TERRAIN

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# Terrain FUZE

Design, specification and installation guide

Polypipe
Building Services

# 1 The Genuit Group

At Genuit Group we help create a better built environment, by developing and producing sustainable solutions to the key challenges faced in water, climate and ventilation management. Sustainability is core to our commercial strategy, driving innovation in both how we run our business and the products we create. We find solutions for the environmental challenges facing our infrastructure, our buildings and our communities, and delivering these at scale.

The Genuit Group of businesses are recognised as professionals and experts in their given markets. From commercial and residential applications, heating and ventilation, fabrications, roads and highways to plumbing, large scale water storage and drainage, tall building applications and green infrastructure solutions. Our goal is to be the leading, UK-focused, sustainable products Group – helping construction build better.

Together, we aim to provide solutions to the sustainability and construction challenges of today and in the future. The increased need for resilient drainage systems, for example, the need for important Green Urbanisation, for cleaner, healthier air, for simpler, faster and more cost-effective drainage installations, for innovative future-ready systems and for low/zero-carbon heating and low-carbon construction.

Helping construction build better is at the heart of what we do. Through our sustainability strategy, the resilient way in which we operate, our capabilities and scalability, and our speed and agility through working together to understand exactly what you need to succeed.

It's an inclusive approach to business – and one our customers trust.

Polypipe Building Products
Polypipe Building Services
Polypipe Civils & Green Urbanisation
nuaire
Manthorpe Building Products
Polypipe Italia
Polypipe Ulster
DOMUS VENTILATION
ADEY
Polypipe International
permavoid
ufcm UnderFloor Climate Management
surestop® Protecting property from the risk of water damage
Polypipe Middle East
ALDERBURGH
Nu-Heat Feel the difference
Polypipe Merchandising Solutions
Polypipe Offsite
PLURA INNOVATIONS POLYBOSS



# Polypipe Building Services

## AT THE HEART OF COMMERCIAL AND TALL BUILDINGS.

At Polypipe Building Services, we harness our ingenuity and creativity to deliver class-leading solutions and product sustainability, with optimised whole-life costs, unrivalled technical support and on-the-ground assistance.

We understand the challenges today's projects face, including climate change, air quality and flooding, and in-industry regulations, skilled labour shortages and the lack of on-site storage facilities. From high-rise residential and commercial office projects to healthcare and leisure facilities, we develop systems that support you, that facitilate easier, more cost-effective ways to install.

Integral to our development process is providing innovative sustainable solutions that support safety, whether from the product itself or in the way it's installed. Our products are designed for a long life, use recycled content and are recyclable at end of life, enabling it to live on in the circular economy. We challenge ourselves on how we help solve on-site problems, whether lack of labour or on-site space, and look to develop solutions that benefit both the installing contractors and the occupants alike.

Polypipe Building Services, part of the Genuit Group. Helping construction build better.

## MORE INNOVATION. MORE EXPERTISE. MORE SUPPORT.

Polypipe Building Services is always working to develop more exceptional products and more cost-effective ways to complete your project. For nearly 60 years, our Terrain brand has been the industry benchmark for drainage systems, but we offer so much more, including our award-winning water supply system MecFlow.

## PRODUCTS AND SYSTEMS

Our specialism is tall buildings, so our products, systems and services reflect that, in design, performance and ease of installation. Our Terrain brand of products and systems have been no exception, from our benchmark, FUZE drainage stacks and PVC soil and waste systems, to the Terrain Q noise reducing system, P.A.P.A.® & Pleura Vent Systems and Firetraps.

However, our continued investment in new technologies and more innovative solutions, enables us to increase our category portfolio, including supply applications like MecFlow. We are constantly working to bring to market only the most sustainable, beneficial, and cost-effective products and systems – engineered from the most practical, recycled and recyclable materials. Together with our Advantage Service, fabrication capabilities and customer support, you're never left without a solution – whatever the challenge. Contact our sales team to discover more at **commercial.buildingservices@polypipe.com**

## TECHNICAL

All our products and systems are backed by our hands-on technical team, providing expert support to ensure you receive a system that's right for your project. Whether it's a single component, or a fully fabricated system, you can call upon our specialist advice, and rely on us to deliver exactly what you need.

## POLYPIPE ADVANTAGE SERVICE

We're constantly working and investing to discover new products and systems that take the complexities out of construction. And we apply that philosophy to ease of installation. Our Polypipe Advantage Service has been specifically introduced to make everything simple from beginning to end. From the design and planning of your project, to ordering, delivery, technical support, and customer service. Through Polypipe Advantage, our drainage stack systems and MecFlow supply systems can be fabricated to your own specification; created off-site, and delivered as a full, ready-to-install system on-site. Facilitating a faster installation process, whilst addressing skilled labour shortages and the lack of on-site storage facilities.

**Welcome to Polypipe Building Services.**
**Delivering more, to achieve more.**

POLYPIPE
ADVANTAGE



# 1 Contents

# 2 Introduction to FUZE

## A modern high density polyethylene system with many advantages over cast iron and other traditional systems.

## Terrain FUZE is a top-to bottom solution for all above and below ground drainage and many chemical waste applications.

Terrain FUZE is manufactured using HDPE for superior performance and exceptional durability. HDPE is resilient to extreme temperatures enabling applications for hot water and within colder environments. For example, without mechanical load, FUZE is able to tolerate temperatures of up to 80°C – even up to 95°C for a maximum of two minutes – against the flow of hot water.

The lightweight nature of Terrain FUZE allows the product to be installed quickly and efficiently, giving direct, resource-saving benefits to specifiers and installers.

**For further information see contact details on the back cover of this brochure.**

# 2 Introduction to FUZE

## Features and Benefits

### TERRAIN HIGH DENSITY POLYETHYLENE HDPE: DENSITY 945 – 965 kg/m³

Polyethylene density varies between 945 – 965kg/m³. Terrain FUZE retains exceptional quality and durability at up to 965kg/m³ giving great confidence to specifiers and installers. HDPE is a lighter material than water, offering direct benefits in handling, transportation and installation.

### RESISTANCE TO COLD

Terrain FUZE pipes are resistant to freezing within the pipeline. When tested, the pipes simply expand with the ice and then return to their original dimensions without any damage.

### FLEXIBILITY

Flexibility of a pipeline can be a major factor on certain building projects where concern must be given to the route of the pipeline through expansion joints or areas subject to vibrations.

### RESISTANCE TO CHEMICALS

Terrain FUZE offers high resistance against chemical corrosion and is insoluble in all inorganic and organic solutions at 20˚C. Terrain FUZE is only susceptible to aliphatic and aromatic carbons and relative chlorination products over 90˚C. The material is also vulnerable to attack by heavily oxidised media conc. HNO3 (chemical equation), conc. H2SO4 (chemical equation) when exposed over long periods at room temperature.

### SCOPE OF USE

Terrain FUZE offers exceptional performance as a drainage system. A maximum load of 15m Water Column (1.5 bar) temperature of 30°C (10years) should be considered when utilising the pipes in a low-pressure environment.

### RESISTANCE TO IMPACT

Terrain FUZE ensures maximum strength against impact stresses and is unbreakable at room temperature. It still maintains a high impact resistance at temperatures as low as -40˚C thus meets the requirements for outlet pipes.

### NON-TOXIC

Terrain FUZE pipes are non-toxic, ensuring safe handling during installation. With no risk of contamination to the flow through the pipeline, HDPE is even suitable for use in the food or liquid transportation industries.

### BEHAVIOUR IN FIRE

HDPE in open construction is a flammable material. However, the material has been installed throughout Europe for over 40 years and poses no greater risk to fire spread than other similar plastic based systems when installed in accordance with local fire regulations. For further prevention, Terrain FUZE should be fitted with Terrain fire collars or sleeves (see Terrain Drainage System Price List ) and these should be installed in strict accordance with instructions provided.

### NOISE

HDPE has a low E-modulus and limits solid-borne conduction along the pipeline. Airborne noise should be insulated by utilising duct wall.

### PROTECTION AGAINST BLOCKAGES

Terrain FUZE enables the continual flow of waste through the pipe, reducing the possibility of blockages along the pipeline.

### SEALING MATERIAL

The rubber ring on the seal is installed under compression on all sides and is protected from expansion so, although the chemical resistance of the seal does not equate to that of HDPE, there is no risk of the seal being destroyed.

### HEAT EXPANSION 0.2mm/m/°C

Expansion of the HDPE pipeline should be anticipated when put under heat stress. As a general rule, an expansion rate of 10mm per linear metre for every 50˚C should be allowed.

### WELDING TEMPERATURE

With a much lower welding temperature of 210˚C minimum, HDPE is a much safer and easier material to work with compared to metal. This enables processing of the material using simple tools and in a more energy efficient manner.

### NON-CONDUCTIVE

HDPE like most plastics has an exceptional reputation as an insulator.

### RESISTANCE TO ABRASION

HDPE offers greater abrasion resistance through increased strength within the walls of the pipeline. This additional protection of the pipe makes HDPE an effective material for branch pipes, soil stacks and ground pipes.

### CONDENSATE

Terrain FUZE is a poor heat conductor thus preventing condensation from forming as the pipeline undergoes short periods of intense undercooling.

### RESISTANCE TO HOT WATER

Terrain FUZE offers substantial durability against the flow of hot water. A waste pipe with no mechanical load will tolerate temperatures of up to 80˚C and up to 95˚C is permissible for a maximum of two minutes.

### EASY HANDLING

Lightweight and quick to install, constructions teams choose Terrain FUZE for its ease-of-use as well as its outstanding performance properties.

# 3 Soil and waste drainage

## A soil and waste system should be installed on a project to facilitate:

- Ease of access and maintenance to all parts of the system
- Flexible expansion of the system and integration with other pipe systems

Straight sections of horizontal pipe must be installed in perfect alignment with the pipe's axis and parallel to the wall. Vertical sections of the pipeline should be fixed in perfect alignment with the axis. Right angle bends must only be used to connect horizontal and vertical pipes and not within horizontal pipe networks.

Branches in the soil stack must be created using swept entry fittings when the branch is equal to the soil stack size. Eccentric reductions must be used, when the pipe diameter varies in the horizontal branch pipes, to ensure a centred connection of the pipes at the axis line. To minimise reductions in speed, sound and other negative effects variances in the direction of the horizontal and vertical pipe system must be kept to a minimum and use large radius bends. The stack vent should protrude by 2m above the roof structure where possible, and never less than 0.3m. Ventilating pipes to the outside air should finish at least 900mm above any opening into the building within 3m.

Access pipes should be installed in the following cases:

- At the beginning of the main manifolds in the waste system and at the base of every internal soil stack
- Access pipes should be installed every 15m for a linear stretch of pipe with a diameter equal to or less than 110mm and every 30m for larger diameter pipes
- Wherever two or more branches connect

Access pipes must be within easy reach throughout the system and must offer sufficient space for the use of utensils to clean the pipes.

## The use of HDPE soil & waste pipe and fittings

The elements of the HDPE total pipe system offer direct benefits to the specifier and installer over more traditional materials. These benefits cover:

- Terrain FUZE HDPE is easier than more traditional materials to transport and handle safely due to its light weight.
- Terrain FUZE HDPE is installed quicker and easier than more traditional materials, offering increased time and labour savings on-site
- Terrain FUZE HDPE is resistant to impact shock
- Due to its composition, HDPE is highly resistant to chemical attack and will not erode, ensuring a long life for the system
- Terrain FUZE HDPE offers system flexibility, where alterations can be made easily to a completed system
- A smooth inner surface of the pipe minimises the risk of build-up or scaling
- Terrain FUZE HDPE welded joints will not deteriorate over time as no other materials or solvents are used
- Terrain FUZE HDPE can be used in close proximity to electrical installations or systems as it is not subject to electrolytic action
- Terrain FUZE HDPE offers a broad range of bespoke and fabricated items to be used in conjunction with the product ranges

Terrain FUZE HDPE offers a wide range of additional drains, traps and adaptors to be used with the standard catalogue of pipes and fittings, enabling HDPE products to be connected to other materials such as PVC, cast iron and cement pipes. This enables Terrain FUZE products to be used in an extensive range of applications, for example, in below ground applications when waste pipes with butt welded or electrofusion welded joints are utilised.

**For all Terrain FUZE HDPE pipes and fittings, please see pages 20 to 57.**

## Table A: **Discharge units (DU) Values**

| APPLIANCE | SYSTEM III DU l/s |
|---|---|
| Wash basin, bidet | 0.3 |
| Shower without plug | 0.4 |
| Shower with plug | 1.3 |
| Single urinal with cistern | 0.4 |
| Urinal with flushing valve | - |
| Slab urinal | 0.2* |
| Bath | 1.3 |
| Kitchen sink | 1.3 |
| Dishwasher (household) | 0.2 |
| Washing machine up to 6kg | 0.6 |
| Washing machine up to 12Kg | 1.2 |
| WC with 4.0L cistern | ** |
| WC with 6.0L cistern | 1.2 to 1.7*** |
| WC with 7.5L cistern | 1.4 to 1.8*** |
| WC with 9.0L cistern | 1.6 to 2.0*** |
| Floor gully DN 50 | - |
| Floor gully DN 70 | - |
| Floor gully DN 100 | - |

* Per person ** Not permitted - Not used or no data.
*** Depending upon type (valid for WC's with siphon flush cistern only)

## Example: 10 storey building with:

| | | | |
|---|---|---|---|
| 2 | WC | On each floor | 2 x 1.5 = 3.0 |
| 4 | WHB | | 4 x 0.3 = 1.2 |
| 2 | Baths | | 2 x 1.3 = 2.6 |
| 2 | Sinks | | 2 x 1.3 = 2.6 |
| 2 | W/MC | | 2 x 0.6 = 1.2 |
| | | | 10.6 x 9 = 95.4 DU |

Domestic Building Use K = 0.7

0.7 √95.4 .84 l/s

See Table C and D for capacities of pipes.

## Table B: **Typical frequency factors (K)**

| USAGE OF APPLIANCES | K |
|---|---|
| Intermittent use, e.g. in dwelling, guesthouse, office | 0.5 |
| Frequent use, e.g. in hospital, school, restaurant, hotel | 0.7 |
| Congested use, e.g. in toilets and/or showers open to public | 1.0 |
| Special use, e.g. laboratory | 1.2 |

## Frequency factor (K)

**Typical frequency factors associated with different usage of appliances Table B.**

**Calculation of flowrate**
**Waste water flowrate (Qww)**

**Qww is the expected flowrate of waste water in a part or in the whole drainage system where only domestic sanitary appliances are connected to the system**

$Qww = K\sqrt{\sum DU}$ where:

| | | |
|---|---|---|
| Qww | = | Waste water flowrate (L/s) |
| K | = | Frequency factor |
| ∑DU | = | Sum of discharge units. |

**NB: Under no circumstances should pipe of a larger diameter be connected to pipe of a smaller diameter in the direction of flow.**

# 3 Soil and waste drainage

## Table C: **Stack with only Primary Vent**

| STACK & STACK VENT | SYSTEM I, II, III, IV Q MAX (L/S) | |
|---|---|---|
| DN | Square # entries | Swept entries |
| 60 | 0.5 | 0.7 |
| 70 | 1.5 | 2.0 |
| 80* | 2.0 | 2.6 |
| 90* | 2.7 | 3.5 |
| 100* | 4.0 | 5.2 |
| 125 | 5.8 | 7.6 |
| 150 | 9.5 | 12.4 |
| 200 | 16.0 | 21.0 |

* Minimum size where WC's are connected in system II.
** Minimum size where WC's are connected in system I, III, IV. # Equal branch junctions that are more than 45° or has a centre line radius less than the internal pipe diameter.

## Table D: **Stack with Secondary Venting**

| STACK & STACK VENT | SECONDARY VENT | SYSTEM I, II, III, IV Q MAX (L/S) | |
|---|---|---|---|
| DN | DN | Square # entries | Swept entries |
| 60 | 50 | 0.7 | 0.9 |
| 70 | 50 | 2.0 | 2.6 |
| 80* | 50 | 2.6 | 3.4 |
| 90* | 50 | 3.5 | 4.6 |
| 100* | 50 | 5.6 | 7.3 |
| 125 | 70 | 7.6 | 10.0 |
| 150 | 80 | 12.4 | 18.3 |
| 200 | 100 | 21.0 | 27.3 |

* Minimum size where WC's are connected in system II.
** Minimum size where WC's are connected in system I, III, IV. # Equal branch junctions that are more than 45°, or has a centre line radius less than the internal pipe diameter.

