BGTIG1	APRIL 2021

Below Ground Drainage

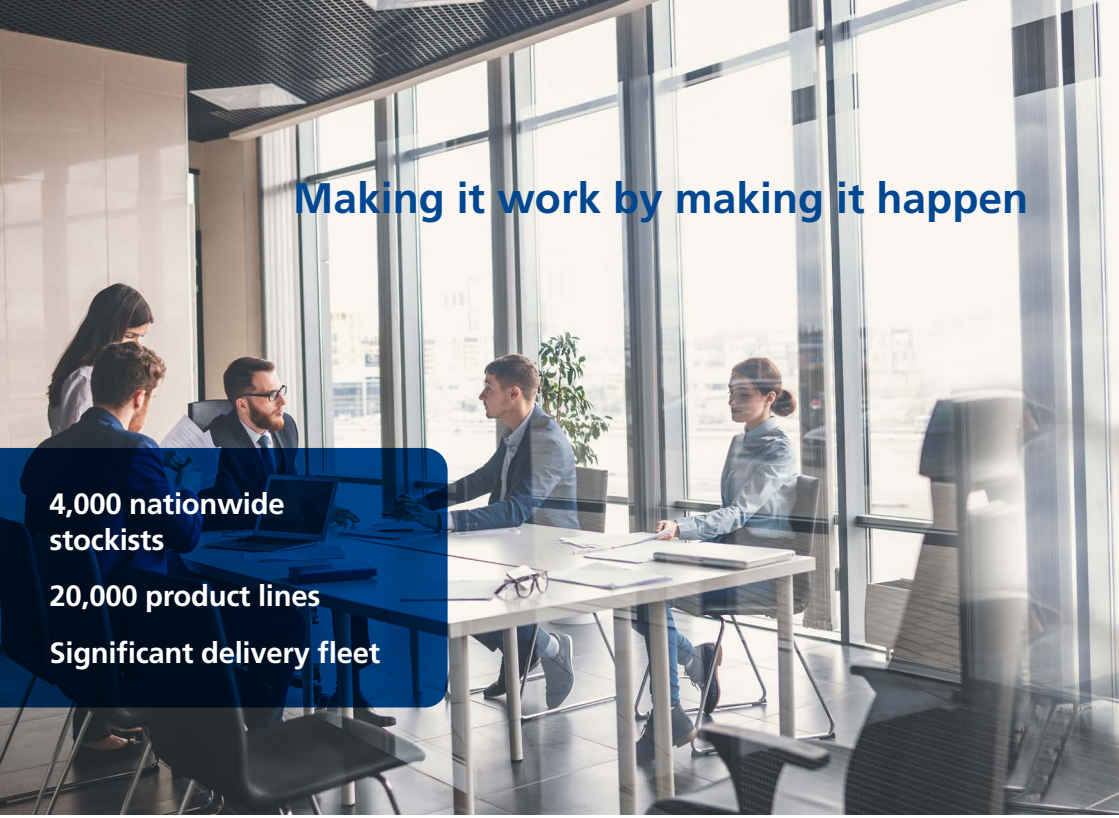





Technical Installation Guide

Polypipe

Contents



Making it work by making it happen

4,000 nationwide stockists

20,000 product lines

Significant delivery fleet

Since creating our very first plastic pipe back in 1980, there's been a passion within us to support the industry at every stage of its growth. We are invested in its future and look forward to facing the challenges together, both from an economic and sustainability point of view. This is why we invest heavily in innovation and manufacturing techniques – to enable us to establish more inventive solutions, such as our new soil, waste and traps systems and processes.

Our customer service centres also benefit from significant investment, to provide you with the best possible service. You can be sure we have got a team on hand to help; from research and development to technical and design support. The expert knowledge of our Sales and Business Development support teams can help get you on the right track from day one.

With manufacturing facilities across Doncaster, together with the stock levels we hold, we have the capability to deliver the solutions you need to complete your projects on time and in full.

Investing to stay ahead

Without investing in new technology, new ideas and fresh talent, we'd never be able to deliver the products and systems to help you move forward and help overcome construction challenges.

By making this investment in new construction methods and technology, we can make advancements within our product ranges, helping to make installation easier, quicker and safer. Advancements that provide the end-user with peace of mind and that allow you to simply fit and forget.

The scale to deliver

The number and size of our manufacturing facilities, together with recent investment in our own delivery fleet allows us to deliver the confidence you need to ensure your projects are completed on time, in full and to the highest quality.

We have over 20,000 product lines, giving you a choice of materials and installation methods to complete your system, from plot drainage through to plastic plumbing. We are stocked in over 4,000 merchant branches nationwide, so you're sure to find the product you need close at hand.

Not just bigger… better

We also have teams of specialists who work together with you to help design a system that fits your scheme exactly, ensure your project runs smoothly and everything meets the necessary regulations.

As we're well networked with all the necessary trade associations and regulatory bodies, working with us means you'll have access to regular important updates on legislation and new industry developments.

To ensure you get the right service, the most relevant product and the most cost-effective system for your project, we've over 1,200 experienced individuals supporting you from start to finish, whatever the size of the job. As technology and innovation become a bigger part of our lives and indeed our working environments, our experts work together with you to design a system to ensure projects run smoothly and meet all the necessary regulations.

Our Customer Experience teams, Business Development Managers and Area Sales Managers are available at every stage of your project, support is always there for whenever you need it.

Whether for new build or refurbishment projects, Polypipe specifically recognises the demands of modern construction environments, and works across all disciplines to help you get the job done.

Over 20
Research & Development Technicians

Over 2,200
Manufacturing and Support Services

Over 70
Design, Heating and Ventilation Engineers

Over 120
Dedicated Technical Support Engineers

Over 200
Sales and Business Development Managers

National sales team with local knowledge

Multisite manufacturing

2,500 tonnes of products delivered each week

On average 50,000 order lines per day

One of the UK's largest privately-owned delivery fleet

4,000 stockists nationwide

Drainage

Product	Certificate No	Kitemark Licence
Plastic Piping Systems for non-pressure UG Drainage & Sewer	KM 583143	BS EN 13476-2
110mm-160mm UG Gravity Drainage & Sewer	KM 59284	BS 4660:2000
PVCu Plastic Piping Systems for non-pressure UG Drainage & Sewer	KM 06383	EN 1401-1
Ductile Iron Covers and Frames	KM 583718	BS 124-2
Plastic Inspection Chambers for Drains and Sewers	KM 061546	BS 7158
Plastic Pipe Fittings and Shallow Inspection Chambers	KM 585205	BS EN 13598-2
150mm - 300mm Structured Wall Pipe	KM 583143	BS EN 13476-3
Structured Wall Pipe and Couplers	KM 582885	WIS 4-35-01
Shear Band Couplings	KM 506831	EN 295-4
EPDM Rubber	KM 506832	WIS 4-41-01
EPDM Rubber	KM 37955	EN 681-1

Product	BBA Certificate No
Underground Drainage Couplings & Adaptors	89/2206
Underground Drainage Gullies	89/2206
Polyrib Drainage Fittings	89/2206
460x610mm Rectangular, 320mm and 460mm Inspection Chambers	89/2206
150mm - 300mm Polysewer Fittings	02/3923

Water Supply

Product	Certificate No	Kitemark Licence
Water Supply under-pressure Water Pipes	KM 85017	EN 12201-2
Polyfast Polyethylene Compression Fittings	KM 85017	WIS 4-32-11
Polyguard Barrier Pipe & Fittings	KM 692343	BS 8588

Product	WRAS
Water Supply	1704501 & 1706501

Utilities

Product	Certificate No	Kitemark Licence
Polyethylene pipe and fittings for natural and manufactured gas	KM 611619	GIS/PL 2-2:2008

BS EN 13476-2 KM583143 · BS 4660:2000 KM59284 · EN 1401-1 KM06383 · BS 124-2 KM583718 · BS 7158 KM061546 · BS EN 13598-2 KM585205 · WIS 4-35-01 KM582885

EN 295-4 KM506831 · WIS 4-41-01 KM506832 · EN 681-1 KM37955 · EN 12201-2 KM85017 · WIS 4-32-11 KM85017 · BS 8588 KM692343

Promoting recycling

We produce pipes and fittings using recycled materials where appropriate, and all products are 100% recyclable at the end of their useful life. Following a major investment programme and the commissioning of a polymer reprocessing plant at Horncastle, we are now one of the UK's largest processors of post-consumer waste. The plant has increased our ability to make use of reprocessed materials, recycling pre-sorted bales of household plastic polyethylene waste to produce high quality materials for our products.

