UNDERGROUND DRAINAGE **SPECIFICATION MANUAL**

2022

v2.1

vision
by drainfast

Contents

Introduction

Vision Drainage provides a fully comprehensive range of underground drainage and sewerage systems.

Pipes and Fittings are produced in six (OD) diameters, ranging from 110mm to 315mm. The systems are manufactured under BS EN ISO 9001: 2015 certification and tested to the requirements of BS EN 13598-2, BS EN 13598-1, BS EN 1401-1 and BS EN 13476-2 and many items carry the BSI Kitemark.

The Vision Drainage specification manual provides information relating to dimensions, performance, illustration, design and fitting. The specification manual is a comprehensive manual for architect, specifier and builder alike.

AVAILABILITY

Vision Drainage underground systems are available from Drainfast Ltd, who operate from strategic locations in the South of England, London and the Midlands.

Standards

Vision Drainage systems are manufactured under the following British and European Standards:-

BS EN ISO 9001

Quality Management Systems

BS EN 1401-1

Plastic piping systems for non-pressure underground drainage and sewerage. Unplasticized poly(vinyl chloride) (PVC-U). Part 1: Specifications for pipes, fittings and the system. Nominal diameters 110mm are SN8, 160mm SN8, 200mm and larger SN4.

BS EN 13598-1

Plastics piping systems for non-pressure underground drainage and sewerage. Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE). Part 1: Specifications for ancillary fittings including shallow inspection chambers.

BS EN 13598-2

Plastics piping systems for non-pressure underground drainage and sewerage. Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE). Part 2: Specifications for manholes and inspection chambers.

BS EN 13476-2

Plastics piping systems for non-pressure underground drainage and sewerage. Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE). Specifications for pipes and fittings with smooth internal and external surface and the system, Type A. For nominal diameters 110mm SN4/SN8, 160mm SN4 and 200mm SN4.

INSTALLATION STANDARDS

Drain and Sewer installations must be designed to comply with the following:

- The Building Regulations 2010, Approved Document H, Section H1
- Building (Scotland) Regulations 2004, Technical Handbook (Domestic & Non-Domestic) Section 3: Environment
- Building Regulations (Northern Ireland) 2012, Technical Booklet N, Section 3
- Building Regulations 2010, Technical Guidance Document H, Section 1.3 (ROI)

Comprehensive guidance on the design of drain and sewer systems is given in BS EN 752:2017 and BS5955: Part 6: 1980 Code of Practice for the Installation of Unplasticized PVC pipework for Gravity Drains and Sewers.

Following the recommendations of these codes is also deemed necessary to satisfy the requirements of the above Building Regulations.

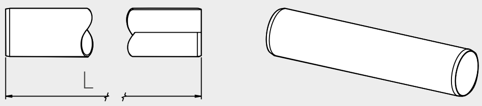
All information in this product guide is based on the above documents, which should in any case be consulted for all installations.

Underground Drainage

PIPES

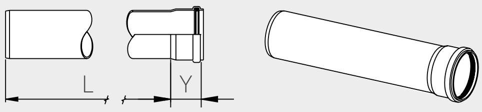
PIPE – PLAIN ENDED

CODE	SIZE	LENGTH	WALL THICKNESS
4VP3	110mm	3m	3.2mm
4VP6	110mm	6m	3.2mm
6VP3	160mm	3m	4.7mm
6VP6	160mm	6m	4.7mm



PIPE – SINGLE SOCKET

CODE	SIZE	LENGTH	Y (SOCKET LENGTH)
4VP3S	110mm	3m	70mm
4VP6S	110mm	6m	70mm
6VP3S	160mm	3m	95mm
6VP6S	160mm	6m	95mm

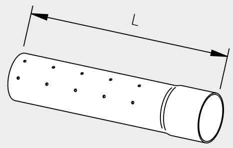


PERFORATED PIPES

HALF PERFORATED PIPE – BLOWN SOCKET

(Pipe to BS 4660/BS 5481)

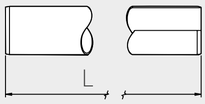
CODE	SIZE	LENGTH	WALL THICKNESS	HOLES PER M	°	Ø
4VP6SP	110mm	6m	3.2mm	39	46°	6mm
6VP6SP	160mm	6m	4.1mm	52	36°	6mm

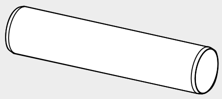


ROCKER PIPES

ROCKER PIPE

CODE	SIZE	LENGTH
4VPR	110mm	600mm
6VPR	160mm	600mm



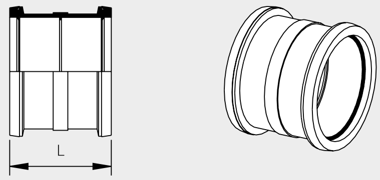


COUPLERS

DOUBLE SOCKET (BS) COUPLER

CODE	SIZE	LENGTH
4VF20D	110mm	135mm
6VF20D	160mm	175mm

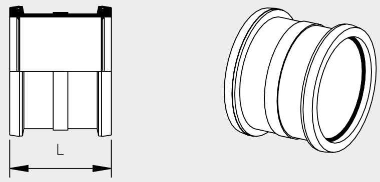
Material: PVC



DOUBLE SOCKET SLIP COUPLER

CODE	SIZE	LENGTH
4VF20DSC	110mm	135mm
6VF20DSC	160mm	175mm

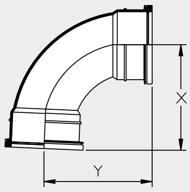
Material: PVC

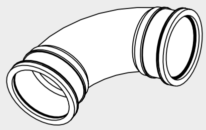


BENDS

DOUBLE SOCKET BEND 87.5°

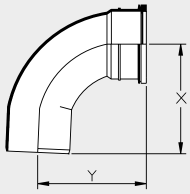
CODE	SIZE	X	Y
4VF90D	110mm	156mm	150mm
6VF90D	160mm	223mm	228mm

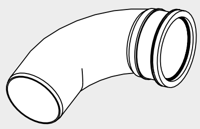




SINGLE SOCKET BEND 87.5°

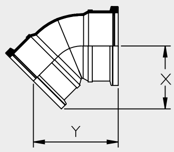
CODE	SIZE	X	Y
4VF90	110mm	163mm	150mm
6VF90	160mm	223mm	230mm

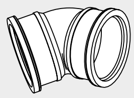




DOUBLE SOCKET BEND 45°

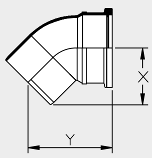
CODE	SIZE	X	Y
4VF45D	110mm	104mm	143mm
6VF45D	160mm	163mm	231mm

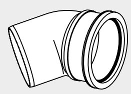




SINGLE SOCKET BEND 45°

CODE	SIZE	X	Y
4VF45	110mm	96mm	142mm
6VF45	160mm	138mm	228mm

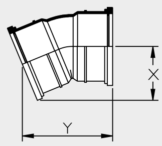


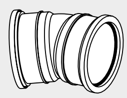


BENDS

DOUBLE SOCKET BEND 22½°

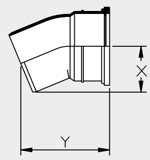
CODE	SIZE	X	Y
4VF22D	110mm	88mm	149mm
6VF22D	160mm	133mm	227mm

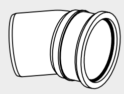




SINGLE SOCKET BEND 22½°

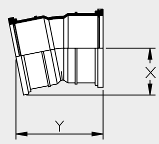
CODE	SIZE	X	Y
4VF22	110mm	78mm	149mm
6VF22	160mm	113mm	234mm

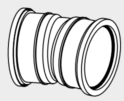




DOUBLE SOCKET BEND 11¼°

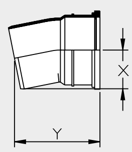
CODE	SIZE	X	Y
4VF11D	110mm	78mm	147mm
6VF11D	160mm	123mm	221mm

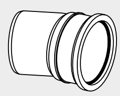




SINGLE SOCKET BEND 11¼°

CODE	SIZE	X	Y
4VF11	110mm	68mm	144mm
6VF11	160mm	103mm	219mm

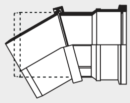


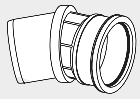


BENDS

ADJUSTABLE BEND 0-45°

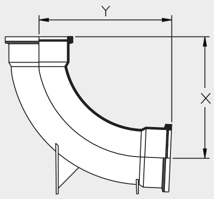
CODE	SIZE
4VFA45	110mm

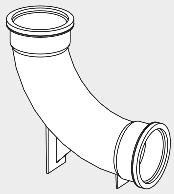




DOUBLE SOCKET REST BEND (LONG RADIUS) 87.5°

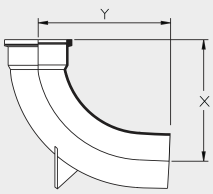
CODE	SIZE	X	Y
4VF90DRB	110mm	241mm	263mm

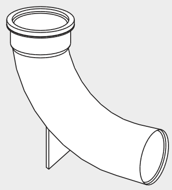




SINGLE SOCKET REST BEND 87.5°

CODE	SIZE	DEPTH	X	Y
4VF90RB	110mm	130mm	260mm	285mm

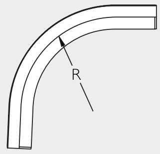


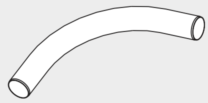


BENDS

LONG RADIUS BENDS PLAIN ENDED 87°

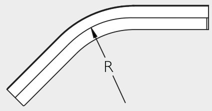
CODE	SIZE	RADIUS
4VF90LR	110mm	450mm
6VF90LR	160mm	610mm





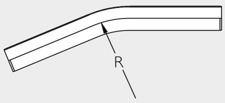
LONG RADIUS BENDS PLAIN ENDED 45°

CODE	SIZE	RADIUS
4VF45LR	110mm	450mm



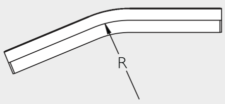
LONG RADIUS BENDS PLAIN ENDED 30°

CODE	SIZE	RADIUS
4VF30LR	110mm	450mm



LONG RADIUS BENDS PLAIN ENDED 22.5°

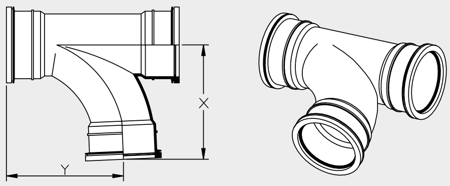
CODE	SIZE	RADIUS
4VF22LR	110mm	450mm



JUNCTIONS

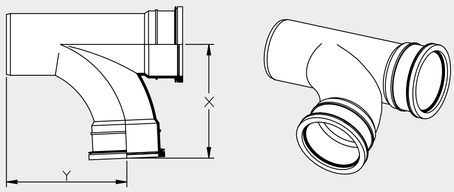
87½° TRIPLE SOCKET T JUNCTION

CODE	SIZE	X	Y
4VF90TT	110mm x 110mm dia.	135mm	145mm
6VF90TT	160mm x 160mm dia.	223mm	228mm



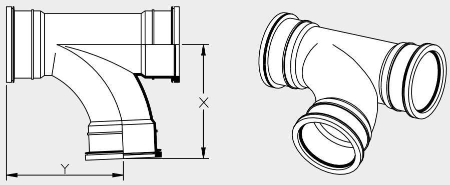
87½° DOUBLE SOCKET T JUNCTION

CODE	SIZE	X	Y
4VF90DT	110mm x 110mm dia.	135mm	150mm
6VF90DT	160mm x 160mm dia.	223mm	224mm



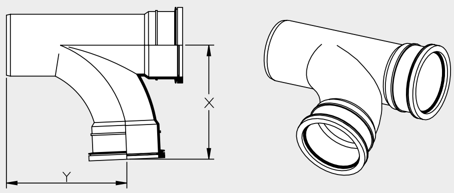
87½° TRIPLE SOCKET T JUNCTION UNEQUAL

CODE	SIZE	X	Y
64VF90TT	160mm x 110mm dia.	223mm	228mm



87½° DOUBLE SOCKET T JUNCTION UNEQUAL

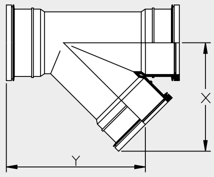
CODE	SIZE	X	Y
64VF90DT	160mm x 110mm dia.	223mm	223mm

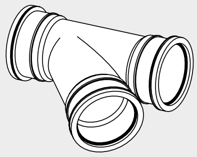


JUNCTIONS

45° TRIPLE SOCKET Y JUNCTION

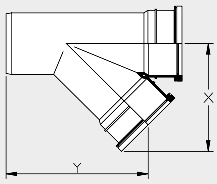
CODE	SIZE	X	Y
4VF45TY	110mm x 110mm dia.	188mm	244mm
6VF45TY	160mm x 160mm dia.	298mm	333mm

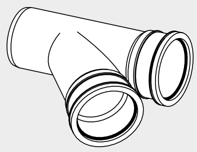




45° DOUBLE SOCKET Y JUNCTION

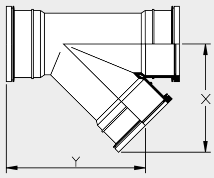
CODE	SIZE	X	Y
4VF45DY	110mm x 110mm dia.	188mm	252mm
6VF45DY	160mm x 160mm dia.	298mm	329mm

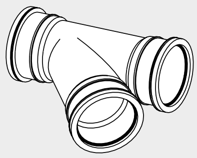




45° TRIPLE SOCKET Y JUNCTION UNEQUAL

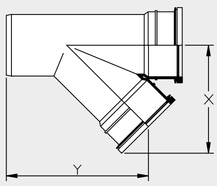
CODE	SIZE	X	Y
64VF45TY	160mm x 110mm dia.	223mm	300mm

