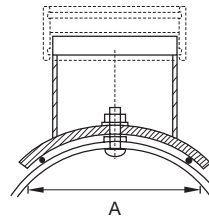
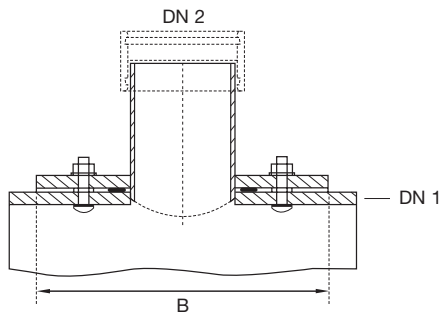


Saddle Piece 90° – Glued



Saddle Piece 45° – Glued

Saddle Pieces 90° – Bolted & Glued –



				For Bolted Only		
DN 1 [mm]	DN 2 [mm]	A [mm] +/- 5 mm	B [mm] +/- 5 mm	No. of Bolts	Sealing	
					d [mm]	L [mm]
250	100	286	500	2	10	660
250	150	286	500	2	10	660
300	100	312	500	2	10	660
300	150	312	500	2	10	660
300	200	312	500	2	12	870
350	100	338	500	2	10	660
350	150	338	500	2	10	660
350	200	338	500	2	12	870
400	100	364	500	2	10	660
400	150	364	500	2	10	660
400	200	364	500	2	12	870
450	100	389	500	2	10	660
450	150	389	500	2	10	660
450	200	389	500	2	12	870
500	100	415	500	2	10	660
500	150	415	500	2	10	660
500	200	415	500	2	12	870
500	250	415	500	2	12	1080
600	100	459	500	2	10	660
600	150	459	500	2	10	660
600	200	459	500	2	12	870
600	250	459	500	2	12	1080
700	100	510	500	2	10	660
700	150	510	500	2	10	660
700	200	510	500	2	12	870
700	250	510	500	2	12	1080

Table Saddle Pieces 90° – Bolted & Glued –

				For Bolted Only		
DN 1 [mm]	DN 2 [mm]	A [mm] +/- 5 mm	B [mm] +/- 5 mm	No. of Bolts	Sealing	
					d [mm]	L [mm]
800	100	561	500	2	10	660
800	150	561	500	2	10	660
800	200	561	500	2	12	870
800	250	561	500	2	12	1080
900	100	612	500	2	10	660
900	150	612	500	2	10	660
900	200	612	500	2	12	870
900	250	612	500	2	12	1080
1000	100	663	500	2	10	660
1000	150	663	500	2	10	660
1000	200	663	500	2	12	870
1000	250	663	500	2	12	1080
1100	100	714	500	2	10	660
1100	150	714	500	2	10	660
1100	200	714	500	2	12	870
1100	250	714	500	2	12	1080
1100	300	784	500	2	16	1140
1200	100	765	500	2	10	660
1200	150	765	500	2	10	660
1200	200	765	500	2	12	870
1200	250	765	500	2	12	1080
1200	300	835	500	2	16	1140
1300	100	816	500	2	10	660
1300	150	816	500	2	10	660
1300	200	816	500	2	12	870
1300	250	816	500	2	12	1080
1300	300	886	500	2	16	1140

Table Saddle Pieces 90° – Bolted & Glued –

				For Bolted Only		
DN 1 [mm]	DN 2 [mm]	A [mm] +/- 5 mm	B [mm] +/- 5 mm	No. of Bolts	Sealing	
					d [mm]	L [mm]
1400	100	867	500	2	10	660
1400	150	867	500	2	10	660
1400	200	867	500	2	12	870
1400	250	867	500	2	12	1080
1400	300	937	600	2	16	1140
1500	100	918	500	2	10	660
1500	150	918	500	2	10	660
1500	200	918	500	2	12	870
1500	250	918	500	2	12	1080
1500	300	988	600	2	16	1140
1600	100	969	500	2	10	660
1600	150	969	500	2	10	660
1600	200	969	500	2	12	870
1600	250	969	500	2	12	1080
1600	300	1039	600	2	16	1140
1700	100	1020	500	2	10	660
1700	150	1020	500	2	10	660
1700	200	1020	500	2	12	870
1700	250	1020	500	2	12	1080
1700	300	1090	600	2	16	1140
1800	100	1071	500	2	10	660
1800	150	1071	500	2	10	660
1800	200	1071	500	2	12	870
1800	250	1071	500	2	12	1080
1800	300	1141	600	2	16	1140
1900	100	1122	500	2	10	660
1900	150	1122	500	2	10	660
1900	200	1122	500	2	12	870
1900	250	1122	500	2	12	1080
1900	300	1192	600	2	16	1140