In 2018, Polypipe recycled 44,700 tonnes of plastic, of which 17,500 tonnes came from recyclable plastic bottles and containers. As such, recycled plastic accounted for 75% of the raw material consumed by our Civils and Green Infrastructure Division in 2017, to produce pipes that were destined to be buried in the ground in applications that will manage and treat rainwater and stormwater.

Sustainable Multi-layer pipe

Polypipe Building Products MLRC pipe incorporates a number of industry leading improvements which includes certification to stiffness class SN8 to meet the requirements for adoption. It also carries the BS EN 13476-2 kitemark, so you can be assured that it meets the highest quality standards. Our sustainable Multi-layer pipes have identical dimensions, chemical resistance and life expectancy to pipes manufactured to BS EN 1401.

Plot Drainage Systems

Developed and manufactured with quality, innovation and longevity in mind, Polypipe Building Products' plot drainage systems is the most comprehensive range in the UK residential drainage market. Manufactured to meet market specification, Polypipe's 110mm - 160mm smooth wall systems are BSI Kitemarked™ or BBA approved, ensuring you are using high quality products.

Our plot drainage is available in 110mm and 160mm, complemented with a vast range of fittings and accessories all designed to enhance your experience with our products, ensuring you have the right products for the job.

However, none of these advancements are at the expense of the environment. Polypipe has invested heavily in technology which allows us to use more recycled materials in our products and systems, while still ensuring compliance with stringent Kitemark™ standards. This is evidenced by our recycled core drainage pipe, which has at least 50% recycled material at its core.

Underground Drain - PVCu

Polypipe Underground Drain - PVCu system is designed and manufactured with strength and durability in mind. Featuring a wide range of bends, junctions, gullies and other ancillaries, the range covers all project needs.

- Manufactured out of a durable PVCu offering durability and longevity.
- Kitemarked to BS EN 13476-2, BS 4660:2000 and BS EN 1401-1.
- Available in sizes 3"/82mm, 4"/110mm and 6"/160mm.

Pipe Riser Inspection Chambers

The Polypipe 450mm Pipe Riser Inspection Chamber gives complete flexibility, providing easy access for inspection, cleaning and maintenance in sewer and drainage systems in traffic and non-traffic areas.

- Suitable for both adoptable and non-adoptable applications.
- Versatile and available with inlets for 150mm Polysewer or 110-160mm Underground Drainpipe.
- High strength single piece 450mm Ridgisewer SN8 riser.
- Kitemarked to BS EN 13598-2.

Inspection Chambers, Covers & Frames

- Manufactured from Polypropylene.
- Kitemarked to BS EN 13598-2 and/or BS EN 124-2.
- Covers and frames available for intensity of traffic in either Class A15 or B125 applications.
- Range of frame depths up to 70mm (UG520).
- Ductile Iron Covers and Frames are kitemarked to BS EN 124:2015.

Channel and Slot Drain

- Discreet, flush-fitting design.
- Engineered polypropylene for strength and durability.
- Simple slot construction for fast installation.
- Fits to standard 110mm underground plastic pipe.

Polysewer Gravity Sewer System

- Kitemarked to WIS 4-35-01, BS EN 13476-3 and BBA Approved.
- Compliant to Sewerage Sector Guidance for England, Sewers for Scotland, and the Welsh Minister Standards for Sewers.
- Manufactured to stiffness class SN8 and adoptable by sewerage companies.

Underground Drainage Adaptors

- Choice of three adaptors and drain stopper for 4"/110mm pipe.
- Ideal for floor level connections to PVCu, clay or cast-iron nominal 110mm pipe.
- Seal to inside of pipe, so they can be used even if cut-pipe end is at finished floor level.

Access Fittings

- Manufactured to BS 4660:2000.
- Available in plastic or aluminium giving the fittings their strength and durability.
- Sizes available to connect to 110mm or 160mm pipe.

Anti-Splash Concrete Surrounds

- A range of PVCu products bonded to concrete surround.
- Kitemarked to BS 4660:2000.
- Available in Gullies and Hoppers.

Channel Components

- Manufactured from PVCu providing strength and durability.
- Easy to install.
- Manufactured to BS 4660:2000.

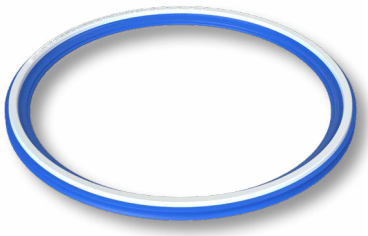
Settlement Fittings

- Designed for situations where differential settlement may be an issue.
- Manufactured from PVCu providing strength and durability.
- Easy to install.

Ring Lock Seal

The ring lock seal won't distort once installed. The innovative design of the reinforcing ring means the shape of the seal stays uniformed through the entire circumference regardless of how it's installed. The seal will not dislodge from the fitting during installation. When combined with single-piece moulding technology, Polypipe Underground Drain - PVCu range is the UK's most advanced drainage system.

Look for blue so you know its Polypipe.



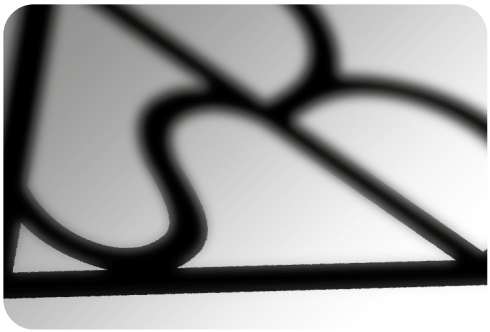
Single-piece Moulding Technology

At Polypipe, we're constantly looking at how we can improve and enhance our below ground drainage systems to improve their ease of installation and durability once installed. That's why we're working hard and investing in bringing the latest single-piece moulding technology to our below ground drainage fittings.

Polypipe's single-piece moulding technology means the entire body of the fitting is manufactured as one complete unit. This, together with Blue Ring-Lock Seal Technology gives robust fittings with secure joints. Over the lifetime of the drainage system, expansion and contraction from temperature changes causes pipe movement at the fitting joint. Single-piece moulded fittings have a seal fixed within the fitting body, which allows this expansion and contraction without compromising the integrity of the system.

Approvals

Polypipe's below ground drainage systems hold a comprehensive range of BSI and BBA certifications and approvals.
As a company, Polypipe take pride knowing that our products are manufactured to and beyond industry standards. Giving us and you the reassurance of a quality product that will stand up to and beyond industry standards.



Roads and Sewers Drainage Systems

Developed and manufactured with quality, innovation and longevity in mind, Polypipe Building Products' roads and sewers drainage systems is the most comprehensive range in the UK residential drainage market. Manufactured to meet market specification, Polypipe's 150mm - 315mm smooth wall and ribbed systems carry a range of BSI Kitemarked™ and BBA approved, ensuring you are using high quality products.

Our roads and sewers drainage is also available in a range of fittings and accessories all designed to enhance your experience with our products, ensuring you have the right products for the job.

However, none of these advancements are at the expense of the environment. Polypipe has invested heavily in technology which allows us to use more recycled materials in our products and systems, while still ensuring compliance with stringent Kitemark™ standards. This is evidenced by our recycled core drainage pipe, which is designed with at least 50% recycled material at its core.

IC600 Pipe Riser Inspection Chambers

The Polypipe IC600 range of inspection chambers is a safe and cost-effective solution for all foul and surface water applications. Designed for adoptable and non-adoptable domestic and commercial drainage systems, the range is manufactured from high quality polypropylene and is engineered to last whilst being light in weight for ease of handling and installation.

- Choice of IC600 bases with straight through or cross tee flow configurations.
- Certified to EN 13598-2
- High strength single piece 600mm diameter Ridgisewer SN8 riser.
- Light in weight and strong for improved health and safety and easy handling

Polysewer Gravity Sewer System

Polysewer is a range of PVCu structured wall pipes and fittings available in diameters 150-300mm. The complete system includes a range of couplings, seals, bends, junctions and accessories. Polysewer provides robust, sewer gas-resistant pipes for new and replacement gravity sewer systems.

- Kitemarked™ to WIS 4-35-01 and BS EN 13476-3.
- Compliant with Sewerage Sector Guidance for England, Sewers for Scotland, and The Welsh Minister Standards for Sewers.
- Manufactured to stiffness classification SN8.

Sewerdrain Gravity Sewer System

- Available in 200mm, 250mm and 315mm diameters with a full range of pipe and fittings.
- Kitemarked to BS EN 1401-1.
- Compliant with Sewerage Sector Guidance for England, Sewers for Scotland, and The Welsh Minister Standards for Sewers.

Flexicon Rubber Couplers & Adaptors

- Comprehensive range for adapting different sized plain ended pipes, including clay, PVCu, and cast iron.
- Quick and easy installation giving an air-tight and water-tight installation.
- Kitemarked to BS EN 295-4 and WIS 4-41-01.

