Brymec

VOX dB12 Acoustic Drainage System TECHNICAL MANUAL

0.1 Introducing Brymec Products

Brymec is a family business with 50 years of experience in providing quality products to the construction industry, and this means that we understand the challenges that you face and the solutions that you require

From our start in 1974 in south London, Brymec has grown to become one of the country's leading manufacturers and suppliers of quality products to the construction industry.

Our philosophy is to always provide the ultimate service and peace of mind to our customers. A key feature of our pledge to you is to ensure that we always have the best possible range of products for you to choose from.

By investing in innovation, we have been able to engineer our own range of products, all manufactured to our exacting specifications, to deliver quality solutions for the building services industry.

Each one of Brymec's products is not only manufactured to the highest quality standards, but they are also all backed up by robust quality controls, Brymec's industry-leading guarantees and all are supported by our in-house Technical Support team.

Our efficient approach of 'direct supply' enables you to buy a full range of products straight from the manufacturer, Brymec. This innovative approach simplifies your supply chain, speeds up your deliveries, provides greater support and gives you greater control.

A proven benefit to all construction projects is the unique way that Brymec ensure unbroken support to each stakeholder throughout the full project cycle. Starting during the Design phases, through Pre-Construction and the on-site construction period and on to project completion we are providing the required levels of technical expertise, knowledge and support.

This seamless journey **from start to finish** saves time and cost, but vitally ensures that the right input and teamwork are there to assist as valued Partners in a successful project.

0.2 Contents

0.3 Sustainability - commitment to a sustainable future

The '2021 Global Status Report for Buildings and Construction' by the UN states that "The buildings and construction sector accounted for 36% of global energy demand and 37% of energy and energy-related carbon dioxide (CO2) emissions in 2020". Currently, data for the UK shows that the construction industry is responsible for 40% of total emissions, so we all have a major part to play in achieving the UK's goals.

Our Vision

'To be the greenest, most environmentally friendly supplier to the Building Services industry.'

Cert. 459902024

Our Business

As a leading manufacturer and distributor of quality valves, tubes and fittings we are always seeking ways to improve our operations to lower our environmental impact and to better serve the industries we supply.

Our signature phrase 'Built for Tomorrow' underpins what we do as a business, whether that be through innovative products which are more environmentally friendly, or by adopting ever more efficient processes.

Certification

Working with accredited independent assessors, our UK based facilities and operations identified key areas of improvement. By enacting these recommended changes, since June 2022 Brymec has been awarded the status of 'Carbon Neutral Organisation' by Carbon Neutral Britain*.

* Certified for scope 1, 2 & 3.6 emissions

0.4 Brymec Environmentally Friendly delivery model

Core sustainability goals

In 2021 Brymec's board set our goals to focus the activities of our sustainability agenda.

Sustainability goals set in January 2021 - Brymec operations and core product ranges					
Goal	40.1% reduction in emissions per £ million by 2030	Core product ranges from 50% recycled feedstock by 2030	50% reduction of single use plastic packaging	100% of wooden products certified as sustainable FSC Approved	30% of company vehicles to be electric by 2030

Key areas of focus

Our journey towards an ever more environmentally friendly solution continues, and our focus falls in to several key categories;

- Sustainable packaging solutions including plastic packaging.
- Development of product ranges to include sustainable materials and processes.
- UK based operations heating and energy from renewable technologies.
- New software to optimise efficiencies for onward logistics.
- Shortening of the supply chain (below);.

Standard models of distribution in the UK can involve up to 6 movements of products by the time products are delivered from the manufacturing facility to the construction location. Brymec's model is to shorten this process to make the delivery process as efficient as possible to reduce emissions.

Industry leading Order Fulfillment

With over 99 % of orders being delivered fully complete with no balances and therefore avoiding follow on deliveries, this provides real proven savings in transport emissions and ensures huge benefits in increased site efficiency.

1. Brymec Acoustic Waste System

1.1 System Overview

The VOX dB12 Acoustic Drainage System is a superior quality push-fit drainage system for use in above ground commercial, residential and industrial applications. Made from high-grade polypropylene copolymer with reinforcing mineral fillers which greatly increases the acoustic properties of the system, this results in a material which is exceptionally resistant to impact and stress.

The VOX range is manufactured using the latest multilayer pipe technology and consists of high-performance multilayer pipes with mono and dual sockets together with a vast range of fitting configurations.

VOX is available in a wide range of diameters from 32 mm up to 200 mm.

The sound-optimised fittings feature an innovative. Double Lip Seal design and include special and exclusive component configurations.

Due to the superior sound reduction properties, the VOX dB12 Acoustic Drainage System is particularly suitable for the use in hotels, multi-occupancy residential, high-quality residences, educational, scientific and healthcare projects. It also has outstanding strength and durability properties and is ideal for the secure removal of:

- wastewater and domestic water
- foul water
- internal rainwater
- swimming pool drainage
- secondary water drainage

1.2 Key Features and Advantages

The VOX dB12 Acoustic Drainage System has several outstanding features

VOX has an outstanding combination of features and unique details included in the design to provide the user with the easiest and most reliable installation. This is coupled with best practice standards from the start of manufacture to the completion of a project.

Acoustic Rating of dB12

When tested to EN 14366 with optimised pipe clamps, Vox achieved a Structure-born sound characteristic level of 12dB

Waste water system with optimised clamps				
Flow rate [l/s]	0,5	1,0	2,0	4,0
Airborne sound pressure level $L_{a,A}$ [dB(A)] [1])	45	49	52	54
Structure-born sound characteristic level $L_{SC,A}$ [dB(A) [1])	<10	<10	12	16

[1]) Evaluation according to DIN EN 14366.

Double Lip Seal

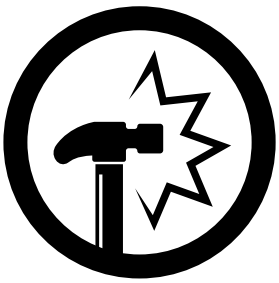
The unique Double Lip Seal provides ultimate sealing performance due to the latest technology bi-material ring component which is inserted mechanically into the fitting socket. This guarantees protection for the hydraulic seal element and provides ultra secure Push-Fit joint completion.

White Internal Lining

The smooth internal layer is supplied with a smooth white finish which enhances flow, reduces the risk of blockages and enables easy inspection if required.

Sound protection

Multilayer construction and special mineral reinforcement provides excellent noise reduction perfomance – dB12 rated and Sound Level 3.

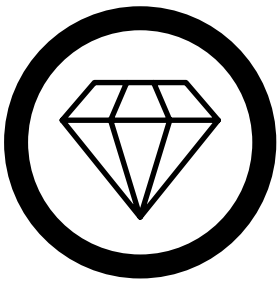


Impact resistance

High strength Polypropylene Copolymer with reinforcement ensures excellent resilience and impact resistance even in low temperatures.

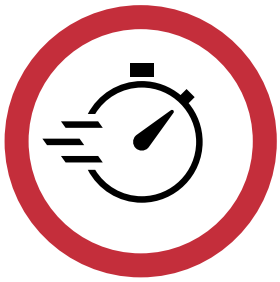
Leakproof

Unique Double Lip seals on the fittings provides ultra secure Push-Fit joint technology with visible evidence of correct installation.



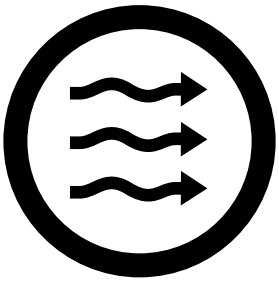
Durability

The stability and endurance of Polypropylene Copolymer provides and expected lifespan under normal usage and conditions of in excess of 50 years.



Time saving

Secure and reliable Push -fit connections provide rapid joint completion for time saving installation.

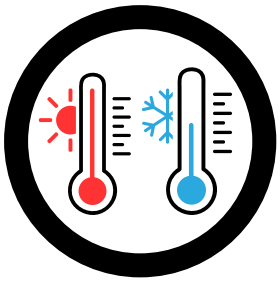


Blockage resistance

The smooth white Polypropylene Copolymer internal finish is abrasion resistant and is designed to maximise the flow rate and reduce the formation of deposits, thus reducing the risk of blockages.

Chemical resistance

The internal surface is resistant to many chemicals including most surfactants including at high temperatures according to ISO/TR 10358.

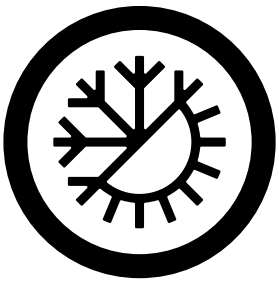


Wide temperature range

VOX is not affected by low temperatures and will not deform or become brittle. The wide range of operating temperatures suits most building environments.

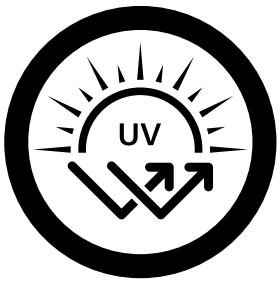
Weather resistance

The system is impervious to the weather.



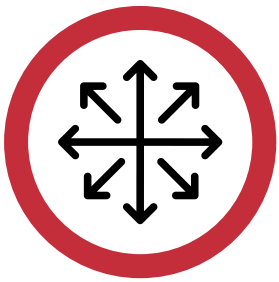
Low thermal conductivity

Formation of condensation is minimised due to the low thermal conductivity.



UV resistance

Formation of condensation is minimised due to the low thermal conductivity.



Low linear expansion

The low coefficient of expansion and the effective Double Lip Seal jointing method means that expansion sockets are not needed in the system.