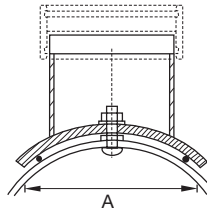
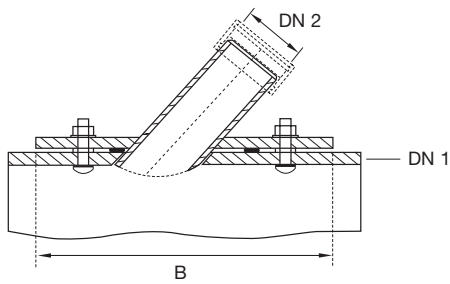
Table Saddle Pieces 90° – Bolted & Glued –

				For Bolted Only		
DN 1 [mm]	DN 2 [mm]	A [mm] +/- 5 mm	B [mm] +/- 5 mm	No. of Bolts	Sealing	
					d [mm]	L [mm]
2000	100	1173	500	2	10	660
2000	150	1173	500	2	10	660
2000	200	1173	500	2	12	870
2000	250	1173	500	2	12	1080
2000	300	1243	600	2	16	1140
2100	100	1224	500	2	10	660
2100	150	1224	500	2	10	660
2100	200	1224	500	2	12	870
2100	250	1224	500	2	12	1080
2100	300	1294	600	2	16	1140
2200	100	1275	500	2	10	660
2200	150	1275	500	2	10	660
2200	200	1275	500	2	12	870
2200	250	1275	500	2	12	1080
2200	300	1345	600	2	16	1140
2300	100	1326	500	2	10	660
2300	150	1326	500	2	10	660
2300	200	1326	500	2	12	870
2300	250	1326	500	2	12	1080
2300	300	1396	600	2	16	1140
2400	100	1377	500	2	10	660
2400	150	1377	500	2	10	660
2400	200	1377	500	2	12	870
2400	250	1377	500	2	12	1080
2400	300	1447	600	2	16	1140

Table Saddle Pieces 90° – Bolted & Glued –

Bigger diameters available on request

Saddle Pieces 45° – Bolted & Glued –



				For Bolted Only		
DN 1 [mm]	DN 2 [mm]	A [mm] +/- 5 mm	B [mm] +/- 5 mm	No. of Bolts	Sealing	
					d [mm]	L [mm]
250	100	340	500	2	12	870
250	150	340	500	2	12	870
300	100	340	500	2	12	870
300	150	340	500	2	12	870
300	200	340	500	2	12	1080
350	100	340	500	2	12	870
350	150	340	500	2	12	870
350	200	390	550	2	12	1080
400	100	340	500	2	12	870
400	150	340	500	2	12	870
400	200	340	550	2	12	1080
450	100	340	500	2	12	870
450	150	340	500	2	12	870
450	200	390	550	2	12	1080
500	100	340	500	2	12	870
500	150	340	500	2	12	870
500	200	390	550	2	12	1080
500	250	340	650	2	12	1080
600	100	340	500	2	12	870
600	150	340	500	2	12	870
600	200	390	550	2	12	1080
600	250	430	650	2	12	1080
700	100	340	500	2	12	870
700	150	340	500	2	12	870
700	200	390	550	2	12	1080
700	250	430	650	2	12	1080

Table Saddle Pieces 45° – Bolted & Glued –

				For Bolted Only		
DN 1 [mm]	DN 2 [mm]	A [mm] +/- 5 mm	B [mm] +/- 5 mm	No. of Bolts	Sealing	
					d [mm]	L [mm]
800	100	340	500	2	12	870
800	150	340	500	2	12	870
800	200	390	550	2	12	1080
800	250	430	650	2	12	1080
900	100	340	500	2	12	870
900	150	340	500	2	12	870
900	200	390	550	2	12	1080
900	250	430	650	2	12	1080
1000	100	340	500	2	12	870
1000	150	340	500	2	12	870
1000	200	390	550	2	12	1080
1000	250	430	650	2	12	1080
1100	100	340	500	2	12	870
1100	150	340	500	2	12	870
1100	200	390	550	2	12	1080
1100	250	430	650	2	12	1080
1100	300	540	760	2	16	1430
1200	100	340	500	2	12	870
1200	150	340	500	2	12	870
1200	200	390	550	2	12	1080
1200	250	430	650	2	12	1080
1200	300	540	760	2	16	1430
1300	100	340	500	2	12	870
1300	150	340	500	2	12	870
1300	200	390	550	2	12	1080
1300	250	430	650	2	12	1080
1300	300	540	760	2	16	1430