Flexicon Reducing Bushes

- Compatible with pipes made from other material.

Installation Guidance

With Polypipe Building Products' ethos of 'fit and forget'. Installation and design calculations are an important part of having a watertight system. Working to the advice in this section will inform you of Polypipe's recommended installation method.

Note: Illustrations are for visual representation only.

Best practice and guidance of jointing methods, flow rate calculations, pipework installation and drainage/chamber requirements are all featured in the guide. Should you require any further details please email:

Drainage@Polypipe.com

Or contact your local Area Sales Manager by visiting:

www.polypipe.com/your-local-asm

Product	Size	Outside Diameter (mm) Min	Wall Thickness (mm) Min	Weight Per Metre (kg) Min
Underground Drain - PVCu (BS EN 1401-1 & BS EN 13476-2)	82mm/3"	82.40	3.20	1.18
	110mm/4"	110.00	3.20	1.59
	160mm/6"	160.00	4.10	2.97
Polysewer Gravity Sewer System (WIS 4-35-01 & BS EN 13476-3)	150mm	160.00	7.00	1.90
	225mm	250.00	10.50	3.70
	300mm	330.00	14.50	5.50
Sewerdrain Gravity Sewer System (BS EN 1401-1)	200mm	200.00	4.90	4.44
	250mm	250.00	6.10	6.92
	315mm	315.00	7.70	11.00

TABLE 1: PRODUCT DIMENSIONS & WEIGHTS

Pipe Handling and Storage

Handling and loading of pipes

PVCu pipes and fittings are very easily handled as they are strong and lightweight, however, incorrect handling can result in damage and care should be exercised. Loose pipes should be loaded onto transport and unloaded by hand, however for mechanical unloading, webbing or rope slings should be used. Metal chains, hooks or chains must not come into contact with pipes.

Pipes in larger quantities may be delivered in full bundles within timber frames and the pipes should remain within this packaging until required for installation.

Pipe bundles should be unloaded by using webbing or rope slings or by forklift. If unloading by forklift, care should be taken to align forks correctly underneath the bundles to avoid damage to the pipes.

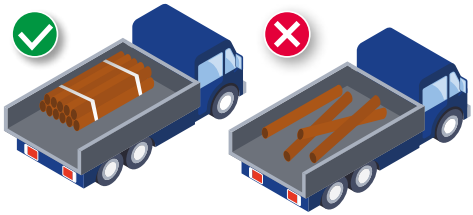


DIAGRAM 1: Correct and Incorrect way to load pipes

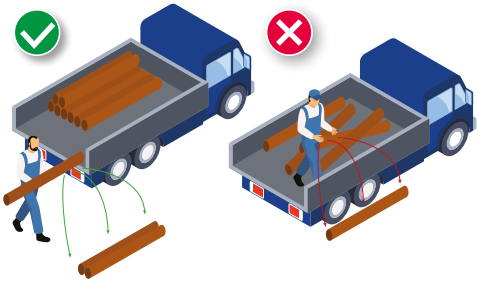


DIAGRAM 2: Correct and Incorrect way to off load pipes

Truck Graphic Originaly Designed by upklyak / Freepik

Storage of loose pipes

Pipe bundles may be stacked up to three high on firm level ground ensuring that the frames are placed 'wood to wood' to avoid damaging the pipes. Pipes should not be removed from any position within stacked bundles. Before removing pipes, the bundles should be placed at ground level and provision made to retain the frames in an upright position as pipes are removed.

Loose pipes should be laid on a reasonably flat surface free from large stones or sharp projections, if this is not possible, place the pipes on transverse bearers of at least 75mm width and spaced at centres not exceeding 1m. Side support should have a minimum bearing width of at least 75mm and placed at intervals of 1.5m or less.

Different sizes are best stacked separately, if this is not practical, then stack with the largest pipes at the base (see diagram 3), stacks should not exceed seven layers or 2m in height.

DIAGRAM 3: Correct and Incorrect way to store pipes

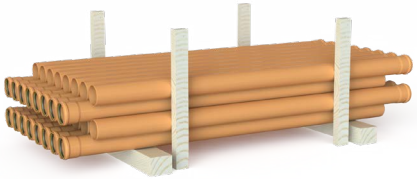


DIAGRAM 4: Correct way to store socketed pipes

When socketed pipes are stacked, the bottom layer of sockets should be prevented from being in direct contact with the ground, either by excavating under the socket, or by use of transverse supports (see diagram 4).

Alternate layers should have the sockets protruding from and opposite to the previous layer.

Methods of Jointing

Push-fit (Ring Seal) Jointing

1. Where plain end pipe is being used, ensure that the pipe is cut square to the axis and that all burrs are removed.
2. Chamfer the end of the pipe to prevent the ring seal being damaged or displaced when the pipe is inserted into the socket. Fittings with spigot ends are moulded with a chamfer during manufacture.
3. Lubricate the spigot or ring seal with joint lubricant.
4. Insert the pipe or fitting into the socket and then withdraw it by approx. 10mm to allow for thermal expansion and contraction of the pipework.

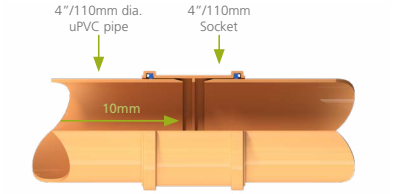


DIAGRAM 5:Push-Fit Jointing Installation

Solvent Weld Jointing

1. Ensure that the pipe is cut square and that all burrs are removed.
2. Ensure that both surfaces to be jointed are dry and free from dust or other debris.
3. Use Polypipe cleaning fluid CF250 to remove any surface grease from the spigot and socket to be jointed.
4. Apply a coat of Polypipe solvent cement to both surfaces to be jointed using the brush applicator provided in the lid. The cement should be applied along the length of the spigot and not around it's diameter.
5. The spigot should be inserted into the socket immediately, with a slight twisting action.
6. Any surplus solvent cement should be removed with a clean cloth.
7. The joint will be strong enough to handle after approx. 5 minutes and can be tested after 12 hours.

Table 2 indicates the approximate number of joints that can be made for each pipe diameter with solvent cement, cleaning fluid and silicone grease.

Solvent Cement Joints for Pipe Diameters

	Pipe Dimensions		
	82mm	110mm	160mm
Solvent Cement 125ml Code SC125	9	5	3
Solvent Cement 250ml Code SC250	18	10	6
Solvent Cement 500ml Code SC500	35	20	12
Cleaning Fluid 250ml Code CF250	30	20	15
Silicone Grease 100g Code SG100	35	20	10
LUBX Joint Lubricant 500ml Bottle		100	45
LUBX Joint Lubricant 1kg Tub		200	90
LUBX Joint Lubricant 2.5kg Tub		250	110

TABLE 2: NUMBER OF SOLVENT CEMENT JOINTS FOR PIPE DIAMETERS

Ancillaries

Solvent Weld

Solvent cement available in 125ml, 250ml & 500ml.

Gap filling cement available as a 140ml tube

When working with solvent cement it is essential to observe normal safety rules:

- Do not allow solvents or cleaners to come into contact with skin or eyes
- Only use when in a well-ventilated area
- Do not smoke or use naked flames near the area of work
- Once finished, close the container and store in a cool area

Cleaning Fluid

- Available as a 250ml tin

Lubricant

- Silicone available in 100g tub
- Aerosol Lubricant in 400ml can
- Joint Lubricant 500ml bottle
- Joint Lubricant 1kg and 2.5kg tub

Solvent Cement *Lubricant* *Gap Filling Cement* *Cleaning Fluid* *Aerosol Lubricant* *LUBX Lubricants*

Scan the QR codes opposite for COSHH data sheets

Cutting and Jointing Polysewer Pipes

Polysewer pipes should be to length using a fine tooth saw. The cut should be made square to the pipe in the valley midway between the corrugations, chamfering is not necessary.

The procedure for jointing is as follows:

1. Ensure Polysewer pipe ends and sockets are free from dirt, swarf, grit, etc., particularly the first corrugation of any pipe ends.
2. Check the seal is clean and fits over the pipe end into the valley of the **first corrugation**. Ensure the seal is not twisted.
3. Apply lubricant to both the pipe seal and the socket.
4. Push the pipe fully into the socket. If necessary, use a timber block and lever to ensure the pipe is fully inserted.