## For branch pipe sizing based on System III the following sizing charts should be used.

| APPLIANCE | DIA. DN | MIN. TRAP SEAL DEPTH (mm) | MAX. LENGTH (L) OF PIPE FROM TRAP OUTLET TO STACK (m) | PIPE GRADIENT | MAX. NO OF BENDS | MAX. DROP (H) (m) |
|---|---|---|---|---|---|---|
| Limitations for unventilated branch discharge pipes, system III | | | | | | |
| Washbasin, bidet (30mm dia. trap) | 30 | 75 | 1.7 | 2.2[1] | 0 | 0 |
| Washbasin, bidet (30mm dia. trap) | 30 | 75 | 1.1 | 4.4[1] | 0 | 0 |
| Washbasin, bidet (30mm dia. trap) | 30 | 75 | 0.7 | 8.7[1] | 0 | 0 |
| Washbasin, bidet (30mm dia. trap) | 40 | 75 | 3.0 | 1.8 to 4.4 | 2 | 0 |
| Shower, bath | 40 | 50 | No Limit[2] | 1.8 to 9.0 | No Limit | 1.5 |
| Bowl urinal | 40 | 75 | 3.0[3] | 1.8 to 9.0 | No Limit[4] | 1.5 |
| Trough urinal | 50 | 75 | 3.0[3] | 1.8 to 9.0 | No Limit[4] | 1.5 |
| Slab urinal[3] | 60 | 50 | 3.0[3] | 1.8 to 9.0 | No Limit[4] | 1.5 |
| Kitchen sink (40mm dia. trap) | 40 | 75 | No Limit[2] | 1.8 to 9.0 | No Limit | 1.5 |
| Household dishwasher or washing machine | 40 | 75 | 3.0 | 1.8 to 4.4 | No Limit | 1.5 |
| WC with outlet up to 80mm[6] | 75 | 50 | No Limit | 1.8 min | No Limit[4] | 1.5 |
| WC with outlet greater than 80mm[6] | 100 | 50 | No Limit | 1.8 min | No Limit[4] | 1.5 |
| Food waste disposal[7] | 40 min. | 75[8] | 3.0[3] | 13.5 min | No Limit[4] | 1.5 |
| Sanitary towel disposal unit | 40 min. | 75[8] | 3.0[3] | 5.4 min | No Limit[4] | 1.5 |
| Floor drain | 50 | 50 | No Limit[3] | 1.8 min | No Limit | 1.5 |
| Floor drain | 50 | 50 | No Limit[3] | 1.8 min | No Limit | 1.5 |
| Floor drain | 100 | 50 | No Limit[3] | 1.8 min | No Limit | 1.5 |
| 4 basins | 50 | 75 | 4.0 | 1.8 to 4.4 | 0 | 0 |
| Bowl urinals[3] | 50 | 75 | No Limit[3] | 1.8 to 1.9 | No Limit[4] | 1.5 |
| Maximum of 8 WC's[6] | 100 | 50 | 15.0 | 0.9 to 9.0 | 2 | 1.5 |
| Up to 5 spray tap basins[9] | 30 max | 50 | 4.5[3] | 1.8 to 4.4 | No Limit[4] | 0 |

1) Steeper gradient permitted if pipe is less than maximum permitted length.
2) If length is greater than 3m noisy discharge may result with an increased risk of blockage.
3) Should be as short as possible to limit problems with deposition.
4) Sharp throated bends should be avoided.
5) For slab urinal for up to 7 persons. Longer slabs to have more than one outlet.
6) Swept-entry branches serving WC's.
7) Includes small potato-peeling machines.
8) Tubular not bottle or resealing traps.
9) Spray tap basins shall have flush-grated wastes without plugs.

| APPLIANCE | DIA. DN | MIN. TRAP SEAL DEPTH (mm) | MAX. LENGTH (L) OF PIPE FROM TRAP OUTLET TO STACK (m) | PIPE GRADIENT | MAX. NO OF BENDS | MAX. DROP (H) (m) |
|---|---|---|---|---|---|---|
| Limitations for ventilated branch discharge pipes, system III | | | | | | |
| Washbasin, bidet (30mm dia. trap) | 30 | 75 | 3.0 | 1.8 min | 2 | 3.0 |
| Washbasin, bidet (30mm dia. trap) | 40 | 75 | 3.0 | 1.8 min | No Limit | 0 |
| Shower, bath | 40 | 50 | No Limit[2] | 1.8 min | No Limit | No Limit |
| Bowl urinal | 40 | 75 | 3.0[3] | 1.8 min | No Limit[4] | 3.0 |
| Trough urinal | 50 | 75 | 3.0[3] | 1.8 min | No Limit[4] | 3.0 |
| Slab urinal[3] | 60 | 50 | 3.0[3] | 1.8 min | No Limit[4] | 3.0 |
| Kitchen sink (40mm dia. trap) | 40 | 75 | No Limit[2] | 1.8 min | No Limit | No Limit |
| Household dishwasher or washing machine | 40 | 75 | No Limit[3] | 1.8 min | No Limit | No Limit |
| WC with outlet up to 80mm[6] &[14] | 75 | 50 | No Limit | 1.8 min | No Limit[4] | 1.5 |
| WC with outlet greater than 80mm[6] &[14] | 100 | 50 | No Limit | 1.8 min | No Limit[4] | 1.5 |
| Food waste disposal[7] | 40 min. | 75[8] | 3.0[3] | 13.5 min | No Limit[4] | 3.0 |
| Sanitary towel disposal unit | 40 min. | 75[8] | 3.0[3] | 5.4 min | No Limit[4] | 3.0 |
| Bath drain, floor drain | 50 | 50 | No Limit[3] | 1.8 min | No Limit | No Limit |
| Floor drain | 70 | 50 | No Limit[3] | 1.8 min | No Limit | No Limit |
| Floor drain | 100 | 50 | No Limit[3] | 1.8 min | No Limit | No Limit |
| 5 basins[9] | 50 | 75 | 7.0 | 1.8 to 4.4 | [2] | 0 |
| 10 basins[9] &[10] | 50 | 75 | 10.0 | 1.8 to 1.9 | No Limit | 0 |
| Bowl urinals[9] &[11] | 50 | 70 | No Limit[3] | 1.8 min | No Limit[4] | No Limit |
| More than 8 WC's[6] | 100 | 50 | No Limit | 0.9 min | No Limit | No Limit |
| Up to 5 spray tap basins[12] | 30 max | 50 | No Limit[3] | 1.8 to 4.4 | No Limit[4] | 0 |

1) For maximum distances from trap to vent (see Figure 8 of BS EN 1205-2:2000).
2) If length is greater than 3m noisy discharge may result with an increased risk of blockage.
3) Should be as short as possible to limit problems with deposition.
4) Sharp throated bends should be avoided.
5) For slab urinal for up to 7 persons. Longer slabs to have more than one outlet.
6) Swept-entry branches serving WC's.
7) Includes small potato-peeling machines.
8) Tubular not bottle or resealing traps.
9) See Figure 9 of BS EN 12056-2:2000).
10) Every basin shall be individually ventilated.
11) Any number.
12) Spray tap basins shall have flush-grated wastes without plugs.
13) The size of ventilating pipes to branches from appliances can be DN 25 but, if they are longer than 15m or contain more than five bends, a DN 30 pipe shall be used.
14) If the connection of the ventilating pipe is liable to blockage due to repeated splashing or submergence, it should be DN 50, up to 50mm above the spill-over of the appliance.

**Ventilated discharge branches:** Sizes and limitations upon the use of ventilated discharge branches are given in the tables above. Limitations given in the second table are simplifications, for further information see national and local regulations and practice.



# Terrain Drainage Ventilation System

Terrain soil & waste products represent the industry benchmark for quality, installation, flexibility and product innovation, backed by the highest levels of customer service. Terrain systems comprise of an extensive range of soil & waste drainage products, including the Terrain Pleura system, a unique alternative engineered ventilation solution for high-rise buildings.

- Unique products offering unrivalled installation options
- High quality finish
- Suitable for all types of commercial and residential high-rise buildings
- Extensive technical experience to support and advise on all aspects of design and installation
- Terrain P.A.P.A.® Valve accredited to BBA 18/5551

As you would expect from a market leader our products come with all relevant standards including:

### Manufacturing Standards

BS EN 12380 A1 Air Admittance Valve (Pleura System)
Terrain FUZE HDPE: BS EN 1519/BBA, Certificate No. 07/4479

### Quality Management Systems Standards

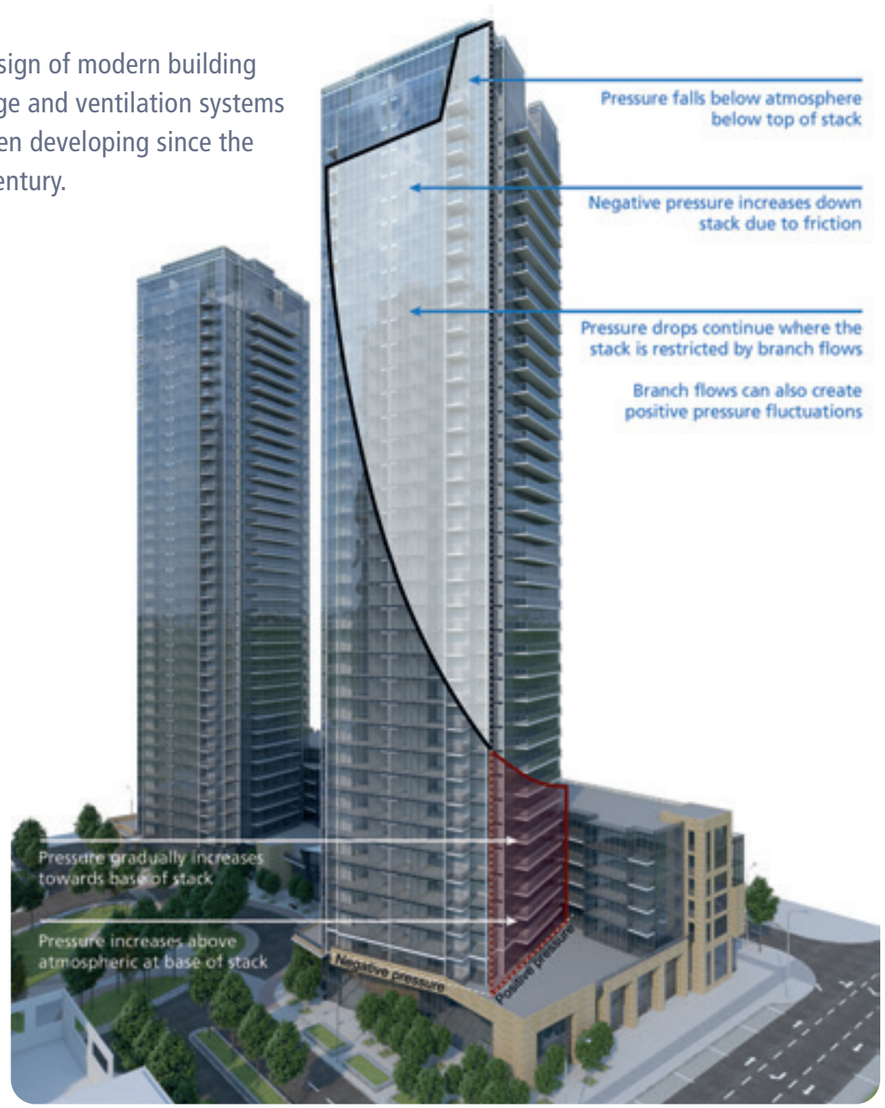
EN ISO 9001:2008 Management System
EN ISO14001:2004 Management System
BS OHSAS 18001:2007 Management System
PASS 99:2006 Integrated Management Registration

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE 18/5551

# 3 Soil and waste drainage

## Ventilation Drainage Pipework Systems

The design of modern building drainage and ventilation systems has been developing since the 19th century.




A minimum of 50mm of water is all that protects the occupants of a building from potentially harmful sewer gases and 'particulates'. Therefore, a good design must consider the integrity of the trap seal and protect it from being lost. One way of doing this is to consider the air flow within the system, as this is the primary reason for trap seal breach. The flow of air within the drainage pipework system is equally as important as the flow of water in maintaining a safe and hygienic drainage system. This is because the flow of water creates both positive and negative air fluctuations which can compromise water trap seals and upset the equilibrium in the system. Installation of a secondary stack is traditionally the answer to help alleviate the pressure within the system, however, this modern method of drainage ventilation saves cost, time, floor space and is a more efficient solution.



## Terrain P.A.P.A.® & Pleura Drainage Ventilation System

### The smarter air pressure and drainage ventilation system for high-rise buildings.

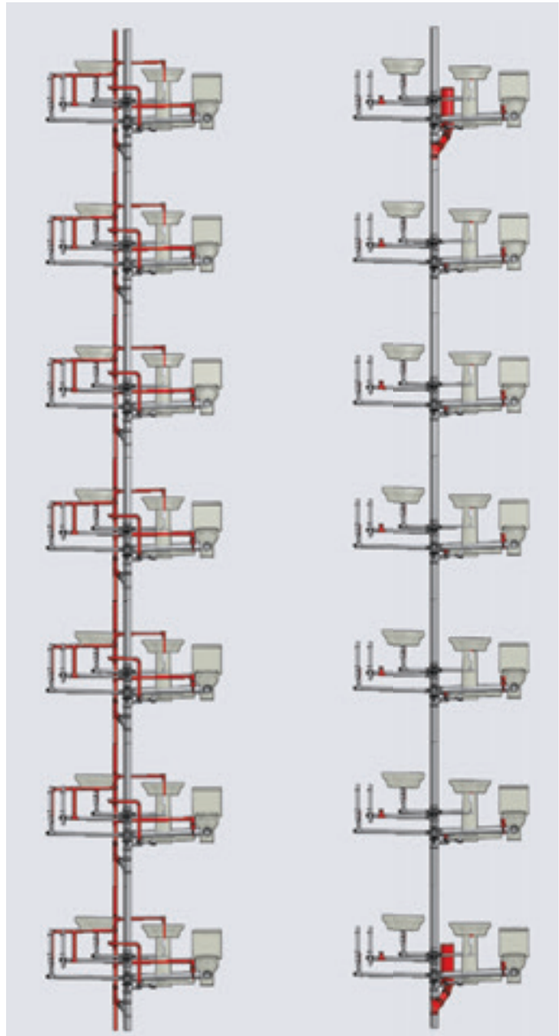
Following several years of theoretical and practical research into both positive and negative transient pressure fluctuations in drainage systems, the Terrain Pleura system provides both an intelligent and integrated solution for balancing the ambient air pressure within a drainage system.

### Terrain P.A.P.A® and Pleura drainage ventilation system; how it works:

Terrain Pleura regulators balance negative air pressure fluctuations whilst a positive pressure reduction device (P.A.P.A) balances positive pressures. Together, they protect the water trap seal from damage by forming a highly effective alternative solution for maintaining ambient air pressure within the drainage pipework system – whilst trapping foul air and introducing fresh air into the built environment.

**Terrain P.A.P.A can be installed with all of our fabricated soil and waste drainage stacks.**

**To find out more, visit www.polypipe.com/this-is-our-terrain/terrain-papa-pleura**



Conventional stack assembly

Stack assembly using P.A.P.A.® and Pleura venting systems

# 3 Soil and waste drainage

## TERRAIN PLEURA 50

The Terrain Pleura 50 air regulator provides ventilation to branch pipework. It is generally installed on the pipe behind the appliance trap. The Terrain Pleura 50 opens and admits fresh air into the branch pipe when the negative (suction) pressure occurs from an appliance discharging into the pipework system. This equalises the ambient air pressure within the pipework and protects the trap seal. When the flow stops and the internal ambient air pressure in the pipework balances, the Terrain Pleura 50 closes by gravity and prevents foul air entering the built environment.

## TERRAIN PLEURA 100

The Terrain Pleura 100 air regulator can be fitted on to the top of a foul or waste stack or at the end of long low gradient branch drains to provide ventilation. The Terrain Pleura 100 opens and admits fresh air under condition of reduced pressure in the discharge pipes and prevents trapped water seals being drawn. As the internal ambient air pressure in the pipework balances, the Terrain Pleura 100 closes by gravity and prevents foul air entering the built environment.

## TERRAIN P.A.P.A®

The Terrain P.A.P.A is a positive pressure reduction device, designed to mitigate the affects of positive air fluctuations in the drainage pipework system. As water descends down the drainage stack it creates a negative pressure; if that flow is interrupted or is approaching a change of direction, the negative pressure changes to a positive pressure and moves up the pipe. This low amplitude air wave typically travels at 320m/s, the speed of sound.

As the positive air fluctuation approaches the branch-off point for the Terrain P.A.P.A, the bladder within the unit reacts very quickly, within 0.2 seconds, and starts to expand; this creates a pressure differential at the branch-off point. The branch to the Terrain P.A.P.A then becomes the path of least resistance and the majority of the positive air pressure is absorbed within the unit.

As the ambient air pressure within the pipework starts to equalise, the bladder slowly releases the small volume of air into the pipework system at only 12m/s, which will have no effect on the trap seals.

Terrain P.A.P.A.® 9300.4


Pleura 100 9301.34

Pleura 50 9301.253



# Case Studies

## DEANSGATE SQUARE, MANCHESTER, UK

A range of Terrain's drainage ventilation and soil and waste systems are installed at Deansgate Square – one of Manchester's most prestigious residential developments. The 1,508-apartment luxury development has been fitted with a Terrain P.A.P.A.® and Pleura Vent System, eliminating the need for a secondary vent system, while Terrain FUZE HDPE drainage stacks and Terrain PVC piping systems helped meet the project's drainage and soil and waste requirements.

## MANCHESTER ENGINEERING CAMPUS DEVELOPMENT, UK

The University of Manchester's Engineering Campus Development (MECD) used Polypipe Building Services large diameter Terrain FUZE soil and waste pipes to manage water across the eight-storey, 78,000 square metre building.

## THE ROYAL LIVERPOOL UNIVERSITY HOSPITAL, UK

Terrain FUZE, Terrain PVC Vent and Waste Pipes, and Terrain Dilution Traps have been installed in some of the most critical areas of The Royal Liverpool University Hospital, including above surgery theatres, and in the Accident and Emergency Department.

## D1 TOWER, DUBAI, UAE

Terrain P.A.P.A is installed in D1 Tower, an 80 floor luxury residential building, providing a simplified, but efficient drainage ventilation system.

# 3 Soil and waste drainage

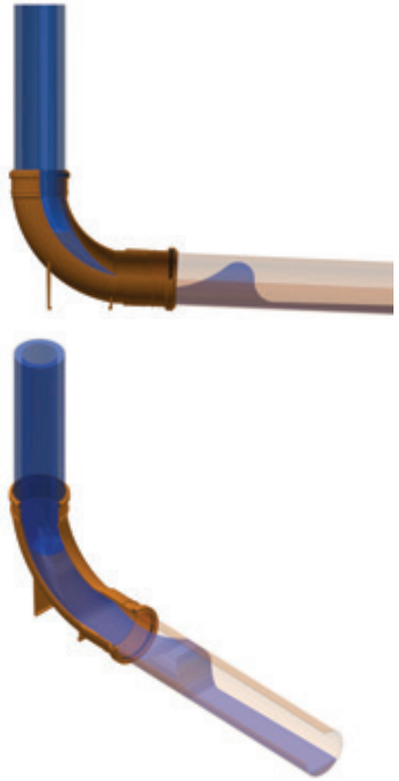
## Base of Stack/Transition Areas

When foul water and air discharge down a drainage stack, reaching the base of the stack, it will need to change direction to flow horizontally into either a high-level collector drain or into the below-ground drainage system.