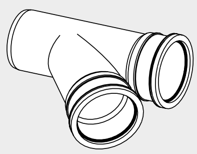




45° DOUBLE SOCKET Y JUNCTION UNEQUAL

CODE	SIZE	X	Y
64VF45DY	160mm x 110mm dia.	223mm	296mm



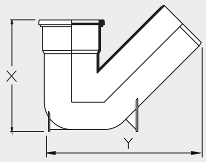


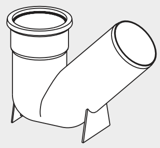
GULLY RANGE

110mm DRAINAGE GULLY TRAP

CODE	SIZE	X	Y
4VG90	110mm	142mm	310mm

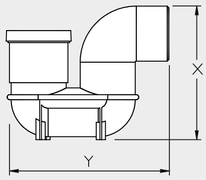
Material: PP

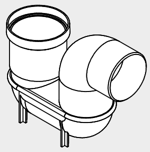




110mm DRAINAGE 'P' LOW TRAPPED GULLY

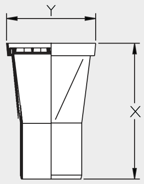
CODE	SIZE	X	Y
4VG91	110mm	267mm	325mm

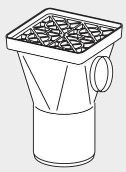




110mm SQUARE HOPPER HEAD

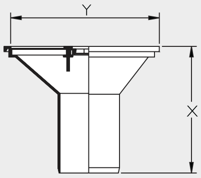
CODE	SIZE	X	Y
4VG92	110mm	205mm	168mm

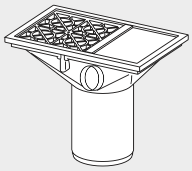




110mm RECTANGULAR HOPPER HEAD

CODE	SIZE	DEPTH	X	Y
4VG93	110mm	168mm	205mm	255mm

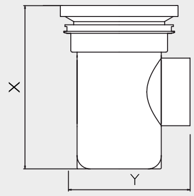


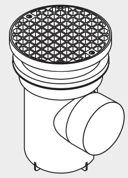


GULLY RANGE

110mm CIRCULAR BOTTLE GULLY RODDABLE

CODE	SIZE	DEPTH	X	Y
4VG97	110mm	190mm	290mm	247mm

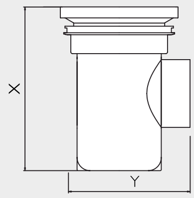


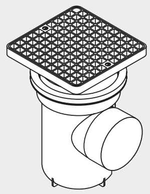


110mm SQUARE BOTTLE GULLY RODDABLE

Square top is 225mm

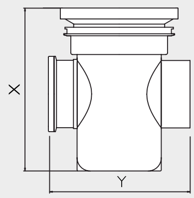
CODE	SIZE	DEPTH	X	Y
4VG88	110mm	190mm	290mm	247mm

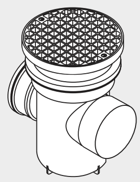




110mm CIRCULAR B/INLET BOTTLE GULLY RODDABLE

CODE	SIZE	DEPTH	X	Y
4VG97BI	110mm	192mm	290mm	275mm

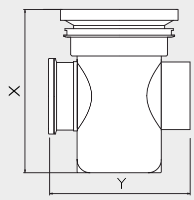


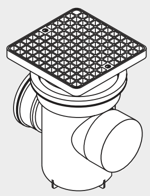


110mm SQUARE B/INLET BOTTLE GULLY RODDABLE

Square top is 225mm

CODE	SIZE	DEPTH	X	Y
4VG88BI	110mm	192mm	290mm	275mm



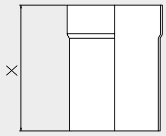


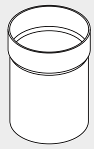
GULLY RANGE

BOTTLE GULLY RAISING PIECE

Can be used with 4VG97, 4VG88, 4VG97BI & 4VG88BI

CODE	SIZE	X
4VGRO	195mm dia.	250mm

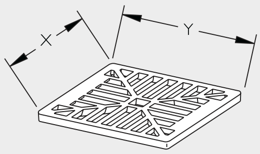




SQUARE GULLY GRATES

CODE	SIZE	X	Y
150VGG	150mm	150mm	150mm
198VGGS	198mm	198mm	198mm

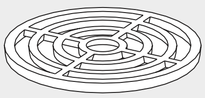
Material: aluminum



CIRCULAR GULLY GRATES

CODE	SIZE
175VGGC	175mm dia.
200VGGC	200mm dia.

Material: aluminum

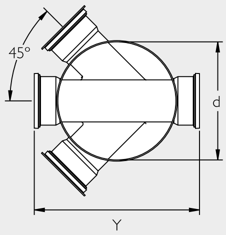


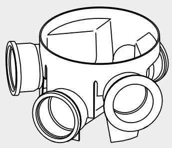
SHALLOW ACCESS CHAMBERS

280mm INSPECTION CHAMBER BASE 110mm INLET

205mm invert (inc. 2 socket plugs)

CODE	SIZE	DIAMETER (d)	Y
4VC280	110mm	280mm	392mm

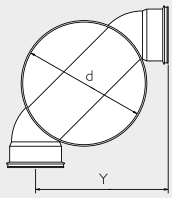


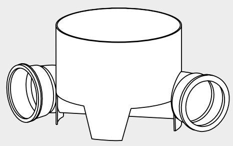


280mm INSPECTION CHAMBER BASE 110mm INLET 90° CHANNEL

205mm invert

CODE	SIZE	DIAMETER (d)	Y
4VC28090	110mm	280mm	305mm

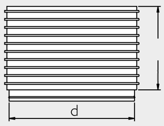


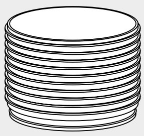


280mm CHAMBER SHAFT 185mm HEIGHT

Incl seal

CODE	SIZE	DIAMETER (d)	INVERT (i)
4VC280S	110mm	266mm	185mm

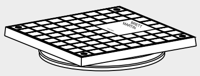




280mm SQUARE DOUBLE SEAL COVER & FRAME

For pedestrian areas only

CODE	SIZE	DIAMETER (d)
4VCF280S	110mm	266mm



Material: PVCu

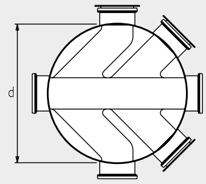
At installation, we recommend that a copper impregnated grease should be applied to the threads of the lid retaining screws for ease of removal.

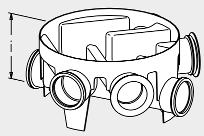
INSPECTION CHAMBERS

450mm INSPECTION CHAMBER BASE 110mm INLET

Includes 3 socket plugs

CODE	SIZE	INVERT (i)	DIAMETER (d)
450VC4	110mm	225mm	450mm

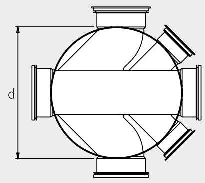


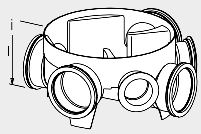


450mm INSPECTION CHAMBER BASE 160mm CHANNEL

2 x 160mm inlets & 2 x 110mm inlets. Includes 2 x 160mm and 1 x 110mm socket plugs

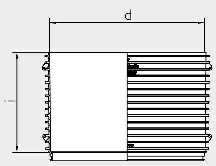
CODE	SIZE	INVERT (i)	DIAMETER (d)
450VC6	160mm	255mm	450mm

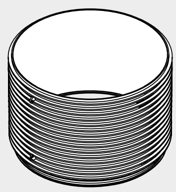




450mm INSPECTION CHAMBER SHAFT 300mm HEIGHT

CODE	INVERT (i)	DIAMETER (d)
450VCR	315mm	450mm

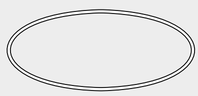




450mm CHAMBER SHAFT SEALING RING

For use with 450VCR

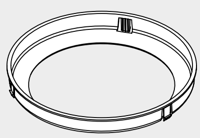
CODE	DIAMETER
450VCS	450mm



RESTRICTOR RING

For use when chamber base invert is between 1.2 and 3 meters

CODE	OUTSIDE DIAMETER	CLEAR OPENING
450VCR350	450mm	350mm

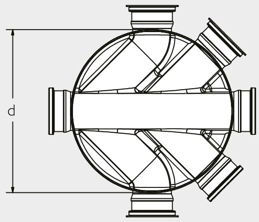


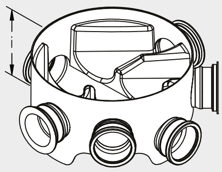
ADOPTABLE INSPECTION CHAMBERS

450mm INSPECTION CHAMBER BASE 110mm INLET

Includes 3 socket plugs

CODE	SIZE	INVERT (i)	DIAMETER (d)
450VC4A	110mm	225mm	450mm

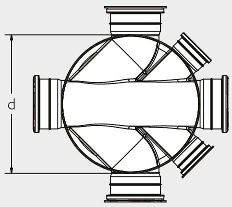


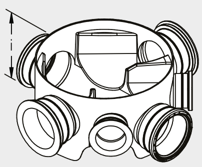


450mm INSPECTION CHAMBER BASE 160mm CHANNEL

2 x 160mm inlets & 2 x 110mm inlets. Includes 2 x 160mm and 1 x 110mm socket plugs

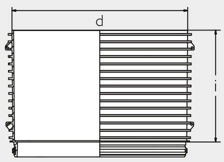
CODE	SIZE	INVERT (i)	DIAMETER (d)
450VC6A	160mm	255mm	450mm

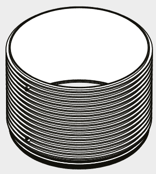




450mm INSPECTION CHAMBER SHAFT 300mm HEIGHT

CODE	INVERT (i)	DIAMETER (d)
450VCRA	315mm	450mm

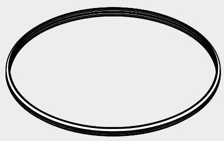




450mm CHAMBER SHAFT SEALING RING (replacement seal)

For use with 450VCRA

CODE	DIAMETER
450VCSA	450mm

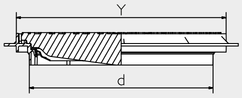


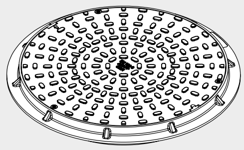
INSPECTION CHAMBER COVERS

SECURED PLASTIC COVER AND FRAME TO EN124 A15 50KN

Suitable for domestic driveways

CODE	Y	DIAMETER (d)
450VCFC	518mm	450mm

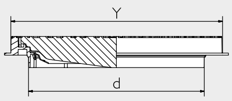


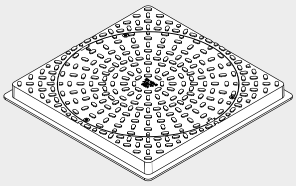


SECURED SQUARE PLASTIC COVER AND FRAME TO EN124 A15 50KN

Suitable for domestic driveways

CODE	Y	DIAMETER (d)
450VCFS	545mm	450mm



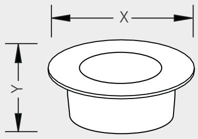


DRAINAGE

DRAINAGE TEMPORARY SITE CAPS

CODE	SIZE	X	Y
4VF65	110mm	118.5mm	35.2mm
6VF65	160mm	159.5mm	33mm

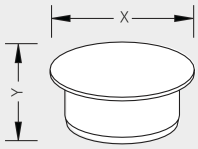
Material: LDPE



DRAINAGE SOCKET PLUGS

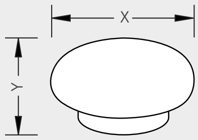
CODE	SIZE	X	Y
4VF68	110mm	126mm	38mm
6VF68	160mm	180mm	49mm

Material: UPVc



SOIL PIPE MUSHROOM VENT COWL

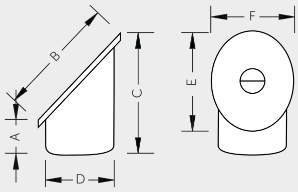
CODE	SIZE	X	Y
4VFMUSH	110mm	180mm	80mm



RODDING EYES 45°

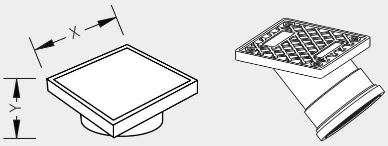
CODE	A	B	C	D	E	F
4VFRE	80mm	185mm	202mm	109mm	167mm	120mm
6VFRE	80mm	272mm	270mm	160mm	258mm	189mm

Material: aluminum



SQUARE RODDING EYE

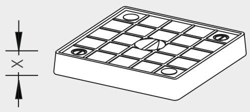
CODE	SIZE	X	Y
4VFRES	110mm	145mm	50mm



DRAINAGE

SQUARE SEALING PLATE

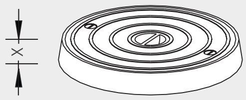
CODE	SIZE	LID	CLEAR OPENING	X
150VFSPS	150mm	135mm	135x135mm	22mm



Material: aluminum

CIRCULAR SEALING PLATE

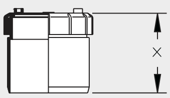
CODE	OVERALL DIAMETER	CLEAR OPENING	DIAMETER OF LID	X
140VFSPC	136mm	103mm	121mm	23mm