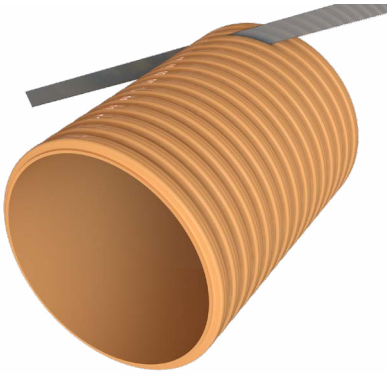


DIAGRAM 6: Cutting Polysewer pipes

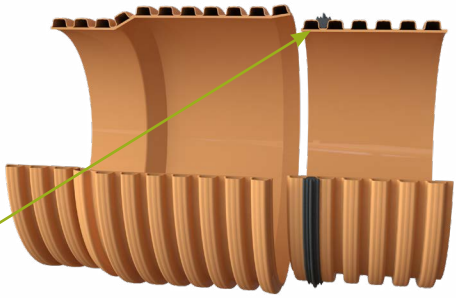


DIAGRAM 7: Adding seal and Joining Polysewer Pipes and Sockets

Seal must be seated in the valley of the first corrugation

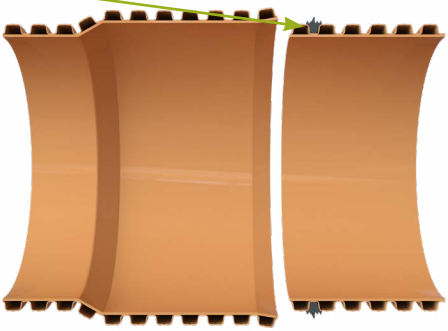


DIAGRAM 8: Adding seal and Joining Polysewer Pipes and Sockets

Calculation of Flow Rates

Foul Drains

Individual sanitary appliances, e.g., a WC or washbasin have a Discharge Unit value to enable flow rates to be established.

BS EN 12056-2: 2000 details the Discharge Unit values, which may vary slightly, depending on the soil system configuration to which they are connected. However, the following figures are suitable for general calculation purposes.

Appliance	Discharge Unit Value
Wash basin	0.5
Bidet	0.5
Shower	0.6
Single urinal with cistern	0.8
Bath	0.8
Sink	0.8
Dishwasher	0.8
Washing machine	0.8
WC with 7.5 litre cistern	2.0

TABLE 3: DISCHARGE UNIT VALUES

Formula for calculation of flow rate: $Q=k\sqrt{\sum DU}$

Where: Q = *Flow Rate in litres/sec*
K = *Frequency factor*
$\sum DU$ = *Sum of discharge units*

K= *0.5 for dwellings, guest houses, offices etc.*
0.7 for hospitals, schools, restaurants, hotels etc.
1.0 for toilets/showers open to the public

Surface Water Drains

It is generally accepted that a suitable rainfall design intensity for sizing surface water drains is 0.014 litres/second/m^2 (50mm/hour).

For high-risk areas, where ponding would lead to flooding of buildings, the drainage scheme should be designed in accordance with BS EN 752, where a higher rainfall intensity would be appropriate.

Minimum Velocities

Flow velocities in drainage systems should be a minimum of 0.75metres/sec at 1/3 of the design flow to avoid the possibility of grit and other solid waste being deposited along the invert of the drain.

From / To	Junction	Inspection Chamber	Manhole
Start of external drain (stack or ground floor appliance)	-	22m	45mm
Rodding Eye	22m	45m	45m
Shallow Inspection Chamber (up to 1m deep)	22m	45m	45m
Deep Inspection Chamber and Manhole (deeper than 1m)	-	45m	90m

TABLE 4: MAXIMUM SPACINGS OF ACCESS POINTS

Capacity of Drains

The capacity of a drainage system will be determined by the diameter and gradient of the pipework. The table shows capacities of 110mm and 160mm diameter drains for each of the roughness coefficient factors usually applied to pipework for calculation purposes as follows:

k = 0.06 for new surface water drains

k = 0.60 for new foul water drains

k = 1.50 for mature foul drains

The figures are also based on the recommended proportional depth of flow of 0.75. Foul drains are normally designed to carry peak discharges at less than full depth to allow for a safety factor and to aid ventilation.

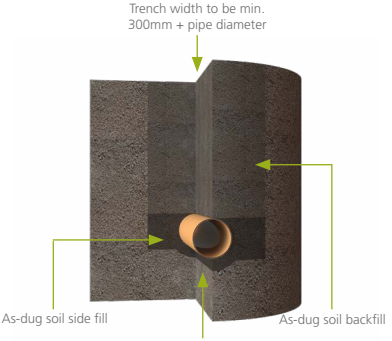
Gradient (1 in...)	110mm k= 0.06	110mm k= 0.60	110mm k= 1.50	160mm k= 0.06	160mm k= 0.60	160mm k=1.50
Capacity in Litres/Second						
5	33.3	25.1	21.6	96.2	73.4	63.5
10	23.3	17.7	15.3	67.4	51.8	44.9
15	18.9	14.5	12.4	54.7	42.2	36.6
20	16.3	12.5	10.8	47.2	36.5	31.6
25	14.5	11.2	9.7	42.0	32.6	28.4
30	13.0	10.2	8.8	38.2	29.8	25.9
35	12.2	9.5	8.2	35.3	27.5	23.9
40	11.3	8.8	7.6	33.0	25.9	22.0
45	10.5	8.3	7.2	31.0	24.1	21.0
50	10.0	7.8	6.7	29.2	23.0	20.0
55	9.5	7.5	6.5	28.0	22.0	19.0
60	9.2	7.2	6.2	26.7	21.0	18.0
65	8.6	6.8	5.8	25.4	20.1	17.5
70	8.5	6.6	5.6	24.6	19.4	16.8
75	8.0	6.4	5.5	24.6	19.4	16.3
80	7.8	6.2	5.3	23.0	18.0	15.7
85	7.5	6.0	5.2	22.2	17.5	15.1
90	7.3	5.8	5.0	21.7	17.0	15.4
95	7.1	5.7	4.9	21.0	16.6	14.2
100	6.9	5.5	4.8	20.5	16.2	14.0

TABLE 5: DRAIN CAPACITIES

Bedding & Backfilling

The following information is based on the recommendations in BS EN 1610 'Construction and testing of drains and sewers' and is intended as a general guide to good practice in the selection of bedding and backfill materials for Polypipe Building Products underground drainage systems.

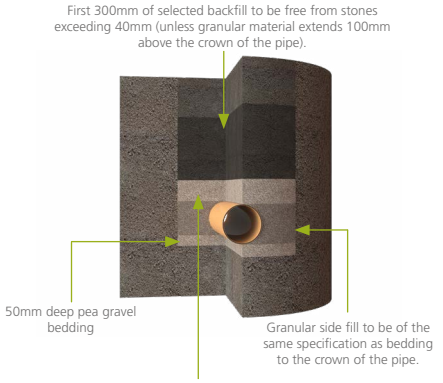
1. *Pipe laid on trench bottom*



Trench bottom hand trimmed and loosened to form pipe bed. Small depressions should be made to accommodate pipe sockets.

As-dug material is suitable if conforming to BS EN 1610 i.e. material should have particles not exceeding 10mm for 110mm pipe and 15mm for 160mm pipe.

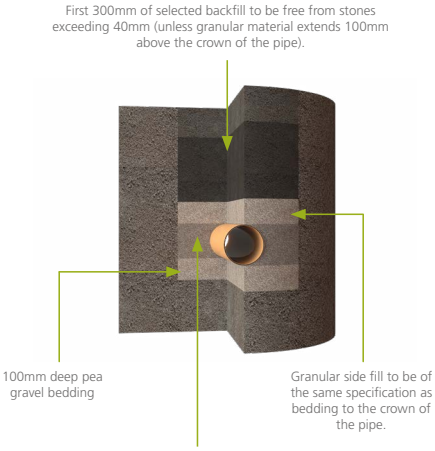
2. *Pipes laid on 50mm granular bedding*



Where the backfill above the pipe contains stones larger than 40mm or where pipes are laid deeper than 2.0m in poor ground, the granular material should extend to a minimum of 100mm above the crown of the pipe.

Where the as-dug material can be hand trimmed by shovel and is not puddled when walked upon, a 50mm depth of 10mm single sized granular bedding material may be used.

3. *Pipes laid on 100mm granular bedding*



Where the backfill above the pipe contains stones larger than 40mm or where pipes are laid deeper than 2.0m in poor ground, the granular material should extend to a minimum of 100mm above the crown of the pipe.

When pipes are laid in rock, compacted sand and gravel requiring mechanical means of trimming and in very soft or wet ground, the bedding should be a minimum of 100mm.

Pipe Diameter	Nominal maximum Particle size	Material Detail
100mm	10mm	10mm single size with no sharp edges
Over 100mm to 150mm	15mm	10mm or 14mm single size or 14mm to 5mm graded
Over 150mm to 300mm	20mm	10mm, 14mm or 20mm single size or 14mm to 5mm graded or 20mm to 5mm graded

TABLE 6: GRANULAR BEDDING AND SIDEFILL MATERIALS FOR PVCu DRAINAGE PIPES

Note: Installation should be carried out in accordance with BS EN 1610 and BS EN 752.