The flow velocity in the horizontal drainage pipework will be controlled by the installed gradient and pipe diameter; this will be appreciably less than the velocity of the vertical drainage stack. At the base of the drainage stack the waste water discharge undergoes a rapid deceleration in velocity, creating an increase in the depth of the flow at the change of direction. This increase in depth is generally sufficient to fill the cross section area of the pipe.

This phenomenon is known as the 'hydraulic jump'.

The distance at which the hydraulic jump occurs varies from immediately at the stack change of direction, up to 10 times the diameter of the stack downstream.



### This is dependant upon

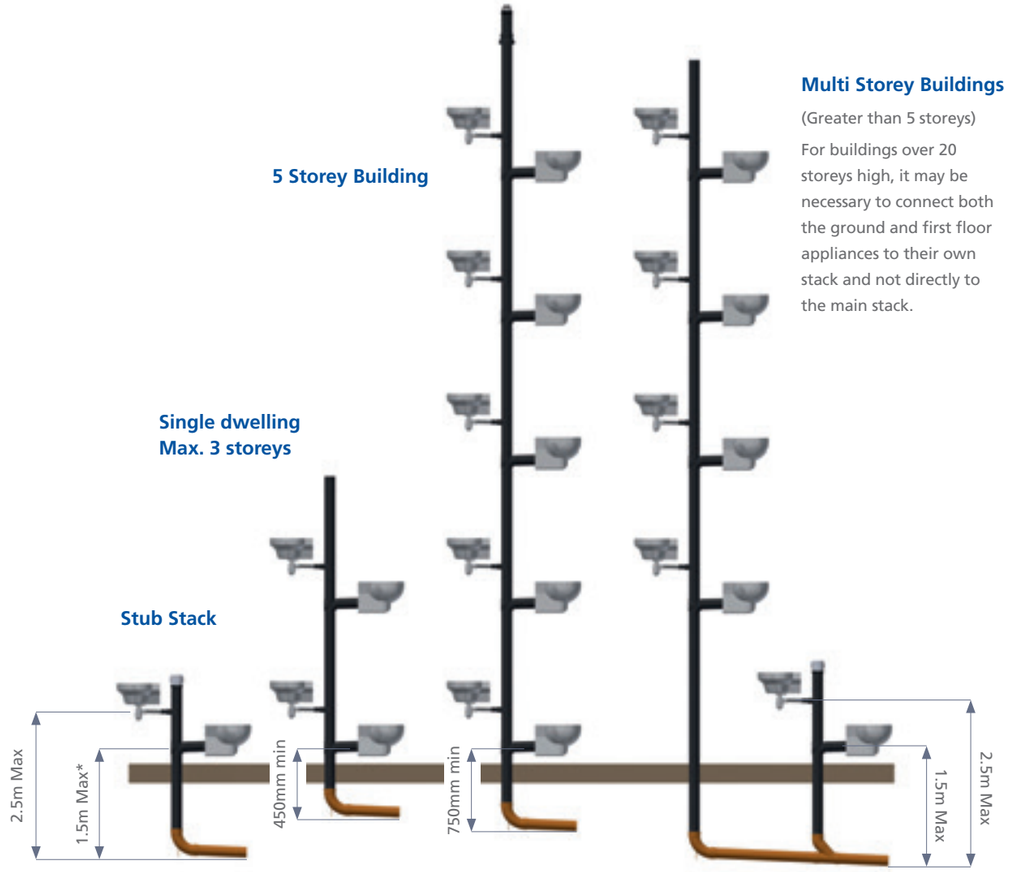
- The entrance velocity
- Depth of water that may already exist within the horizontal drainage pipe
- Roughness co-efficient of the pipe
- Pipe diameter
- Pipe gradient
- Bend formation at the base of the stack

The surged flow condition will extend until the frictional resistance of the pipe reduces the velocity to the designed flow condition.

To mitigate the air fluctuation problems associated at the base of the drainage stack, Building Regulations Approved Document H, states that the following design details are to be incorporated.



## Base of Stack Requirements

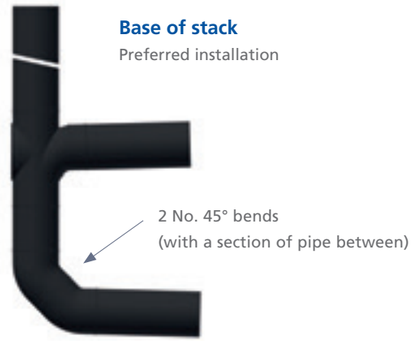


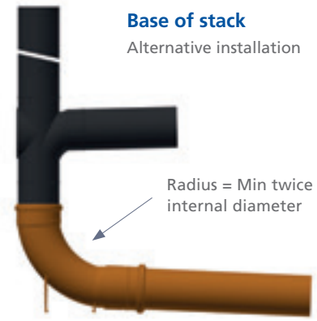

**Multi Storey Buildings**

(Greater than 5 storeys)

For buildings over 20 storeys high, it may be necessary to connect both the ground and first floor appliances to their own stack and not directly to the main stack.

* BS EN 12056-2 states 1.5m from the invert of the pipe to the centre line of the branch.



# 4 Pipes and Fittings

## Terrain HDPE Stax

Terrain FUZE Stax is the latest addition to the Terrain FUZE HDPE drainage system family, this new range of 2-part fabricated stack configurations is designed to make installing the most common high-rise applications simpler and quicker.

Many large-scale drainage stack projects involve repeating very similar configurations of loose components across floors, significant time is spent on the same cutting and welding jobs.

Using data gathered by our Polypipe Advantage Service, we have produced a range of stacks that reflect the most common of these standard configurations to help reduce installation time needed on-site.

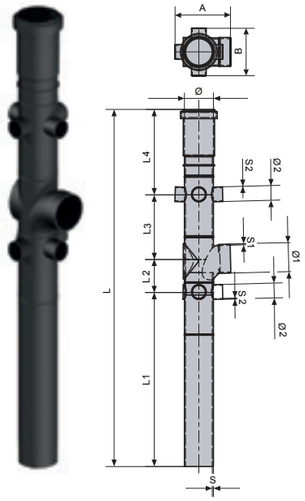
We have developed Terrain FUZE Stax as the perfect solution to sit between the current options of ordering loose Terrain FUZE components or using our Advantage service for more unique, complex projects.

Available from Polypipe Building Services stockists, the range covers three standard applications – kitchens, bathrooms, and utility rooms. Within these are a broad range of options including different top and bottom sections, stack diameters, vents and more to ensure maximum flexibility in meeting on site demands.

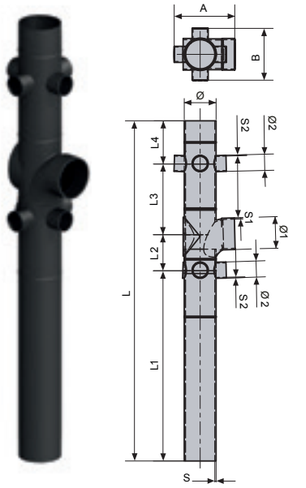
Terrain FUZE Stax can be obtained from distributors and integrate with loose Terrain FUZE components if needed. Where project requirements are too complex to be met efficiently through Terrain loose or FUZE Stax, the Polypipe Advantage service is on hand to offer bespoke design and fabrication.

# 4 Pipes and Fittings

## HDPE Stax

| PRODUCT | HDPE BATHROOM SINGLE EXPANSION | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | CODE | Ø/Ø$_1$/Ø$_2$ mm | S/S$_1$/S$_2$ mm | L mm | L$_1$ mm | L$_2$ mm | L$_3$ mm | L$_4$ mm | A mm | B mm | WEIGHT Kg/m |
|  | 9401.11011056B | 110/110/56 | 4.3/4.3/3 | 1354 | 660 | 125 | 245 | 324 | 210 | 180 | 2.578 |
| | 9401.16011056B | 160/110/56 | 6.2/4.3/3 | 1358 | 660 | 125 | 250 | 323 | 243 | 241 | 5.16 |

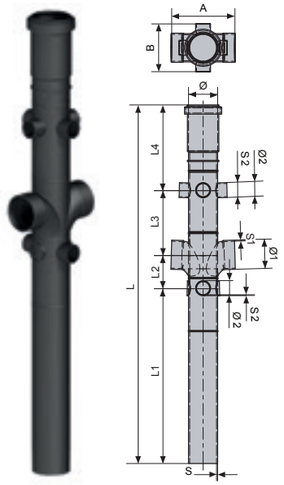
Bottom section, use with an access section (9411)

| PRODUCT | HDPE BATHROOM SINGLE LOCKED | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | CODE | Ø/Ø$_1$/Ø$_2$ mm | S/S$_1$/S$_2$ mm | L mm | L$_1$ mm | L$_2$ mm | L$_3$ mm | L$_4$ mm | A mm | B mm | WEIGHT Kg/m |
|  | 9402.11011056B | 110/110/56 | 4.3/4.3/3 | 1177 | 660 | 125 | 245 | 147 | 210 | 180 | 2.37 |
| | 9402.16011056B | 160/110/56 | 6.2/4.3/3 | 1177 | 660 | 125 | 250 | 142 | 243 | 241 | 4.564 |

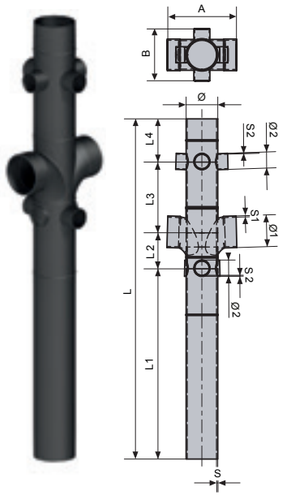
Bottom section, use with an access section (9411)



## HDPE Stax

| PRODUCT | HDPE BATHROOM DOUBLE EXPANSION | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | CODE | Ø/Ø$_1$/Ø$_2$ mm | S/S$_1$/S$_2$ mm | L mm | L$_1$ mm | L$_2$ mm | L$_3$ mm | L$_4$ mm | A mm | B mm | WEIGHT Kg/m |
|  | 9403.11011056B | 110/110/56 | 4.3/4.3/3 | 1354 | 660 | 125 | 245 | 324 | 240 | 180 | 3 |
| | 9403.16011056B | 160/110/56 | 6.2/4.3/3 | 1358 | 660 | 125 | 250 | 324 | 259 | 241 | 4.805 |

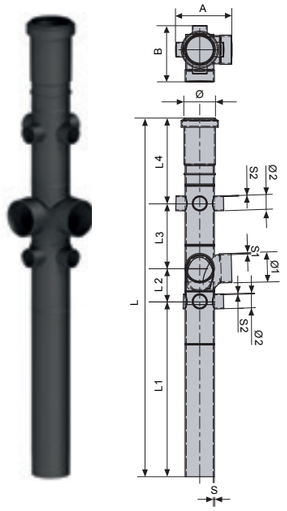
Bottom section, use with an access section (9411)

| PRODUCT | HDPE BATHROOM DOUBLE LOCKED | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | CODE | Ø/Ø$_1$/Ø$_2$ mm | S/S$_1$/S$_2$ mm | L mm | L$_1$ mm | L$_2$ mm | L$_3$ mm | L$_4$ mm | A mm | B mm | WEIGHT Kg/m |
|  | 9404.11011056B | 110/110/56 | 4.3/4.3/3 | 1177 | 660 | 125 | 245 | 147 | 240 | 180 | 2.576 |
| | 9404.16011056B | 160/110/56 | 6.2/4.3/3 | 1177 | 660 | 125 | 250 | 142 | 262 | 241 | 4.565 |

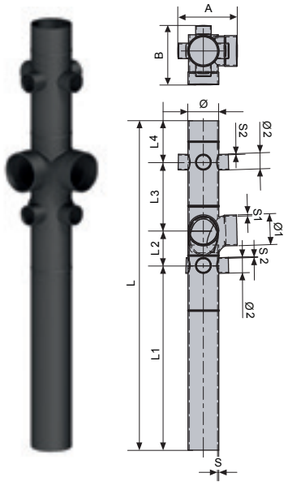
Bottom section, use with an access section (9411)

# 4 Pipes and Fittings

## HDPE Stax

| PRODUCT | HDPE BATHROOM CORNER EXPANSION | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | CODE | Ø/Ø$_1$/Ø$_2$ mm | S/S$_1$/S$_2$ mm | L mm | L$_1$ mm | L$_2$ mm | L$_3$ mm | L$_4$ mm | A mm | B mm | WEIGHT Kg/m |
|  | 9405.11011056B | 110/110/56 | 4.3/4.3/3 | 1354 | 660 | 125 | 245 | 324 | 210 | 210 | 2.959 |
| | 9405.16011056B | 160/110/56 | 6.2/4.3/3 | 1358 | 660 | 125 | 250 | 323 | 259 | 243 | 4.791 |

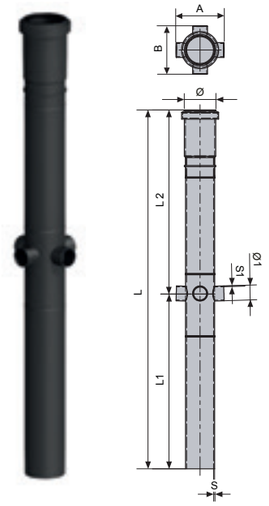
Bottom section, use with an access section (9411)

| PRODUCT | HDPE BATHROOM CORNER LOCKED | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | CODE | Ø/Ø$_1$/Ø$_2$ mm | S/S$_1$/S$_2$ mm | L mm | L$_1$ mm | L$_2$ mm | L$_3$ mm | L$_4$ mm | A mm | B mm | WEIGHT Kg/m |
|  | 9406.11011056B | 110/110/56 | 4.3/4.3/3 | 1177 | 660 | 125 | 245 | 147 | 210 | 210 | 2.574 |
| | 9406.16011056B | 160/110/56 | 6.2/4.3/3 | 1177 | 660 | 125 | 250 | 142 | 245 | 259 | 4.664 |

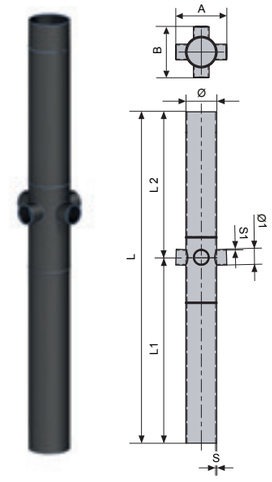
Bottom section, use with an access section (9411)



## HDPE Stax

| PRODUCT | HDPE KITCHEN EXPANSION | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | CODE | Ø/Ø$_1$ mm | S mm | S$_1$ mm | L mm | L$_1$ mm | L$_2$ mm | A mm | B mm | WEIGHT Kg/m |
|  | 9407.7556B* | 75/56 | 3.5 | 3 | 1025 | 572 | 453 | 93 | 125 | 0.907 |
| | 9407.11056B• | 110/56 | 4.3 | 3 | 1354 | 660 | 692 | 180 | 180 | 2.251 |
| | 9407.16056B• | 160/56 | 6.2 | 3 | 1358 | 660 | 698 | 241 | 241 | 4.668 |

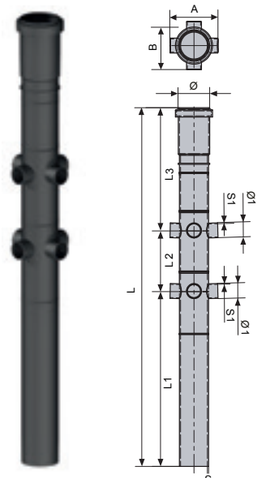
Bottom section, use with an access section (9411)
*Single Branch •4-Way Branch

| PRODUCT | HDPE KITCHEN LOCKED | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | CODE | Ø/Ø$_1$ mm | S mm | S$_1$ mm | L mm | L$_1$ mm | L$_2$ mm | A mm | B mm | WEIGHT Kg/m |
|  | 9408.7556B* | 75/56 | 3.5 | 3 | 859 | 572 | 287 | 78 | 118 | 0.677 |
| | 9408.11056B• | 110/56 | 4.3 | 3 | 1177 | 660 | 517 | 180 | 180 | 1.721 |
| | 9408.16056B• | 160/56 | 6.2 | 3 | 1177 | 660 | 517 | 241 | 241 | 3.412 |

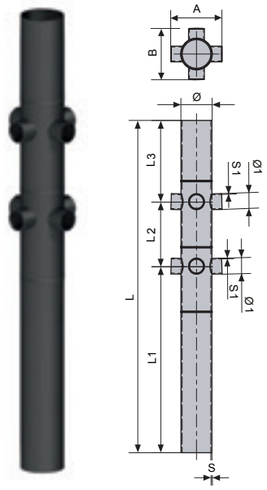
Bottom section, use with an access section (9411)
*Single Branch •4-Way Branch

# 4 Pipes and Fittings

## HDPE Stax

| PRODUCT | HDPE UTILITY EXPANSION | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | CODE | Ø/Ø$_1$ mm | S mm | S$_1$ mm | L mm | L$_1$ mm | L$_2$ mm | L$_3$ mm | A mm | B mm | WEIGHT Kg/m |
|  | 9409.7556B* | 75/56 | 3.5 | 3 | 1025 | 572 | 140 | 313 | 93 | 125 | 0.936 |
| | 9409.11056B• | 110/56 | 4.3 | 3 | 1354 | 660 | 229 | 463 | 180 | 180 | 2.377 |
| | 9409.16056B• | 160/56 | 6.2 | 3 | 1358 | 660 | 125 | 573 | 241 | 241 | 5.417 |

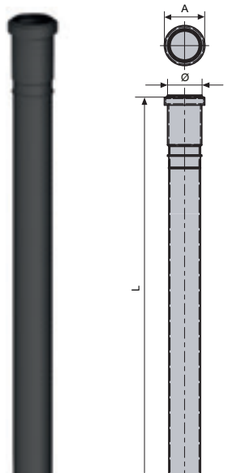
Bottom section, use with an access section (9411)
*2x Single Branch •2x 4-Way Branch