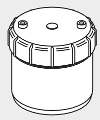


Material: aluminum

DRAINAGE SCREWED ACCESS CAP

CODE	SIZE	X
4VF64	110mm	81mm
6VF64	160mm	83mm



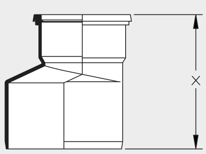


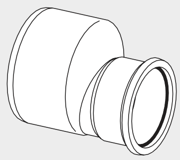
Material: UPVC

UNIVERSAL REDUCERS

Spigot to socket reducers

CODE	SIZE	X
64VR	160/110mm	181mm

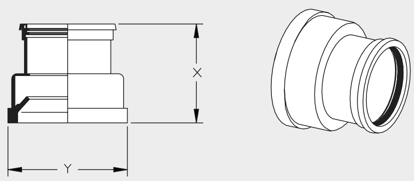




DRAINAGE

CLAY TO PLASTIC ADAPTORS

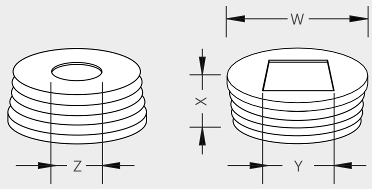
CODE	SIZE	X	Y
4VFC2P	4"/110mm	125mm	145mm
6VFC2P	6"/160mm	130mm	250mm



FLEXIBLE SPIGOT & SOCKET RAIN/WASTE ADAPTOR

Can be used to connect to both pipe spigot and a fitting socket

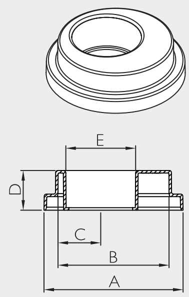
CODE	SIZE	W	X	Y	Z
4VF78	110mm	108mm	35mm	60mm	50mm



RAINWATER ADAPTOR

Can be used to connect to both pipe spigot and a fitting socket

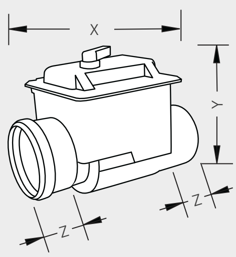
CODE	SIZE	A	B	C	D	E
4VF68RA	110mm	139mm	110mm	43mm	40mm	68mm



NON-RETURN VALVE - SINGLE SOCKET

CODE	SIZE	X	Y	Z
4VFNRV	110mm	307mm	230mm	61mm
6VFNRV	160mm	337mm	255mm	74mm

Material: UPVC

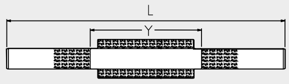


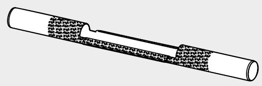
CHANNEL PIPES & BENDS

OPEN CHANNEL

CODE	SIZE	Y	LENGTH
4VOC1	110mm	600mm	1.5m

Material: UPVC

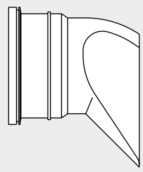
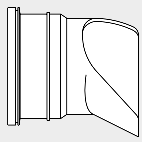




SLIPPER BEND 90° LEFT HAND

CODE	SIZE
4VF90L	110mm

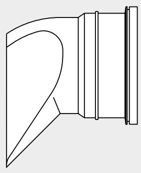
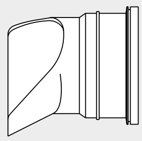
Material: UPVC

SLIPPER BEND 90° RIGHT HAND

CODE	SIZE
4VF90R	110mm

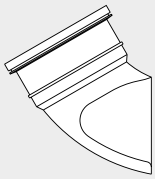
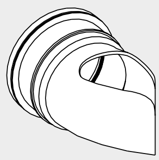
Material: UPVC

SLIPPER BEND 30° LEFT HAND

CODE	SIZE
4VF30L	110mm

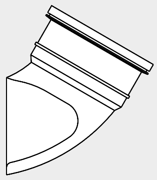
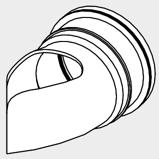
Material: UPVC

SLIPPER BEND 30° RIGHT HAND

CODE	SIZE
4VF30R	110mm

Material: UPVC

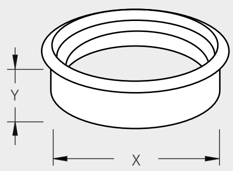



WALL SEALS

WALL SEALS

Compliant with BS EN681-5

CODE	SIZE	X	Y	Dia core drill required
4VFWS	110mm	142mm	50mm	140mm
6VFWS	160mm	189mm	50mm	181mm



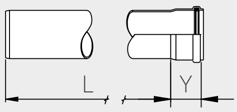
Material: EPDM rubber

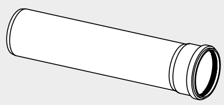
Underground Sewer

PIPES

PIPE – SINGLE SOCKET

CODE	SIZE	LENGTH	Y (SOCKET LENGTH)
8VP3S	200mm	3m	110mm
8VP6S	200mm	6m	110mm
10VP3S	250mm	3m	140mm
10VP6S	250mm	6m	140mm
12VP3S	315mm	3m	155mm
12VP6S	315mm	6m	155mm

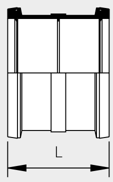


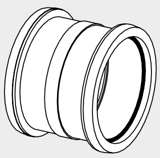


COUPLERS

DOUBLE SOCKET COUPLER

CODE	SIZE	LENGTH
8VF20D	200mm	217mm
10VF20D	250mm	254mm
12VF20D	315mm	297mm

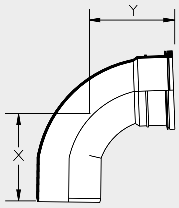


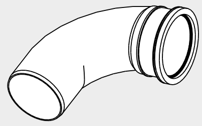


BENDS

SINGLE SOCKET BEND 87.5°

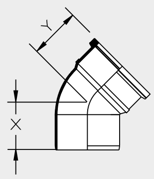
CODE	SIZE	X	Y
8VF90	200mm	205mm	207mm
10VF90	250mm	268mm	257mm
12VF90	315mm	310mm	306mm

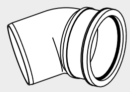




SINGLE SOCKET BEND 45°

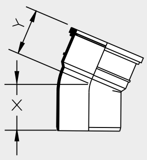
CODE	SIZE	X	Y
8VF45	200mm	146mm	148mm
10VF45	250mm	183mm	175mm
12VF45	315mm	217mm	218mm

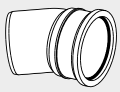




SINGLE SOCKET BEND 30°

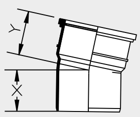
CODE	SIZE	X	Y
8VF30	200mm	130mm	135mm
10VF30	250mm	171mm	162mm
12VF30	315mm	191mm	192mm

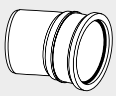




SINGLE SOCKET BEND 15°

CODE	SIZE	X	Y
8VF15	200mm	118mm	121mm
10VF15	215mm	153mm	143mm
12VF15	315mm	167mm	172mm

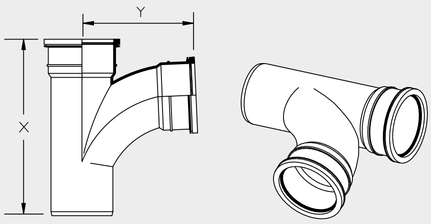




JUNCTIONS

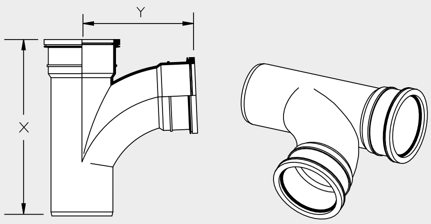
90° DOUBLE SOCKET T JUNCTION

CODE	SIZE	X	Y
8VF90DT	200mm x 200mm dia.	410mm	205mm
10VF90DT	250mm x 250mm dia.	508mm	253mm
12VF90DT	315mm x 315mm dia.	611mm	288mm



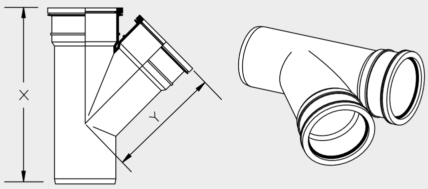
90° DOUBLE SOCKET T JUNCTION UNEQUAL

CODE	SIZE	X	Y
104VF90DT	250mm x 110mm dia.	433mm	183mm
106VF90DT	250mm x 160mm dia.	433mm	219mm
126VF90DT	315mm x 160mm dia.	496mm	253mm



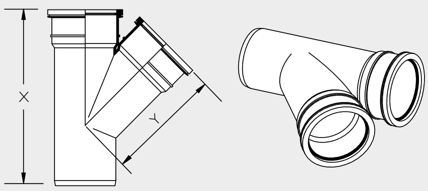
45° DOUBLE SOCKET Y JUNCTION

CODE	SIZE	X	Y
8VF45DY	200mm x 200mm dia.	482mm	337mm
10VF45DY	250mm x 250mm dia.	603mm	412mm
12VF45DY	315mm x 315mm dia.	723mm	506mm



45° DOUBLE SOCKET Y JUNCTION UNEQUAL

CODE	SIZE	X	Y
104VF45DY	250mm x 110mm dia.	482mm	327mm
106VF45DY	250mm x 160mm dia.	487mm	335mm
126VF45DY	315mm x 160mm dia.	580mm	381mm

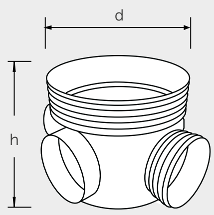


INSPECTION CHAMBERS

600mm INSPECTION CHAMBER BASE SWEPT CROSS

Compliant with EN13598-2 and with Sewers for Adoption 7th Edition (SfA7)
Adaptors/end caps are required for each connection

CODE	SIZE	DIAMETER (d)	HEIGHT (h)
6VC160	160mm inlets	637mm	556mm
6VC250	250mm inlets	637mm	556mm
6VC315	315mm inlets	637mm	556mm

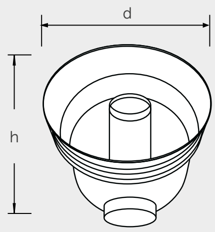


Material: PP

600mm INSPECTION CHAMBER BASE STRAIGHT CHANNEL

Compliant with EN13598-2 and with Sewers for Adoption 7th Edition (SfA7)
Adaptors/end caps are required for each connection

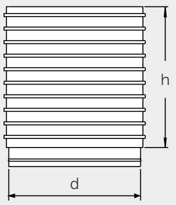
CODE	SIZE	DIAMETER (d)	HEIGHT (h)
6VC160S	160mm inlets	637mm	556mm
6VC250S	250mm inlets	637mm	556mm

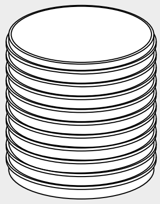


Material: PP

600mm INSPECTION CHAMBER BASE SHAFT

CODE	SIZE (h)	DIAMETER (d)
6VCSH1.5	1.5m height	600mm
6VCSH3	3m height	600mm
6VCSH6	6m height	600mm

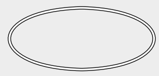




Material: PE

INSPECTION CHAMBERS

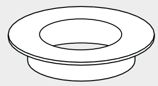
600mm SEALING RING



CODE	DIAMETER (d)
6VCSHS	600mm

600mm RESTRICTOR CAP

To suit 600mm chamber base



CODE	DIAMETER (d)	OPENING
6VCR350	600mm	350mm

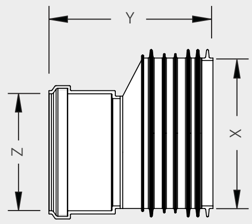
INSPECTION CHAMBERS

UPVC OUTLET ADAPTORS TO UPVC SOCKET

To suit 600mm chamber base. Spigot to Socket

CODE	SIZE	X	Y	Z
6VCA672	160-160mm	200mm	222mm	160.8mm
6VCA1072	250-250mm	247mm	248.5mm	251mm

Material: PP

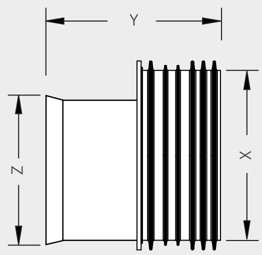


UPVC OUTLET ADAPTORS TO TWINWALL SOCKET

To suit 600mm chamber base. Spigot to socket, adaptor comes with adaptor seals, but requires twinwall seals

CODE	SIZE	X	Y	Z
6VCA6150	160-150mm	200mm	190mm	184.4mm
6VCA10150	250-150mm	247mm	200.5mm	184.4mm
6VCA10225	250-225mm	247mm	250.5mm	289.1mm
6VCA12150	315-150mm	296.5mm	226.45mm	184.4mm
6VCA12225	315-225mm	296.5mm	276.45mm	289.1mm
6VCA12300	315-300mm	296.5mm	306.95mm	379.8mm

Material: PP

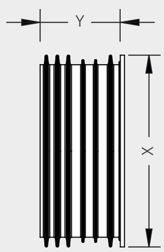


SPIGOT END CAPS

To suit 600mm chamber base

CODE	SIZE	X	Y
6VCE669	160mm	230mm	100mm
6VCE1069	250mm	282.6mm	110.5mm
6VCE1269	315mm	358.22mm	136.45mm

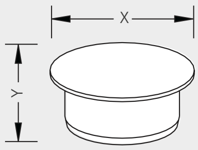
Material: PP



DRAINAGE

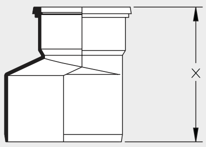
UPVC DRAINAGE SOCKET PLUGS

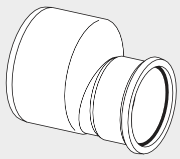
CODE	SIZE	X	Y
8VF68	200mm	223mm	59mm
10VF68	250mm	282mm	90mm
12VF68	315mm	350mm	93mm



UNIVERSAL REDUCERS

CODE	SIZE	X
86VR	200/160mm	213mm
106VR	250/160mm	264mm
108VR	250/200mm	269mm
126VR	315/160mm	174mm
1210VR	315/250mm	311mm





Technical Information

AUTHORITY

Vision Drainage systems satisfy the requirements of the following:-

- The Building Regulations 2010, Approved Document H
- Building (Scotland) Regulations 2004, Technical Handbook (Domestic & Non-Domestic) Section 3: Environment
- Building Regulations (Northern Ireland) 2012, Technical Booklet N
- Building Regulations 2010, Technical Guidance Document H (ROI)

STANDARDS

Refer to page 4.