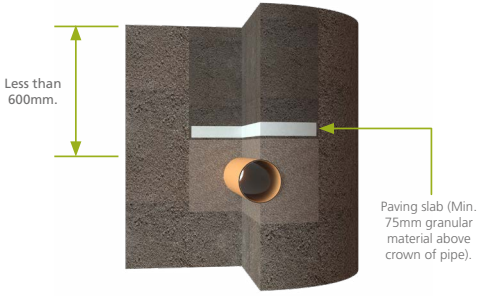
Where the 'as dug' material is suitable as bedding, the bottom of the trench may be trimmed to form the pipe bed. Suitable material is defined as granular material in accordance with the recommendations of BS EN 1610.

Recycled bedding of suitable size may also be used.

Protection for Pipes

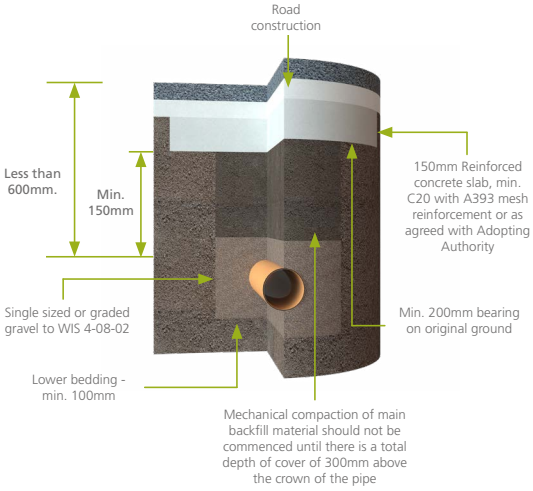
1. *Pipes laid at shallow depths in non-trafficked areas*

Pipes laid in non-trafficked areas, e.g., in gardens with less than 600mm of cover, should be protected against damage by placing paving slabs or similar over them across the whole width of the trench. A layer of granular material of 75mm min. thickness must be laid between pipes and slabs.

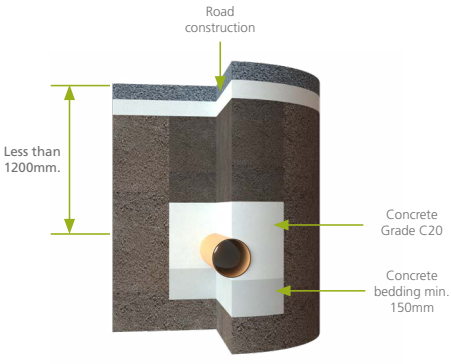


2. *Pipes laid at shallow depths in adoptable trafficked areas*

(a) Side fill material to be placed evenly on both sides of pipe, taking care to work the material under the lower quadrant of the pipe, ensuring the pipe is not lifted. Both sides of the trench should be filled simultaneously to avoid horizontal movement of the pipe.

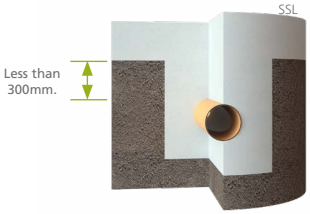


(b) Flexible joints to be provided in concrete at each pipe joint. It is recommended that 3.0m pipe lengths are used where concrete encasement is required.



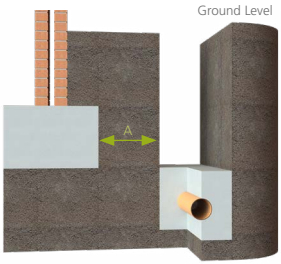
Pipes Laid at Shallow Depths Under Buildings

Where the crown of the pipe is within 300mm of the underside of the slab, the pipework should be surrounded with 150mm concrete as an integral part of the floor slab.

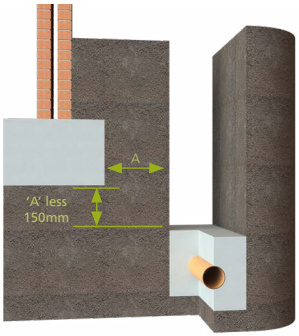


Pipes Near Buildings

Where the crown of the pipe is within 300mm of the underside of the slab, the pipework should be surrounded with 150mm concrete as an integral part of the floor slab.



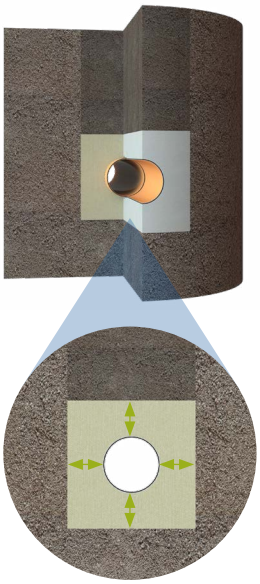
Where dimension A is less than 1.0m, concrete fill trench to level of underside of foundations.



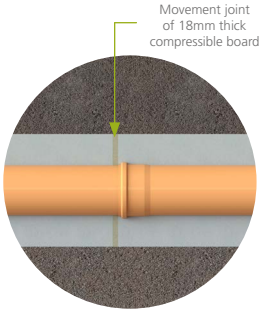
Where dimension A is greater than 1.0m, concrete fill trench to this level.

Joint for Concrete Encased Pipe

Where pipes are surrounded in concrete to protect nearby foundations, an 18mm compressible board, e.g. fibreboard or polystyrene should be placed around the pipe at each joint.

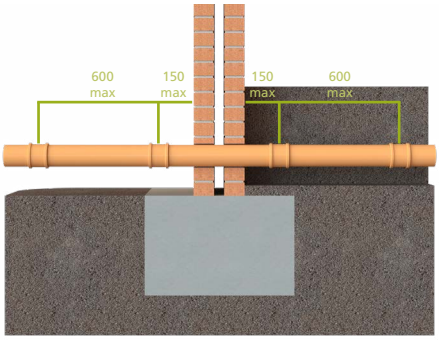


100mm of Concrete on each side of pipe



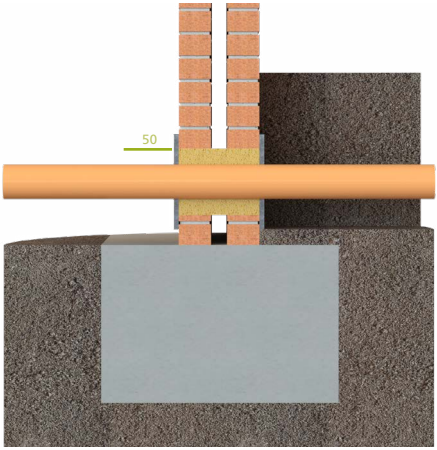
Pipes Through Walls

(a) Short length of pipe bedded in wall with joints formed within 150mm of each wall face.
Adjacent rocker pipes of 600mm max. length with flexible joints.



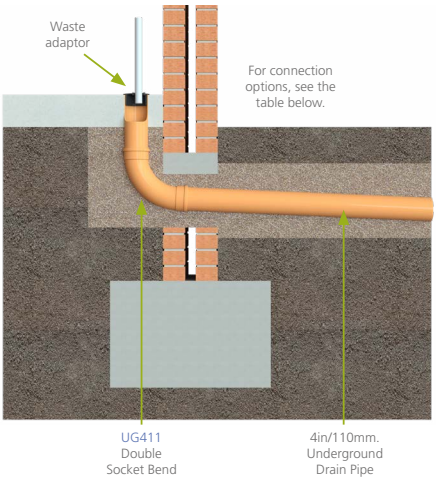
(b) Arch or lintelled opening to give min. 50mm space all round the pipe. Mask opening on both side of the wall with rigid sheet material to prevent entry of fill or vermin.

Important Fill void with compressible material to prevent entry of gas.