1.3 VOX dB12 Acoustic Multilayer Pipe

The high performance system pipework is manufactured with the latest technology in multilayer pipe production. Formed with three layers of copolymer polypropylene, it has an intermediate core which is reinforced with a purpose designed mineral which greatly enhances the acoustic performance.

The result is a product which has exceptional sound reduction properties whilst offering excellent durability, impact resistance, is proof against UV rays and weather, whilst providing great flow characteristics, chemical resistance and ease of internal inspection if needed.

- **Outer layer:**
  Black Polypropylene Copolymer compound

  - UV resistant
  - High impact resistance even at lower temperatures
  - Weather resistant
  - Low flame spread

- **Intermediate core layer:**
  Black Polypropylene Copolymer compound
  with reinforcing minerals

  - Excellent level of soundproofing
  - High strength and stiffness

- **Inner layer:**
  White coloured Polypropylene Copolymer

  - Smooth surface finish - excellent flow characteristics to minimise blockage risk
  - Good Chemical resistance
  - Easy internal inspection due to the white finish

CODE	D (mm)	ID (mm)	L (mm)	S	S*
61600	32	28.4	3000	1.8	16
61601	40	36.4	3000	1.8	16
61602	50	46.4	3000	1.8	16
61603	75	70.4	3000	2.3	16
61604	110	103.2	3000	3.4	16
61605	125	117.2	3000	3.9	16
61606	160	150.2	3000	4.9	16
61607	200	187.6	3000	6.2	16

S* dimensional series required by the EN1451-1 standard

1.4 VOX Acoustic Fittings

Vox fittings are produced using a Polypropylene copolymer compound with mineral reinforcement.

The fittings have been innovatively designed with precision profiled grooves which increase the strength whilst maintaining the compact dimensions.

The unique double lip seal is co-moulded onto a polypropylene ring which is inserted mechanically into the fitting socket.

In addition to facilitating the insertion of the pipe into the fitting, the bi-material seal cannot be removed which provides ultimate joint security and ensures a perfect hydraulic seal even during backflow, and gives the installer total safety after installation.

- **Double Lip Seal**
  This unique design has several benefits:

  - Outer seal protects the inner seal and prevents ingress of dirt or dust
  - Inner seal provides the hydraulic seal and is always protected
  - Rigidity of the lip seal assists stability whilst under mechanical stress
  - Resistance to misalignment between the pipe and the Socket
  - Visual evidence of the gasket after it is installed
  - The double lip seal guarantees a vacuum seal which makes the pipe suitable for negative pressure drainage systems, such as marine systems

The range has several exclusive elements such as the swept-entry branch.

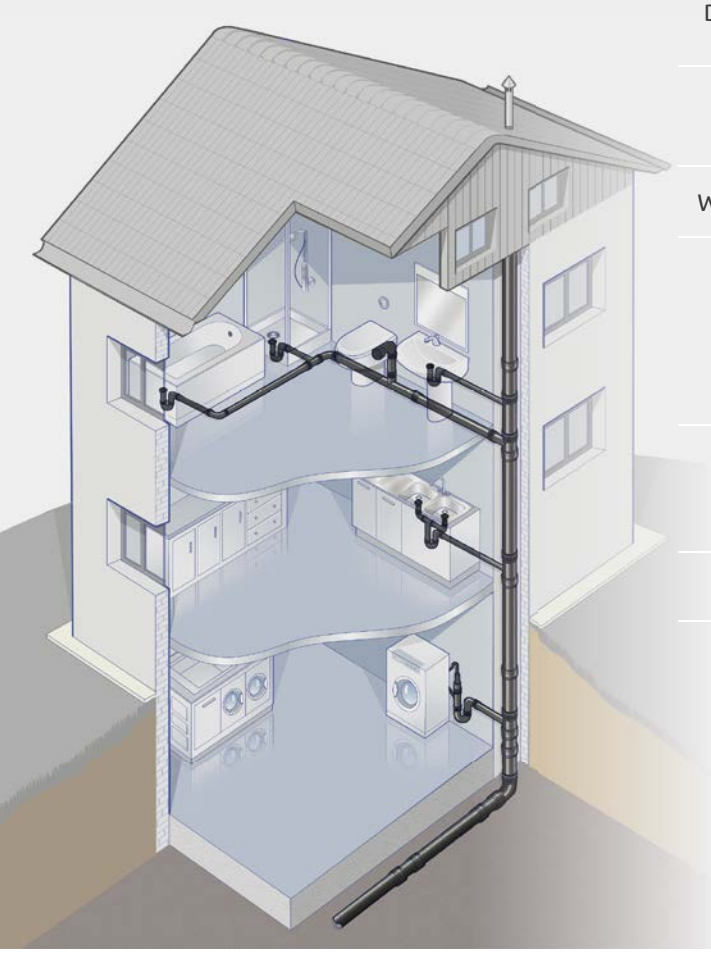
All fittings are supplied with adhesive labels containing a bar code, part number and description of the element.

1.5 Fields of Application

Due to it's outstanding soundproofing characteristics and strength, VOX Acoustic Waste is particularly suitable for most above ground commercial or domestic drainage applications.

VOX is ideal for use in any building where noise reduction and superior quality is paramount - in hotels, healthcare buildings, residential developments, muti-apartment buildings, educational buildings and restaurants.

Applications



APPLICATION	STANDARD	DETAILS
Domestic Waste Water - Low Temperature	EN 1451-1	Suitable for sanitary and domestic waste water
Domestic Waste Water - High Temperature	EN 1451-1	Suitable for sanitary and domestic waste water
Rainwater	EN 1451-1	Suitable for internal drainage of rainwater and surface water
Waste system ventilation	EN 1451-1	Venting the above systems
Application Area **BD**	EN 1451-1	**B.** Above ground internally or outside buildings when fixed to walls. **D.** Underground when within 1m from building
Aggressive fluid drainage		Refer to chemical compatibility information – ISO TR/ 10358:2021
Underground usage		Limitations apply - Contact Brymec Technical
Negative Pressure		Limitations apply - Contact Brymec Technical

2. Technical Information

2.1 Standards and Specifications

Vox Pipes and Fittings are carefully designed and manufactured to meet the most stringent quality standards. Products are rigorously tested in compliance with our ISO 9001:2015 Quality Management System

Products are manufactured to the following standards:

- EN 1451:1 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure. Polypropylene (PP). Specifications for pipes, fittings and the system.

Technical Specification

DETAILS AND PROPERTIES	VALUE	UNIT OF MEASURE	STANDARD
Manufacturing Standard			EN 1451-1: 2017
Structure Born Sound characteristic level level with optimised clamps	12 dB	dB at 2.0 l/s	EN 14366
Continuous Operating Temperature	5 to 70	°C	
Intermittent Operating Temperature	95	°C	
Reaction to Fire Classification	D - s3,d0		EN 13501
Normal Operating Pressure	0.5 Bar		EN 1451-1
Operating Pressure - special details – Min/Max	- 0.89 Bar / + 1.5	Bar	
Coefficient of Thermal Expansion	0.16	mm/m°C	
Thermal Conductivity	0.22	W/m°K	
Yield Strength	32	Mpa	
Tensile Strain at Yield	8	%	
Tensile Modulus	1800	MPa	
Density	0.90	g/cm³	
Melt Index at 190°C/5Kg	0.5	g/10Min	EN ISO 1133
Mean Joules absorbed (Charpy)	0.568	J	
Balldrop Test at 0°C without damage	4 Kg at 2 m		EN 744
Application Area	BD		EN 1451-1

2.2 Acoustics and Noise in Drainage Systems

Introduction to noise and acoustics in drainage systems

Noise is a very important factor in our quality of life, and excessive noise is rightly viewed as a form of pollution. One situation which can cause considerable distress is the intrusion of noise that that can and should be controlled or reduced.

Typically there is a larger focus on external environmental noise such as road, rail and air traffic, whilst internal noise in buildings from mechanical services, occupants and importantly, soil and waste systems, may be treated as a lower consideration.

Measurement of Noise

The study of noise and the effect of noise on humans is known as Environmental Acoustics, and noise control engineering has become a specialist subject. This is now an important element of building design.

Decibels

Noise, or sound intensity, is measured in units called decibels. Decibels (dB) are named after Alexander Graham Bell, who is famous for inventing the telephone. He also invented the audiometer. which is a device that measures how well a person can hear certain sounds

The unit of 1 decibel is a logarithmic unit that measures the ratio of a sound's intensity to a reference value. This reference value is 20 micro pascals (μPa), which is the quietest sound the average human ear can hear. This is designated as 0 dB.

As the decibel scale is logarithmic, this means that each increase in decibels represents a tenfold increase in sound intensity. This means that for each increase in 10 decibels, For example, a sound that is 10 times more powerful than 0 dB is 10 dB, and a sound that is 100 times more powerful than 0 dB is 20 dB.