COMPOSITION

Extruded pipe sections and injection moulded fittings are made from PVCu and polypropylene compounds complying with the material requirements of the relevant British Standards. They contain the necessary processing additives, stabilisers and pigments to give products excellent appearance, durability and performance.

BIOLOGICAL AND CHEMICAL RESISTANCE

Polluted industrial atmospheres will not effect Vision Drainage systems. PVC is vermin and rot proof and resistant to most commonly occurring chemicals: notable exceptions however are solvents, including those incorporated in most timber preservatives.

GENERAL RESISTANCES

Expected action
G - Good/Excellent resistance to attack
P - Poor resistance to attack

SUBSTANCE	EXPECTED ACTION
Mineral Acids (Diluted)	G
Mineral Acids (Concentrated)	G
Alkalis	G
Alcohol's	G
Ketones	P
Aromatic Hydrocarbons	P
Chlorinated Hydrocarbons	P
Greases and Oils	G

General Information

STORAGE

The following recommendations relate to the storage of PVCu pipes under the normal climatic conditions of the United Kingdom.

a) Pipes should be stacked on a reasonably flat surface free from sharp projections, stones and other protuberances. Side supports should be provided at intervals of not more than 1.5m and these supports should preferably consist of battens not less than 75mm wide. However, if pipes are delivered in factory strapped bundles, no side supports are necessary.

b) Pipes should be uniformly supported throughout their length, if this is not possible timber battens at least 75mm wide at spacings not greater than 1m centres should be placed beneath the pipes. Preferably pipes of different sizes and wall thicknesses should be stacked separately. Where this is not possible the pipes with larger diameters and thicker walls should be at the bottom. It is preferable that pipes should not be stacked one inside the other.

c) If spigot and socket pipes are stacked, sockets should be placed at alternate ends of the stack with sockets protruding so that the pipes are evenly supported along their entire length. Pipe stacks should not exceed 7 layers with a maximum height of 2m.

HANDLING

Pipes made from PVCu are strong, though lightweight and are therefore very easily handled. However, it is necessary to take care to prevent damage; in particular, pipes should not be thrown, dropped or dragged along. If pipes are moved by rolling it is necessary to support them along their length and properly restrain them on inclines. If pipes are loaded or unloaded by mechanical means (forklift, crane etc,) care should be taken to prevent damage. Pipes should be properly supported in two places when lifted. Preferably protected slings should be used, if metal chains and hooks are all that is available, padding should be placed between them and the pipes. If pipes are delivered stuffed, special care should be taken to avoid damage during unloading.

IMPORTANT

The impact strength of PVCu is reduced in cold weather during which time extra care must be taken to prevent site damage.

TRANSPORT

Vehicles with a flat bed should be used for the transport of pipes. The bed should be free from nails or other projections. Each pipe should be supported uniformly along its length. Vehicles should have adequate side supports at not more than 1.5m centres and pipes should be well secured during transit. All uprights should be flat and free from sharp edges. When loading spigot/socket pipes, they should be stacked in alternate layers so that the sockets do not carry any load. Pipes should be loaded onto vehicles in such a way that any overhang does not exceed 1m. Thick walled pipes must be loaded before thin walled pipes.

Installation

GENERAL

The ability of a rigid pipe to support the total load transmitted to it is established by reference to actual crushing tests to cause fracture. Flexible pipes such as those made from unplasticized PVC do not fracture under load but they are liable to deformation. The extent of this deformation depends largely upon the compaction of the immediate surrounding fill. For this reason, flexible pipes should always be surrounded with non-cohesive material. This surround should extend to the trench width in normal trench situations. The external loads (backfill and surcharge) imposed on a pipe of rigid material (such as vitrified clay, concrete, asbestos cement or cast iron) are supported mainly (sometimes wholly) by the resistance of the pipe to circumferential bending. On the other hand unplasticized PVC pipes, being relatively flexible, offer less resistance to circumferential deformation and rely partly on external support to resist deformation. Therefore, it is of primary importance for unplasticized PVC pipes that fill material, particularly the bedding and sidefill, should be properly compacted in order to prevent excessive deformation.

It is desirable that vertical deformation should be limited to 5% on completion of the backfilling, which can only be achieved by proper compaction of the backfill (Please refer to Codes of Practice BS 5955 and BS EN 752).

It is essential to avoid high stress concentrations and sharp objects such as large stones or flints which should not be allowed to come into contact with the surface of the pipe.

The flexible nature of unplasticized PVC pipes helps them to accommodate deformations resulting from ground movement or from other differential settlement under normal circumstances.

Except in special circumstances, e.g. at very shallow cover depths or where it is necessary to safeguard the foundations of existing structures, the use of concrete for bedding or surrounding the pipes is unnecessary. Figure 2 (in "Special Protection - Ground Loads" section) illustrates the use of concrete in special local circumstances.

Normally drainage pipework is laid in straight lines. However, in special circumstances and subject to approval it may sometimes be acceptable to "spring" the jointed pipes to a slight curve to avoid an obstacle, or to follow the curvature of a street. If this is done, and the joints are of the push-in type, care has to be taken not to spring the pipework to, too sharp a curve or the joints may be overstrained and fail later. The manufacturer should be consulted as to the minimum radius that can be accommodated in this way. Straining of the joints can be minimised by firmly backfilling a short length of pipe. The pipe should be anchored in this position by further backfilling before the next joint is made, and the process repeated as necessary. The trench may need to be widened on the curve to accommodate the pipe in its straight position. It is essential that the jointing is always carried out in the straight position.

FLOW PROPERTIES

The following is based upon information given in the code of practice BS 5955: Part 6: 1980.

For the purposes of calculating flow rates through PVCu pipes, reference should be made to the Colebrook-White equation. Figures have been derived using values for roughness (Ks) given in the "Hydraulic Research Station Charts", 4th edition (metric), 1978 and "Tables for the hydraulic design of pipes" (metric edition), 1977 for the sizes of PVCu pipes dealt with in this code. It is recommended that the information given in Figure 3(b) is used for velocities less than 1m/s.

These values of roughness are for guidance only and may need future modification in the light of continuing research work.

CHOICE OF GRADIENTS

Choice of gradients should be such as to maintain self-cleansing velocity under normal discharge conditions.

To achieve a satisfactory installation, diameter and gradient should be adequate for the maximum flow and competent supervision should be provided to ensure a high standard of pipe quality, laying, jointing and workmanship. This is particularly important when pipes are laid to flat gradients.

The following guidelines on gradients should be observed:

a) For flows of less than 1 L/s, pipes not exceeding 100mm nominal bore at gradients not flatter than 1:40 have proved satisfactory.

b) Where the peak flow is more than 1 L/s, a 100mm nominal bore pipe may be laid at a gradient not flatter than 1:80, provided that at least one WC is connected.

c) 150mm nominal bore pipe may be laid at a gradient not flatter than 1:150, provided that at least five WC's are connected.

d) Experience has shown that for gradients flatter than those given in items a) and c), a high standard of design and workmanship is necessary if blockages are to be minimised. Where this has been achieved, gradients of 1:130 for 100mm nominal bore pipes and 1:200 for 150mm nominal bore pipes have been used successfully.

Where the available fall is less than that necessary to achieve the recommended gradient, increasing the pipe diameter particularly at low flows is not a satisfactory solution. It will lead to a reduction in velocity and depth of flow and an increase in the tendency for deposits to accumulate in the pipes.

Where it is expected that a drain may be affected by settlement, the selected gradient should be such as to ensure that a satisfactory fall will be maintained.

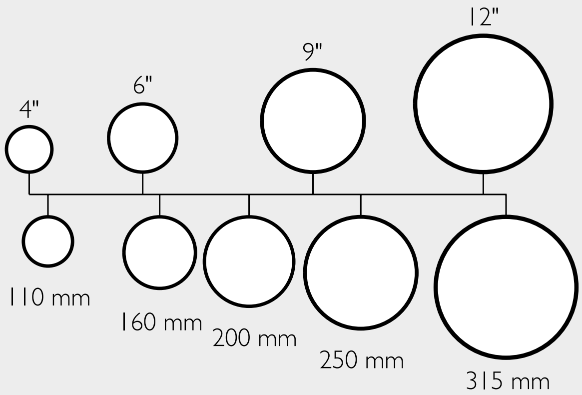
Research has shown that high velocities of sewage flow arising from steep gradients do not cause increased erosion of pipes or deposition of solids. In such situations drains should be laid at gradients, which are the most economical in excavation and cost. High velocities can, however, cause excessive turbulence at bends and manholes and lead to fouling. Where this occurs it can be mitigated for example by using long radius or sealed access fittings.

PIPE SIZING

PVCu PIPE SIZES COMPARED WITH TRADITIONAL PIPE SIZES

The diameters of Vision Drainage PVCu pipes increase in approximately 50mm increments compared with the 75mm generally for other materials, this enables pipes to be matched to design requirements more accurately and economically.

FIGURE 1. **COMPARISON OF PIPE SIZES**



SPECIAL PROTECTION - GROUND LOADS

Where a rigid pipe of:-

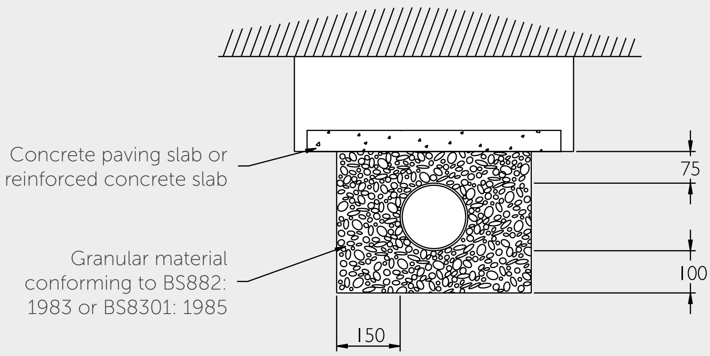
a) less than 150mm diameter has less than 300mm depth of cover, or

b) 150mm or more diameter has less than 600mm depth of cover,

it should be surrounded with concrete either 100mm or the diameter of the pipe, whichever is greater, in thickness and have movement joints, at not more than 5m centres.

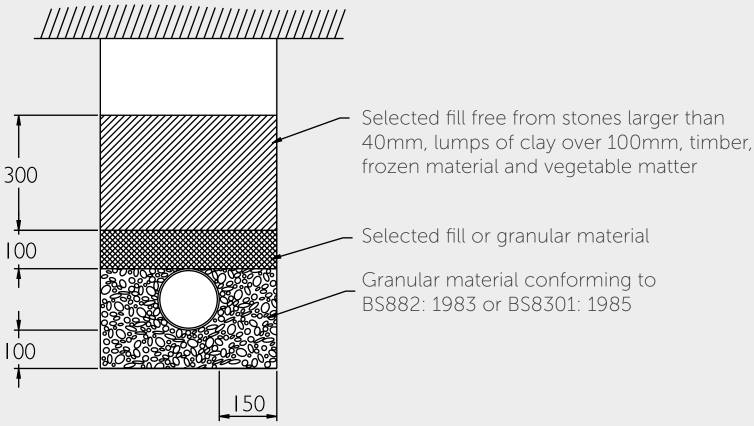
Where a flexible pipe has less than 300mm depth of cover under an area other than a vehicular area, it should have concrete paving slabs laid as bridging on granular or other flexible filling at least 75mm above the top of the pipe. Where a flexible pipe has less than 600mm depth of cover under a vehicular area it should have a reinforced concrete slab laid as bridging in a similar manner.

FIGURE 2. **PROTECTION FOR FLEXIBLE PIPES**



TRENCH PREPARATION

FIGURE 3. **BEDDING FOR FLEXIBLE PIPES**



1. Provision shall be required to prevent ground water flow in open trenches.
2. The barrel of the pipe shall have continuous bearing on the floor of the trench or the granular fill.

The trench should not be opened too long in advance of pipe laying and should be backfilled as soon as possible. It is essential to ensure that the sides of the trenches are adequately supported in accordance with the requirements of BS6031. To minimise a possible hazard, a trench should be open for the minimum time practicable.

At the crown of the pipe and for 300mm, or one pipe diameter if greater, above it the width of the trench within any timbering should be as narrow as is practicable, but not less than the outside diameter of the pipe plus sufficient extra width (usually about 150mm) on each side of the pipe to provide access for making the joints and placing and compacting sidefill. Above this level, the trench may be of any convenient width.

If the "as-dug" material is suitable for use as bedding, the bottom of the trench may be trimmed to form the pipe bed. Otherwise, the trench should be excavated to an adequate depth below the invert level of the pipe to allow for the necessary thickness of bedding material. The thickness of bedding under the barrel of the pipes should be a minimum of 100mm, but in very wet or soft conditions or where the trench bottom is very irregular, it may be necessary to increase this thickness. Bedding should be properly compacted and finished so as to provide uniform support for the pipe. It is essential that bricks or other hard materials are not placed under the pipes for temporary or permanent support.