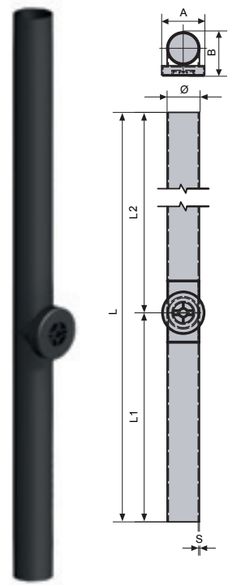
| PRODUCT | HDPE UTILITY LOCKED | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | CODE | Ø/Ø$_1$ mm | S mm | S1 mm | L mm | L$_1$ mm | L$_2$ mm | L$_3$ mm | A mm | B mm | WEIGHT Kg/m |
|  | 9410.7556B* | 75/56 | 3.5 | 3 | 859 | 572 | 140 | 147 | 118 | 78 | 0.835 |
| | 9410.11056B• | 110/56 | 4.3 | 3 | 1177 | 660 | 229 | 288 | 180 | 180 | 1.955 |
| | 9410.16056B• | 160/56 | 6.2 | 3 | 1177 | 660 | 125 | 392 | 241 | 241 | 4.033 |

Bottom section, use with an access section (9411)
*2x Single Branch •2x 4-Way Branch



## HDPE Stax

| PRODUCT | HDPE NO CONNECTION | | | | | |
|---|---|---|---|---|---|---|
| | CODE | Ø mm | S mm | L mm | A mm | WEIGHT Kg |
|  | 9411.56B | 56 | 3 | 1027 | 73 | 0.806 |
| | 9411.75B | 75 | 3.5 | 1025 | 93 | 1.119 |
| | 9411.110B | 110 | 4.3 | 1354 | 140 | 2.161 |
| | 9411.160B | 160 | 6.2 | 1358 | 192 | 4.558 |

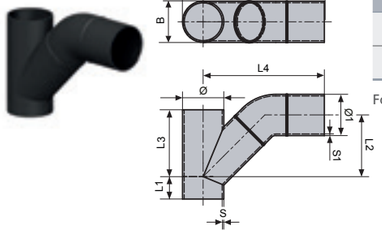
| PRODUCT | HDPE ACCESS PIPE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CODE | Ø mm | S mm | L mm | L$_1$ mm | L$_2$ mm | A mm | B mm | WEIGHT Kg |
|  | 9412.56B | 56 | 3 | 2341 | 878 | 1463 | 82 | 108 | 1.246 |
| | 9412.75B | 75 | 3.5 | 2341 | 878 | 1463 | 85 | 126 | 1.865 |
| | 9412.110B | 110 | 4.3 | 2023 | 648 | 1375 | 146 | 150 | 3.543 |
| | 9412.160B | 160 | 6.2 | 2023 | 648 | 1375 | 191 | 233 | 7.492 |

Top section, use with a bathroom, kitchen or utility section (9401-9408) or in a vent stack

# 4 Pipes and Fittings

## HDPE Stax

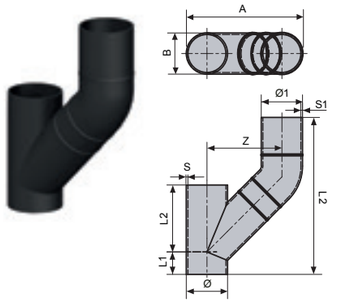
| PRODUCT | HDPE VENT TERRAIN P.A.P.A. HORIZONTAL |
|---|---|




| CODE | Ø/Ø$_1$ mm | S mm | S$_1$ mm | L$_1$ mm | L$_2$ mm | L$_3$ mm | L$_4$ mm | A mm | B mm | WEIGHT Kg/m |
|---|---|---|---|---|---|---|---|---|---|---|
| 9413.110110B | 110/110 | 4.3 | 4.3 | 60 | 165 | 178 | 323 | 379 | 112 | 0.755 |
| 9413.160110B | 160/110 | 6.2 | 4.3 | 70 | 211 | 244 | 364 | 444 | 160 | 1.581 |

For connecting to Terrain P.A.P.A. valve (9300.4)

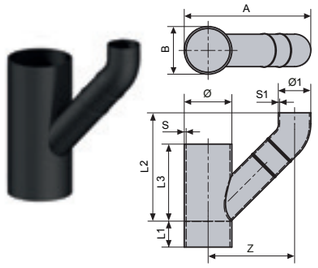
| PRODUCT | HDPE VENT TERRAIN P.A.P.A.VERTICAL |
|---|---|




| CODE | Ø/Ø$_1$ mm | S mm | S$_1$ mm | L$_1$ mm | L$_2$ mm | L$_3$ mm | A mm | B mm | Z mm | WEIGHT Kg/m |
|---|---|---|---|---|---|---|---|---|---|---|
| 9414.110110B | 110/110 | 4.3 | 4.3 | 60 | 178 | 419 | 312 | 113 | 200 | 0.755 |
| 9414.160110B | 160/110 | 6.2 | 4.3 | 70 | 244 | 479 | 386 | 160 | 250 | 1.262 |

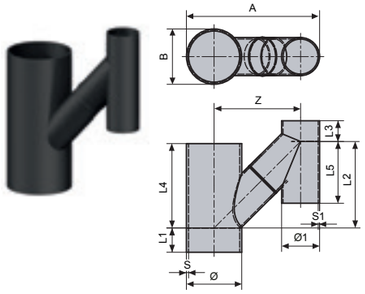
For connecting to Terrain P.A.P.A. valve (9300.4)

| HDPE CROSS VENT TERMINATION |
|---|




| CODE | Ø/Ø$_1$ mm | S mm | S$_1$ mm | L$_1$ mm | L$_2$ mm | L$_3$ mm | A mm | B mm | Z mm | WEIGHT Kg/m |
|---|---|---|---|---|---|---|---|---|---|---|
| 9415.11056B | 110/56 | 4.3 | 3 | 60 | 247 | 178 | 284 | 110 | 200 | 0.520 |
| 9415.11075B | 110/75 | 4.3 | 3.5 | 60 | 251 | 178 | 294 | 110 | 200 | 0.694 |
| 9415.110110B | 110/110 | 4.3 | 4.3 | 60 | 259 | 178 | 311 | 112 | 200 | 0.755 |
| 9415.160110B | 160/110 | 6.2 | 4.3 | 70 | 309 | 244 | 385 | 160 | 250 | 1.543 |

| HDPE CROSS VENT |
|---|

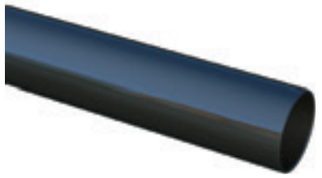



| CODE | Ø/Ø$_1$ mm | S mm | S$_1$ mm | L$_1$ mm | L$_2$ mm | L$_3$ mm | L$_4$ mm | L$_5$ mm | A mm | B mm | Z mm | WEIGHT Kg/m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9416.11056B | 110/56 | 4.3 | 3 | 60 | 200 | 55 | 178 | 115 | 200 | 283 | 110 | 0.586 |
| 9416.11075B | 110/75 | 4.3 | 3.5 | 60 | 200 | 51 | 178 | 136 | 200 | 293 | 110 | 0.652 |
| 9416.110110B | 110/110 | 4.3 | 4.3 | 60 | 200 | 60 | 178 | 178 | 200 | 310 | 110 | 1.05 |
| 9416.160110B | 160/110 | 6.2 | 4.3 | 70 | 250 | 60 | 244 | 178 | 250 | 385 | 160 | 1.785 |

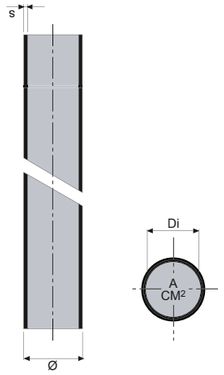


## HDPE Pipes

| PRODUCT | HDPE PIPE (3m length) |
|---|---|



| CODE | Ø mm | Di mm | S mm | A cm² | PN | WEIGHT Kg/m |
|---|---|---|---|---|---|---|
| 900.40.30B | 40 | 34 | 3 | 9 | 8 | 0.37 |
| 900.50.30B | 50 | 44 | 3 | 15.2 | 6.4 | 0.46 |
| 900.56.30B | 56 | 50 | 3 | 19.6 | 5.7 | 0.53 |
| 900.75.30B | 75 | 69 | 3 | 37.3 | 4.1 | 0.74 |
| 900.110.30B | 110 | 101.4 | 4.3 | 80.7 | 4 | 1.45 |
| 900.160.30B | 160 | 147.6 | 6.2 | 171.1 | 4 | 3.08 |

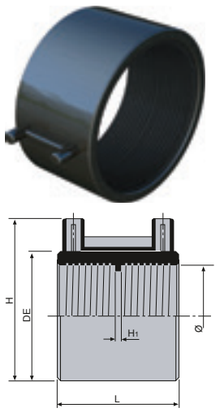



| HDPE PIPE (5m length) |
|---|

| CODE | Ø mm | Di mm | S mm | A cm² | PN | WEIGHT Kg/m |
|---|---|---|---|---|---|---|
| 900.40.50B | 40 | 34 | 3 | 9 | 8 | 0.37 |
| 900.50.50B | 50 | 44 | 3 | 15.2 | 6.4 | 0.46 |
| 900.56.50B | 56 | 50 | 3 | 19.6 | 5.7 | 0.53 |
| 900.75.50B | 75 | 69 | 3 | 37.3 | 4.1 | 0.74 |
| 900.110.50B | 110 | 101.4 | 4.3 | 80.7 | 4 | 1.45 |
| 900.160.50B | 160 | 147.6 | 6.2 | 171.1 | 4 | 3.08 |
| 900.200.50B | 200 | 187.6 | 6.2 | 276.4 | 3.2 | 4.1 |
| 900.250.50B | 250 | 234.4 | 7.8 | 431.5 | 3.2 | 6.1 |
| 900.315.50B | 315 | 295.4 | 9.8 | 685.3 | 3.2 | 9.51 |

## HDPE Fittings

| PRODUCT | HDPE ELECTROFUSION COUPLINGS |
|---|---|

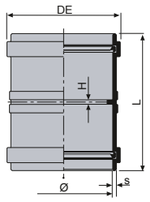



| CODE | Ø mm | L mm | DE mm | H mm | H$_1$ mm | WEIGHT Kg |
|---|---|---|---|---|---|---|
| 910.40B | 40 | 62 | 54.5 | 72.6 | 2 | 0.075 |
| 910.50B | 50 | 61.8 | 62.2 | 78 | 1.8 | 0.07 |
| 910.56B | 56 | 61.8 | 68.2 | 84 | 1.8 | 0.077 |
| 910.75B | 75 | 61.8 | 87.8 | 103.5 | 1.8 | 0.106 |
| 910.110B | 110 | 61.8 | 176.5 | 191 | 1.8 | 0.283 |
| 910.160B | 160 | 153 | 227.8 | 242.2 | 3 | 1.467 |
| 910.200B | 200 | 153 | 278.5 | 292.6 | 3 | 1.909 |
| 910.250B | 250 | 153 | 345.5 | 358.3 | 3 | 2.496 |
| 910.315B | 315 | 153 | 350 | 365 | 3 | 2.61 |

# 4 Pipes and Fittings

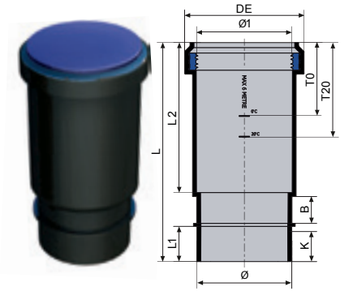
## HDPE Fittings

**PRODUCT**




**HDPE RING SEAL SOCKET**

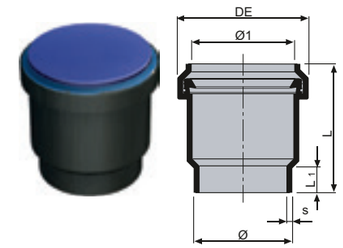
| CODE | Ø mm | S mm | L mm | H mm | DE mm | WEIGHT Kg |
|---|---|---|---|---|---|---|
| 910P.110B | 110 | 4.3 | 176 | 6 | 130 | 0.43 |
| 910P.160B | 160 | 6.7 | 230 | 6 | 185 | 1.24 |
| 910P.200B | 200 | 6.7 | 270 | 6 | 226 | 1.815 |
| 910P.250B | 250 | 8.3 | 300 | 7 | 284 | 5.14 |
| 910P.315B | 315 | 10.4 | 320 | 9 | 354 | 7.33 |




**HDPE EXPANSION JOINT WITH CAP**

| CODE | Ø mm | S mm | DE mm | L mm | $L_1$ mm | $L_2$ mm | K mm | B mm | $T_0$ mm | $T_{20}$ mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 911.40B | 40 | 3 | 57 | 245 | 35 | 171 | 30 | 35 | 85 | 110 | 0.099 |
| 911.50B | 50 | 3 | 67 | 245 | 35 | 171 | 30 | 35 | 85 | 110 | 0.122 |
| 911.56B | 56 | 3 | 73 | 245 | 35 | 171 | 28 | 35 | 85 | 110 | 0.136 |
| 911.75B | 75 | 3 | 93 | 245 | 35 | 171 | 26 | 35 | 85 | 110 | 0.181 |
| 911.110B | 110 | 3.5 | 130 | 255 | 41 | 174 | 36 | 32 | 85 | 110 | 0.521 |
| 911.160B | 160 | 6.2 | 192 | 264 | 44 | 184 | 35 | 32 | 85 | 110 | 0.839 |
| 911.200B* | 200 | 6.2 | 228 | 350 | 80 | - | - | - | 85 | 110 | 1.85 |
| 911.250B° | 250 | 7.8 | 280 | 440 | 183 | - | - | - | 85 | 110 | 3.38 |
| 911.315B° | 315 | 9.8 | 350 | 480 | 183 | - | - | - | 85 | 110 | 6.1 |

° Without cap * For rigid support




**HDPE RING SEAL ADAPTOR WITH CAP**

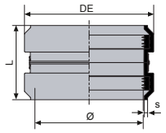
| CODE | Ø/$Ø_1$ mm | S mm | DE mm | L mm | $L_1$ mm | WEIGHT Kg |
|---|---|---|---|---|---|---|
| 927.40B | 40 | 3 | 57 | 104 | 35 | 0.038 |
| 927.50B | 50 | 3 | 67 | 104 | 35 | 0.053 |
| 927.56B | 56 | 3 | 73 | 104 | 35 | 0.059 |
| 927.75B | 75 | 3 | 93 | 104 | 35 | 0.076 |
| 927.110B | 110 | 3.5 | 130 | 112 | 31 | 0.203 |
| 927.160B* | 160 | 6.2 | 192 | 184 | 85 | 0.785 |
| 927.200B | 200 | 6.2 | 225 | 170 | 18 | 1.075 |
| 927.250B° | 250 | 7.8 | 278 | 170 | 22 | 1.37 |
| 927.315B° | 315 | 9.8 | 350 | 180 | 22 | 1.97 |

° Without cap * For rigid support



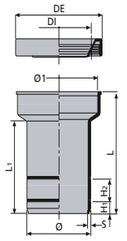
## HDPE Fittings

**PRODUCT**



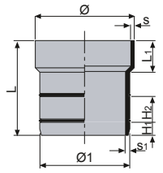

**HDPE SLIDING CONNECTOR**

| CODE | Ø mm | S mm | L mm | DE mm | WEIGHT Kg |
|---|---|---|---|---|---|
| 911S.110B | 110 | 4.3 | 196 | 140 | 1 |
| 911S.160B | 160 | 6.7 | 110 | 192 | 0.936 |
| 911S.200B | 200 | 6.7 | 270 | 226 | 1.445 |
| 911S.250B | 250 | 8.3 | 300 | 284 | 2.91 |
| 911S.315B | 315 | 10.4 | 320 | 354 | 5.1 |



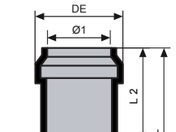

**HDPE WC CONNECTOR FOR PVC WITH RING SEAL**

| CODE | Ø/$Ø_1$ mm | S mm | DI mm | DE mm | L mm | $L_1$ mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|
| 925.110100B | 110/100 | 4.3 | 102±5 | 140 | 166 | 130 | 0.39 |



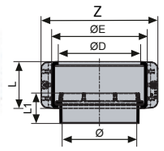

**HDPE MALE PVC ADAPTOR WITH RING SEAL**

| CODE | Ø/$Ø_1$ mm | S mm | $S_1$ mm | L mm | $L_1$ mm | $H_1$ mm | $H_2$ mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|
| 9113.110100B | 110/100 | 4.3 | 6 | 105 | 30 | 25 | 25 | 0.162 |




**HDPE - PVC RING SEAL ADAPTOR**

| CODE | Ø/$Ø_1$ mm | S mm | DE mm | L mm | $L_1$ mm | $L_2$ mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|
| 927.4036B | 40/36 | 3 | 49 | 93 | 35 | 53 | 0.035 |
| 927.5036B | 50/36 | 3 | 49 | 93 | 35 | 55 | 0.04 |
| 927.5043B | 50/43 | 3 | 56 | 93 | 35 | 53 | 0.041 |
| 927.5636B | 56/36 | 3 | 49 | 93 | 35 | 53 | 0.044 |
| 927.5643B | 56/43 | 3 | 56 | 93 | 35 | 53 | 0.047 |




**HDPE RIGID FIXING**

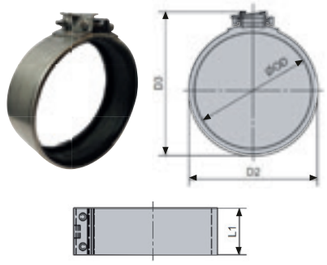
| CODE | Ø mm | DE mm | ID mm | L mm | $L_1$ mm | Z mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|
| 990.110B* | 110 | 144 | 123 | 70 | 45 | 173 | 0.281 |