Please see below some typical noise levels

LEVEL IN dB(A)	DESCRIPTION
0	Hearing threshold
20	Whispered voice
40	Quiet office
60	Normal conversation
80	Car, orchestra
100	The inside of a car at 120 kn/h
120	Pneumatic drill (pain threshold)
140	Plane

Types of noise/sound

Specific types of sound that affect internal drainage are:

- Structure borne sound
- Air born sound

Sound Travel

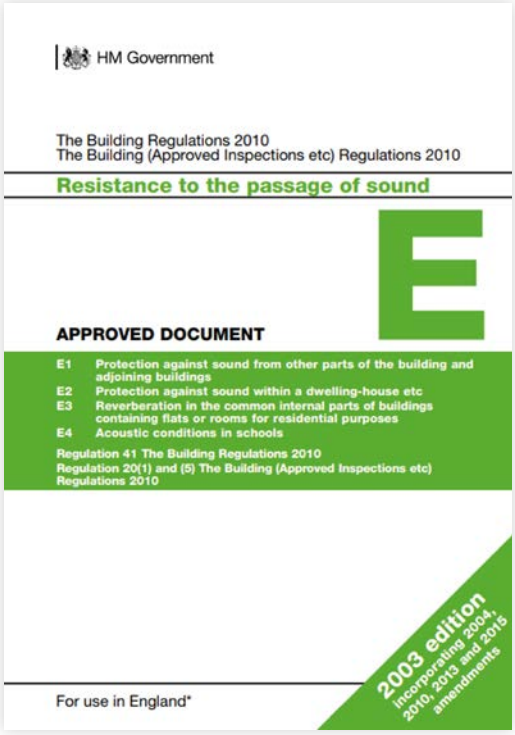
Sound energy travels in the form of sound waves that can travel through different mediums (eg gas, liquid, solid, elastic) and these travel at a typical speed which varies according to the material.

The table below provides some common materials which illustrate how noise energy can transfer by travelling through structures or in the air.

MEDIUM	VELOCITY IN m/s
Air	331
Bricks	3700
Concrete	3100
Water	1441
Soft Rubber	70

Regulations - control of sound in buildings

There are specific building regulations and guidance in the UK that cover noise control in buildings, amongst which the primary regulation is Approved Document E of the Building Regulations - Resistance to the passage of sound.. This details the regulations regarding sound insulation within and between dwellings, and it ensures that the design and construction of a building will protect the comfort and health of building users by limiting the transmission of noise.



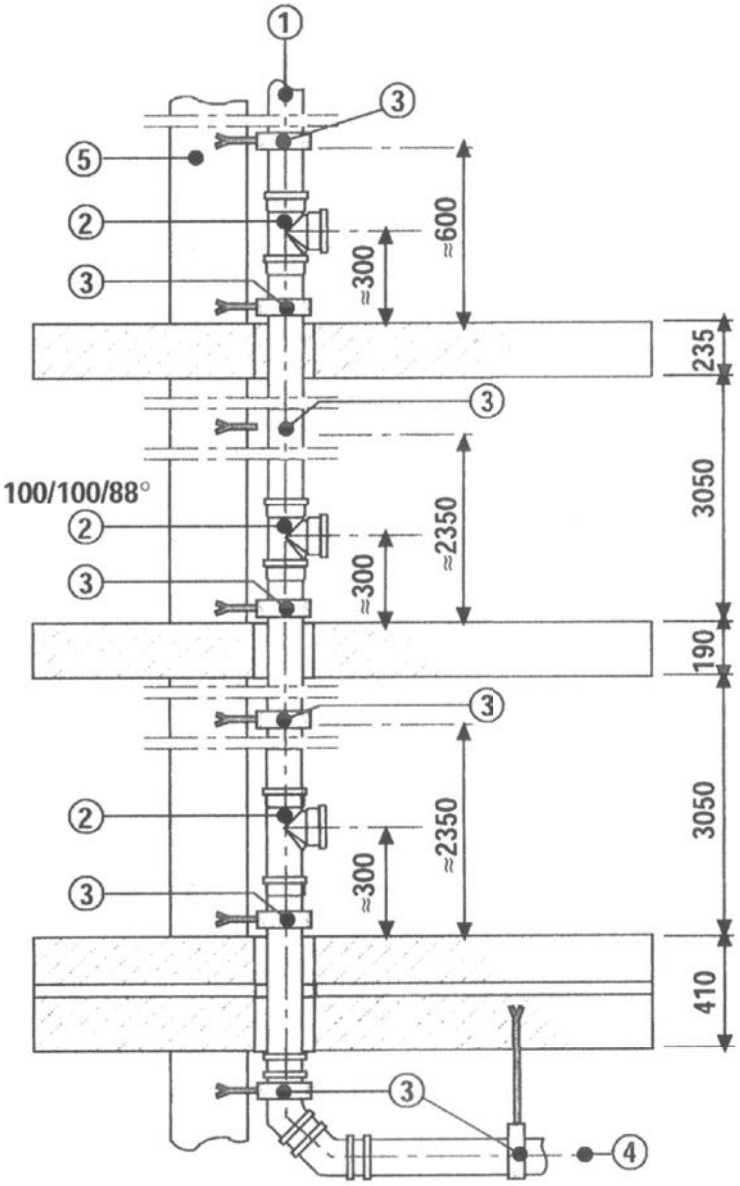
Control of Noise in Drainage

There are ways to reduce noise by using acoustic lagging or constructing a noise reducing casing, but the most effective way of achieving certainty is by using a drainage system that is purpose designed to achieve results.

The VOX dB12 Acoustic drainage system has been designed specifically to perform and reduce unwanted noise. As well as specific optimised designs, our system has been extensively tested to EN 14322 and DIN 4109

Soundproofing tests: test conditions and results

The soundproofing tests were performed at the Fraunhofer Institute for Construction Physics in Stuttgart, according to the system diagram presented in DIN 4109 and EN 14366. The pipe was examined from a phono technique point of view in a standard system based on various volumes of drainage. The system diagram subjected to testing is shown in Figure 1.



2.3 VOX dB12 Acoustic Performance

Test system specifications

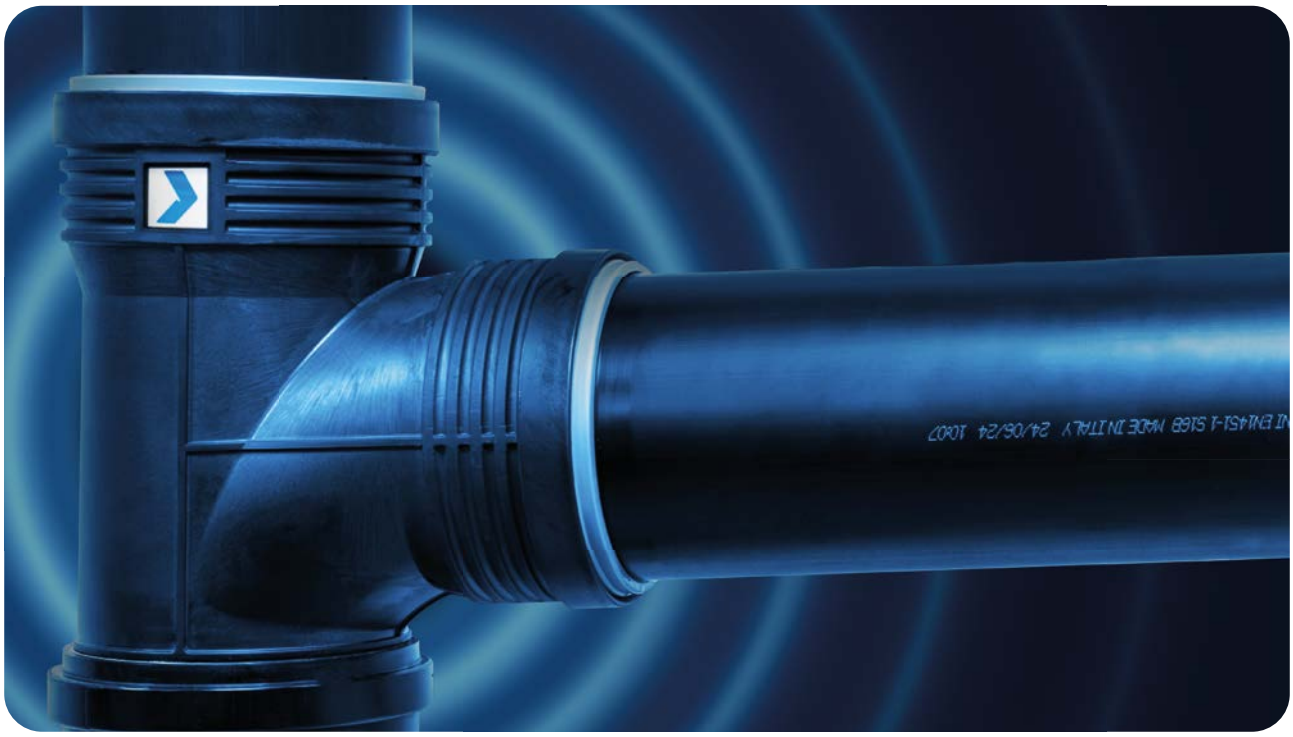
1. The Acoustic dB12 System is installed on a concrete wall with mass per unit area equal to 220 Kg/m²
2. Diameter of tested pipes and fittings is 110 mm.
3. The column goes from the mezzanine floor to the cellar, via ground floor. The connections for service pipes are installed at cellar level.
4. The system is designed for flow rates of 0.5 - 1.0 - 2.0 - 4.0 l/s.

The results obtained and certified are shown in the table below:

When tested to EN 14366 with optimised pipe clamps, Vox achieved a Structure-born sound characteristic level of **12dB**

WASTE WATER SYSTEM WITH OPTIMISED CLAMPS				
Flow rate [l/s]	0,5	1,0	2,0	4,0
Airborne sound pressure level $L_{a,A}$ [dB(A)][1])	45	49	52	54
Structure-born sound characteristic level $L_{SC,A}$ [db(A)] [1])	<10	<10	12	16

[1]) Evaluation according to DIN EN 14366



3. Design Principals

3.1 Waste water and Drainage in Buildings

Safe disposal of wastewater and effluent is a fundamental need in all types of buildings. As well as selecting suitable quality materials, it is essential to comply with the legal requirements for drainage design and installation.