Table Saddle Pieces 45° – Bolted & Glued –

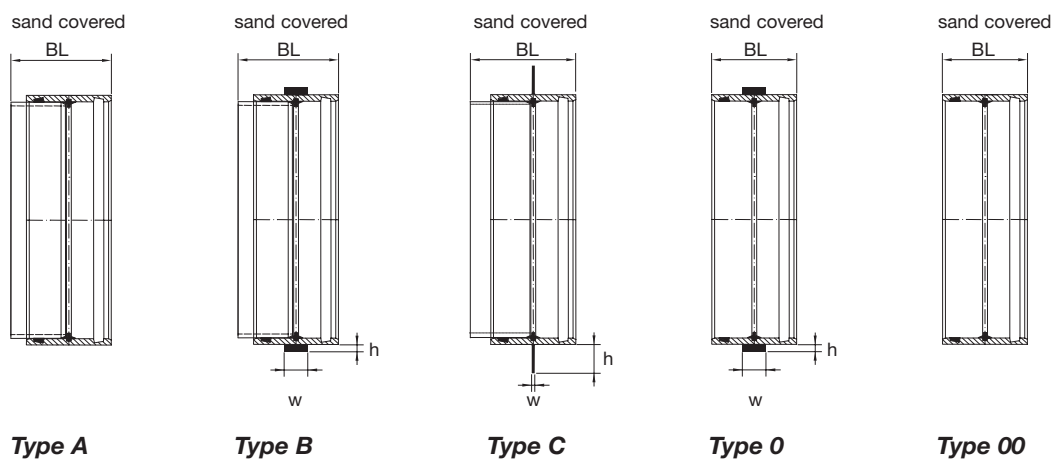
				For Bolted Only		
DN 1 [mm]	DN 2 [mm]	A [mm] +/- 5 mm	B [mm] +/- 5 mm	No. of Bolts	Sealing	
					d [mm]	L [mm]
1400	100	340	500	2	12	870
1400	150	340	500	2	12	870
1400	200	390	550	2	12	1080
1400	250	430	650	2	12	1080
1400	300	540	760	2	16	1430
1500	100	340	500	2	12	870
1500	150	340	500	2	12	870
1500	200	390	550	2	12	1080
1500	250	430	650	2	12	1080
1500	300	540	760	2	16	1430
1600	100	340	500	2	12	870
1600	150	340	500	2	12	870
1600	200	390	550	2	12	1080
1600	250	430	650	2	12	1080
1600	300	540	760	2	16	1430
1700	100	340	500	2	12	870
1700	150	340	500	2	12	870
1700	200	390	550	2	12	1080
1700	250	430	650	2	12	1080
1700	300	540	760	2	16	1430
1800	100	340	500	2	12	870
1800	150	340	500	2	12	870
1800	200	390	550	2	12	1080
1800	250	430	650	2	12	1080
1800	300	540	760	2	16	1430
1900	100	340	500	2	12	870
1900	150	340	500	2	12	870
1900	200	390	550	2	12	1080
1900	250	430	650	2	12	1080
1900	300	540	760	2	16	1430

Table Saddle Pieces 45° – Bolted & Glued –

				For Bolted Only		
DN 1 [mm]	DN 2 [mm]	A [mm] +/- 5 mm	B [mm] +/- 5 mm	No. of Bolts	Sealing	
					d [mm]	L [mm]
2000	100	340	500	2	12	870
2000	150	340	500	2	12	870
2000	200	390	550	2	12	1080
2000	250	430	650	2	12	1080
2000	300	540	760	2	16	1430
2100	100	340	500	2	12	870
2100	150	340	500	2	12	870
2100	200	390	550	2	12	1080
2100	250	430	650	2	12	1080
2100	300	540	760	2	16	1430
2200	100	340	500	2	12	870
2200	150	340	500	2	12	870
2200	200	390	550	2	12	1080
2200	250	430	650	2	12	1080
2200	300	540	760	2	16	1430
2300	100	340	500	2	12	870
2300	150	340	500	2	12	870
2300	200	390	550	2	12	1080
2300	250	430	650	2	12	1080
2300	300	540	760	2	16	1430
2400	100	340	500	2	12	870
2400	150	340	500	2	12	870
2400	200	390	550	2	12	1080
2400	250	430	650	2	12	1080
2400	300	540	760	2	16	1430