• HDPE to HDPE * HDPE to PVC

# 4 Pipes and Fittings

## HDPE Fittings

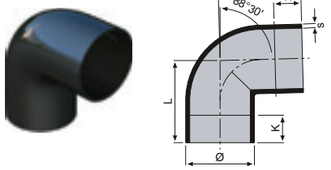
### HDPE MECHANICAL COUPLING




| CODE | Ø OD mm | OD TOLERANCE mm | $L_1$ mm | $D_2$ mm | $D_3$ mm | SCREW SIZE | HEX SOCKET ADAPTER mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|
| 9110.90B* | 90 | 89/92 | 65 | 101.4 | 145.4 | M6 x 50 | 5 | 0.43 |
| 9110.110B* | 110 | 109/112 | 65 | 121.4 | 165.4 | M6 x 50 | 5 | 0.47 |
| 9110.160B* | 160 | 159/162 | 65 | 171.4 | 215.4 | M6 x 50 | 5 | 0.58 |
| 9110.90C• | 90 | 85/90 | 65 | 101.4 | 145.4 | M6 x 50 | 5 | 0.43 |
| 9110.110C• | 114 | 110/114 | 65 | 125.4 | 169.4 | M6 x 50 | 5 | 0.52 |
| 9110.160C• | 165 | 160/165 | 65 | 176.4 | 220.4 | M6 x 50 | 5 | 0.61 |

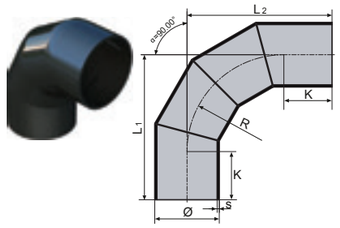
* HDPE to HDPE • HDPE to Cast Iron

### HDPE 91.5° (88.5°) BEND




| CODE | Ø mm | S mm | L mm | K mm | WEIGHT Kg |
|---|---|---|---|---|---|
| 901.40.92B | 40 | 3 | 54.6 | 30 | 0.038 |
| 901.50.92B | 50 | 3 | 59.5 | 30 | 0.053 |
| 901.56.92B | 56 | 3 | 62.4 | 30 | 0.062 |
| 901.75.92B | 75 | 3 | 71.7 | 30 | 0.09 |
| 901.110.92B | 110 | 4.3 | 95 | 30 | 0.244 |
| 901.160.92B | 160 | 6.2 | 118.3 | 30 | 0.651 |

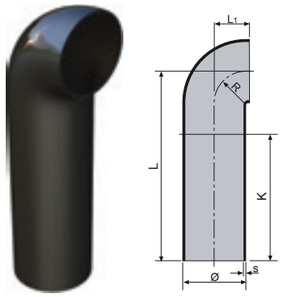
### HDPE 90° WIDE RADIUS BEND




| CODE | Ø mm | S mm | $L_1$ mm | $L_2$ mm | K mm | R mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|
| 907.200.90B* | 200 | 6.2 | 452 | 452 | 150 | 300 | 3.05 |
| 907.250.90B* | 250 | 7.8 | 627 | 627 | 250 | 375 | 6.4 |
| 907.315.90B* | 315 | 9.8 | 775 | 775 | 300 | 472.5 | 12 |

* Segmented

### HDPE EXTENDED SPIGOT BEND

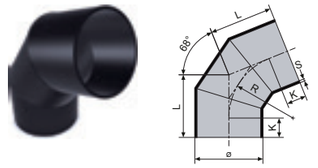



| CODE | Ø/$Ø_1$ mm | S mm | DE mm | L mm | $L_1$ mm | R mm | K mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|
| 902.56.90B | 56 | 3 | 50 | 100 | 80 | - | - | 0.085 |
| 902.110.90B | 110 | 4.3 | - | 300 | 60 | 60 | 220 | 0.5 |



## HDPE Fittings

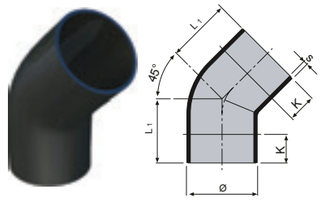
### HDPE 112.5° (67.5°) BEND




| CODE | Ø mm | S mm | L mm | K mm | R mm | WEIGHT Kg |
|---|---|---|---|---|---|---|
| 901.110.112B* | 110 | 4.3 | 125 | 50 | 142.5 | 0.34 |
| 901.160.112B* | 160 | 6.2 | 161 | 70 | 167 | 0.91 |
| 901.200.112B* | 200 | 6.2 | 183 | 80 | 188 | 1.30 |
| 901.250.112B* | 250 | 7.8 | 196 | 80 | 204.5 | 2.19 |
| 901.315.112B* | 315 | 9.8 | 295 | 139 | 295.5 | 5.2 |

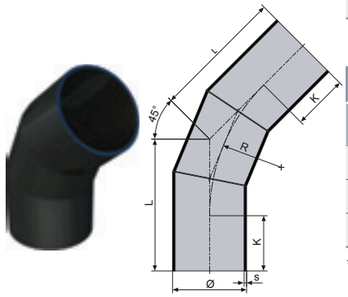
* Segmented

### HDPE 45° BEND




| CODE | Ø mm | S mm | $L_1$ mm | K mm | WEIGHT Kg |
|---|---|---|---|---|---|
| 901.40.135B | 40 | 3 | 43.3 | 30 | 0.033 |
| 901.50.135B | 50 | 3 | 45.4 | 30 | 0.043 |
| 901.56.135B | 56 | 3 | 46.7 | 30 | 0.05 |
| 901.75.135B | 75 | 3 | 50.6 | 30 | 0.074 |
| 901.110.135B | 110 | 4.3 | 58.8 | 30 | 0.167 |
| 901.160.135B | 160 | 6.2 | 73.3 | 30 | 0.453 |

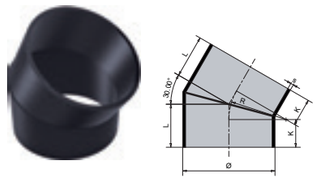
### HDPE 45° WIDE RADIUS BEND




| CODE | Ø mm | S mm | L mm | K mm | R mm | WEIGHT Kg |
|---|---|---|---|---|---|---|
| 901.200.135B* | 200 | 6.2 | 358 | 150 | 500 | 2.7 |
| 901.250.135B* | 250 | 7.8 | 510 | 250 | 625 | 6 |
| 901.315.135B* | 315 | 9.8 | 628 | 300 | 787.5 | 11.3 |

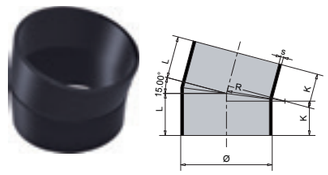
* Segmented

### HDPE 150° (30°) BEND




| CODE | Ø mm | S mm | L mm | K mm | R mm | WEIGHT Kg |
|---|---|---|---|---|---|---|
| 901.110.150B* | 110 | 4.3 | 50 | 35 | 57 | 0.15 |
| 901.160.150B* | 160 | 6.2 | 64 | 42 | 80.5 | 0.38 |
| 901.200.150B* | 200 | 6.2 | 113 | 86 | 101.5 | 0.86 |
| 901.250.150B* | 250 | 7.8 | 117 | 83 | 125 | 1.39 |
| 901.315.150B* | 315 | 9.8 | 128 | 85 | 160 | 2.41 |

* Segmented



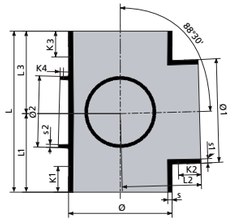

| CODE | Ø mm | S mm | L mm | K mm | R mm | WEIGHT Kg |
|---|---|---|---|---|---|---|
| 901.110.165B* | 110 | 4.3 | 43 | 35 | 59 | 0.13 |
| 901.160.165B* | 160 | 6.2 | 50 | 39 | 79.5 | 0.30 |
| 901.200.165B* | 200 | 6.2 | 92 | 79 | 97.5 | 0.70 |
| 901.250.165B* | 250 | 7.8 | 99 | 82 | 126 | 1.18 |
| 901.315.165B* | 315 | 9.8 | 104 | 84 | 154 | 1.97 |

* Segmented

# 4 Pipes and Fittings

## HDPE Fittings

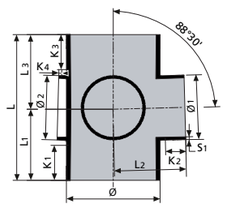
| PRODUCT | HDPE 90° BRANCH |
|---|---|




| CODE | Ø mm | Ø$_1$ mm | Ø$_2$ mm | S mm | S$_1$ mm | S$_2$ mm | L mm | L$_1$ mm | L$_2$ mm | L$_3$ mm | K$_1$ mm | K$_2$ mm | K$_3$ mm | K$_4$ mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 904.40.90B | 40 | 160 | 110 | 3 | 6.2 | 4.3 | 110.2 | 55.6 | 60.6 | 54.6 | 30 | 35 | 40 | 5 | 0.06 |
| 904.50.90B | 50 | 160 | 110 | 3 | 6.2 | 4.3 | 120.2 | 60.8 | 65.8 | 59.4 | 30 | 35 | 40 | 5 | 0.085 |
| 904.56.90B | 56 | 160 | 110 | 3 | 6.2 | 4.3 | 126.3 | 63.9 | 68.8 | 62.4 | 30 | 35 | 40 | 5 | 0.105 |
| 904.75.90B | 75 | 160 | 110 | 3 | 6.2 | 4.3 | 145.4 | 73.7 | 77.2 | 71.7 | 30 | 35 | 40 | 5 | 0.145 |
| 904.110.90B | 110 | 160 | 110 | 4.3 | 6.2 | 4.3 | 223.1 | 108 | 91 | 115.1 | 30 | 35 | 40 | 5 | 0.365 |
| 904.160.90B | 160 | 160 | 110 | 6.2 | 6.2 | 4.3 | 250 | 122 | 123 | 128 | 40 | 35 | 40 | 5 | 1.19 |
| 904.200.90B* | 200 | 160 | 110 | 6.2 | 6.2 | 4.3 | 800 | 400 | 400 | 400 | 150 | 35 | 40 | 5 | 1.705 |
| 904.250.90B* | 250 | 160 | 110 | 7.8 | 6.2 | 4.3 | 800 | 400 | 400 | 400 | 250 | 35 | 40 | 5 | 3.1 |
| 904.315.90B* | 315 | 160 | 110 | 9.8 | 6.2 | 4.3 | 984 | 492 | 492 | 492 | 300 | 35 | 40 | 5 | 6.15 |

* Segmented

| HDPE REDUCING BRANCH 90° |
|---|



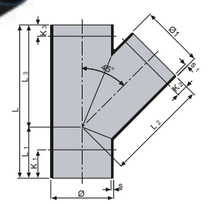

| CODE | Ø/Ø$_1$ mm | S mm | S$_1$ mm | L mm | L$_1$ mm | L$_2$ mm | L$_3$ mm | K$_1$ mm | K$_2$ mm | K$_3$ mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 904.5040.90B | 50/40 | 3 | 3 | 150 | 90 | - | – | 60 | 25 | 30 | 0.08 |
| 904.5650.90B | 56/50 | 3 | 3 | 175 | 105 | - | – | 70 | 30 | 35 | 0.105 |
| 904.7540.90B* | 75/40 | 3 | 3 | 210 | 105 | 107 | 105 | 75 | 60 | 75 | 0.18 |
| 904.7550.90B* | 75/50 | 3 | 3 | 210 | 105 | 108 | 105 | 75 | 60 | 75 | 0.14 |
| 904.7556.90B | 75/56 | 3 | 3 | 175 | 105 | - | – | 65 | 25 | 30 | 0.14 |
| 904.11040.90B | 110/40 | 4.3 | 3 | 210 | 105 | 91 | 105 | 80 | 30 | 80 | 0.32 |
| 904.11050.90B | 110/50 | 4.3 | 3 | 225 | 135 | - | – | 95 | 25 | 50 | 0.345 |
| 904.11056.90B | 110/56 | 4.3 | 3 | 210 | 105 | 91 | 105 | 75 | 30 | 70 | 0.323 |
| 904.11075.90B | 110/75 | 4.3 | 3 | 210 | 105 | 91 | 105 | 65 | 30 | 60 | 0.324 |
| 904.160110.90B | 160/110 | 6.2 | 4.3 | 350 | 210 | - | – | 135 | 45 | 60 | 1.12 |
| 904.200110.90B* | 200/110 | 6.2 | 4.3 | 450 | 225 | 434 | 225 | 150 | 150 | 150 | 2.1 |
| 904.200160.90B* | 200/160 | 6.2 | 6.2 | 500 | 250 | 410 | 250 | 150 | 150 | 150 | 2.75 |
| 904.250110.90B* | 250/110 | 7.8 | 4.3 | 650 | 325 | 463 | 325 | 250 | 150 | 250 | 4.3 |
| 904.250160.90B* | 250/160 | 7.8 | 6.2 | 700 | 350 | 447 | 350 | 250 | 150 | 250 | 5 |
| 904.250200.90B* | 250/200 | 7.8 | 6.2 | 750 | 375 | 425 | 375 | 250 | 150 | 250 | 5.4 |
| 904.315110.90B* | 315/110 | 9.8 | 4.3 | 800 | 400 | 498 | 400 | 300 | 150 | 300 | 7.6 |
| 904.315160.90B* | 315/160 | 9.8 | 6.2 | 820 | 410 | 486 | 410 | 300 | 150 | 300 | 8.2 |
| 904.315200.90B* | 315/200 | 9.8 | 6.2 | 850 | 425 | 472 | 425 | 300 | 150 | 300 | 8.7 |
| 904.315250.90B* | 315/250 | 9.8 | 7.8 | 900 | 450 | 446 | 450 | 300 | 250 | 300 | 9.1 |

* Welded



## HDPE Fittings

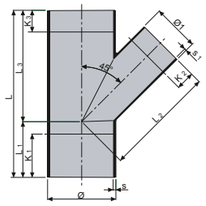
| PRODUCT | HDPE 45° Y BRANCH |
|---|---|




| CODE | Ø/Ø$_1$ mm | S/S$_1$ mm | L mm | L$_1$ mm | L$_2$/L$_3$ mm | K$_1$ mm | K$_2$ mm | K$_3$ mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|
| 904.40.135B | 40 | 3 | 135 | 45 | 90 | 25 | 30 | 30 | 0.07 |
| 904.50.135B | 50 | 3 | 165 | 55 | 110 | 35 | 20 | 20 | 0.105 |
| 904.56.135B | 56 | 3 | 180 | 60 | 120 | 40 | 25 | 25 | 0.13 |
| 904.75.135B | 75 | 3 | 210 | 70 | 140 | 40 | 25 | 25 | 0.205 |
| 904.110.135B | 110 | 4.3 | 270 | 90 | 180 | 55 | 20 | 20 | 0.53 |
| 904.160.135B | 160 | 6.2 | 375 | 125 | 250 | 75 | 25 | 25 | 1.475 |
| 904.200.135B* | 200* | 6.2 | 916 | 458 | 458 | 150 | 150 | 150 | 5 |
| 904.250.135B* | 250* | 7.8 | 1045 | 448 | 597 | 250 | 250 | 250 | 8.5 |
| 904.315.135B* | 315* | 9.8 | 1153 | 435 | 718 | 300 | 300 | 300 | 15.1 |

* Segmented

| HDPE REDUCING Y BRANCH 45° |
|---|



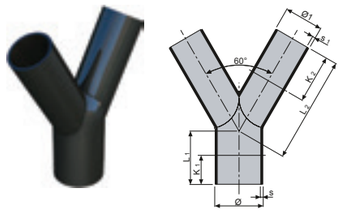

| CODE | Ø/Ø$_1$ mm | S mm | S$_1$ mm | L mm | L$_1$ mm | L$_2$ mm | L$_3$ mm | K$_1$ mm | K$_2$ mm | K$_3$ mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 904.5040.135B | 50/40 | 3 | 3 | 165 | 55 | 110 | 110 | 40 | 45 | 45 | 0.1 |
| 904.5650.135B | 56/50 | 3 | 3 | 180 | 60 | 120 | 120 | 40 | 30 | 30 | 0.125 |
| 904.7540.135B* | 75/40 | 3 | 3 | 210 | 68 | 158 | 142 | 70 | 70 | 70 | 0.19 |
| 904.7550.135B* | 75/50 | 3 | 3 | 210 | 68 | 158 | 142 | 70 | 70 | 70 | 0.2 |
| 904.7556.135B | 75/56 | 3 | 3 | 210 | 70 | 140 | - | 55 | 25 | 35 | 0.19 |
| 904.11040.135B* | 110/40 | 4.3 | 3 | 240 | 59 | 183 | 181 | 70 | 70 | 70 | 0.38 |
| 904.11050.135B | 110/50 | 4.3 | 3 | 270 | 90 | 180 | - | 95 | 50 | 55 | 0.44 |
| 904.11056.135B | 110/56 | 4.3 | 3 | 270 | 90 | 180 | - | 90 | 40 | 45 | 0.455 |
| 904.11075.135B | 110/75 | 4.3 | 3 | 270 | 90 | 180 | - | 75 | 30 | 35 | 0.47 |
| 904.16075.135B* | 165/75 | 6.2 | 3 | 315 | 65 | 253 | 250 | 80 | 75 | 80 | 1.03 |
| 904.160110.135B | 160/110 | 6.2 | 4.3 | 375 | 125 | 250 | - | 110 | 45 | 55 | 1.25 |
| 904.20075.135B* | 200/75 | 6.2 | 3 | 500 | 150 | 604 | 350 | 150 | 150 | 150 | 2.246 |
| 904.200110.135B* | 200/110 | 6.2 | 4.3 | 540 | 170 | 587 | 370 | 150 | 150 | 150 | 2.4 |
| 904.200160.135B* | 200/160 | 6.2 | 6.2 | 540 | 170 | 562 | 370 | 150 | 150 | 150 | 2.7 |
| 904.250110.135B* | 250/110 | 7.8 | 4.3 | 700 | 225 | 622 | 475 | 250 | 150 | 250 | 4.4 |
| 904.250160.135B* | 250/160 | 7.8 | 6.2 | 780 | 264 | 597 | 516 | 250 | 150 | 250 | 4.85 |
| 904.250200.135B* | 250/200 | 7.8 | 6.2 | 800 | 275 | 577 | 525 | 250 | 150 | 250 | 5 |
| 904.315110.135B* | 315/110 | 9.8 | 4.3 | 850 | 267 | 668.5 | 583 | 300 | 150 | 300 | 8.6 |
| 904.315160.135B* | 315/160 | 9.8 | 6.2 | 850 | 267 | 643 | 583 | 300 | 150 | 300 | 9.15 |
| 904.315200.135B* | 315/200 | 9.8 | 6.2 | 900 | 292 | 623 | 608 | 300 | 150 | 300 | 9.45 |
| 904.315250.135B* | 315/250 | 9.8 | 7.8 | 1000 | 342 | 598 | 658 | 300 | 250 | 300 | 9.25 |