The statutory requirements are covered by the Building Regulations (primarily in Approved Document H). By applying the correct British Standards, recommended practices and guidance from industry bodies and authorities the designer, installer and occupier should expect to meet these requirements.

Regulation and Guidance

The elements listed below are some of the key resources for drainage design.

Approved Document H – Drainage and Waste Disposal

BS EN 12056:2000 – Gravity Drainage systems inside buildings.

- Part 1: General and Performance Requirements
- Part 2: Sanitary pipework, layout and calculation
- Part 3: Roof drainage, layout and calculation
- Part 4: Wastewater lifting plants. Layout and calculation
- Part 5: Installation and Testing, instructions for operation, maintenance and use

Standard models of distribution in the UK can involve up to 6 movements of products by the time products are delivered from the manufacturing facility to the construction location. Brymec's model is to shorten this process to make the delivery process as efficient as possible to reduce emissions.

PD CEN/TR 13801:2014 – Plastics piping systems for soil and waste discharge (low and high temperature) Within the building structure – Thermoplastics

- Recommended practice for installation

CIBSE Public Health Engineering Guide G

- Includes Sanitary Pipework and Drainage

3.2 Resistance to Fire

The VOX dB12 Acoustic Drainage System is classified as follows:

- Class D-s3, d0 according to standard UNI 13501
- Class B1 according to standard DIN 4102
- Class HB according to ASTM D 635

4. Installation

4.1 Installation instructions

General information

It is important when installing the VOX Acoustic Waste system that each installer is familiar with the correct handling, installation and safety procedures of this product.

Standards and Regulations

Each installation must be carried out in accordance with recognised local and national standards including BS EN 12056 – parts 1 to 5 (Gravity Drainage inside buildings), TR 13801 Recommended practice for installation and in particular Building Regulations Approved Document H. In addition, all installation must include compliance with the relevant and required accident prevention and safety regulations, including the use of appropriate PPE, and any specific site rules or guidance.

Pre-installation checks

Before installation, the installer must check all components for possible transport damage and must also read, understand and observe the relevant installation information.

Installation Socket Connection Instructions

Installation of the VOX Acoustic Waste System is quick, clean and easy due to the accuracy of the products and the simplicity of the ring-seal jointing method using push fit connections.

1

Inspection

Check the integrity of the socket seal – this should be undamaged, free from dirt and securely fitted within the gasket retention slot. Check beveled ends for damage and treat scratches if needed.

2

Preparation

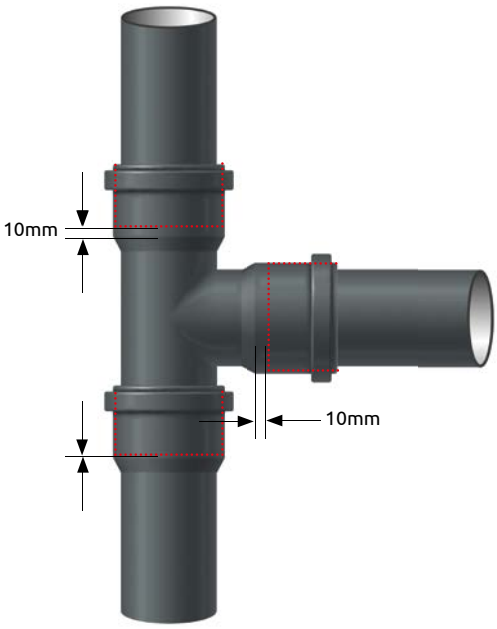
Clean the ends of un-cut pipe and fittings. Refer to 5 & 6 for cutting of pipes

3

Lubrication

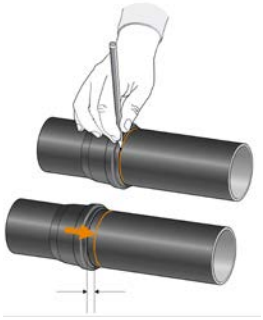
Lubricate the part to be inserted with approved lubricant

4



Pipe Insertion

Insert the pipe up to the abutment of the socket; then slide it out 10 mm to compensate for any potential thermal expansion.



5

Pipe Cutting

If cut pipe lengths are required, make a clean and perpendicular cut using a plastic drainage pipe cutter, hacksaw with suitable blade, a hardpoint handsaw or a vertical chopsaw with a suitable blade.

6

Chamfering

VOX Acoustic pipes and fittings are factory produced with perfectly bevelled ends to facilitate insertion. It is essential to avoid damage to the seal during insertion.

A correct bevel must be formed using an appropriate chamfering tool or fine toothed file to create a smooth bevel that will not damage the gaskets.
Correct bevel angle range is 15 to 30 degrees.

See Tools and equipment 5.2 for further details

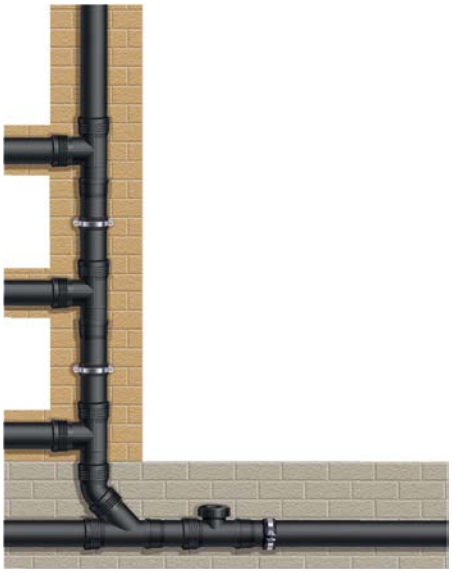
4.2 Expansion Allowance

Expansion Allowance

The socket length has been calculated to absorb thermal expansions of pipes of 2 meters maximum length. It is normal practice to estimate thermal expansion as 5 mm per metre for waste water drainage and 2 mm per metre for downpipe columns.

The system must be constructed in such a way that thermal expansion is not prevented. A fixed point that locks that part of the system must be installed under the socket of each pipe leaving the element of the system that is inserted into the pipe free to expand. Movement under maximum test pressure should not exceed 10mm.

4.3 Clamping the System



Preventing mechanical stress

The socket system ensures a hydraulic seal. Any mechanical stress must be taken into account during design and assembly, so as not to affect the integrity of the system's hydraulic seal. Pipes must be fastened using pipe clamps placed under each socket, in order to restrain the socket whilst allowing the inserted pipe to move.

Recommended Pipe Clamps

The VOX Acoustic system comes with acoustic pipe clamps for optimal soundproofing.

The main characteristics are the following:

- The collar is made of two parts,
- The two locking screws allow correct installation even with pipes that have different tolerances
- The EPDM insulated profile provides acoustic separation from the pipe

Fastening points

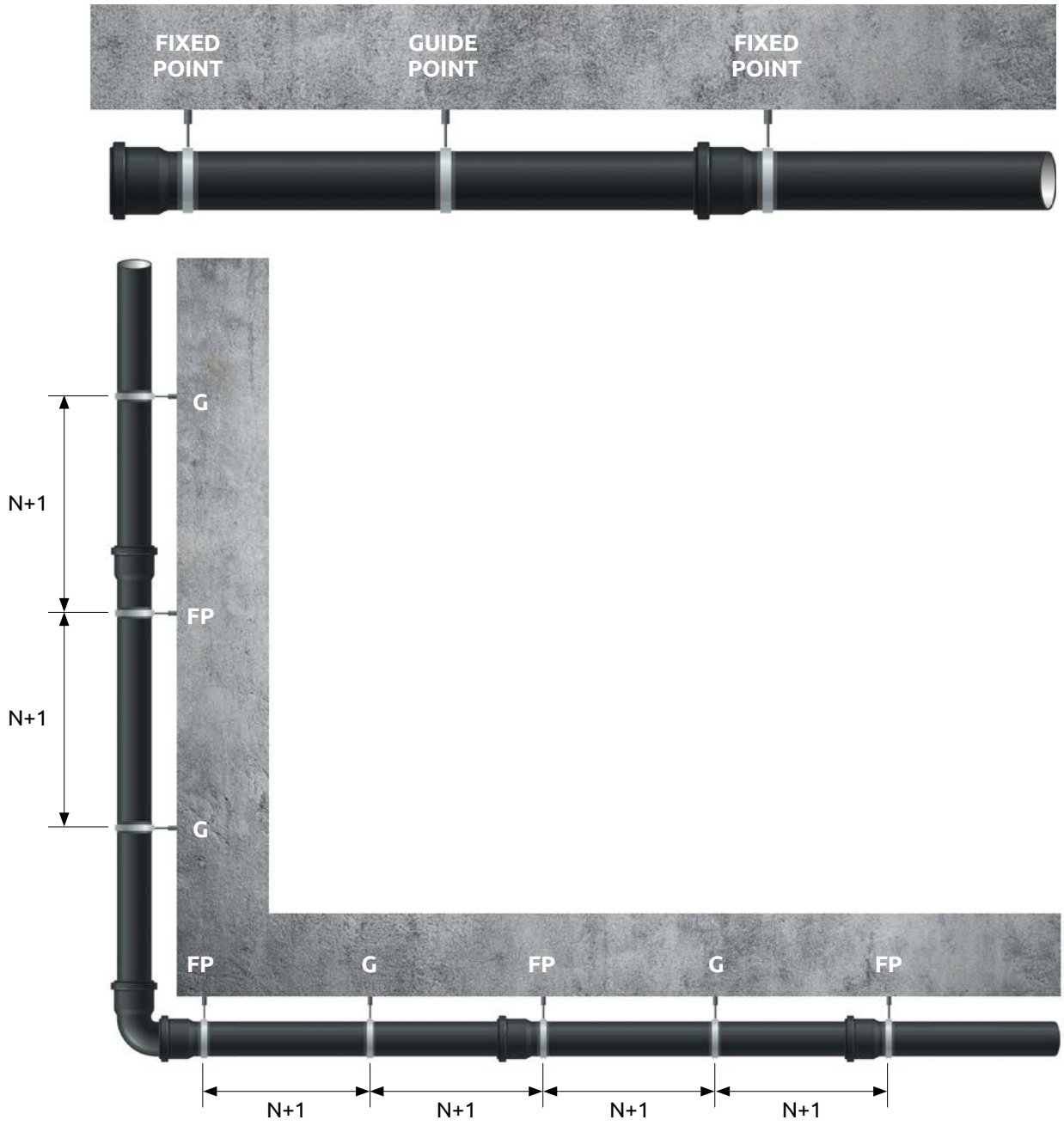
The socket connection of pipe elements constitutes a partial constraint capable of reacting to shear actions (for example, caused by the weight of a pipe full of water) or compression (for example, caused by negative internal pressure). This constraint is not able to react to traction, such as that produced by internal overpressure. In general, the use of this kind pipes for gravity drainage is compatible with this characteristic. However, there are situations where internal overpressure occurs.