Material to be used for bedding and surrounding the pipes should be selected granular material, either available locally or, if necessary, brought to the site. Suitable materials are described in Table 1.

TABLE 1. **SUITABLE MATERIAL FOR BEDDING AND SURROUNDING PIPES**

Nominal pipe size (mm)	Material (complying with the requirements of BS882:Part 2)
110	10mm, nominal single-sized aggregate
160	10mm or 14mm, nominal single-sized aggregate or 14 to 5 graded aggregate
220 and over	10mm, 14mm or 20mm, nominal single-sized aggregate, or 14 to 5 or 20 to 5 graded aggregate

Alternatively, granular material in accordance with the following materials for bedding recommendations and having a particular size not exceeding that in Table 1 depending on pipe size, may be used.

MATERIALS FOR BEDDING

1 VISUAL EXAMINATION

Examine the material and reject any which contains pieces with sharp edges.

2 PARTICLE SIZE

The maximum particle size should generally not exceed 20mm. The presence of an occasional particle between 20mm and 40mm is acceptable provided the total quantity of such particles is only a very small fraction. If particles over 40mm are present, the material should be rejected.

The following test will ensure compliance with this recommendation.

A weighed representative sample of the material, about 50kg of the proposed material should be subdivided to give a 2kg test sample which is sieved, using test sieves of 19mm and 38mm nominal mesh size (see BS410).

Note 1: To obtain a representative sample, about 50kg of the proposed material should be heaped on a clean surface and divided with a spade down the middle. One of these halves should then be similarly divided, and so on until the required sample is left.

Note 2: In the sieving, clumps of material that break up under light finger pressure may be helped through the sieve, but considerable force should not be used to squeeze oversize clumps through the mesh.

The material is not recommended if:

a) any particles are retained on the 38mm sieve, or

b) more than 5% by mass of the sample is retained on the 19mm sieve.

EASE OF COMPACTION

I) APPARATUS:

The following apparatus is required

a) Open-ended cylinder 250mm long and 150 ± 6mm internal diameter (160mm diameter unplastisized PVC pipe is suitable)

b) Metal rammer with striking face 40mm diameter and weighing 1.0 ± 0.1kg

c) Rule

II) PROCEDURE

Obtain a representative sample (note 1) more than sufficient to fill the cylinder (about 11kg). It is important that the moisture content of the sample should not differ materially from that of the main body of material at the time of its use in the trench.

Place the cylinder on a firm flat surface and gently pour the sample material into it, loosely and without tamping. Strike off the top surface level with the top of the cylinder and remove all surplus spilled material. Lift the cylinder clear of its contents and place on a fresh area of flat surface. Place about one quarter of the contents back in the cylinder and tamp vigorously with the metal rammer until no further compaction can be obtained. Repeat with the second quarter, tamping as before, and so on for the third and fourth quarter, tamping the final surface as level as possible.

Measure down from the top of the cylinder to the surface of the compacted material. This distance in millimetres divided by the height of the cylinder (250mm) is referred to as the "compaction fraction".

INTERPRETATION OF RESULTS

TABLE 2.

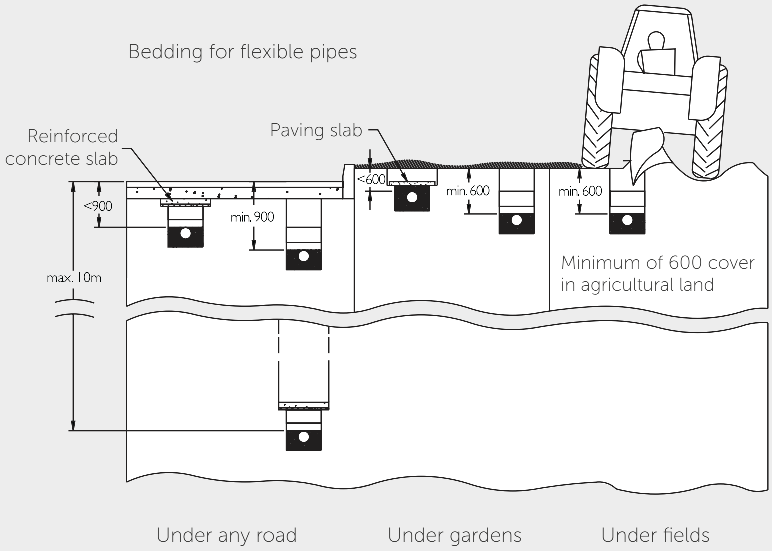
Compaction fraction (equivalent measurement from the top of the cylinder, mm)	Suitability for use
<0.20 (50)	Material Suitable
>0.20<0.3 (50 to 75)	Material may be suitable for applications other than installation carried out in compliance with the Civil Engineering Specification for the Water Industry but requires extra care in compaction. Not suitable if the ground is subjected to waterlogged conditions after laying.
>0.3 (75)	Material Unsuitable

PIPE LAYING

Unlike rigid pipes, pipes made from "flexible material" such as PVCu cannot be classified by their "crushing strength" but the fact that they are flexible does enable PVCu pipes to withstand forces from external loads and ground movement.

When a vertical load is imposed on a "flexible pipe" the resulting horizontal force is transmitted to the undisturbed trench wall by the sidefill. Any deflection of the pipe will cease when the horizontal reaction of the sidefill corresponds to the transmitted vertical load and a state of equilibrium is reached.

FIGURE 4. **MAXIMUM AND MINIMUM RECOMMENDED DEPTHS**



SPECIAL PROTECTION - SETTLEMENT

A drain which runs under a building should be surrounded by at least 100mm of granular or other flexible filling.

It is recommended that a drain, which passes through a wall or foundation, should either:-

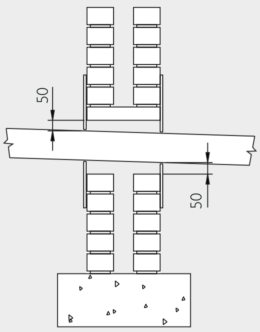
a) pass through an opening giving at least 50mm clearance all round as shown in Fig 5(a); or

b) be built in with, on each side, flexible joints within 150mm and rocker pipes of maximum length 600mm as shown in Fig 5(b).

c) wall protection sleeves are available shown Fig 5(c).

FIGURE 5. **PIPES PENETRATING WALLS**

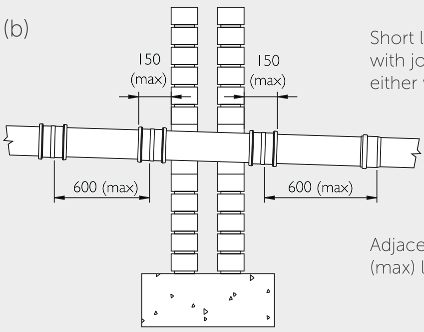
(a)



Arched or lintelled opening to give 50mm space all round the pipe

Mask openings on both sides of the wall with rigid sheet material to prevent entry of fill or vermin

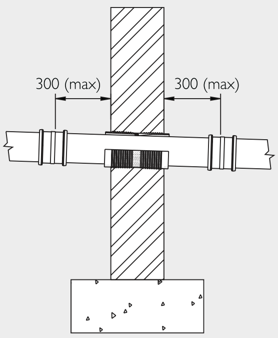
(b)



Short length of pipe bedded in wall with joints formed within 150mm of either wall face

Adjacent rocker pipes of 600mm (max) length with flexible joints

(c)



Wall protection sleeve bedded in wall with joints formed within 300mm of either wall face

A drain which is at a level lower than the foundations of a building:-

i) where the trench is within 1m of the foundations, it should be filled with concrete up to the level of the underside of the foundations; or

ii) where the trench is more than 1m from the foundations, it should be filled with concrete to a level, below the level of the underside of the foundations, equal to the distance from the foundations less 150mm.

Flexible pipes must be wrapped in polythene before surrounding in concrete. The minimum thickness of the concrete surround should be 150mm or the diameter of the pipe, whichever is greater.

(**Note:** where a drain is to pass under a foundation it should be supported on piles, or where the ground is unstable, specialist advice should be sought on the required protective measures).

SPECIAL PROTECTION - SURCHARGING

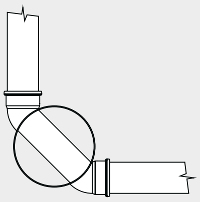
Where a drain is liable to surcharge, protective measures as described in standard BS EN 752 should be used.

ACCESS TO DRAINS

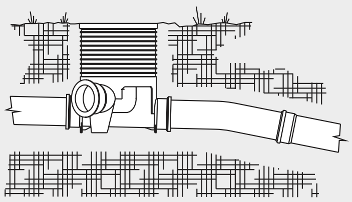
Access must be provided to drainage installations to allow for periodical maintenance, inspection and testing. Manholes, inspection chambers and shallow access chambers allow a system to be rodded in both directions whereas rodding eyes allow for only a downstream operation.

Basic principles state that every length of drain should be accessible for maintenance and rodding without the need to enter buildings. Access should be provided at the following points:

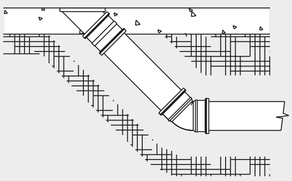
i) At every change in direction



iii) At any change in gradient



ii) At the head of a drain



iv) At any change in pipe diameter

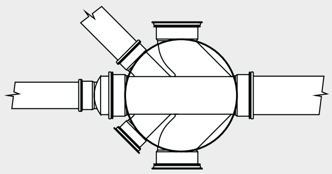


Table 3 indicates the maximum recommended spacing between various types of access points, based on standard rodding techniques and the necessity to clear blockages.

Where two drains join together via a branch junction and no provision of access is made on that junction then access should be provided no more than 12m from this point.

TABLE 3. **MAXIMUM SPACING OF ACCESS POINTS**

Distance to	To junction/ branch	To access fitting	To inspection chamber	To manhole
	m	m	m	m
From start of external drain	-	12	22	45
From rodding point	12	12	22	45
From access fitting	12	12	22	45
From inspection chamber	12	22	45	45
From manhole	-	-	45	90
As per National Annex to BS EN 752:2017				

The depth of any inspection chamber or manhole is determined by its minimum internal dimensions, since there must be adequate access or entry for rodding and maintenance. Details listed on Table 4.

TABLE 4. **MINIMUM DIMENSIONS FOR ACCESS FITTINGS AND CHAMBERS**

Type	Depth to invert from cover level (m)	Internal sizes		Cover sizes	
		Length x width (mm x mm)	Circular (mm)	Length x width (mm x mm)	Circular (mm)
Rodding eye	-	As drain but min 100	-	-	same size as pipework[1]
Access fitting					
small 150 diameter	0.6 or less except	150 x 100	150	150 x 100[1]	same size
150 x 100	where situated	150 x 100	150	150 x 100[1]	as access
large 225 x 100	in a chamber	225 x 100	225	225 x 100[1]	fitting
Inspection chamber					
Shallow	0.6 or less	225 x 100	190[2]	-	190[2]
	1.2 or less	450 x 450	450	Min 430 x 430	430
Deep	>1.2	450 x 450	450	Max 300 x 300[3]	access restricted to max 350[3]

Reference: The Building Regulations 2010, Approved Document H.

1 The clear opening may be reduced by 20mm in order to provide proper support for the cover and frame.

2 Drains up to 150mm.

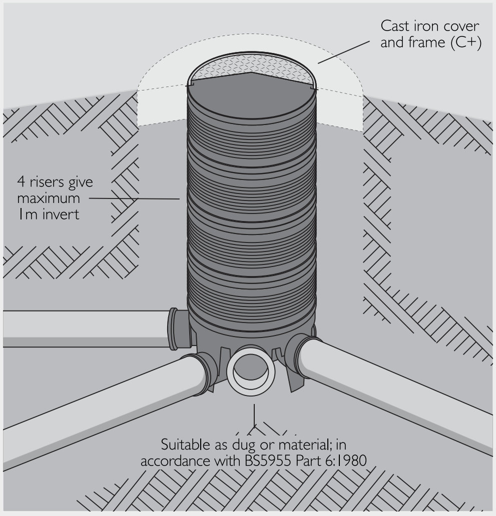
3 A larger clear opening cover may be used in conjunction with a restricted access. The size is restricted for health & safety reasons to deter entry.

PREFORMED INSPECTION CHAMBERS

Preformed inspection chambers can be used for invert depths of up to 3m, dependent on local specifications and building regulations. If the invert depth is greater than 1.2m this constitutes a no personnel entry Inspection Chamber and must have a restricted opening for health & safety reasons of less than 350mm to prevent personnel entry. The Reducer ring, code 450VCR350, is available in such circumstances and should be fitted into the cover frame. The chamber should be placed on suitable compacted material so that it is evenly supported.

When the base is in position the bungs can be removed and pipes inserted as appropriate. The risers are then placed on the base to reach the desired invert. The top riser can be trimmed to suit finished ground level. It is recommended that the cover and frame are fitted at this point to stop any foreign matter from entering the chamber. Backfilling may then take place around the chamber base and the connecting pipes, using suitable granular material. Backfilling continues to within 160mm of ground level. A concrete plinth is then cast, in which the cast iron cover and frame sit.

FIGURE 6a.



The straight through channel should be used for the main flow at all times as illustrated above. This reduces the likelihood of cross flow and helps show direction of flow for rodding purposes.