* Segmented

# 4 Pipes and Fittings

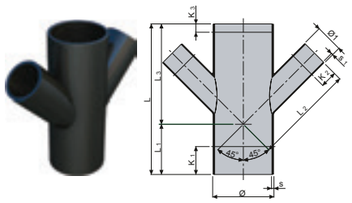
## HDPE Fittings

### HDPE 60° DOUBLE Y BRANCH



| CODE | Ø/Ø1 mm | S mm | S1 mm | L mm | L1 mm | K1 mm | K2 mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|
| 906.5040.60B | 50/40 | 3 | 3 | 55 | 110 | 40 | 50 | 0.093 |
| 906.110.60B | 110/110 | 4.3 | 4.3 | 90 | 120 | 50 | - | 0.393 |

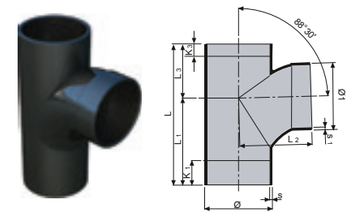
### HDPE 45° DOUBLE REDUCING BRANCH



| CODE | Ø/Ø1 mm | S mm | S1 mm | L mm | L1 mm | L2 mm | L3 mm | L4 mm | K1 mm | K2 mm | K3 mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 906.11040.135B* | 110/40 | 4.3 | 3 | 240 | 59 | 183 | 183 | 181 | 75 | 75 | 75 | 0.42 |
| 906.11050.135B* | 110/50 | 4.3 | 3 | 238 | 60 | 183 | 190 | 178 | 75 | 75 | 75 | 0.43 |
| 906.110.135B | 110/110 | 4.3 | 4.3 | 338 | 110 | 180 | 180 | 228 | 50 | 30 | 50 | 0.738 |

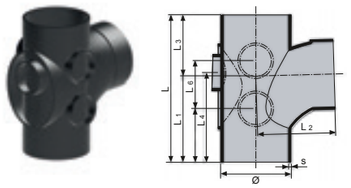
* Segmented

### HDPE SWEPT BRANCH FITTING



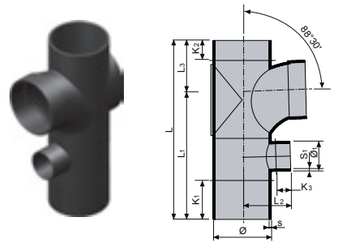
| CODE | Ø/Ø1 mm | S/S1 mm | L mm | L1 mm | L2 mm | L3 mm | K1 mm | K2 mm | K3 mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 904.56.92B | 56 | 3 | 137 | 78 | 70.3 | 59 | 25 | 25 | 25 | 0.106 |
| 904.110.92B | 110/110 | 4.3 | 230 | 140 | 120 | 90 | 90 | 40 | 20 | 0.415 |

### HDPE 92.5° (87.5°) SWEPT ENTRY BOSSED BRANCH



| CODE | Ø mm | S mm | L mm | L1 mm | L2 mm | L3 mm | L4 mm | L5 mm | L6 mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 904.110.925B | 110 | 4.3 | 225 | 135.1 | 119.9 | 89.9 | 140 | 84 | 75 | 0.539 |

### HDPE 88° SINGLE BOSS BRANCH

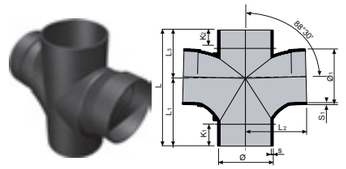


| CODE | Ø/Ø1 mm | S mm | S1 mm | L mm | L1 mm | L2 mm | L3 mm | K1 mm | K2 mm | K3 mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 904.11090.12B | 110/56 | 4.3 | 3 | 338 | 240 | 90 | 97 | 73 | 37 | 27 | 0.575 |



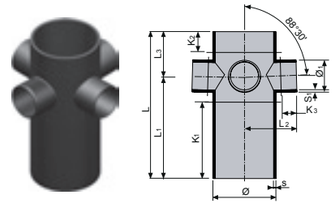
## HDPE Fittings

### HDPE 88° DOUBLE BRANCH



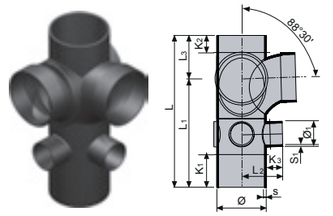
| CODE | Ø/Ø1 mm | S mm | L mm | L1 mm | L2 mm | L3 mm | K1 mm | K2 mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|
| 906.110.92B | 110/110 | 4.3 | 231 | 134 | 120 | 97 | 43 | 37 | 0.553 |

### HDPE 4 WAY BRANCH



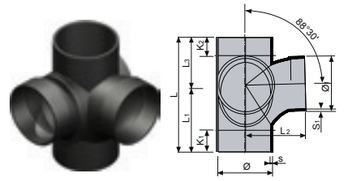
| CODE | Ø/Ø1 mm | S mm | S1 mm | L mm | L1 mm | L2 mm | L3 mm | K1 mm | K2 mm | K3 mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 920.110.56B | 110/56 | 4.3 | 3 | 257 | 177 | 90 | 79 | 133 | 37 | 37 | 0.483 |
| 920.160.56B | 160/56 | 6.2 | 3 | 146 | 73 | 120 | 73 | 15 | 15 | 15 | 0.699 |

### HDPE 88° CORNER BOSS BRANCH



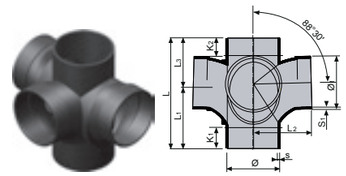
| CODE | Ø/Ø1 mm | S mm | S1 mm | L mm | L1 mm | L2 mm | L3 mm | K1 mm | K2 mm | K3 mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 906.11090.12B | 110/56 | 4.3 | 3 | 338 | 240 | 90 | 97 | 73 | 37 | 27 | 0.71 |

### HDPE 88° CORNER BRANCH



| CODE | Ø mm | S mm | L mm | L1 mm | L2 mm | L3 mm | K1 mm | K2 mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|
| 906.11090.92B | 110 | 4.4 | 231 | 134 | 120 | 97 | 43 | 37 | 0.479 |

### HDPE 88° 3 WAY CORNER BRANCH

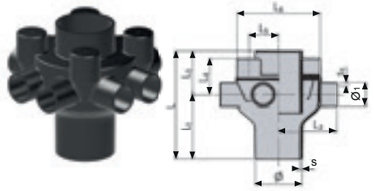


| CODE | Ø mm | S mm | L mm | L1 mm | L2 mm | L3 mm | K1 mm | K2 mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|
| 906.11093.92B | 110 | 4.4 | 231 | 134 | 120 | 97 | 43 | 37 | 0.579 |

# 4 Pipes and Fittings

## HDPE Fittings

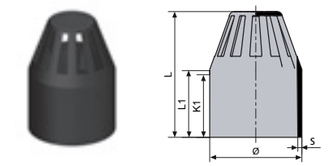
### HDPE MANIFOLD

| PRODUCT | CODE | Ø/Ø$_1$ mm | S mm | S$_1$ mm | L mm | L$_1$ mm | L$_2$ mm | L$_3$ mm | L$_4$ mm | L$_5$ mm | L$_6$ mm |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | 919.110.56B | 110/56 | 4.3 | 3 | 255 | 153 | 138 | 102 | 85 | 100 | 200 |

### HDPE WEATHERING APRON

| PRODUCT | CODE | Ø mm | DE mm | S mm | L mm | L$_1$ mm | A mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|
|  | 931.110.200B | 110 | 131 | 4.3 | 93.5 | 42.5 | 200 | 0.242 |

### HDPE VENT COWL

| PRODUCT | CODE | Ø mm | S mm | L mm | L$_1$ mm | K$_1$ mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|
|  | 950.75B | 75 | 3 | 118 | 68.5 | 63.5 | 0.074 |
| | 950.110B | 110 | 4.3 | 151 | 80 | 75 | 0.191 |
| | 950.160B | 160 | 6.2 | 192 | 100 | 95 | 0.528 |

### HDPE CONCENTRIC REDUCERS

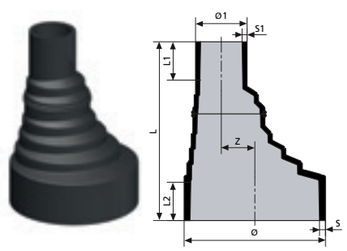
| PRODUCT | CODE | Ø/Ø$_1$ mm | S mm | S$_1$ mm | L mm | L$_1$ mm | L$_2$ mm | K mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|
|  A | 924.5040B▼ | 50/40 | 3 | 3 | 108 | 30 | 60 | 15 | 0.053 |
| | 924.5650B▼ | 56/50 | 3 | 3 | 108 | 30 | 60 | 15 | 0.061 |
| | 924.7540B▼ | 75/40 | 3 | 3 | 80 | 30 | 30 | 15 | 0.045 |
| | 924.7550B▼ | 75/50 | 3 | 3 | 80 | 30 | 30 | 15 | 0.05 |
| | 924.7556B▼ | 75/56 | 3 | 3 | 80 | 30 | 30 | 15 | 0.06 |
| | 924.11040B▼ | 110/40 | 4.3 | 3 | 80 | 30 | 30 | 15 | 0.09 |
| | 924.11050B▼ | 110/50 | 4.3 | 3 | 80 | 30 | 30 | 15 | 0.115 |
| | 924.11056B• | 110/56 | 4.3 | 3 | 80 | 30 | 30 | 15 | 0.095 |
| | 924.11075B▼ | 110/75 | 4.3 | 3 | 80 | 30 | 30 | 15 | 0.125 |
|  B | 924.160110B• | 160/110 | 6.2 | 4.3 | 115 | 30 | 30 | 15 | 0.255 |
| | 924.200160B▼ | 200/160 | 9.2 | 6.2 | 180 | 60 | 60 | 20 | 0.325 |

▼ A • B



## HDPE Fittings

### HDPE ECCENTRIC REDUCER

| PRODUCT | CODE | Ø/Ø$_1$ mm | S mm | S$_1$ mm | L mm | L$_1$ mm | L$_2$ mm | Z mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|
|  | 923.5040B | 50/40 | 3 | 3 | 80 | 35 | 35 | – | 0.035 |
| | 923.5640B | 56/40 | 3.5 | 3.5 | 120 | 64.59 | 31.05 | – | 0.064 |
| | 923.5650B | 56/50 | 3 | 3 | 108 | 35 | 60 | – | 0.064 |
| | 923.7540B | 75/40 | 3 | 3 | 80 | 37 | 35 | – | 0.055 |
| | 923.7550B | 75/50 | 3 | 3 | 80 | 37 | 35 | – | 0.05 |
| | 923.7556B | 75/56 | 3 | 3 | 80 | 37 | 35 | – | 0.05 |
| | 923.11040B* | 110/40 | 4.3 | 3 | 140 | 30 | 30 | 26 | 0.095 |
| | 923.11050B* | 110/50 | 4.3 | 3 | 132 | 30 | 30 | 22 | 0.125 |
| | 923.11056B | 110/56 | 4.3 | 3 | 80 | 37 | 35 | – | 0.1 |
| | 923.11075B | 110/75 | 4.3 | 3 | 80 | 37 | 35 | – | 0.105 |
| | 923.160110B | 160/110 | 6.2 | 4.3 | 80 | 37 | 35 | – | 0.23 |

* Segmented

### HDPE LONG ECCENTRIC REDUCER

| CODE | Ø/Ø$_1$ mm | S mm | S$_1$ mm | L mm | L$_1$ mm | L$_2$ mm | Z mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|
| 923.160110LB | 160/110 | 6.2 | 4.3 | 215 | 35 | 37 | - | 0.43 |
| 923.200110LB* | 200/110 | 6.2 | 4.3 | 353.5 | 150 | 150 | 39 | 0.821 |
| 923.200160LB* | 200/160 | 6.2 | 6.2 | 354 | 150 | 150 | 18 | 1.084 |
| 923.250200LB* | 250/200 | 7.8 | 6.2 | 333.5 | 150 | 150 | 22 | 1.661 |
| 923.315200LB* | 315/200 | 9.8 | 6.2 | 377 | 150 | 150 | 50 | 2.658 |
| 923.315250LB* | 315/250 | 9.8 | 7.8 | 353 | 150 | 150 | 28 | 2.793 |

* Segmented

### HDPE 90° ACCESS PIPE WITH SCREW CAP

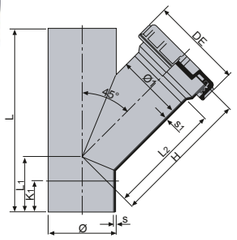
| CODE | Ø/Ø$_1$ mm | S mm | L mm | L$_1$ mm | L$_2$ mm | H mm | DE mm | K$_1$ mm | K$_2$ mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 938.50.90B ▲ | 50 | 3 | 150 | 90 | 60 | 75 | 82 | 55 | 25 | 0.13 |
| 938.56.90B ▲ | 56 | 3 | 175 | 105 | 70 | 84 | 82 | 65 | 30 | 0.195 |
| 938.75.90B ▲ | 75 | 3 | 175 | 105 | 70 | 117 | 82 | 55 | 25 | 0.365 |
| 938.110.90B ▲ | 110 | 4.3 | 240 | 140 | 100 | 94 | 146 | 65 | 20 | 0.62 |
| 938.160.90B ▲ | 160 | 6.2 | 350 | 210 | 140 | 145 | 146 | 105 | 30 | 1.355 |
| 938.200.90B*▲ | 200 | 6.2 | 500 | 250 | 250 | 200 | 192 | 150 | 150 | 2.73 |
| 938.250.90B*▲ | 250 | 7.8 | 700 | 350 | 350 | 226 | 192 | 250 | 250 | 4.16 |
| 938.315.90B*▲ | 315 | 9.8 | 820 | 410 | 410 | 259 | 192 | 300 | 300 | 7.97 |

* Segmented ▲ Use Canvas style test bung

# 4 Pipes and Fittings

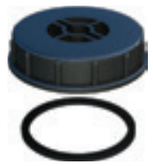
## HDPE Fittings

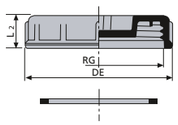
### HDPE 45° ACCESS PIPE WITH SCREW CAP




| CODE | Ø/Ø1 mm | S mm | S1 mm | L mm | L1 mm | L2 mm | H mm | DE mm | K1 mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 938.110.135B | 110/110 | 4.3 | 4.3 | 270 | 90 | 180 | 220 | 150 | 55 | 0.84 |
| 938.160.135B | 160/110 | 6.2 | 4.3 | 375 | 125 | 275 | 280 | 150 | 110 | 1.76 |

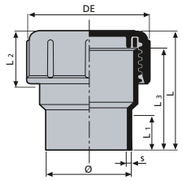
### HDPE SHORT END CAP WITH SEAL





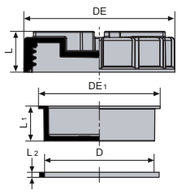

| CODE | Ø mm | RG mm | DE mm | L2 mm | WEIGHT Kg |
|---|---|---|---|---|---|
| 9938.110B | 110 | 132 | 149 | 33 | 0.215 |

### HDPE SCREWED END CAP



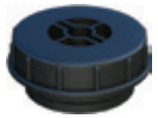

| CODE | Ø mm | S mm | L mm | L1 mm | L2 mm | L3 mm | DE mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|
| 936.40B | 40 | 3 | 75 | 30 | 34 | 66 | 60 | 0.075 |
| 936.50B | 50 | 3 | 75 | 30 | 33 | 66 | 70 | 0.08 |
| 936.56B | 56 | 3 | 77 | 30 | 34 | 66 | 80 | 0.12 |
| 936.75B | 75 | 3 | 103 | 30 | 45 | 87 | 109 | 0.28 |
| 936.110B | 110 | 4.3 | 106 | 30 | 65 | 89 | 144 | 0.5 |
| 936.160B | 160 | 4.3 | 95 | 35 | 48 | 1 | 191 | 0.814 |

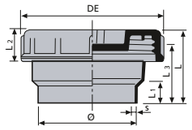
### HDPE END CAP WITH SEAL




| CODE | D mm | DE mm | DE1 mm | L mm | L1 mm | L2 mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|
| 9936.56B | 56 | 82 | - | 39 | 3.5 | - | 0.062 |
| 9936.110B | 110 | 149 | 120 | 41 | 34.5 | 5 | 0.314 |

### HDPE SHORT SCREWED CAP



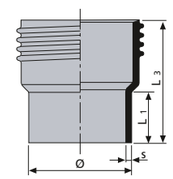



| CODE | Ø mm | S mm | L mm | L1 mm | L2 mm | DE mm | K mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|
| 935.110B | 110 | 4.3 | 63 | 12 | 33 | 50 | 149 | 0.315 |