Overpressure conditions due to, for example, accidental water colums generated by obstructions, are taken into account during the sealing tests. For this reason, the pipe clamps must be arranged to provide necessary fastening of both horizontal and vertical pipes in order to prevent the sockets from moving due to the effect of overpressure. This is obtained by using at least one sufficiently rigid Pipe Clamp located adjacent to the socket seal to prevent movement.

Restraint of straight pipe elements

A straight socketed pipe element requires 2 Pipe Clamps in each length in order to be securedproperly: a fixed point near the socket and a sliding point near the opposite end. The fixed point must prevent the axial movement of the pipe and is obtained by tightening the Pipe Clamp fully, while the sliding point is obtained by limiting the tightening of the collar.

In a chain of straight elements inserted in sequence, the sliding point is represented by the next pipe's socket its self. Therefore, N+1 collars are required to constrain N sections of straight pipe.



4.4 Pipe Support Centres

The maximum distance between the brackets must not exceed:

- Horizontal - 10 times the pipe diameter
- Vertical - 15 times the pipe diameter

Bracketing Support Centres;

External Diameter (mm)	Maximum Support Spacing (Horizontal) mm	Maximum Support Spacing (Vertical) mm
32	320	480
40	400	600
50	500	750
75	750	1125
110	1100	1650
160	1600	2400
200	2000	3000

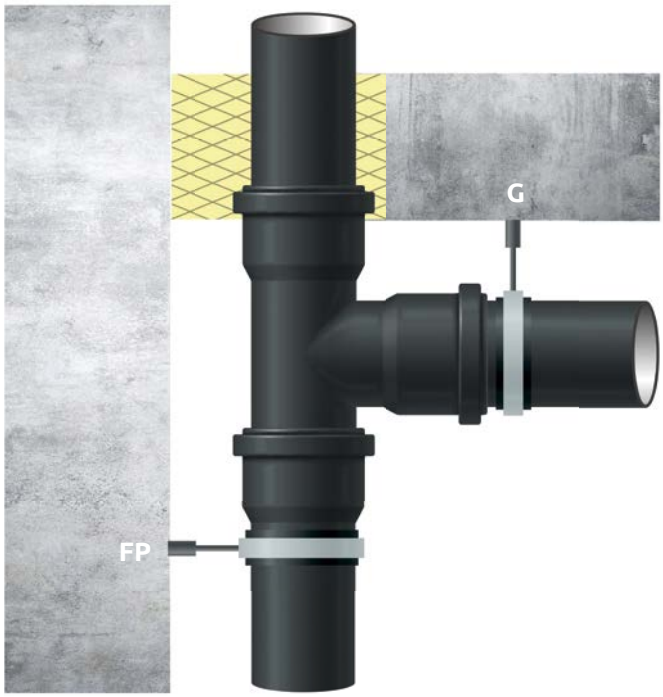
Fittings which include a change in direction must be properly restrained to prevent the socket from moving in the event of unexpected excess pressure. The water column (head) should not exceed a maximum height of 5 metres.

Clamping near fittings

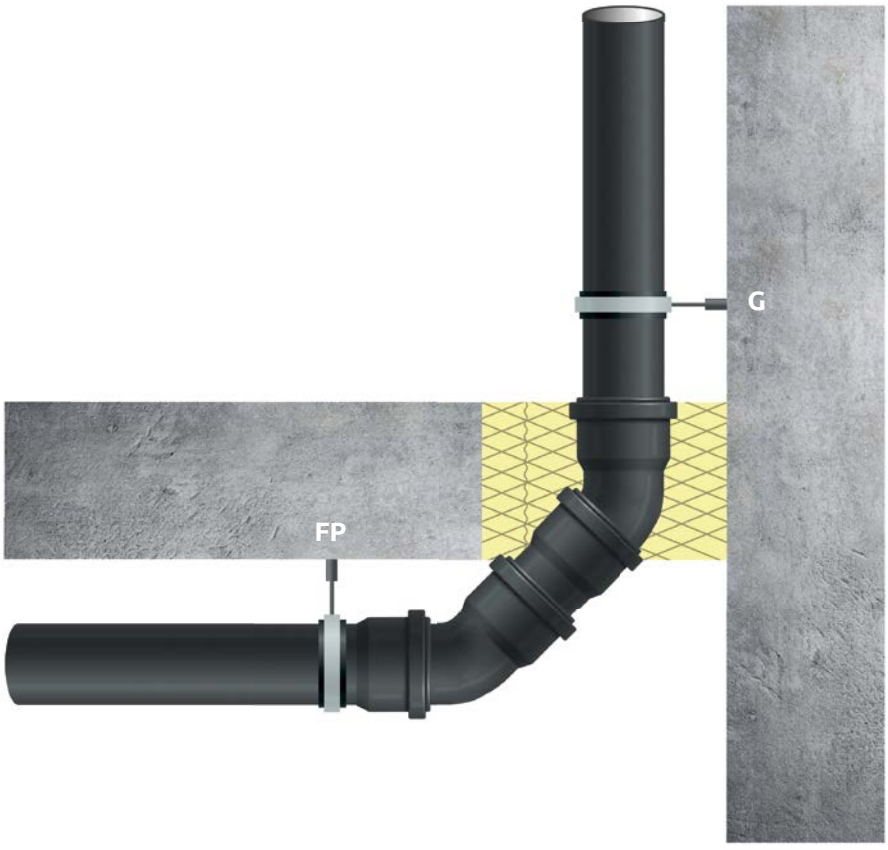
To ensure the needed stability, wherever a fitting provides wherever a fitting provides a change of direction it is essential that there is sufficient restraint. Any Pipe Supports that are near to branches, intersections, bends, etc., must take into account the thrusts acting on individual fittings.

The number of pipe supports is always equal to the number of elements (pipes and fittings) inserted, plus1 extra. Since Pipe Supports are not usually applied directly to fittings, the clamping point that locks the fitting should be placed on the straight pipe section near the socket, as near as possible to the joint. The distance between the fitting and clamping must not be greater than 2 x d (Diameter)

Pipe Size (mm)	Maximum distance of Pipe Support from directional change fitting (mm)
32	64
40	80
50	100
75	150
110	220
160	320
200	400



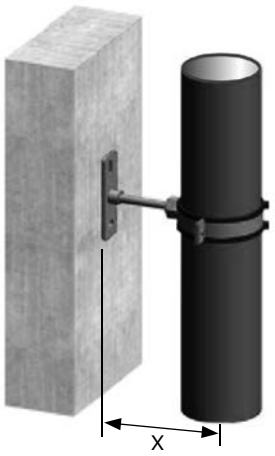
Pipe Supports adjacent to a change of direction



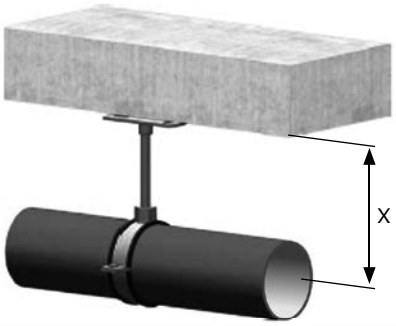
A fixed point bracket must be used under the socket of a pipe adjacent to a change of direction within the distance specified in the table . Use guide brackets on the inlet run pipe.