Table Saddle Pieces 45° – Bolted & Glued –

Wall Couplings



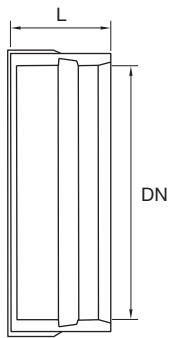
	Type A, B, C	Type B	Type C
DN [mm]	BL [mm]	w [mm]	h [mm]
250	300	50	16
300	300	50	21
350	300	50	21
400	300	50	21
450	300	50	21
500	300	50	21
600	300	80	24
700	300	80	24
800	300	80	24
900	300	80	24
1000	300	80	25
1100	300	80	25
1200	300	80	25
1300	300	120	26
1400	300	120	26
1500	300	120	26
1600	300	120	26
1700	300	120	27
1800	300	120	27
1900	300	120	27
2000	300	120	27
2100	300	120	27
2200	300	120	27
2300	300	120	28
2400	300	120	28

Table Wall Couplings, Type A, B, C

		Type 0, 00	Type 0	
	DN [mm]	BL [mm]	w [mm]	h [mm]
	250	175	50	16
	300	240	50	21
	350	240	50	21
	400	240	50	21
	450	240	50	21
	500	240	50	21
	600	240	80	24
	700	240	80	24
	800	240	80	24
	900	240	80	24
	1000	240	80	25
	1100	240	80	25
	1200	240	80	25
	1300	240	120	26
	1400	240	120	26
	1500	240	120	26
	1600	240	120	26
	1700	240	120	27
	1800	240	120	27
	1900	240	120	27
	2000	240	120	27
	2100	240	120	27
	2200	240	120	27
	2300	240	120	28
2400	240	120	28	

Table Wall Couplings, Type 0, 00

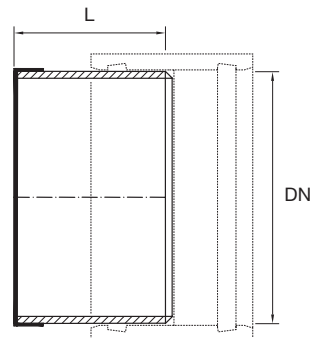
End-Caps



DN [mm]	L [mm]
250	87.5
300	120.0
350	120.0
400	120.0
450	120.0
500	120.0
600	120.0
700	120.0
800	120.0
900	120.0
1000	120.0
1100	120.0
1200	120.0
1300	142.0
1400	142.0
1500	142.0
1600	142.0
1700	142.0
1800	142.0
1900	142.0
2000	142.0
2100	142.0
2200	142.0
2300	142.0
2400	142.0

Table End-Caps

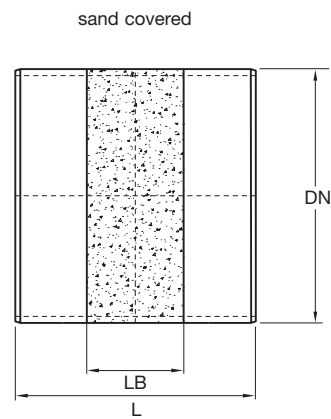
Socket Plugs



DN [mm]	L [mm]
250	250
300	250
350	250
400	250
450	250
500	250
600	300
700	300
800	300
900	300
1000	300
1100	300
1200	300
1300	300
1400	300
1500	400
1600	400
1700	400
1800	400
1900	400
2000	400
2100	400
2200	400
2300	400
2400	400

Table Socket Plugs

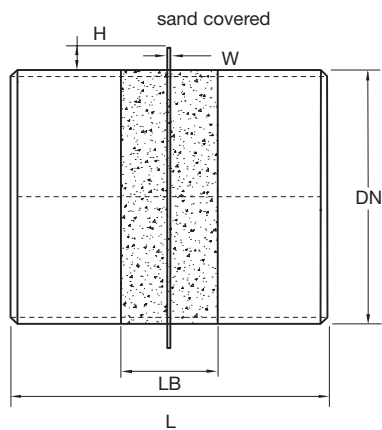
Wall Connection Pieces Type F



DN [mm]	LB	L
250	300	1000
300	300	1000
350	300	1000
400	300	1000
450	300	1000
500	300	1000
600	300	1000
700	300	1000
800	300	1000
900	300	1000
1000	300	1000
1100	300	1000
1200	300	1500
1300	300	1500
1400	300	1500
1500	300	1500
1600	300	1500
1700	300	1500
1800	300	1500
1900	300	1500
2000	300	1500
2100	300	1500
2200	300	1500
2300	300	1500
2400	300	1500