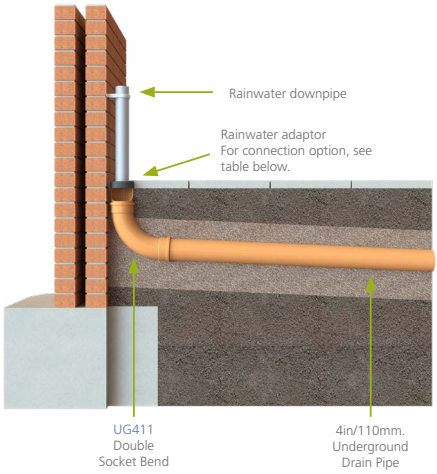


Waste and Rainwater Connections

Waste Pipe



Rainwater Pipe



						Round		Square
		21.5mm	32mm	40mm	50mm	50mm	68mm	65mm
WASTE	UG255 (4in/110mm.)	✓						
	UG256 (4in/110mm.)		✓	✓				
	UG257 (4in/110mm.)				✓			
	UG435 (4in/110mm.)			✓	✓			
	UG456 (4in/110mm.)		✓	✓				
	UG457 (4in/110mm.)				✓			
	UG461 (4in/110mm.)		✓	✓				
	UG492 (4in/110mm.)			✓				
RAINWATER	UG485 (4in/110mm.)		✓	✓	✓	✓	✓	✓
	UG493 (4in/110mm.)		✓	✓	✓	✓	✓	✓
	UG253 (3in/82mm.)						✓	✓
	UG254 (4in/110mm.)						✓	✓

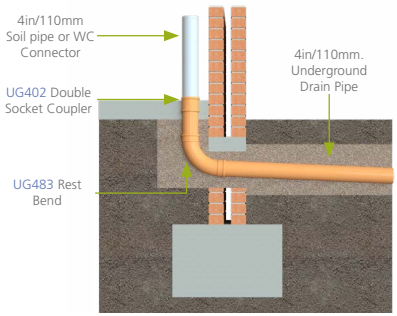
TABLE 7: RAINWATER AND WASTE PIPE CONNECTION OPTIONS

Drainage Adaptors

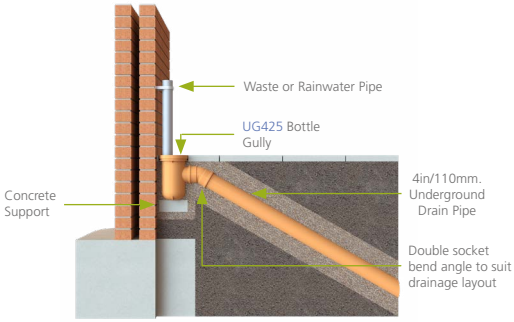
	SKU Code	Description	No. of connections
	UG255	4in/110mm. Adaptor to 21.5mm overflow	1
	UG256	4in/110mm. Adaptor to 32/40mm waste pipe	1
	UG257	4in/110mm. Adaptor to 50mm waste pipe	1
	UG435	4in/110mm. Single to Pipe or Spigot (Requires Waste Boss Adaptor)	1
	UG456	4in/110mm. Socket to 40mm waste pipe	1
	UG457	4in/110mm. Socket to 50mm waste pipe	1
	UG461	4in/110mm. 32mm and 40mm double mixed to Socket	2
	UG492	4in/110mm. 40mm and 40mm double equal to Socket.	2
	UG485	4in/110mm. Universal Drain Adaptors (Black EPDM) Locates on Socket	1
	UG493	4in/110mm. Universal Drain Adaptors (Black EPDM) Locates on Spigot	1
	UG253	3in/82mm. Spigot/Socket to 68mm Round Downpipe Socket	1
	UG254	4in/110mm. Spigot/Socket to 68mm Round Downpipe Socket	1

TABLE 8: DRAINAGE ADAPTOR OVERVIEW

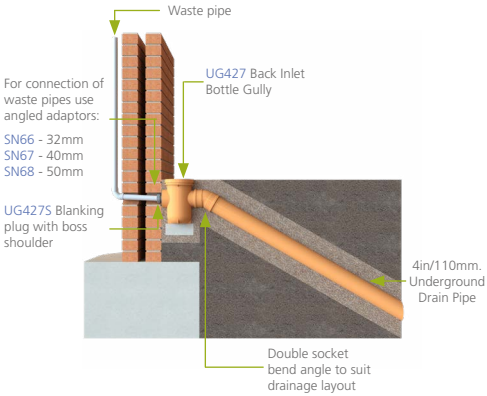
Soil Pipe / WC



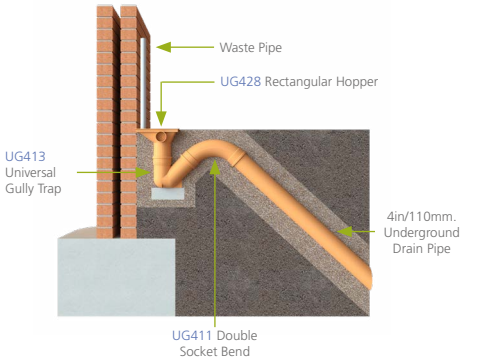
Bottle Gully



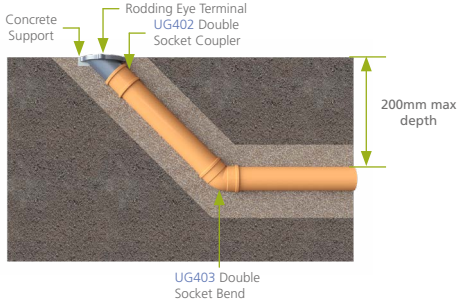
Back Inlet Bottle Gully



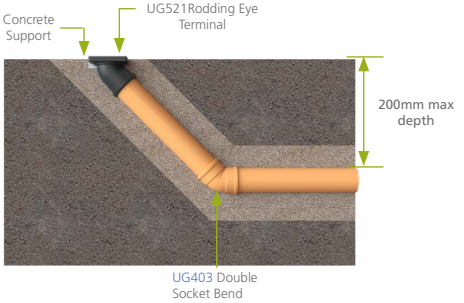
Rectangular Hopper/Universal Gully Trap



Rodding Eye - Spigot Tail

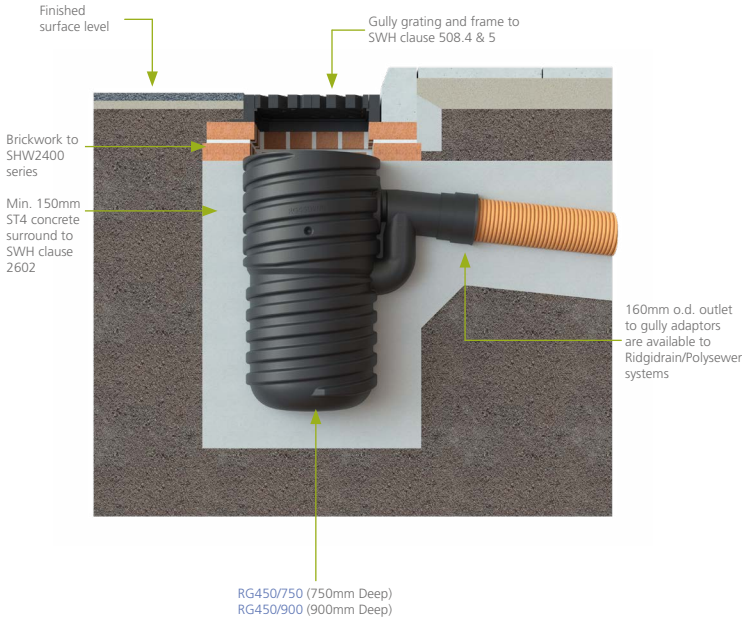


Rodding Eye - Socket Tail



Gully Installation

Road Gully Installation

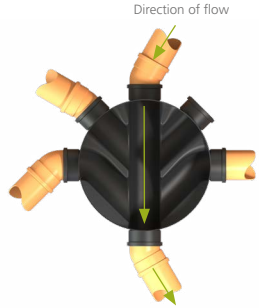


Inspection Chambers

Design Requirements

The layout of the underground drainage system should be kept as simple as possible with the minimum number of changes in direction and gradient. Access points should be provided only if blockages could not be cleared without them.

Connections of drains to other drains should be made obliquely in the direction of flow.



Sewers, i.e. drain serving more than one property, should be kept as far as is practicable away from the point on a building where future extension is likely, e.g. the rear side of a dwelling where there is room for an extension.

The system should be ventilated by a flow of air, normally provided by a ventilating pipe situated at or near the head of each main drain.

Drains should be laid to even gradients and any change of gradient should be combined with an access point.

** Min. 5 WC's*

Peak Flow (Litres/Sec)	Pipe Size	Minimum Gradient	Max. Capacity (Litres/Sec)
< 1	82mm	1:40	4.10
< 1	110mm	1:40	9.20
> 1	82mm	1:80	2.80
> 1	110mm	1:80	6.30
> 1	160mm	1:150*	15.00

TABLE 9: FOUL DRAINS

Pipe Size	Minimum Gradient	Max. Capacity (Litres/Sec)
82mm	1:100	3.50
110mm	1:100	6.90
160mm	1:150	18.20

** Min. 5 WC's*

TABLE 10: SURFACE WATER DRAINS

Chamber Depths

Where the required chamber depth falls between that available with standard risers, the top riser can be cut back using a fine tooth saw to the finished level and slope of surrounding ground.