4.5 Installation dimensions

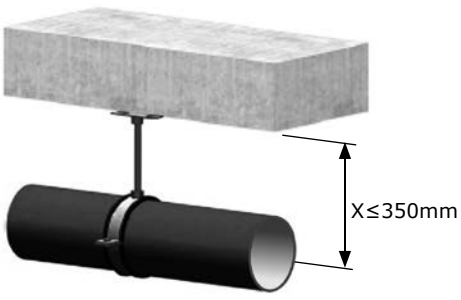
Pipe Centre distance off wall



External Diameter OD (mm)	Fixed point (FP) or guide point (G)	Distance of pipe Centre from the wall X (mm)					
		100	200	300	400	500	600
		Size of the threaded rod for connection to wall					
40	FP	M10	M10	1/2”	1/2”	1/2”	1/2”
	G	M10	M10	M10	M10	M10	M10
50	FP	M10	M10	1/2”	1/2”	1/2”	1/2”
	G	M10	M10	M10	M10	M10	M10
58	FP	M10	M10	1/2”	1/2”	1/2”	1/2”
	G	M10	M10	M10	M10	M10	M10
75/78	FP	M10	M10	1/2”	1/2”	1/2”	1/2”
	G	M10	M10	M10	M10	M10	1/2”
90	FP	M10	1/2”	1/2”	1/2”	1/2”	1/2”
	G	M10	M10	M10	1/2”	1/2”	1/2”
110	FP	M10	1/2”	1/2”	1/2”	1/2”	1/2”
	G	M10	M10	1/2”	1/2”	1/2”	1/2”
125	FP	M10	1/2”	1/2”	1/2”	1/2”	1/2”
	G	M10	M10	1/2”	1/2”	1/2”	1/2”
135	FP	M10	1/2”	1/2”	1/2”	1/2”	1/2”
	G	M10	1/2”	1/2”	1/2”	1/2”	1/2”
160	FP	M10	1/2”	1/2”	1/2”	3/4”	3/4”
	G	M10	1/2”	1/2”	1/2”	1/2”	1/2”
200	FP		1/2”	1/2”	3/4”	3/4”	3/4”
	G		1/2”	1/2”	1/2”	1/2”	1/2”



External Diameter OD (mm)	Fixed point (FP) or guide point (G)	Distance of pipe Centre from the ceiling X (mm)					
		100	200	300	400	500	600
		Size of the threaded rod for connection to ceiling					
40	FP	M10	M10	M10	1/2”	1/2”	1/2”
	G	M10	M10	M10	M10	M10	M10
50	FP	M10	M10	M10	1/2”	1/2”	1/2”
	G	M10	M10	M10	M10	M10	M10
58	FP	M10	M10	M10	1/2”	1/2”	1/2”
	G	M10	M10	M10	M10	M10	M10
75/78	FP	M10	M10	1/2”	1/2”	1/2”	1/2”
	G	M10	M10	M10	M10	M10	M10
90	FP	M10	1/2”	1/2”	1/2”	1/2”	1/2”
	G	M10	M10	M10	M10	1/2”	1/2”
110	FP	M10	1/2”	1/2”	1/2”	1/2”	1/2”
	G	M10	M10	M10	1/2”	1/2”	1/2”
125	FP	M10	1/2”	1/2”	1/2”	1/2”	1/2”
	G	M10	M10	1/2”	1/2”	1/2”	1/2”
135	FP	M10	1/2”	1/2”	1/2”	1/2”	1/2”
	G	M10	M10	1/2”	1/2”	1/2”	1/2”
160	FP	M10	1/2”	1/2”	1/2”	1/2”	3/4”
	G	M10	M10	1/2”	1/2”	1/2”	1/2”
200	FP		1/2”	1/2”	1/2”	3/4”	3/4”
	G		1/2”	1/2”	1/2”	1/2”	1/2”
	FP		1/2”	1/2”	3/4”	3/4”	1”
	G		1/2”	1/2”	1/2”	1/2”	1/2”



Horizontal run with M10 studding

When using pipe sizes of 110mm or less, to enable M10 threaded support rods to be used the following limits must be followed:

1) Do not exceed 350mm from the pipe centre to the substrate

2) Pipe run must not exceed 8.2m

The pipe must have a Fixed Point bracket at each end to ensure stability.

4.6 Tools and equipment

Pipe Cutter

STOCK NO	SIZE
51590	-

Pipe Bevel Tool

STOCK NO	SIZE
51593	32mm - 160mm

Marker Crayons

STOCK NO	PACK QTY
08645	12

5. Testing, Commissioning and Maintenance

5.1 Testing Procedures

To provide the required level of performance, longevity and hygiene of the VOX dB12 Acoustic System it is important that correct testing is carried out to ensure a leak-free system.

Testing of internal above ground drainage is a requirement of the Building Regulation, and is set out in Approved Document H. This specifically provides detailed testing requirements and guidance in sections 1.38 and 2.59-2.62. Testing is also covered in BS EN 12056-2:2000.

The correct following of the Regulations and Standards will ensure that systems are properly tested for watertightness and performance which will prevent occurrence of leaks and resulting contamination, thereby maintaining the safety and hygiene of buildings.

Before testing with air or water, it is extremely important that the section being tested has been completed and secured suitably. All installed work should be properly tested and confirmed as free from defects, and recorded, before the element is enclosed. It is vital that any specific project requirements for testing are followed.

Air Test

An air test is normally carried out to confirm the airtightness of all pipes and fittings. This should normally be completed in one operation, but for larger systems it is recommended to ensure access points are installed in appropriate positions so that testing in sections can be achieved.

1. Visual Inspection - visually inspect the system for any obvious defects or damage and resolve if needed.

2. Cleaning: Ensure all pipes and fittings are clean and free from debris

3. Sealing. Close all open vents and connection to sewer with suitable test bungs

4. Pressurise. Use a hand pump and a manometer to pressurise the system.

5. Observation. Allow the system to stabilise, then after the required test duration, observe and record the results of the test.

6. Completion. Make sure that all bungs are removed before the system is enclosed or put into operation.

Leak detection

If there is a pressure drop, identify this by applying a soapy water solution to the pipes and joints so that any leaks can then be detected visually.

Testing with water:

Water testing is used for the part of the system that is most at risk below the lowest sanitary appliance. This can be tested using a test plug in the lower end of the pipe and filling the pipe with water up to the flood level of the lowest sanitary appliance. It is not generally necessary to apply a water test to the whole of the drainage system.

Testing with smoke:

We do not recommend the operation of a smoke test on plastic pipework systems due to potential detrimental effects on plastics or rubber gaskets.

Functional Testing

Introduce water into the system to simulate normal usage and check for correct flow and drainage. Check Traps and Vents to ensure that they are functioning correctly and not causing any blockages or siphoning.

5.2 Commissioning and Handover

Documentation and Approval

Record Results: Document all test results, including any issues found and corrective actions taken.

Final Inspection

Conduct a final inspection with a building control officer or relevant authority to verify compliance with standards

5.3 Cleaning and Maintenance

VOX Acoustic Drainage – ease of Maintenance

VOX products are designed to be durable and easy to clean when required.

One important feature of the design of VOX Multilayer Pipe is the smooth flow white inner surface, made from white Polypropylene Copolymer.

There are 2 main benefits of this unique internal design:

Smooth Surface Finish

- Excellent flow characteristics which speed up the flow, therefore reducing the risk of the formation of deposits and resultant blockages

White Colour

- In the unfortunate incident of impeded flow or a blockage, this is found to be a real assistance for any internal inspections that are carried out.

Cleaning and Maintenance requirements

The requirements for periodic cleaning and maintenance are generally specified by the building Owner or Occupier.

During the design and the construction phase of a project, attention should be given to BS EN 12056 Part 5, Gravity Drainage Systems inside buildings – Installation and testing, instructions for operation, maintenance and use.

Section 10 does not stipulate details regarding cleaning but does require that a document giving instructions for this shall be prepared and made available for the building owner.

Guidance

To assist in documenting, planning and carrying out any planned or un-planned maintenance that is required please use the following guidance;

Cleaning Guidance:

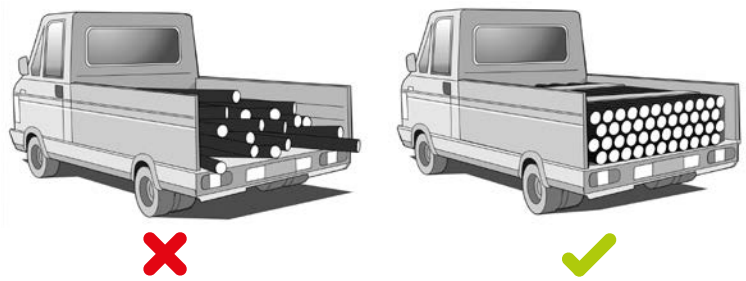
1. **Inspection**
   This is an important element of any cleaning regime. Regular inspection should be carried out to ensure that there is no build up of deposits that could lead to more serious problems such as blockages. Inspection should include for signs of damage, and to identify if there is a need for any localised extra cleaning.
2. **Flushing**
   Regularly flush the system with water to prevent sediment buildup and ensure smooth operation.
3. **Cleaning Agents:**
   Use only mild, non-corrosive cleaning agents to avoid damaging the surface of pipes and fittings. Avoid harsh chemicals that could degrade the material.

6. Transport, Site Handling and Storage

6. Transport, Handling and Storage

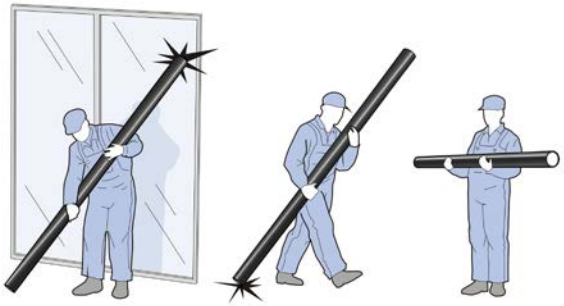
Transport

In the event of pipes being removed from their factory packaging please ensure that they are stacked straight, level and interlocking to prevent deformation.



Site Handling

Avoid dragging pipes on the ground or against the sides and tailgate of the vehicle. When handling pipes or fittings please ensure that the chamfered ends and the socket element are not damaged or scratched.



Storage

Pipe stacking

In the event of pipes being removed from their factory packaging please ensure that they are stacked straight, level and interlocking to prevent deformation.

- Pipes should be placed on flat and smooth surfaces.
- In order to prevent deformations over time, the maximum stacking height must be no more than 2m, whatever their diameter may be.
- Outdoor storage must not exceed 2 years.

Fittings Storage

- The same criteria used for pipes also applies to fittings; they should be stored with care and protected from sunlight.