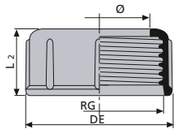
## HDPE Fittings

### HDPE THREADED UNION




| CODE | Ø mm | S mm | L1 mm | L2 mm | WEIGHT Kg |
|---|---|---|---|---|---|
| 9122.50B | 50 | 3 | 30 | 66 | 0.03 |
| 9122.56B | 56 | 3 | 30 | 66 | 0.025 |
| 9122.75B | 75 | 3 | 30 | 87 | 0.095 |
| 9122.110B | 110 | 4.3 | 30 | 89 | 0.17 |

### HDPE NUT




| CODE | Ø mm | RG mm | DE mm | L2 mm | WEIGHT Kg |
|---|---|---|---|---|---|
| 9120.50B | 50 | 62 | 70 | 33 | 0.03 |
| 9120.56B | 56 | 71 | 80 | 34 | 0.05 |
| 9120.75B | 75 | 96 | 100 | 45 | 0.1 |
| 9120.110B | 110 | 132 | 144 | 65 | 0.20 |

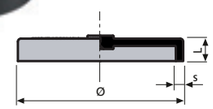
### HDPE THREADED COUPLING






| CODE | Ø/Ø1 mm | S mm | L mm | L1 mm | L2 mm | L3 mm | DE mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|
| 912.40B | 40 | 3 | 74 | 30 | 34 | 66 | 60 | 0.075 |
| 912.50B | 50 | 3 | 76 | 30 | 33 | 66 | 70 | 0.08 |
| 912.56B | 56 | 3 | 46 | 30 | 34 | 66 | 80 | 0.12 |
| 912.5663B | 56/63 | 3 | 48 | - | 34 | 66 | 80 | 0.1 |
| 912.75B | 75 | 3 | 106 | 30 | 45 | 87 | 109 | 0.25 |
| 912.110B | 110 | 4.3 | 113 | 30 | 65 | 89 | 144 | 0.47 |

### HDPE BLANK END

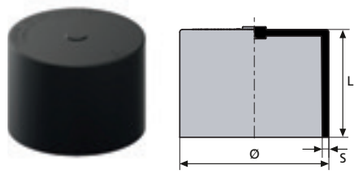



| CODE | Ø mm | S mm | L mm | WEIGHT Kg |
|---|---|---|---|---|
| 930.40B | 40 | 3 | 15 | 0.009 |
| 930.50B | 50 | 3 | 15 | 0.013 |
| 930.56B | 56 | 3 | 15 | 0.016 |
| 930.75B | 75 | 3 | 15 | 0.024 |
| 930.110B | 110 | 4.3 | 15 | 0.061 |
| 930.160B | 160 | 6.2 | 15 | 0.164 |
| 930.200B | 200 | 6.2 | 110 | 0.56 |
| 930.250B | 250 | 7.8 | 93 | 0.75 |
| 930.315B | 315 | 9.2 | 117 | 1.42 |

# 4 Pipes and Fittings

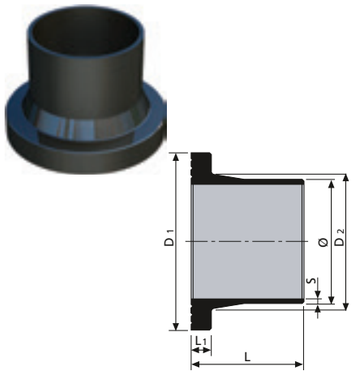
## HDPE Fittings

| PRODUCT |
|---|



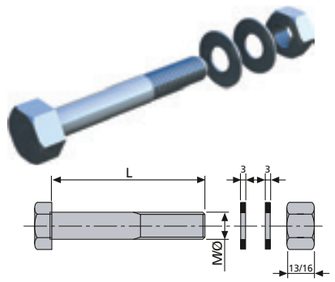

**HDPE LONG BLANK END**

| CODE | Ø mm | S mm | $L_1$ mm | $L_2$ mm | WEIGHT Kg |
|---|---|---|---|---|---|
| 930.40LB | 40 | 3 | 68.5 | 66 | 0.032 |
| 930.50LB | 50 | 3 | 68.5 | 66 | 0.042 |
| 930.56LB | 56 | 3 | 68.5 | 66 | 0.048 |
| 930.75LB | 75 | 3 | 68.5 | 66 | 0.069 |
| 930.110LB | 110 | 4.3 | 80 | 87 | 0.17 |
| 930.160LB | 160 | 6.2 | 107 | 89 | 0.505 |




**HDPE FLANGE ADAPTORS**

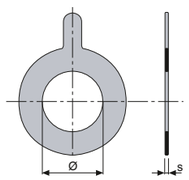
| CODE | Ø mm | S mm | $D_1$ mm | $D_2$ mm | L mm | $L_1$ mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|
| 980.50B | 50 | 3 | 88 | 61 | 52 | 12 | 0.075 |
| 980.56B | 56 | 3 | 94 | 72 | 90 | 12 | 0.115 |
| 980.75B | 75 | 3 | 122 | 89 | 90 | 15 | 0.185 |
| 980.110B | 110 | 4.3 | 158 | 120 | 100 | 18 | 0.335 |
| 980.160B | 160 | 6.2 | 212 | 175 | 100 | 18 | 0.585 |
| 980.200B | 200 | 6.2 | 268 | 232 | 100 | 20 | 0.92 |
| 980.250B | 250 | 7.8 | 320 | 285 | 100 | 20 | 1.48 |
| 980.315B | 315 | 9.8 | 370 | 236 | 100 | 20 | 1.72 |




**HDPE GALVANISED BOLT SET WITH WASHER FOR FLANGE**

| CODE | MØ mm | L mm | THREAD | FOR FLANGE mm | WEIGHT Kg |
|---|---|---|---|---|---|
| 984.1650B | 16 | 90 | 38 | 50-56 | 0.215 |
| 984.1663B | 16 | 100 | 38 | 63-75 | 0.23 |
| 984.16110B | 16 | 100 | 38 | 110-125-140 | 0.25 |
| 984.20160B | 20 | 110 | 46 | 160 | 0.41 |
| 984.20250B | 20 | 130 | 58 | 200-250-315 | 0.45 |

Material: Galvanised steel



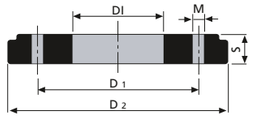

**FLAT RUBBER SEAL FOR FLANGE**

| CODE | Ø mm | S mm | WEIGHT Kg |
|---|---|---|---|
| 982.50B | 50 | 3 | 0.02 |
| 982.56B | 56 | 3 | 0.02 |
| 982.75B | 75 | 3 | 0.03 |
| 982.110B | 110 | 3 | 0.045 |
| 982.160B | 160 | 3 | 0.07 |
| 982.200B | 200 | 3 | 0.11 |
| 982.250B | 250 | 3 | 0.14 |
| 982.315B | 315 | 3 | 0.14 |



## HDPE Fittings

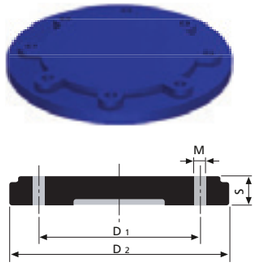
| PRODUCT |
|---|




**PAINTED ALUMINIUM BACKING FLANGE**

| CODE | Ø mm | S mm | DI mm | $D_1$ mm | $D_2$ mm | M mm | HOLE No | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|
| 981.50B | 50 | 20 | 62 | 120 | 150 | 18 | 4 | 0.625 |
| 981.56B | 56 | 20 | 64 | 123 | 159 | 18 | 4 | 0.71 |
| 981.75B | 75 | 21 | 93 | 148 | 185 | 18 | 4 | 0.885 |
| 981.110B | 110 | 22 | 128 | 182 | 220 | 19 | 8 | 1.05 |
| 981.160B | 160 | 25 | 179 | 240 | 285 | 22 | 8 | 1.84 |
| 981.200B | 200 | 26 | 235 | 295 | 337 | 22 | 8 | 2.325 |
| 981.250B | 250 | 30 | 285 | 350 | 396 | 22 | 12 | 3.78 |
| 981.315B | 315 | 30 | 340 | 400 | 444 | 22 | 12 | 3.945 |

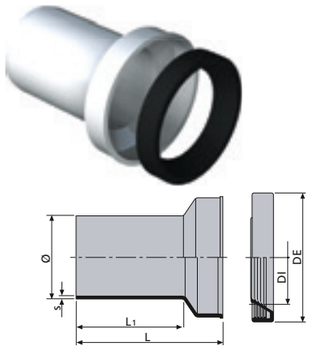
Manufactured to EN1092-1/04 PN10/16




**PAINTED ALUMINIUM BLANK FLANGE**

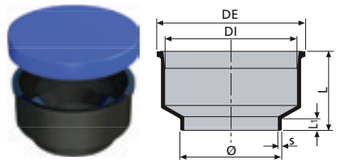
| CODE | Ø mm | S mm | $D_1$ mm | $D_2$ mm | M mm | HOLE No | WEIGHT Kg |
|---|---|---|---|---|---|---|---|
| 983.50B | 50 | 20 | 120 | 150 | 18 | 4 | 0.76 |
| 983.56B | 56 | 20 | 123 | 159 | 18 | 4 | 0.865 |
| 983.75B | 75 | 21 | 148 | 185 | 18 | 4 | 1.305 |
| 983.110B | 110 | 22 | 176 | 220 | 19 | 8 | 1.7 |
| 983.160B | 160 | 25 | 240 | 285 | 22 | 8 | 2.945 |
| 983.200B | 200 | 26 | 295 | 337 | 22 | 8 | 4.485 |
| 983.250B | 250 | 30 | 350 | 396 | 22 | 12 | 7.495 |
| 983.315B | 315 | 30 | 400 | 444 | 22 | 12 | 9.345 |

Manufactured to EN1092-1/04 PN10/16




**HDPE WC PAN CONNECTOR - WHITE**

| CODE | Ø mm | S mm | L mm | $L_1$ mm | R mm | K mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|
| 925.110W | 110 | 4.3 | 102±5 | 140 | 166 | 130 | 0.355 |



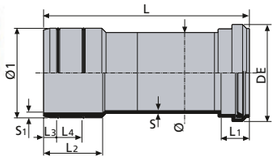

**HDPE WC PAN CONNECTOR WITH CAP**

| CODE | Ø mm | S mm | DI mm | DE mm | L mm | $L_1$ mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|
| 925.110B | 110 | 4.3 | 120 | 131 | 68 | 15 | 0.13 |

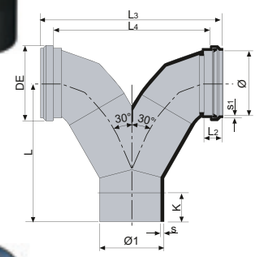
# 4 Pipes and Fittings

## HDPE Fittings

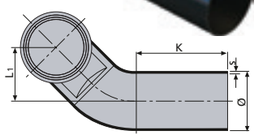
| PRODUCT | HDPE STRAIGHT WC PAN CONNECTOR WITH SEAL AND CAP |
|---|---|



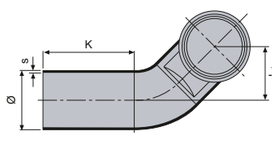

| CODE | Ø/Ø1 mm | S mm | S1 mm | DE mm | L mm | L1 mm | L2 mm | L3 mm | L4 mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 999.90100.00B | 90/100 | 3.5 | 5.5 | 109 | 232 | 31 | 70 | 15 | 28 | 0.332 |




| HDPE DOUBLE WC PAN CONNECTOR WITH LIP SEALS AND CAPS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CODE | Ø/Ø1 mm | S mm | S1 mm | DE mm | L mm | L2 mm | L3 mm | L4 mm | K mm | WEIGHT Kg |
| 929.110.90DB | 110/110 | 4.3 | 4.3 | 130 | 205 | 37 | 285 | 240 | 50 | 0.816 |




| HDPE WC BEND FOR HANGING PAN WITH 1-LIP SEAL AND CAP, LEFT | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CODE | Ø/Ø1 mm | S mm | DE mm | L mm | L1 mm | L2 mm | L3 mm | K mm | WEIGHT Kg |
| 949.110LB | 110/110 | 4.3 | 130 | 320 | 100 | 35 | 85 | 170 | 0.72 |
| 949.11090LB | 110/90 | 4.3 | 108 | 315 | 100 | 35 | 85 | 170 | 0.616 |

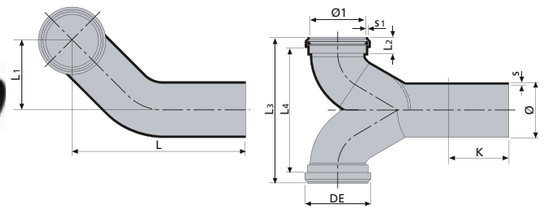



| HDPE WC BEND FOR HANGING PAN WITH 1-LIP SEAL AND CAP, RIGHT | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CODE | Ø/Ø1 mm | S mm | DE mm | L mm | L1 mm | L2 mm | L3 mm | K mm | WEIGHT Kg |
| 949.110RB | 110/110 | 4.3 | 130 | 320 | 100 | 35 | 85 | 170 | 0.72 |
| 949.11090RB | 110/90 | 4.3 | 108 | 315 | 100 | 35 | 85 | 170 | 0.616 |



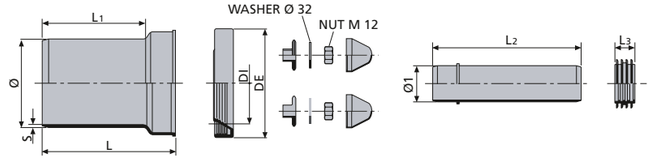
## HDPE Fittings

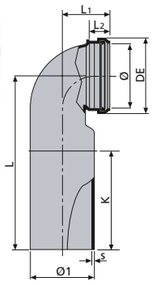
| PRODUCT | HDPE WC PAN CONNECTORS |
|---|---|




| CODE | Ø/Ø1 mm | S mm | S1 mm | DE mm | L mm | L1 mm | L2 mm | L3 mm | L4 mm | K mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 949.110DB | 110/110 | 4.3 | 3.5 | 108 | 335 | 100 | - | 285 | - | 120 | 1.02 |

| HDPE WC CONNECTOR FOR HANGING PAN WITH SEAL AND WHITE COVERINGS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CODE | Ø/Ø1 mm | S mm | DI mm | DE mm | L mm | L1 mm | L2 mm | L3 mm | WEIGHT Kg |
| 925.11044B | 110/45 | 4.3 | 102±5 | 132 | 166 | 129 | 199 | 24 | 0.53 |



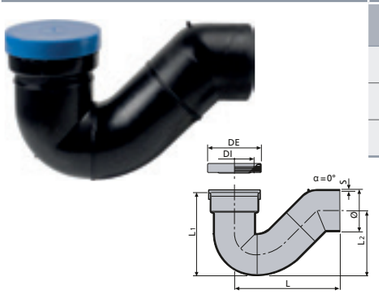




| HDPE WC BEND HANGING PAN WITH SEAL AND CAP | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CODE | Ø/Ø1 mm | S mm | L mm | L1 mm | L2 mm | DE mm | K mm | WEIGHT Kg |
| 999.110.90B | 110/110 | 4.3 | 300 | 87 | 40 | 130 | 180 | 0.596 |

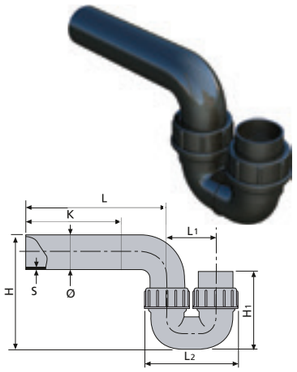
# 4 Pipes and Fittings

## HDPE Fittings

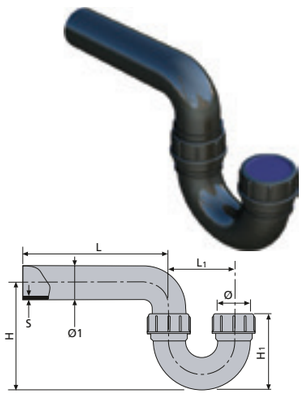
| PRODUCT | HDPE TRAP WITH SEAL AND CAP |
|---|---|




| CODE | Ø mm | α | S mm | DI mm | DE mm | L mm | $L_1$ mm | $L_2$ mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|
| 9631.110.0B | 110 | 0° | 4.3 | 102±5 | 140 | 270 | 215 | 170 | 0.72 |
| 9631.110.45B | 110 | 45° | 4.3 | 102±5 | 140 | 240 | 225 | 160 | 1.002 |
| 9631.110.90B | 110 | 90° | 4.3 | 102±5 | 140 | 340 | 225 | 220 | 0.99 |




| HDPE UNIVERSAL TRAP, VERTICAL INLET AND HORIZONTAL OUTLET | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CODE | Ø mm | S mm | L mm | $L_1$ mm | $L_2$ mm | H mm | $H_1$ mm | K mm | WEIGHT Kg |
| 931.75B | 75 | 3 | 210 | 135 | 245 | 335 | 245 | 140 | 0.92 |
| 931.110B | 110 | 4.3 | 270 | 160 | 310 | 370 | 260 | 220 | 1.92 |

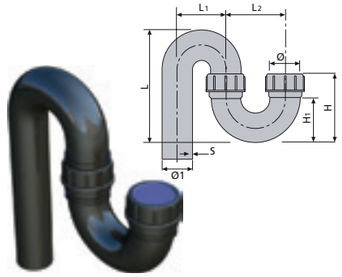



| HDPE TRAP, VERTICAL INLET AND HORIZONTAL OUTLET | | | | | | | |
|---|---|---|---|---|---|---|---|
| CODE | $Ø/Ø_1$ mm | S mm | L mm | $L_1$ mm | H mm | $H_1$ mm | WEIGHT Kg |
| 931.4040B | 40/40 | 3 | 150 | 80 | 140 | 110 | 0.22 |
| 931.4050B | 40/50 | 3 | 180 | 80 | 160 | 110 | 0.31 |
| 931.4056B | 40/56 | 3 | 210 | 80 | 155 | 110 | 0.31 |
| 931.5050B | 50/50 | 3 | 180 | 100 | 170 | 110 | 0.31 |
| 931.5056B | 50/56 | 3 | 210 | 100 | 165 | 110 | 0.31 |