	Dim 'A'
+ 1 Riser	314mm
+ 2 Risers	457mm
+ 3 Risers	600mm

TABLE 11: 320mm SHALLOW INSPECTION CHAMBER BASE DEPTH

	Dim 'A'
+ 2 Risers	605mm
+ 3 Risers	803mm
+ 4 Risers	1000mm

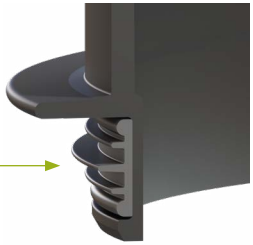
TABLE 12: 460mm INSPECTION CHAMBER BASE DEPTH

Where the depth of the inspection chamber exceeds 1.20m, a 450 and 460mm diameter Non-man Entry chamber is available, which can be used up to depths of 4.00m where permitted.

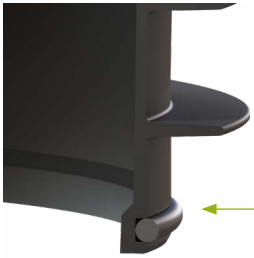
Jointing Side Risers

Section through base of 320mm diameter riser

Section through base of 460mm diameter riser



Seal conforming to BS EN ISO 11600 to be used between sealing fins on 320mm diameter risers.



For Jointing 460mm diameter risers, use sealing ring code UG488 in the groove around the bottom edge of the riser.

Note: Building sealant conforming to BS EN ISO 11600 may also be used to seal joints between risers or between the bottom riser and the base of pre-formed inspection chambers

Riser to Riser and Frame to Riser Fixing Kits

A selection of fixing kits are available to secure risers together and for securing frames to risers.

FRK500

460mm Plastic Frame to Riser Fixing Kit (for use with UG497, UG510& UG511).

FRK501

Spare Black Ties (30) (for FRK 500) - Not suitable for Ductile Iron Frames.

FRK502

460mm Ductile Iron Frame to Riser Fixing Kit (for use with UG419, UG513, UG520, UDC700, UDC702 & UDC750).

FRK503

460mm Riser to Riser Fixing Kit - use 1 kit per riser.

FRK504

320mm. Plastic Frame to Riser Fixing Kit

SFARB Inspection Chambers

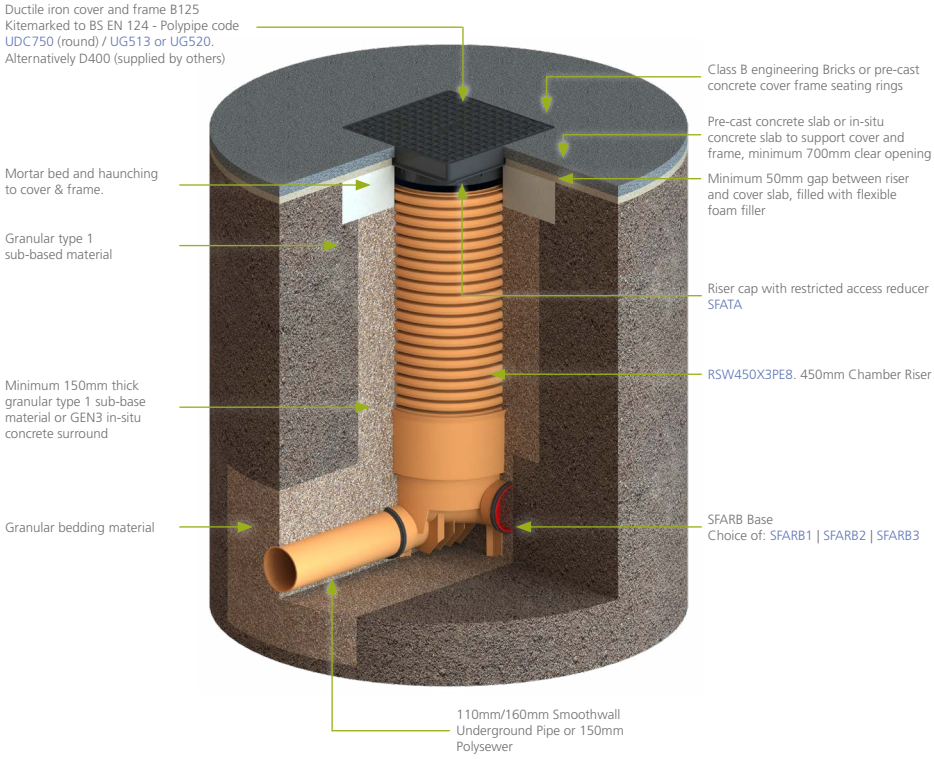
The Polypipe 450mm Pipe Riser Inspection Chamber gives complete flexibility, providing easy access for inspection, cleaning and maintenance in sewer and drainage systems in traffic and non-traffic areas.

Suitable for both adoptable and non-adoptable applications, the range is manufactured from high quality polypropylene and is engineered to last.

The bases are pre-benched and the 450mm Ridgisewer riser is easy to cut to length without the need for special tools or equipment, making the whole installation quicker and easier.

Key Benefits

- Fully sealed for a watertight, tamper proof and low maintenance installation
- Light in weight and strong for improved health and safety and easier handling
- Chemical & corrosion resistant
- Kitemarked to BS EN 13598-2
- High strength single piece 450mm Ridgisewer SN8 riser
- Versatile and available with inlets for 150mm Polysewer and 160mm/110mm BS EN 1401, BS EN 13476-2 & BS EN 13476-3.



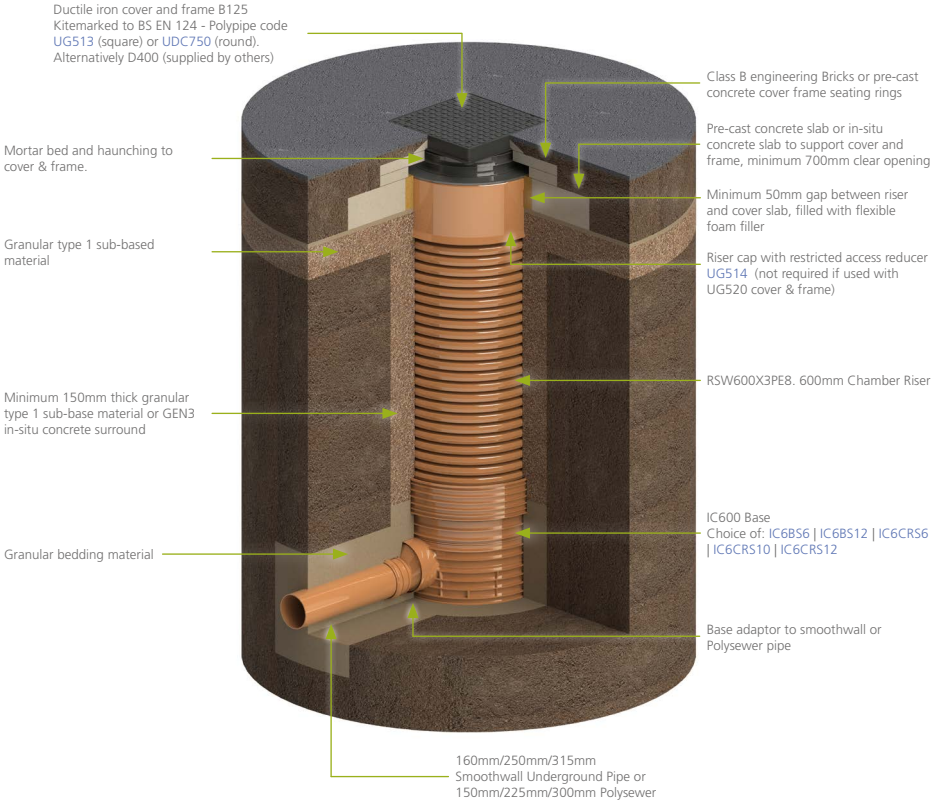
IC600 Inspection Chambers

The Polypipe IC600 range of 600mm diameter inspection chambers is designed for adoptable and non-adoptable domestic and commercial drainage systems, the range is manufactured from high quality polypropylene and is engineered to last.

The unique adaptor range simplifies choice allowing multiple configuration options for connection to Polysewer, Smoothwall PVCu and 150mm Vitrified Clay pipe.