HOW TO INSTALL RISER SECTION

Step 1: Install the chamber base and ensure it is level

Step 2: Apply lubricant to the inner lip on the chamber base

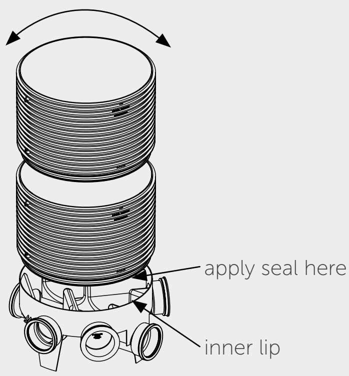
Step 3: Fit seal on the bottom of the first riser section

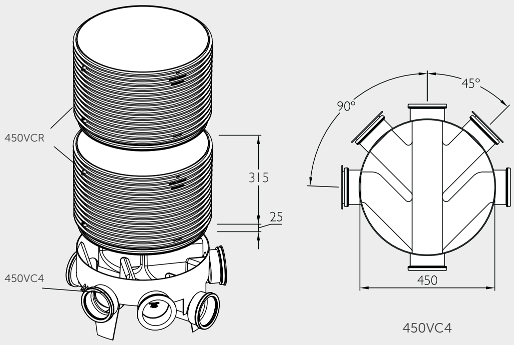
Step 4: Apply lubricant to the seal and bottom of riser section

Step 5: Place the riser on top of the chamber base and line it up, then rotate 180 degrees in one direction and then back while applying a slight downwards pressure

Step 6: Ensuring the riser is centralised push it down firmly

Step 7: Repeat process for each riser section





Product codes - Chamber Base 450VC4
Sectional Riser 450VCR

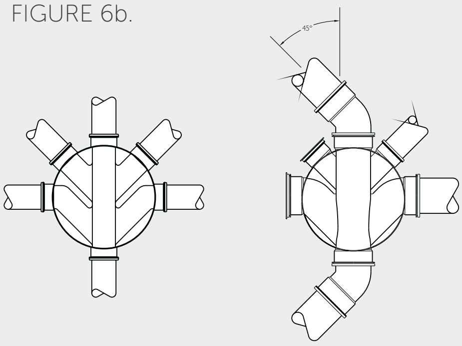
TABLE 5. **INSPECTION CHAMBER 450mm x 110mm & 450 x 160mm - KEY DIMENSIONS**

INSPECTION CHAMBER – KEY DIMENSIONS (mm)		
Socket Diameter	Standard 110mm	Standard 160mm
Chamber Base Diameter	**450**	**450**
Chamber Base Product Code	**450VC4**	**450VC6**
Invert Depth of Base	225	255
Invert Depth of Riser	315	315
Invert Depth of Base and 1 Riser	540	570
Invert Depth of Base and 2 Risers	855	885
Invert Depth of Base and 3 Risers	1170	1200
Round Cover and Frame	33	33
Square Cover and Frame	48	48

NB: Restricted opening of 350mm diameter at ground level must be employed for chambers deeper than 1.2m

Figure 6b illustrates some of the alternative configurations available when using pre-formed inspection chambers.

FIGURE 6b.



NB: When turning through 90°, 2N° x 45° bends should be used as above, to incorporate the main channel throughout the change of direction.

TABLE 6. **SHALLOW ACCESS CHAMBER 280mm & 315mm - KEY DIMENSIONS**

SHALLOW ACCESS CHAMBER – KEY DIMENSIONS (mm)	
Socket Diameter	Standard 110mm
Chamber Base Diameter	**280**
Chamber Base Product Code	**4VC280**
Invert Depth of Base	205
Invert Depth of Riser	185
Invert Depth of Base and 1 Riser	390
Invert Depth of Base and 2 Risers	575
Cover and Frame	20.5

SHALLOW ACCESS CHAMBERS

The Vision Drainage 280mm dia Shallow Access Chambers are designed for use with 110mm pipework and are suitable for inverts up to 600mm.

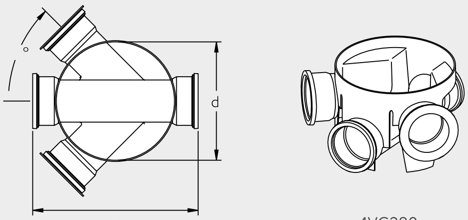
The 280mm Chamber range offers two different bases, code 4VC280 incorporating one 45° inlet on each side and code 4VC28090, which features a 90° change of direction of the main channel.

Chamber Risers for both assemblies incorporate ring seals that allow easy push fit joints between the base and each other. It is strongly recommended that lubricant is always used in making a ring seal joint. Each Riser adds 185mm to the Chamber assembly, with a maximum of two risers to be used.

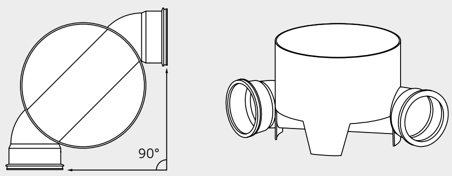
The Cover and Frame code 4VCF280S, features a double seal and can be used internally, if required. When used externally, location must be in a pedestrian area only. It is recommended that all frames are located in a concrete plinth for stability and to spread the loading when used in a driveway location.

All Covers and Frames are square and are easily incorporated into paving or tarmac.

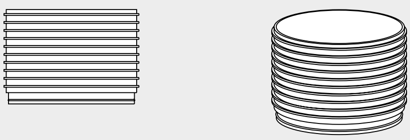
FIGURE 7.



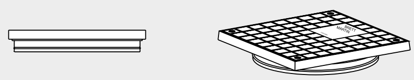
4VC280



4VC28090



4VC280S



4VCF280S
(For pedestrian areas only)

ACCESS AND INSPECTION CHAMBERS

Ensure that the base is embedded on a suitable substrate. This should either be suitable "as dug" material or materials in accordance with BS EN 1610:2015.

Check that the spigot on the riser is free from imperfections such as dents, burrs or cracks.

Clean both the spigot on the riser and the seal to ensure that they are free from any dirt which may impede their function.

When fitting the seal to the riser be careful not to stretch the seal any more than is required to fit it into the recess.

Add some lubricant around the seal and run your thumb around the seal to both ensure that the seal is housed in its groove/recess and to wipe away any excess lubricant.

Place the riser on top of the base/riser to which it will be fitted. The riser should be positioned so that seal sits on top of the chamber/riser below.

Position both hands diametrically opposed to one another and apply even pressure to push the riser downwards into the base/riser below until it is completely fitted. Ensure that the riser is inserted square to its axis and not fitted at an angle as this may push the seal out of its recess.

Check that the riser/base has no raised areas any deflection in front of the seal as this may indicate that the seal is dislodged.

Once the riser is in place, cable ties (or similar) can be used on the integral lugs on the side of both riser and bases. These are positioned between both base and riser or riser and riser in order to ensure that the riser cannot "pop out" of the base/riser below it during backfilling.

Care should be taken when backfilling so the chamber assembly is not disrupted by excessively or unequally backfilling.[a]

It is recommended that inspection chamber assemblies are water tested and visually inspected prior to backfill to ensure leak tightness.[a,b]

Further water testing is also recommended once installation is complete.[a,b]

[a] To be carried out in accordance with BS EN 1610:2015.
[b] Water testing requirement on installations is subject to local/national building regulations.

600mm INSPECTION CHAMBERS

Our Vision 600 inspection chamber bases are manufactured for sewer and surface water applications. They can withstand B125 & D400 loadings supported by a concrete plinth and cover & frame. The chambers are suitable for adoptable and non-adoptable use, and compliant with Sewers for Adoption 7th edition. Our range follows the regulations BS EN 13598-2, SfA7 Type 3 and Building Regulations Part H1.

Key features include:
- lightweight
- fast installation: no wet trades required
- robust
- shaft can be easily cut to required length (maximum of 3m for adoptable use, 5m for non-adoptable use)

Preparation, Positioning & Connections

Prepare and compact a 100mm bed of granular material in the bottom of the trench. Then position the inspection chamber base on the bed. Check each outlet is facing in the correct direction to ensure water flow, and are free from dirt or grit. Use a standard jointing procedure to connect 150-315mm pipe to the base, using the required adaptors for each outlet.

Backfill

Cover the top of shaft in order to prevent ingress of dirt or grit, then, using the same material as the bedding, backfill around the chamber base in 150mm layers.

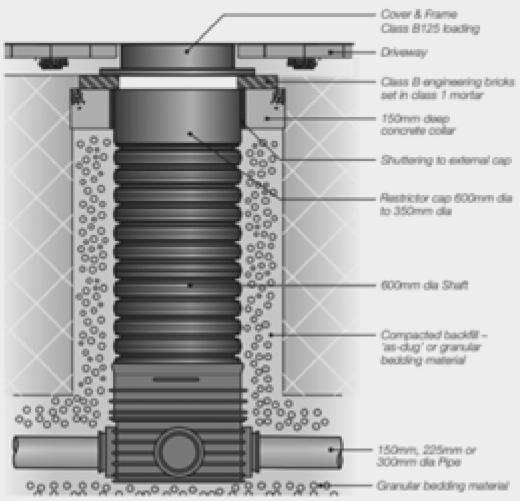
Preparing Inspection Chamber Shafts

Cut corrugated shaft to approx. invert depth of chamber (using a fine-toothed saw). Ensure sealing rings between shafts are seated correctly/not twisted. Clean inside of base socket and lubricate this entire area. Position shaft at 45° angle into base socket and push in manually.

Trim shaft/fit restriction access cap

Trim shaft to final height (using a fine-toothed saw) and make sure the sealing ring is located in the 1st rib from shaft top. It should be seated correctly/not twisted. Lubricate inside the 600 to 350mm restrictor cap, position over top of shaft, and push in.

FIGURE 8. **TYPICAL INSTALLATION DETAIL: VISION 600 INSPECTION CHAMBER**

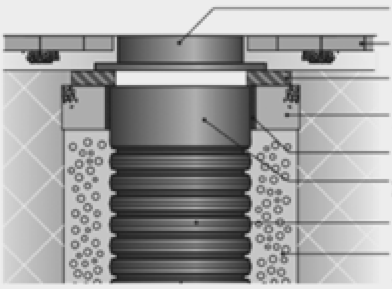


Set up of concrete ring

For A15 applications in domestic gardens or driveways, leave top of shaft clear and lay a 150mm thick concrete collar around. Position A15 Cover and Frame and socket as illustrated.

For heavier duty applications in trafficked areas, ensure unit is at correct height and protect shaft by shuttering its external ribs (see figure 8). Install 150mm thick pre-cast or situ concrete around the top of shaft with a minimum opening of 750mm diameter – to ensure that any loads are dispersed away from the shaft. Position Ductile Iron B125 Cover and Frame on top of slab as illustrated in Figure 9. For a D400 Cover and Frame, follow the Highway Specification.

FIGURE 9. **INSTALLATION DETAIL FOR B125 LOADING**

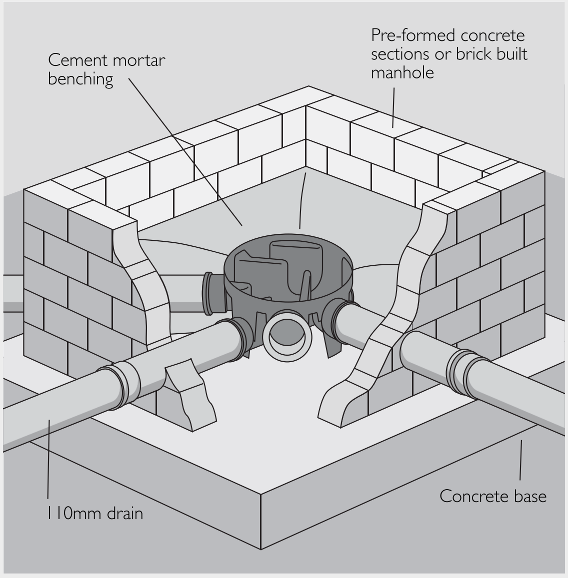


N.B. Please see the Building Regulations 2015, Approved Document H for further information, including granular material that is suitable for backfill.

OPEN CHANNEL MANHOLES

Vision Drainage chamber bases can be used in the bottom of a constructed manhole arrangement. The chamber base is positioned carefully in concrete to give full support throughout its diameter. Benching is sloping upwards from the base to the manhole walls at a gradient of 1:12. All construction must be in accordance with BS EN 752, Figure 10.

FIGURE 10.



A large range of ½ and ¾ channel fittings offer the contractor a wide choice of constructional methods.

Fittings are available in 110mm, 160mm and 200mm diameters. Two systems are available:

(i) Level invert system Figure 11

(ii) Stepped invert system Figure 12

A level invert system is advantageous when invert levels need to be accurate. The range consists of junctions, bends, tapers which have to be solvent welded into position. No solvent welding is required on a stepped invert system.