Table Connection Pieces Type F

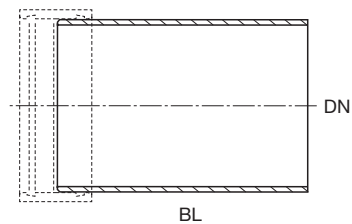
Wall Connection Pieces Type G



DN [mm]	h	w	LB	L
250	80	8	300	1000
300	80	8	300	1000
350	80	8	300	1000
400	80	8	300	1000
450	80	8	300	1000
500	80	8	300	1000
600	80	8	300	1000
700	80	8	300	1000
800	80	10	300	1000
900	80	10	300	1000
1000	100	12	300	1000
1100	100	12	300	1000
1200	100	12	300	1500
1300	100	15	300	1500
1400	100	15	300	1500
1500	100	15	300	1500
1600	100	15	300	1500
1700	100	15	300	1500
1800	120	20	300	1500
1900	120	20	300	1500
2000	120	20	300	1500
2100	120	20	300	1500
2200	120	20	300	1500
2300	120	20	300	1500
2400	120	20	300	1500

Table Connection Pieces Type G

Short Section Pipes



DN [mm]	BL [mm]
250	500
300	500
350	500
400	500
450	500
500	500
600	500
700	750
800	750
900	750
1000	750
1100	750
1200	1000
1300	1000
1400	1000
1500	1000
1600	1000
1700	1000
1800	1000
1900	1000
2000	1000
2100	1000
2200	1000
2300	1000
2400	1000

Table Short Section Pipe

Manholes

The FLOWTITE standard finished manholes are preferential used for laying gravity sewer networks. AMIANTIT offers standard manholes as well as tangential manholes. Standard manholes have a fiberglass shaft connected to the manhole bottom and are manufactured in accordance to local regulations. FLOWTITE tangential manholes are very economic solutions for large bore pipelines. Our manhole product range is well known for its light weight and high buoyancy safety. You find details about manholes in our separate FLOWTITE manhole brochure.

Detailed information about the local availability of specific manhole types can be requested from your local supplier or is attached at the inner backpage of this brochure.

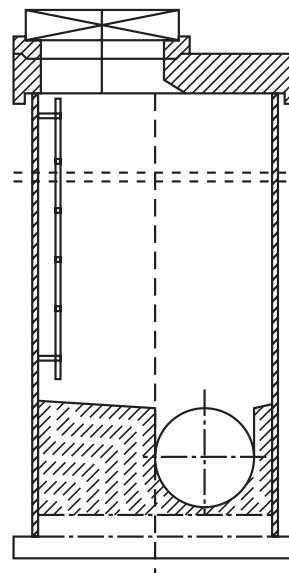


Figure Standard Manhole

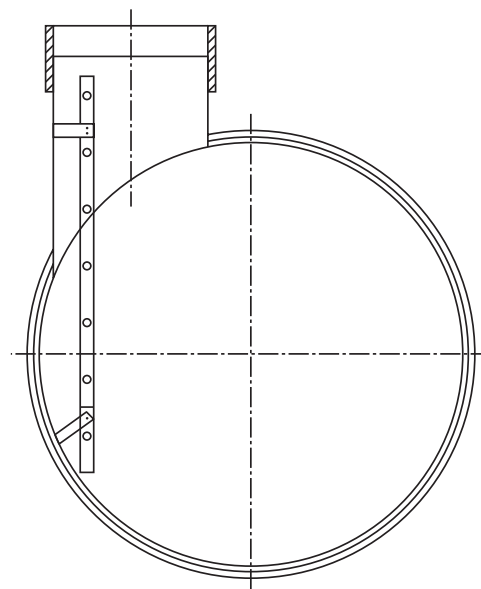


Figure Tangential Manhole

This handbook is intended as a guide only. All values listed in the product specifications are nominal. Unsatisfactory product results may occur due to environmental fluctuations, variations in operating procedures, or interpolation of data. We highly recommend that any personnel using this data have specialised training and experience in the application of these products and their normal installation and operating conditions.

The engineering staff should always be consulted before any of these products are installed to ensure the suitability of the products for their intended purpose and applications. We hereby state that we do not accept any liability, and will not be held liable, for any losses or damage which may result from the installation or use of any products listed in this handbook as we have not determined the degree of care required for product installation or service. We reserve the right to revise this data, as necessary, without notice. We welcome comments regarding this handbook.



Amiblu Technology AS

Østre Kullerød 3
3241 Sandefjord
Norway
T: + 47 971 00 300
info.technology@amiblu.com
www.amiblu.com