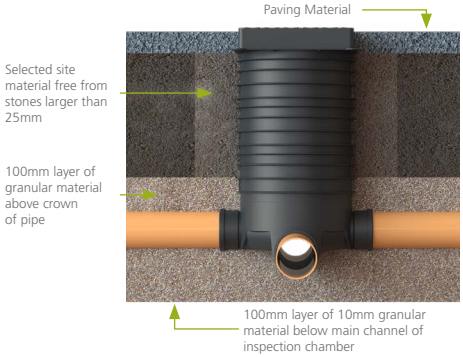
Key Benefits

- For use with 150/160mm, 225/250mm or 300/315mm pipe with a choice of adaptors for pipe connection to Polysewer, Smoothwall PVCu and Vitrified Clay pipe
- Certified to EN 13598-2 and compliant to Sewerage Sector Guidance for England, Sewers for Scotland, and the Welsh Minister Standards for Sewers.
- Light weight & strong for improved health and safety and easy handling, corrosion resistant with high strength single piece 600mm diameter Ridgisewer SN8 riser
- Riser cap which can be adapted for reduced access for chamber depths of greater than 1.2m by using the UG514 restricted access reducer with Polypipe ductile iron covers & frames



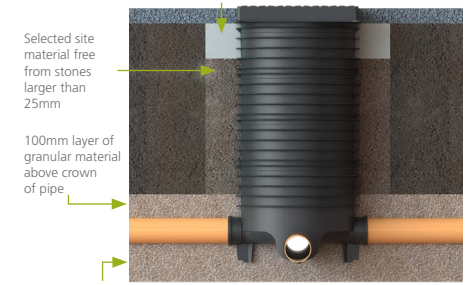
Inspection Chamber Detail

320mm Shallow Inspection Chamber Detail



460mm Diameter Inspection Chamber Detail

150mm x 150mm concrete surround required for support of cover and frame. Where the inspection chamber is being installed on a driveway subject to light vehicular traffic, or where B125 covers are being used, the concrete support should be 300mm wide x 225mm deep



1. In all installations, the main channel of the inspection chamber should always be used. Where the chamber is being used as a change or direction for the drainage system, short radius bends of 11 1/4°, 15°, 30° and 45° can be used in the inlet and outlet to achieve the required angle.
2. Side inlet branch connections enter the inspection chamber approx. 55mm above the invert of the main channel.
3. 320mm diameter chambers are supplied with 2 no. blanking plugs for the side inlets and 460mm diameter chambers are supplied with 3 no. blanking plugs.

TESTING OF BELOW GROUND DRAINAGE SYSTEMS

Following installation, all sections of the underground drainage system should be inspected for obstructions, straightness, and water infiltration.

The current Building Regulations require that drains should be tested for water tightness by means of an air test or water test as detailed below:-

Air Test

For pipes up to 300mm diameter, the pipe should be pressurised to a pressure of 110mm water gauge and held for approx. 5 minutes prior to testing.

Following this, the pipe should be able to hold an initial 100mm pressure with a maximum loss of head on a manometer of 25mm in a period of 7 minutes.

Water Test

For pipes up to 300mm diameter, the system should be filled with water up to a depth of 500mm above the lowest invert in the test section and a minimum depth of 100mm measured at the highest invert in the test section.

This may then be left for a period (one hour is generally sufficient) to condition the pipe. The test pressure should then be maintained for a period of 30 minutes, by topping up the water level as necessary so that it is within 10mm of the required level throughout the test.

The losses per square metre of surface area should not exceed 0.15 litres for test lengths with only pipelines or 0.20 litres for test lengths including pipelines and manholes, or 0.4 litres for tests with only manholes and inspection chambers alone (i.e. no pipelines).

Covers and Frames

It is important to select a cover and frame with a suitable load classification for the location of the chamber. Load classifications are as follows:

(A15) Group 1 - Class A15 of BS EN 124:2015

Cover and frame capable of withstanding a 15kN/1.5 tonne test load. For use in areas to which only pedestrians and cyclists have access. A 150mm x 150mm concrete surround is required for support of cover and frame.

Note: A15 covers may not be acceptable for adoption by some water and sewerage companies

(A35 & A50) Group 1 - Class A15 of BS EN 124:2015 and Class A35 of BS ISO 15398:2012

Cover and frame tested to withstanding a 35kN/3.5 tonne test load (A35) or 50kN/5.0 tonne test load (A50). For use in areas to which pedestrians and cyclists have access, may also be used for private single household driveways not part of the Public Highway, provided always that they are on a concrete surround at least 300mm wide x 225mm deep. On slopes, or where vehicles may turn causing tarmac around the frame to scuff or crack, a 300mm wide x 225mm deep concrete surround should extend upwards to surround the frame and no tarmac should be put on top of the concrete. **If the frame is not supported correctly on concrete, then the cover and frame will not perform as required.**

Note: A35 and A50 covers may not be acceptable for adoption by some water and sewerage companies

(B125) Group 2 - Class B125 of BS EN 124:2015

Covers and frame capable of withstanding a 125kN/12.5 tonne test load. For use in footways, pedestrian areas and comparable areas such as car parks or car decks.

Note: B125 is the minimum class of cover accepted by some water and sewerage companies for adoptable areas.

UDC750

Product	Classification
UG439 Circular Concrete Cover & PP Frame	A15
UG499 Square Concrete Cover & PP Frame	A15
UG436 Aluminium Sealed Cover & Frame	A15
UG501 Circular PP Sealed Cover & Frame	A15
UG502 Square PP Sealed Cover & Frame	A15
UDC700 Circular Ductile Iron Cover & Frame	B125
UDC702 Square Ductile Iron Cover & Frame	B125

TABLE 13: 320mm DIAMETER COVERS & FRAMES

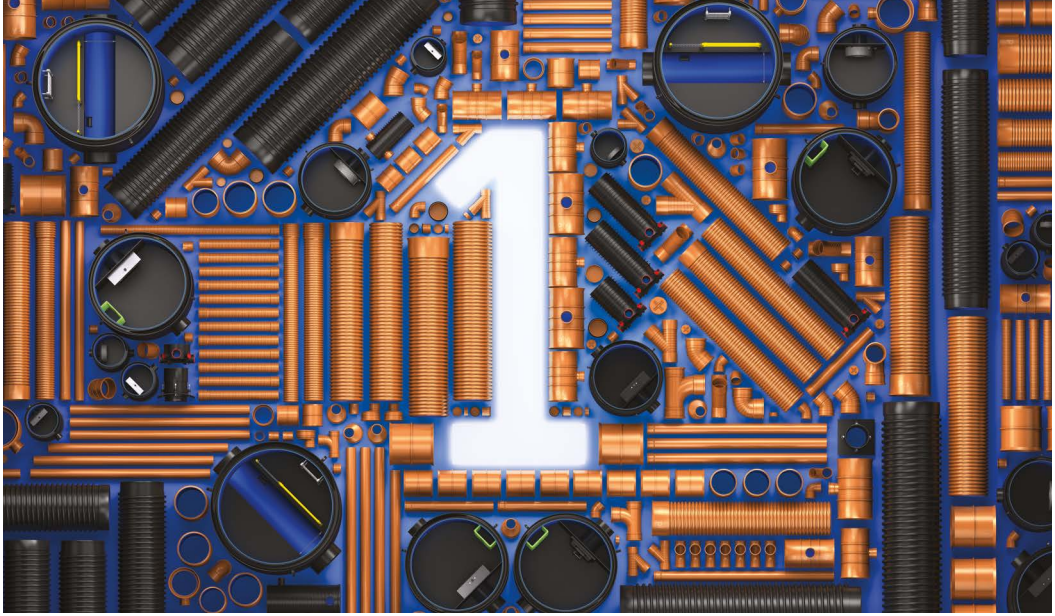
Product	Classification
UG497 Circular Concrete Cover & PP Frame	A15
UG419 Cast Iron Cover & Cast Iron Frame	A50
UG510 Square PP Sealed Cover & Frame with 350mm non-man entry restriction	A35
UG511 Circular PP Cover & Frame	A35
UG513 Square Cast Iron Cover & Cast Iron Frame	B125
UG520 Square Ductile Iron Cover & Frame with 350mm non-man entry	B125

TABLE 14: 450mm/460mm DIAMETER COVERS & FRAMES

Where a heavier duty cover is required, UDC700 (320mm circular), UDC702 (320mm square) and UDC750 (450mm/460mm) circular ductile iron cover and frames are available to BS EN 124 Class B125 tested to withstand 125kN/12.5 tonne test loads. The UG513 and UG520 square cover and frame for the 460mm diameter chamber also meets this requirement.

URP720 (320mm) and URP760 (460mm) recessed paviour covers are available which will withstand a 100kN/10 tonne test load.

NOTE: Where specified, frame to riser fixing kits should be used, see the current Trade Price List for details.



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The Sewers Code for Adoption provides merchants, developers, and contractors with an updated and standardised set of delivery procedures.

The Sewers Code for Adoption guidance includes a Design and Construction Guidance document that replaces the existing manual outlining significant changes which will affect the adoption of sustainable drainage systems (SuDS) and below ground drainage systems on all development sites in England.

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Notes

Notes

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