FIGURE 11. **LEVEL INVERT SYSTEM**

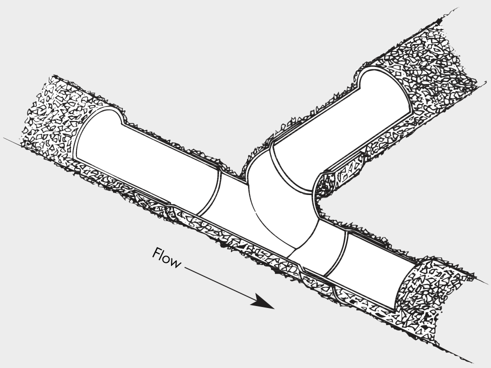
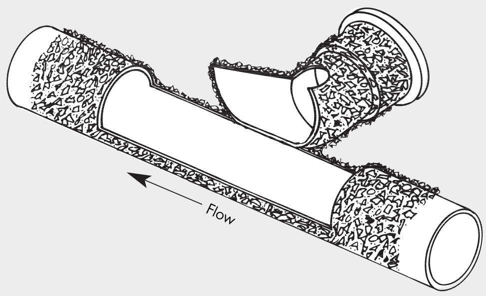


FIGURE 12. **STEPPED INVERT SYSTEM**



Solvent welding must be carried out in the following way to ensure a sound and lasting joint:

(i) All spigot ends must be square and chamfered

(ii) Both surfaces should be free from dirt and water

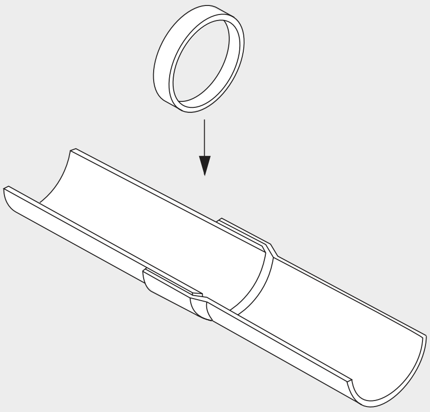
(iii) With a clean brush apply Solvent Cleaner to both surfaces and allow to dry

(iv) Again with a clean brush apply an even coat of Solvent Cement

(v) Immediately insert the coated spigot into the socket and hold in place for about a minute

N.B. A narrow cut-off pipe may be sprung into the joint to hold the assembly in position. See Figure 13, but it must be removed when the joint is set.

FIGURE 13. **SOLVENT WELDING**



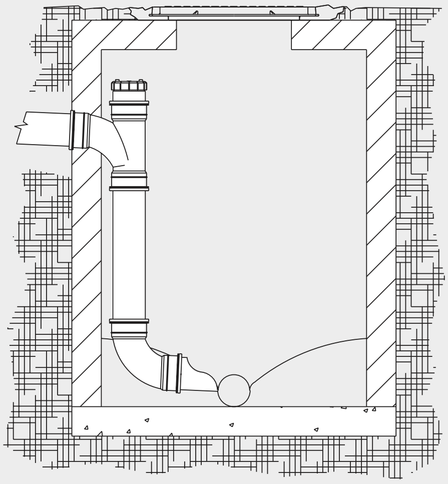
The full range of Vision Drainage Channel Fittings are supplied with a keyed surface, to ensure excellent adhesion to the concrete benching.

BACKDROP MANHOLE CONSTRUCTION

A backdrop installation is required when two or more pipes, at different invert levels, are to meet at one manhole. Minimum trench excavation is therefore needed to join the pipework together.

The vertical section of a backdrop can be constructed internally or externally.

FIGURE 14. **INTERNAL BACKDROP**



INTERNAL CONSTRUCTION

To construct an internal backdrop as illustrated in Figure 14 use:

1 No 4VF64 - Screw Access Cover

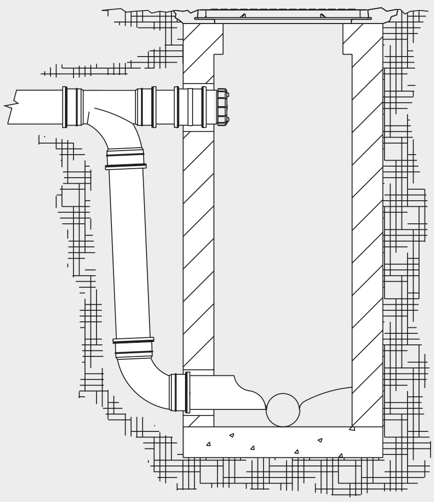
1 No 4VF90TT - 87½° Triple Socket Branch

1 No 4VF90 - Single Socket Bend 87½°

section of pipe for vertical drop

The vertical section should be securely fixed to the manhole wall using double socket soil pipe bracket and held with stainless steel screws.

FIGURE 15. **EXTERNAL BACKDROP**



EXTERNAL INSTALLATION

The vertical section of the installation is this time outside the chamber wall. The fittings required to construct an external backdrop are as shown in Figure 15:

1 No 4VF64 - Screw Access Cover

1 No 4VF90TT - 871/2° Triple Socket Branch

1 No 4VF20D - Pipe Coupler

1 No 4VF90D - Double Socket Bend 871/2°

plus a suitable section of vertical pipe

Note: 160mm installations may be constructed using similar 160mm fittings.

RODDING ACCESS

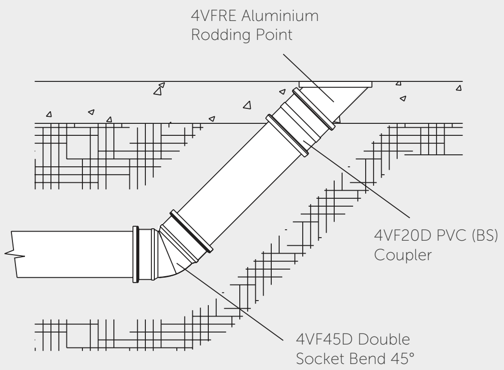
When installed correctly, the use of rodding points can eliminate the need for expensive Inspection Chambers and Manholes, significantly reducing the cost of installation.

HEAD OF DRAIN RODDING POINT

A Rodding Point as shown in Figures 16 and 17 can be used at the head of a drain in place of an inspection chamber or manhole. The rodding eye itself is made from cast alloy and has a 110mm spigot allowing easy connection to the system.

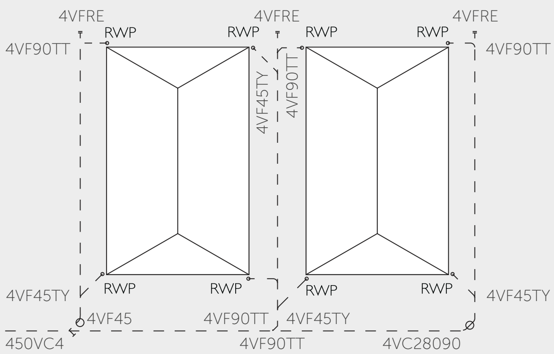
Being set at 45° it allows easy rodding of the system.

FIGURE 16. **HEAD OF DRAIN RODDING POINT**



NB Sealed square and socketed version of the aluminium rodding point is also available code 4VFRE.

FIGURE 17.



Shows how Rodding Points can minimise the number of inspection chambers and manholes on a typical surface water application.

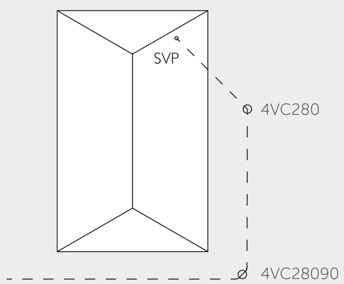
UNIVERSAL RODDABLE BOTTLE GULLY

The Vision Drainage Universal Roddable Bottle Gully, may be used with a wide range of grids and sealing plates. It may be rotated leaving the grid square to the wall thus giving a more direct line of drainage resulting in economy of fittings.

A full 100mm diameter access, gained by the removal of the dip tube, enables a wide range of cleaning equipment to be used.

The unit can be used instead of a traditional gully assembly and in certain applications, can remove the need for an inspection chamber, use Figure 18.

FIGURE 18. **HOW A RODDABLE BOTTLE GULLY CAN ELIMINATE THE USE OF INSPECTION CHAMBER OR MANHOLES**

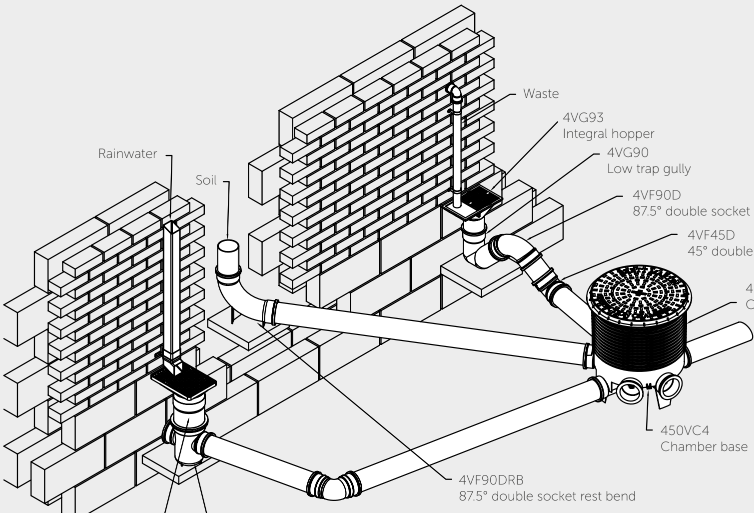


RODDING ACCESS

In areas where combined foul and surface water systems are permitted, the rainwater connections must be trapped. See Figure 19.

Concrete Floor Construction

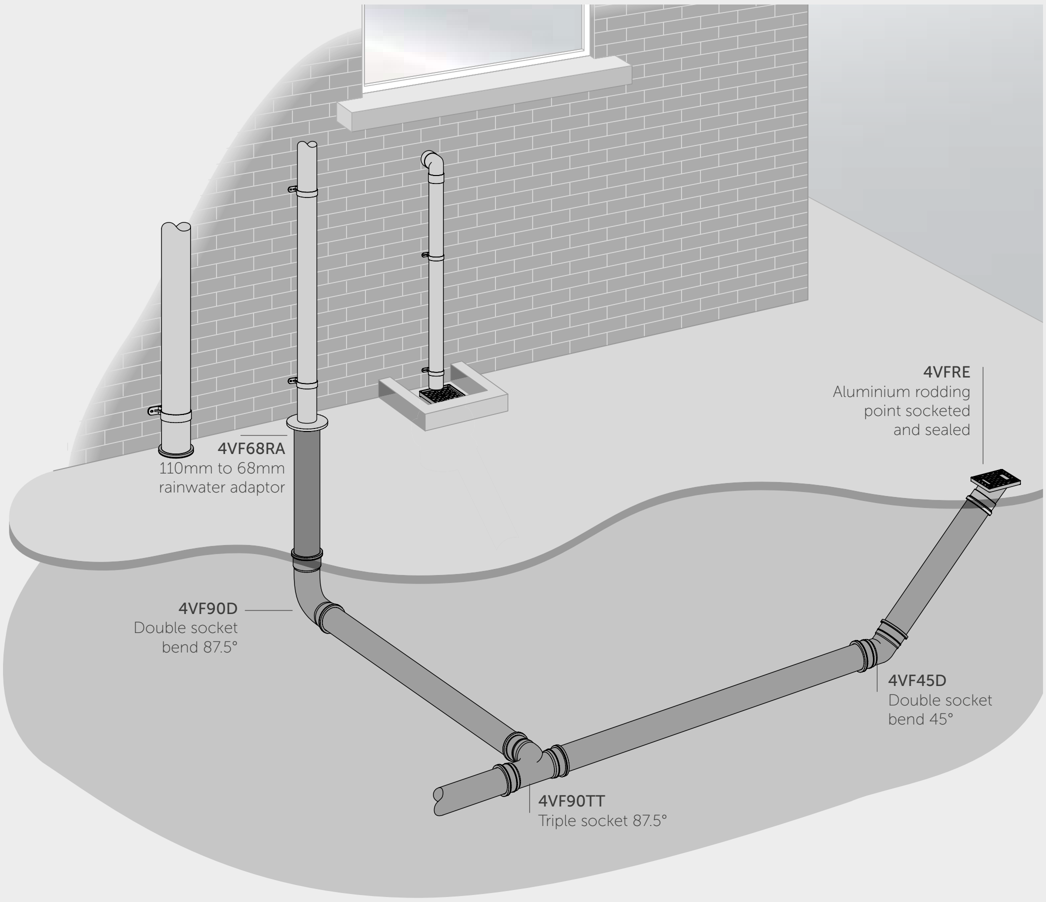
FIGURE 19. **TYPICAL LAYOUT USING RODDING ACCESS COMPONENTS**



USEFUL INSTALLATION TIPS

- Always chamfer cut pipe and lubricate all plain ended spigots for perfect joints.
- Storm water connections are invariably less critical than those in the foul system. Therefore lay the foul drain system closest to the building and lay the storm system around this wherever possible.
- Where external soil stacks are connected to the side inlet of a preformed chamber, ensure that the distance between the two is a minimum of 750mm to help prevent cross flow of solids onto the opposite benching.
- Where combined drainage systems are installed ensure each rainwater pipe is connected to a gully.
- Always use the main channel of a chamber at a change of direction of the main run.

FIGURE 20. **TYPICAL INSTALLATION (ENGLAND & WALES) - SURFACE WATER SYSTEM ONLY**



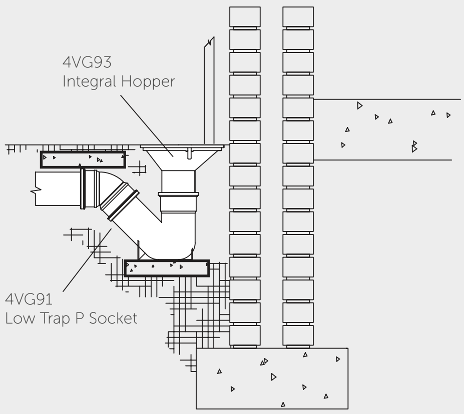
TRADITIONAL GULLY ASSEMBLY

The Low Trap Gully can be supplied in basic assembled form with a wide range of bends offering a choice of outlet.

The hopper should be attached to the trap out of the ground, and the whole assembly should be placed on a ready-made concrete slab, connected to the main drain, and backfilled with a selected granular material.

If the assembly is not protected by pavings or concrete at ground level e.g. in a garden, then a concrete slab should be bedded above the outlet bend to prevent damage from garden implements, Figure 21.