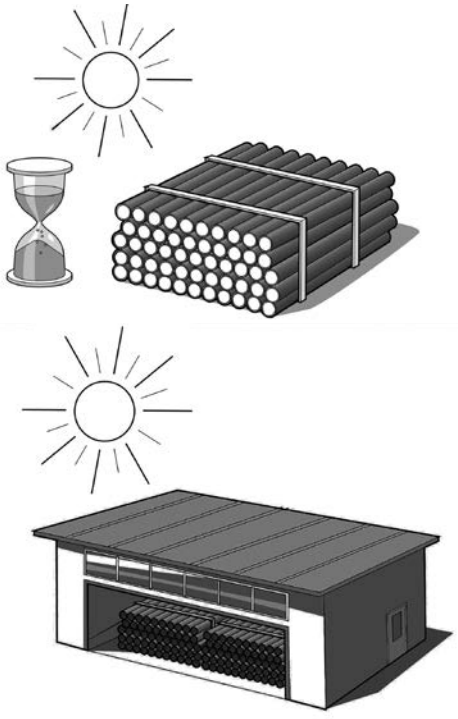


Fig. 3

7. Technical Support

7.1 Technical Support

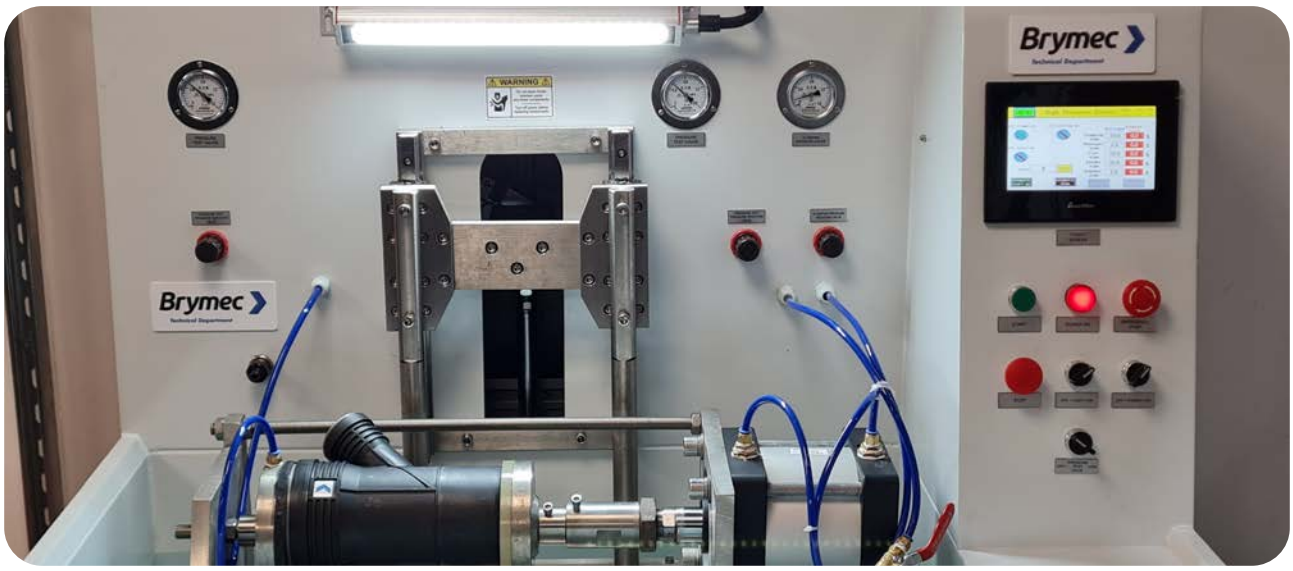
We recognise the importance of having top quality support from the manufacturer throughout every phase of the construction process.

At Brymec, our whole team are committed to providing easy access to design support and technical advice right the way from pre-construction to post-contract.

Key areas of support;

- **Specification**
  - Technical submittal documentation
  - Advice on products and applications
  - Tender documentation
  - Budgetary quotations
- **Construction**
  - Free, certificated installation training
  - Site visits
  - Observation reports
  - Product verification and testing
- **Post contract**
  - O&M manuals
  - Warranty and after-care support

Whatever your needs, we have a dedicated Technical Support Team which has sophisticated equipment and facilities to support you whenever you need.



8. Quality

8.1 Quality, Testing & Approvals

Brymec have our own extensive quality control and quality assurance processes which enable us to guarantee the specification, quality and reliability of the VOX dB12 Acoustic Drainage System.

Every component has undergone rigorous testing and checking in line with the demands of the manufacturing standard and also our ISO 9001 Quality Management System.

Our operating systems are assessed and externally assessed, and as well as ISO 14001 Environmental Management System. Operational efficiency, quality and ongoing compliance are an unseen yet vital element of our commitment to building for the future.

In addition to the above we are also a verified Premier Constructionline Materials Supplier which is important for the many prestigious major projects where we are partnering with you.

Certifications

Cert. 288342018

Cert. 459902024

Cert. 1313072

9. Warranty

9.1 Warranty

At Brymec we place a huge emphasis on the quality of our range of manufactured products. To back this up, when using the VOX dB12 Acoustic Drainage System, Brymec will provide a warranty of 10 years. This is a maximum 10 year guarantee against faults caused by defective manufacturing in VOX dB12 Acoustic Drainage System Pipe or Fittings.

For the warranty to apply

1. Installation
The VOX dB12 Acoustic Drainage System and ancillary items must be installed in accordance with the Brymec installation guidelines, BS EN 12056 and Building Regulations Approved Document H. All testing paperwork must be retained.

2. Training
Each individual installing the VOX dB12 Acoustic Drainage System should be suitably trained and competent.

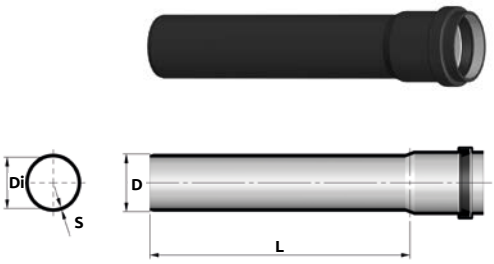
3. Tooling
Any tooling used should be approved for use with this material and used in accordance with the manufacturer's instructions and Brymec Installation instructions.

4. Environment
The VOX dB12 Acoustic Drainage System must be installed in a suitable environment and be used for the correct application.

10. Product Range

Multilayer Single Socket Pipe

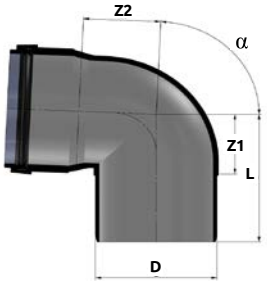
With mono-lip gasket



STOCK NO	D (mm)	Di (mm)	L (mm)	S	S†
61600	32	28.4	3000	1.8	16
61601	40	36.4	3000	1.8	16
61602	50	46.4	3000	1.8	16
61603	75	70.4	3000	2.3	16
61604	110	103.2	3000	3.4	16
61605	160	150.2	3000	4.6	16
61606*	200	187.6	3000	6.2	16

S† Dimension series under the standard EN15191

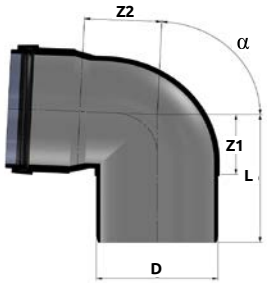
M x F Bends 15°



STOCK NO	D (mm)	Z1 (mm)	Z2 (mm)	L (mm)
61607*	32	3	7	54
61608*	40	4	10	60
61609	50	5	11	62
61610*	75	7	12	70
61611	110	9	20	88
61612*	160	12	20	103

* Available as project order

M x F Bends 30°



STOCK NO	D (mm)	Z1 (mm)	Z2 (mm)	L (mm)
61614	32	6	7	52
61615	40	7	13	60
61616	50	8	14	65
61617	75	12	18	74
61618	110	16	28	93
61619*	160	12	20	103

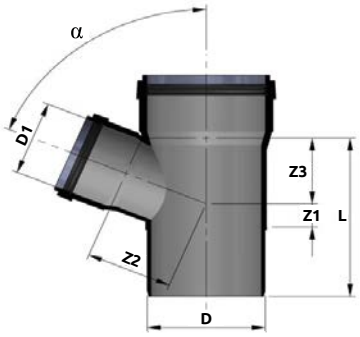
M x F Bends 45°

STOCK NO	D (mm)	Z1 (mm)	Z2 (mm)	L (mm)
61621	32	8	10	55
61622	40	11	17	65
61623	50	13	19	67
61624	75	18	25	81
61625	110	25	35	100
61626	160	36	45	128
61627*	200	43	54	135

M x F Bends 87.3°

STOCK NO	D (mm)	Z1 (mm)	Z2 (mm)	L (mm)
61628	32	14	16	62
61629	40	26	32	80
61630	50	31	37	86
61631	75	43	49	106
61632	110	60	70	128
61633	160	84	90	176
61634*	200	96	103	190

Single Branch 45°



STOCK NO	D (mm)	Z1 (mm)	Z2 (mm)	Z3 (mm)	L (mm)
61635	32	9	40	40	95
61636	40	11	49	49	95
61637	50	13	61	61	106
61638	75	18	91	91	122
61639	110	25	134	134	160
61640	160	36	193	193	214
61641*	200	12	203	203	340

Single Branch 67.3°

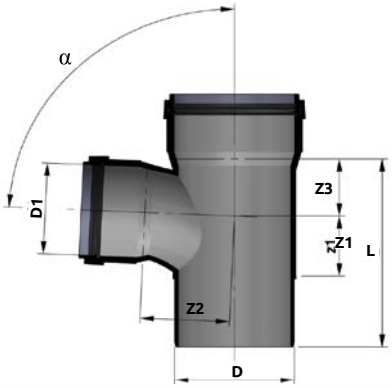
STOCK NO	D (mm)	Z1 (mm)	Z2 (mm)	Z3 (mm)	L (mm)
61646	110	42	89	89	232

Single Branch 87.3°

STOCK NO	D (mm)	Z1 (mm)	Z2 (mm)	Z3 (mm)	L (mm)
61650	40	26	25	25	105
61651	50	31	30	30	116
61652	75	43	43	43	147
61653	110	60	66	66	201
61654	160	84	89	89	322

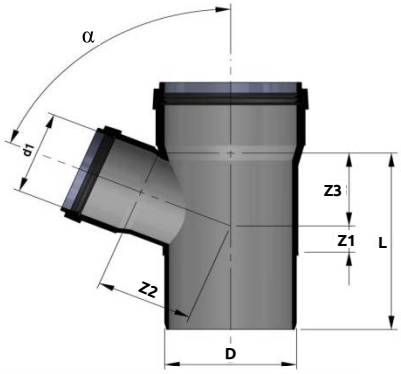
* Available as project order

Swept Branch 87.3°



STOCK NO	D (mm)	D1 (mm)	Z1 (mm)	Z2 (mm)	Z3 (mm)	L (mm)
61733	110	110	73	61	82	207

Reducing Branch 45°

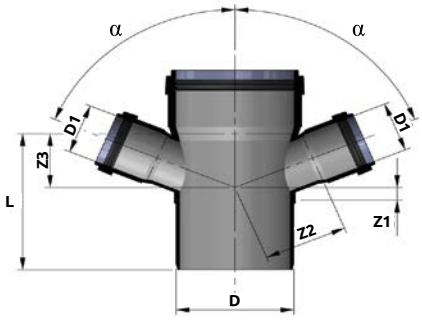


STOCK NO	D (mm)	D1 (mm)	Z1 (mm)	Z2 (mm)	Z3 (mm)	L (mm)
61658	50	40	6	56	54	105
61659	75	50	1	80	73	116
61661	110	50	-17	107	92	169
61662*	110	75	1	119	109	135
61663	160	110	0	176	160	219
61664*	200	160	6	198	198	265

Reducing Branch 87.5°

STOCK NO	D (mm)	D1 (mm)	Z1 (mm)	Z2 (mm)	Z3 (mm)	L (mm)
61674	50	40	26	30	25	106
61675*	75	50	30	31	43	122
61677	110	50	30	67	34	139
61678*	110	75	42	64	46	163
61679	160	110	59	93	64	222

Double Branch 45°



STOCK NO	D (mm)	D1 (mm)	Z1 (mm)	Z2 (mm)	Z3 (mm)	L (mm)
61683*	50	50	71	76	71	128
61684*	75	75	105	110	105	179
61685*	110	110	145	149	145	233
61686*	160	160	213	222	213	328

Double Branch 67.5°

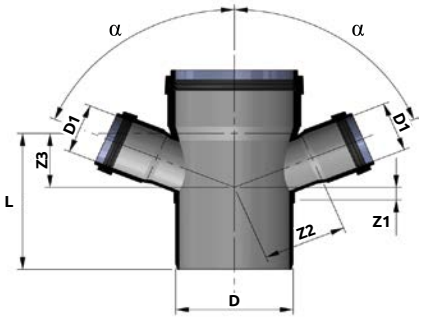
STOCK NO	D (mm)	D1 (mm)	Z1 (mm)	Z2 (mm)	Z3 (mm)	L (mm)
61695*	110	110	50	89	89	200

Double Branch 87.3°

STOCK NO	D (mm)	D1 (mm)	Z1 (mm)	Z2 (mm)	Z3 (mm)	L (mm)
61700	110	110	62	66	66	199

* Available as project order

Reducing Double Y Branch 45°



STOCK NO	D (mm)	D1 (mm)	Z1 (mm)	Z2 (mm)	Z3 (mm)	L (mm)
61690*	75	50	-	94	88	144
61691*	110	50	-	119	105	147
61692*	110	75	-	135	122	182
61693*	160	110	-	186	178	258

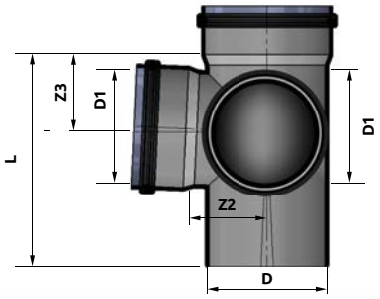
Reducing Double Y Branch 67.3°

STOCK NO	D (mm)	D1 (mm)	Z1 (mm)	Z2 (mm)	Z3 (mm)	L (mm)
61696*	110	50	10	79	55	140
61697*	160	110	35	124	100	222

Reducing Double Y Branch 87.3°

STOCK NO	D (mm)	D1 (mm)	Z1 (mm)	Z2 (mm)	Z3 (mm)	L (mm)
61701*	75	50	-	49	41	139
61702*	110	50	-	66	39	132
61703*	110	75	-	70	48	52
61704*	160	110	-	94	142	236

Corner Branch 87.3°



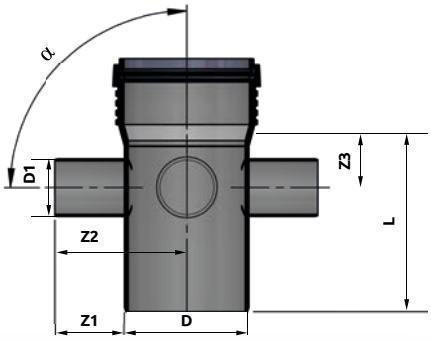
STOCK NO	D (mm)	D1 (mm)	Z1 (mm)	Z2 (mm)	Z3 (mm)	L (mm)
61721*	50	50	-	36	35	106
61722*	75	75	-	52	49	139
61723*	110	110	-	69	66	233
61724*	160	160	-	104	104	258

Reducing Corner Branch 87.3°

STOCK NO	D (mm)	D1 (mm)	Z1 (mm)	Z2 (mm)	Z3 (mm)	L (mm)
61728*	75	50	-	49	41	139
61729*	110	50	-	66	39	132
61730*	110	75	-	70	48	152
61731*	160	110	-	94	84	236

* Available as project order

4-Way Boss Pipe 87.3°

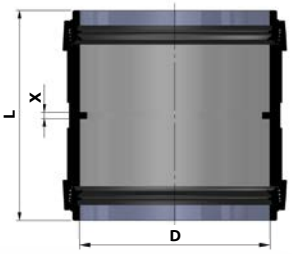


STOCK NO	D (mm)	D1 (mm)	Z1 (mm)	Z2 (mm)	Z3 (mm)	L (mm)
61735	110	50	60	115	54	190

Eccentric Reducer

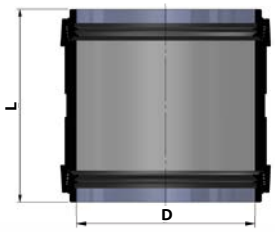
STOCK NO	D (mm)	D1 (mm)	Z1 (mm)	e (mm)	L (mm)
61736	40	32	10	4	53
61737	50	32	16	9	66
61738	50	40	14	5	74
61739	75	50	22	12.5	86
61741	110	50	43	30	118
61742	110	75	28	17.5	103
61743	160	110	43	25	138
61744	200	160	35	20	138

Double Socket Coupler



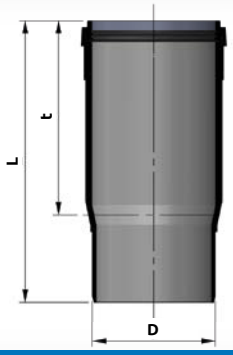
STOCK NO	D (mm)	X (mm)	L (mm)
61745	32	2.8	105
61746	40	2	110
61747	50	2	115
61748	75	3	125
61749	110	4	132
61750	160	6	180
61751*	200	60	380

Slip Coupler



STOCK NO	D (mm)	L (mm)
61753	40	110
61754	50	115
61755	75	125
61756	110	132
61757	160	180
61758*	200	192

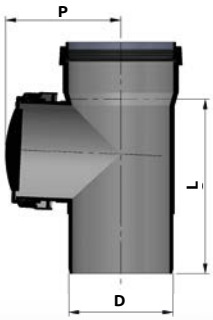
Triple Depth Expansion Coupler



STOCK NO	D (mm)	t (mm)	L (mm)
61763	110	186	272

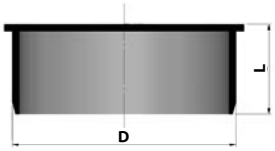
* Available as project order

Access Pipe



STOCK NO	D (mm)	P (mm)	L (mm)
61768	50	70	115
61769	75	80	142
61770	110	95	195
61771	160	105	214
61772*	200	126	238

End Cap



STOCK NO	D (mm)	L (mm)
61785	40	33
61786	50	33
61787	75	33
61788	110	39
61789	160	75

Pipe Clamps

Pipe Clamps

SIZE	ACOUSTIC	HEAVY DUTY ACOUSTIC	LOW FRICTION	UNLINED	HEAVY DUTY UNLINED
	STOCK NO	STOCK NO	STOCK NO	STOCK NO	STOCK NO
32mm	04099		04143	04003	04940
40mm	04100		04144	04004	04941
50mm	04113		04159	04005	04942
75mm	04105	42038	04147	04000	04945
110mm	04108	42039	04149	04014	04949
160mm	04112	42041	04151	04021	04955
200mm	04134	42210	-	04025	04958

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