FIGURE 21. **TRADITIONAL GULLY ASSEMBLY**

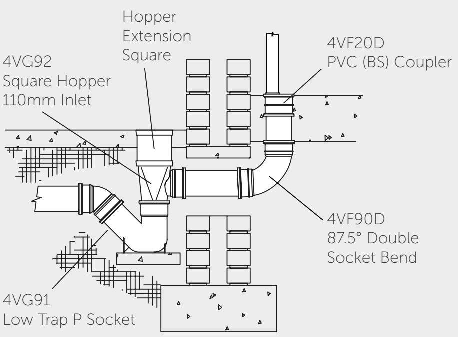


HORIZONTAL BACK INLET ASSEMBLY

Figure 22 shows the use of the Horizontal Back Inlet Hopper when collecting waste water from inside a building.

Gully risers can be used with the whole range of square hoppers and bottle gully when extra depth is necessary. The rest of the gully assembly is as the aforementioned installation.

FIGURE 22. **HORIZONTAL BACK INLET ASSEMBLY**



BOTTLE GULLY ASSEMBLY

The unique round to square adaptor enables the gully outlet to be rotated leaving the grid square to the wall thus giving a more direct line of drainage.

The base design allows the gully to stand freely on a firm base of bricks or concrete without additional support.

It has two bosses which will accept a 110mm pipe when the need for the true back inlet arises.

Installation is completed by bedding and surrounding the gully with selected granular material.

SOIL PIPE CONNECTION (SHORT RADIUS)

Figures 23(a) and (b) show how to connect an internal soil stack to an underground drainage system using a two way knuckle bend.

FIGURE 23 (a). **USUAL SOIL PIPE CONNECTION**

Suitable where WC's are connected to the soil stack, the rest bend 4VF90DRB should be used.

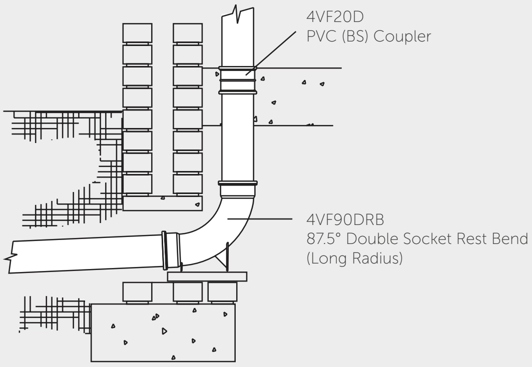
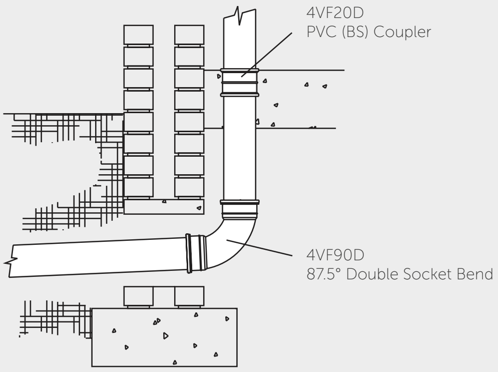


FIGURE 23 (b). **SOIL PIPE CONNECTION (SHORT RADIUS)**

Suitable where WC's are not connected to the soil stack. The pipe is then taken to ground level and connected to the stack with a coupler.

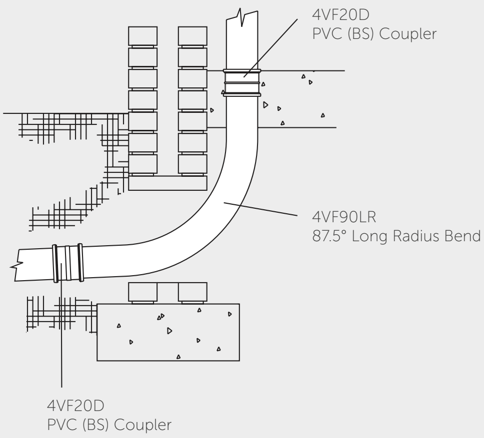


SOIL PIPE CONNECTION (LONG RADIUS)

Figure 24 again shows the connection of underground drain to soil by the use of a long radius bend connected together with two couplers.

It is advisable to use a long radius bend when heavy or fast flows are expected e.g. flats (multi-storey dwellings).

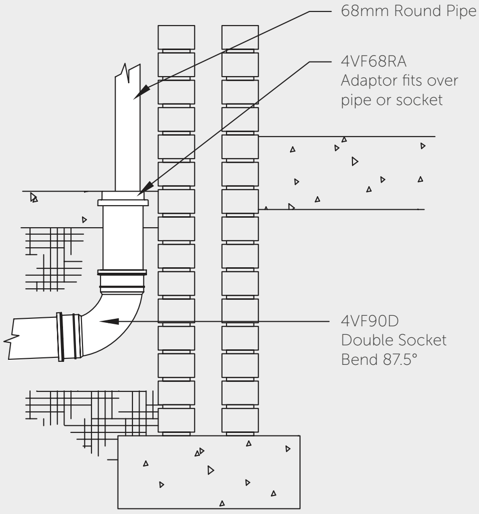
FIGURE 24.



RAINWATER PIPE CONNECTIONS

If rainwater pipes are to be situated externally then connections can be made by fitting a rainwater pipe adaptor to a pipe and via a knuckle bend as shown in Figure 25. Should the system be combined the rainwater pipe would have to be dropped into a trap assembly similar to that shown in Figure 21.

FIGURE 25. **RAINWATER PIPE CONNECTIONS**



PIPE JOINTS

The Vision Drainage system includes adaptors to connect PVCu to clay or cast iron sockets or spigots. These connections are illustrated in Figures 26 and 27.

FIGURE 26. **PVCu STANDARD CLAY ADAPTOR (4VFC2P)**

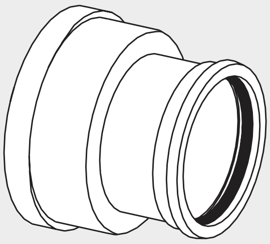
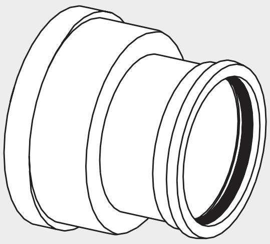


FIGURE 27. **PVCu SUPER CLAY ADAPTOR (6VFC2P)**



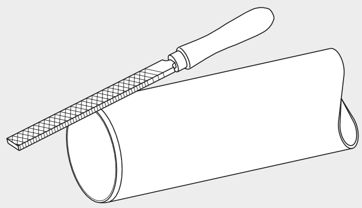
CUTTING

Pipes can be cut with a hand saw having 6-8 teeth per cm, held at a shallow angle and sawing with slow steady strokes. A file should be used to remove any swarf and a chamfer should be made around the full circumference of the pipe.

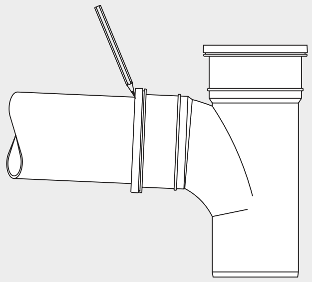
PUSH-FIT JOINTING

To ensure watertight jointing the following procedure should be followed:

- Pipe ends should be cut square. Chamfer the end to approximately half the wall thickness and at an angle of about 15° using a file or rasp. Remove all swarf with a scraper or knife blade. Chamfers are moulded on spigot ends of all fittings.

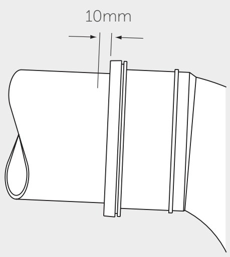


- Check all seals, sockets on pipes and fittings and pipe ends, for a distance equivalent to socket depths, are clean.
- Apply lubricant around the pipe end or spigot end of fittings - not around the ring seals.
- Align components and push the pipe end or fitting spigot fully into the ring seal socket to the depth of entry mark; mark the pipe or fitting spigot at the socket face.



- Withdraw the pipe or spigot until the mark is 10mm away from the socket face: this creates a thermal movement allowance within the socket.

Make a subsequent check to ensure that the expansion gap is not lost during further installation work.



PERFORATED PIPE

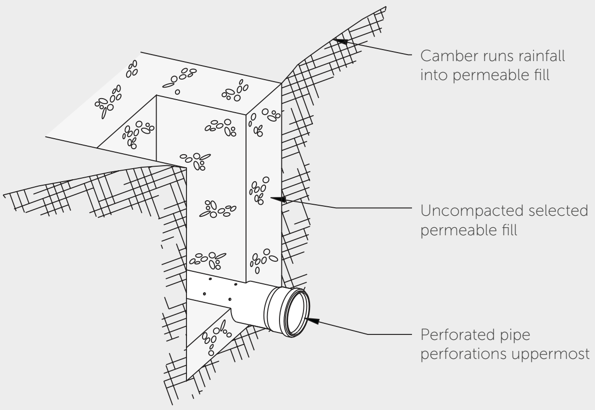
Perforated pipes are normally used in French drain applications, draining rainfall from paved or concreted areas such as roads, car parks, airfields etc. The camber of the paved or concreted area runs rainfall into the permeable fill above the perforated pipe. Highway drainage systems for example usually include French drains on both sides of the carriageway and in the central reservation.

PERFORATED RIGID PIPES

INSTALLATION OF PERFORATED RIGID PIPES AS A FRENCH DRAIN

- Install Perforated Pipes using selected permeable fill as bedding, sidefill and backfill material, Figure 28.
- Do not compact the bedfill.

FIGURE 28. **FRENCH DRAIN**



SEPTIC TANK LEACH PIPE INSTALLATION USING PERFORATED RIGID PIPES

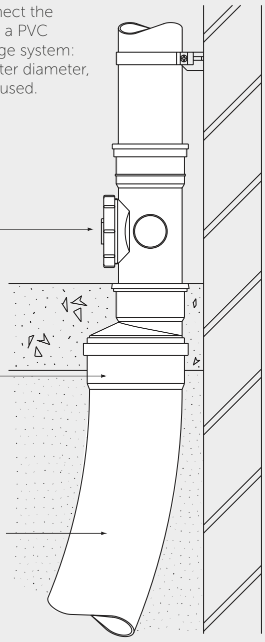
Vision Drainage Perforated Pipes may be used to dispose of septic tank effluent by sub-surface irrigation.

- Lay pipes in trenches with a uniform gradient not steeper than 1:200 from the septic tank outlet.
- Install unperforated Vision Drainage pipe with a fall of 1:30 for the first 3 metres. Installing an Inspection Chamber at this point will make it easier to monitor land drainage.
- Lay the pipes on, and surround them with a 150mm layer of clinker, clean gravel or broken stone 20mm - 50mm grade. Consult the septic tank manufacturer for advice on whether to position the perforations upwards or downwards in the trench.
- Place a layer of polythene sheet over the perforated pipe before backfilling.
- Do not use pipes manufactured in accordance with BS4962 for disposing of septic tank effluent.

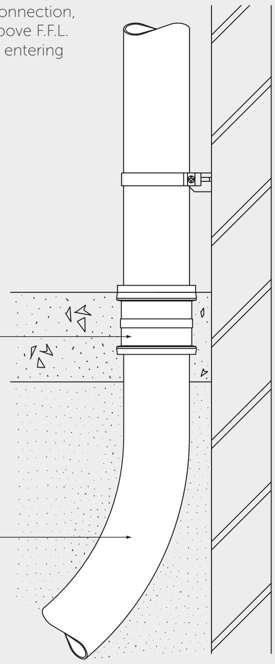
CONNECTION TO UNDERGROUND DRAINAGE

CONNECTION TO PVCu DRAIN SOCKET

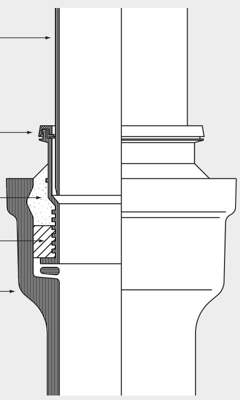
It is possible to connect the 110mm Soil Stack to a PVC underground drainage system: where this is of greater diameter, an adaptor must be used.

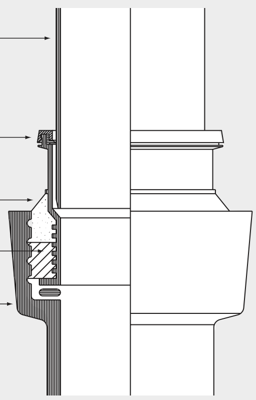


With no ground floor connection, the socket should be above F.F.L. to help prevent rubbish entering the drain.



CONNECTION TO CAST IRON DRAIN SOCKET





WALL SEALS

Before fitting wall seals, ensure that all surfaces are clean and the dimensions of the hole and pipe are accurate.

Firstly, insert the wall seal into the hole, please note that lubricant is not required for this. Then chamfer the edge of the connecting pipe and lubricate. Next, centre the end of the pipe and push it into the seal, ensuring that the pipe end is flush with the inner wall.

MAINTENANCE

When designed and installed correctly the underground Vision Drainage system is maintenance free.

Before any methods of access are adopted the Local Authority must be consulted to ascertain their own specific requirements.

Conventional rods, implements and specialist power assisted equipment may be used for cleaning a PVCu drain. It is necessary to ensure that cleaning equipment, particularly the end implement, will not cause damage to the pipe and fitting walls.

Should it become necessary to repair or extend a drainage system then use of a Vision Drainage Slip Coupler - Code 4VF20DSC/6VF20DSC can be made.

vision
by drainfast

Drainfast Ltd | Vision House, Bedford Road, Petersfield, Hampshire GU32 3QB | 01730 774000 | www.drainfast.co.uk