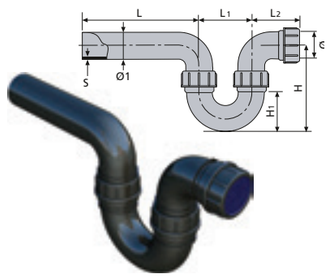


## HDPE Fittings

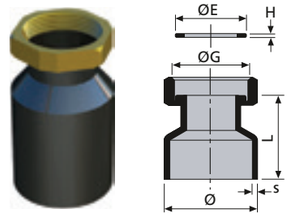
| PRODUCT | HDPE TRAP, VERTICAL INLET AND OUTLET |
|---|---|



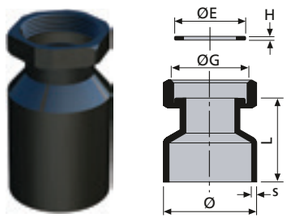

| CODE | $Ø/Ø_1$ mm | S mm | L mm | $L_1$ mm | $L_2$ mm | H mm | $H_1$ mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|
| 932.4040B | 40/40 | 3 | 160 | 60 | 80 | 110 | 60 | 0.235 |
| 932.4050B | 40/50 | 3 | 180 | 80 | 80 | 110 | 65 | 0.34 |
| 932.4056B | 40/56 | 3 | 238 | 80 | 80 | 110 | 65 | 0.34 |
| 932.5050B | 50/50 | 3 | 180 | 80 | 100 | 110 | 70 | 0.34 |
| 932.5056B | 50/56 | 3 | 190 | 80 | 100 | 120 | 70 | 0.37 |




| HDPE TRAP, HORIZONTAL INLET AND OUTLET | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CODE | $Ø/Ø_1$ mm | S mm | L mm | $L_1$ mm | $L_2$ mm | H mm | $H_1$ mm | WEIGHT Kg |
| 945.4040B | 40/40 | 3 | 150 | 80 | 90 | 140 | 40 | 0.31 |
| 945.4050B | 40/50 | 3 | 180 | 80 | 90 | 160 | 65 | 0.37 |
| 945.4056B | 40/56 | 3 | 210 | 80 | 90 | 160 | 40 | 0.4 |
| 945.5050B | 50/50 | 3 | 180 | 100 | 90 | 170 | 70 | 0.42 |




| HDPE FITTING WITH NUT - BRASS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CODE | Ø mm | ØG | S mm | L mm | ØE mm | H mm | NUT | WEIGHT Kg |
| 918.40.125BN | 40 | 1¼" | 3 | 45 | 40 | 2 | Brass | 0.08 |
| 918.40.15BN | 40 | 1½" | 3 | 45 | 45 | 2 | Brass | 0.09 |
| 918.50.125BN | 50 | 1¼" | 3 | 45 | 40 | 2 | Brass | 0.08 |
| 918.50.15BN | 50 | 1½" | 3 | 45 | 45 | 2 | Brass | 0.09 |

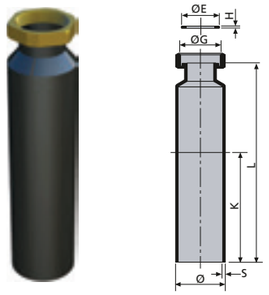



| HDPE FITTING WITH NUT - PLASTIC | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CODE | Ø mm | ØG | S mm | L mm | ØE mm | H mm | NUT | WEIGHT Kg |
| 918.40.125PN | 40 | 1¼" | 3 | 45 | 40 | 2 | Plastic | 0.03 |
| 918.40.15PN | 40 | 1½" | 3 | 45 | 45 | 2 | Plastic | 0.03 |
| 918.50.125PN | 50 | 1¼" | 3 | 45 | 40 | 2 | Plastic | 0.03 |
| 918.50.15PN | 50 | 1½" | 3 | 45 | 45 | 2 | Plastic | 0.03 |

# 4 Pipes and Fittings

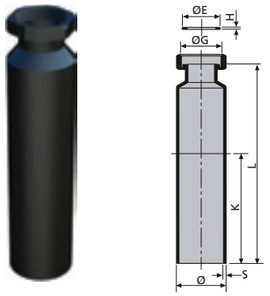
## HDPE Fittings

| PRODUCT | HDPE EXTENDED FITTING WITH NUT - BRASS |
|---|---|



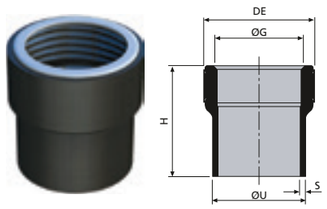

| CODE | Ø mm | ØG mm | S mm | L mm | ØE mm | H mm | Nut mm | K mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|
| 918.40.125EB | 40 | 1¼" | 3 | 195 | 40 | 2 | Brass | 110 | 0.13 |
| 918.40.15EBN | 40 | 1½" | 3 | 195 | 45 | 2 | Brass | 110 | 0.145 |
| 918.50.125EBN | 50 | 1¼" | 3 | 195 | 40 | 2 | Brass | 110 | 0.15 |
| 918.50.15EBN | 50 | 1½" | 3 | 195 | 45 | 2 | Brass | 110 | 0.155 |

| PRODUCT | HDPE EXTENDED FITTING WITH NUT - PLASTIC |
|---|---|




| CODE | Ø mm | ØG mm | S mm | L mm | ØE mm | H mm | Nut mm | K mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|
| 918.40.125EPN | 40 | 1¼" | 3 | 195 | 40 | 2 | Plastic | 110 | 0.08 |
| 918.40.15EPN | 40 | 1½" | 3 | 195 | 45 | 2 | Plastic | 110 | 0.085 |
| 918.50.125EPN | 50 | 1¼" | 3 | 195 | 40 | 2 | Plastic | 110 | 0.1 |
| 918.50.15EPN | 50 | 1½" | 3 | 195 | 45 | 2 | Plastic | 110 | 0.095 |

| PRODUCT | HDPE END WITH INTERNAL THREADING, REINFORCED WITH STEEL RING |
|---|---|

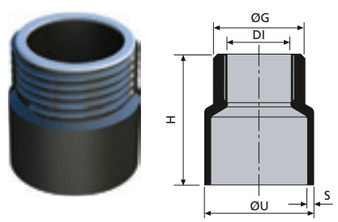



| CODE | ØU mm | ØG mm | S mm | DE mm | H mm | WEIGHT Kg |
|---|---|---|---|---|---|---|
| 916.40.05B | 40 | ½" | 3 | 40.5 | 55 | 0.065 |
| 916.40.075B | 40 | ¾" | 3 | 40.5 | 55 | 0.06 |
| 916.40.1B | 40 | 1" | 3 | 40.5 | 55 | 0.06 |
| 916.50.05B | 50 | ½" | 3 | 50 | 60 | 0.075 |
| 916.50.075B | 50 | ¾" | 3 | 50 | 60 | 0.075 |
| 916.50.1B | 50 | 1" | 3 | 50 | 60 | 0.075 |
| 916.50.125B | 50 | 1¼" | 3 | 50 | 60 | 0.07 |
| 916.50.15B | 50 | 1½" | 3 | 58.5 | 60 | 0.07 |
| 916.56.2B | 56 | 2" | 3 | 70 | 65 | 0.1 |
| 916.75.25B | 75 | 2"½ | 3 | 89 | 70 | 0.135 |



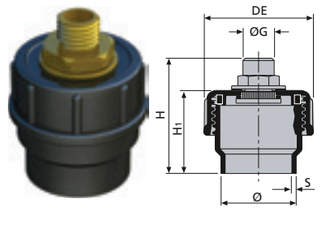
## HDPE Fittings

| PRODUCT | HDPE END WITH EXTERNAL THREADING, REINFORCED WITH STEEL RING |
|---|---|



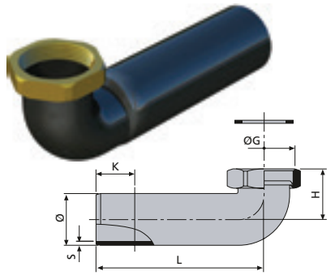

| CODE | ØU mm | ØG mm | S mm | DI mm | H mm | WEIGHT Kg |
|---|---|---|---|---|---|---|
| 917.50.125B | 50 | 1¼" | 3 | 29 | 60 | 0.055 |
| 917.50.15B | 50 | 1½" | 3 | 29 | 60 | 0.065 |
| 917.56.2B | 56 | 2" | 3 | 47 | 65 | 0.09 |
| 917.75.25B | 75 | 2"½ | 3 | 57 | 70 | 0.125 |

| PRODUCT | HDPE THREADED FITTING WITH BRASS NIPPLE |
|---|---|



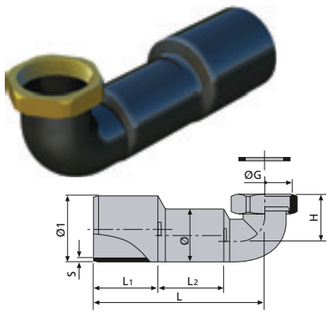

| CODE | Ø mm | ØG mm | S mm | DE mm | H mm | $H_1$ mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|
| 936.40.05NB | 40 | ½" x 15mm | 3 | 60 | 81 | 74 | 0.18 |
| 936.40.075NB | 40 | ¾" x 18mm | 3 | 60 | 84 | 74 | 0.24 |
| 936.50.05NB | 50 | ½" x 15mm | 3 | 71 | 92 | 76 | 0.15 |
| 936.50.075NB | 50 | ¾" x 18mm | 3 | 71 | 95 | 76 | 0.185 |
| 936.50.1NB | 50 | 1" x 22mm | 3 | 71 | 95 | 76 | 0.245 |

| HDPE BEND WITH NUT |
|---|




| CODE | Ø mm | ØG mm | S mm | L mm | H mm | Nut mm | K mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|
| 918.40.125.90BN | 40 | 1¼" | 3 | 130 | 25 | Brass | 100 | 0.1 |
| 918.40.15.90BN | 40 | 1½" | 3 | 130 | 30 | Brass | 100 | 0.105 |
| 918.40.15.90PN | 40 | 1½" | 3 | 130 | 30 | Plastic | 100 | 0.04 |

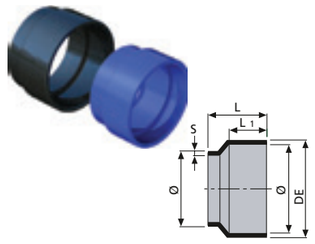
| HDPE REDUCING BEND WITH NUT |
|---|



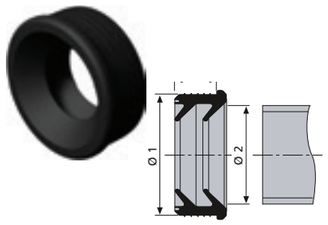

| CODE | Ø mm | ØG mm | S mm | L mm | $L_1$ mm | H mm | Nut mm | K mm | WEIGHT Kg |
|---|---|---|---|---|---|---|---|---|---|
| 918.4050.125.90BN | 40/50 | 1¼" | 3 | 130 | 50 | 54 | 25 | Brass | 0.11 |
| 918.4050.15.90BN | 40/50 | 1½" | 3 | 120 | 50 | N.C. | 30 | Brass | 0.12 |
| 918.4050.15.90PN | 40/50 | 1½" | 3 | 120 | 50 | N.C. | 30 | Plastic | 0.055 |

# 4 Pipes and Fittings

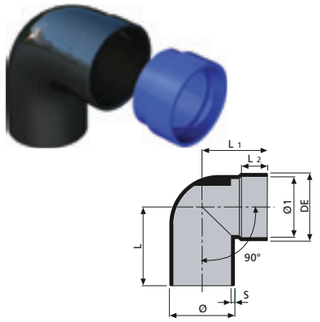
## HDPE Fittings

| PRODUCT | HDPE SLEEVE | | | | | | |
|---|---|---|---|---|---|---|---|
| | CODE | Ø/Ø$_1$ mm | S mm | DE mm | L mm | L$_1$ mm | WEIGHT Kg |
|  | 917.4046B | 40/46 | 3 | 52 | 30 | 20 | 0.015 |
| | 917.5046B | 50/46 | 3 | 52 | 30 | 20 | 0.015 |
| | 917.5058B | 50/58 | 3 | 64 | 38 | 20 | 0.02 |
| | 917.5646B | 56/46 | 3 | 52 | 38 | 20 | 0.02 |
| | 917.5658B | 56/58 | 3 | 64 | 38 | 20 | 0.025 |



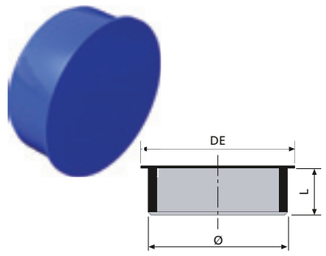
| | GASKET | | | | |
|---|---|---|---|---|---|
| | CODE | Ø$_1$ mm | Ø$_2$ mm | L mm | WEIGHT Kg |
|  | 917.4624.908B | 46 | 24-46 | 22 | 0.01 |
| | 917.4636.908B | 46 | 36-40 | 22 | 0.01 |
| | 917.5836.908B | 58 | 36-40 | 22 | 0.2 |
| | 917.5847.908B | 58 | 47-50 | 22 | 0.3 |



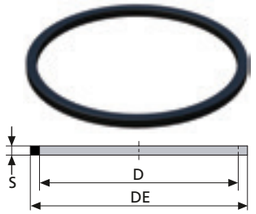
| | HDPE SPIGOT BEND WITH CAP | | | | | | |
|---|---|---|---|---|---|---|---|
| | CODE | Ø/Ø$_1$ mm | S mm | DE mm | L mm | L$_1$ mm | L$_2$ mm | WEIGHT Kg |
|  | 917.4046.90B | 40/46 | 3 | 52 | 60 | 51 | 22 | 0.055 |
| | 917.5046.90B | 50/46 | 3 | 52 | 62 | 51 | 22 | 0.06 |
| | 917.5058.90B | 50/58 | 3 | 64 | 68 | 55 | 24 | 0.07 |
| | 917.5646.90B | 56/46 | 3 | 52 | 64 | 60 | 22 | 0.07 |
| | 917.5658.90B | 56/58 | 3 | 64 | 65 | 60 | 22 | 0.075 |



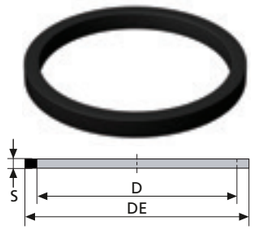
## HDPE Spares

| PRODUCT | HDPE PROTECTIVE CAP FOR SOCKET | | | | |
|---|---|---|---|---|---|
| | CODE | Ø mm | DE mm | L mm | WEIGHT Kg |
|  | 9130.40B | 40 | 48 | 30 | 0.01 |
| | 9130.50B | 50 | 60 | 30 | 0.01 |
| | 9130.56B | 56 | 62 | 25 | 0.01 |
| | 9130.75B | 75 | 85 | 38 | 0.02 |
| | 9130.110B | 110 | 123 | 39 | 0.04 |
| | 9130.160B | 160 | 167 | 36 | 0.055 |
| | 9130.200B | 200 | 220 | 50 | 0.13 |

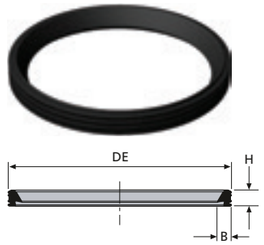


| | HDPE RING | | | | |
|---|---|---|---|---|---|
| | CODE | D mm | DE mm | S mm | WEIGHT Kg |
|  | 9118.50B | 50 | 58 | 3.5 | 0.003 |
| | 9118.56B | 56 | 63 | 3.5 | 0.003 |
| | 9118.75B | 75 | 84 | 4 | 0.007 |
| | 9118.110B | 110 | 121 | 4 | 0.011 |



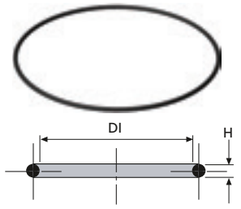
| | HDPE RING SEAL | | | | |
|---|---|---|---|---|---|
| | CODE | D mm | DE mm | S mm | WEIGHT Kg |
|  | 9119.50B | 50 | 56 | 6 | 0.004 |
| | 9119.56B | 56 | 61 | 6 | 0.004 |
| | 9119.75B | 75 | 82 | 10 | 0.006 |
| | 9119.110B | 110 | 121 | 10 | 0.008 |



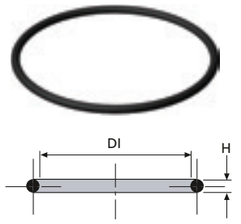
| | HDPE 1 LIP SEAL FOR SOCKETS | | | | | |
|---|---|---|---|---|---|---|
| | CODE | Ø mm | DE mm | H mm | B mm | WEIGHT Kg |
|  | 927.100.908B | 100 | 114 | 9.3 | 8.2 | 0.02 |
| | 927.110.908B | 110 | 123.9 | 8.9 | 7.9 | 0.02 |
| | 927.160.908B | 160 | 179.8 | 11.5 | 10.2 | 0.045 |
| | 927.200.908B | 200 | 223.7 | 12.8 | 11.2 | 0.045 |
| | 927.250.908B | 250 | 282 | 19.5 | 1.6 | 0.5 |
| | 927.315.908B | 315 | 350 | 20.5 | 17.15 | 0.055 |

# 4 Pipes and Fittings

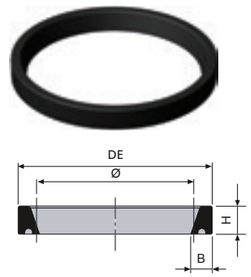
## HDPE Spares




| PRODUCT | O-RING FOR ADAPTORS (PVC) | | | | |
|---|---|---|---|---|---|
| | CODE | Ø mm | H mm | FOR CODES | WEIGHT Kg |
| | 9113.908B | 100 | 2.62 | 353-354 | 0.002 |



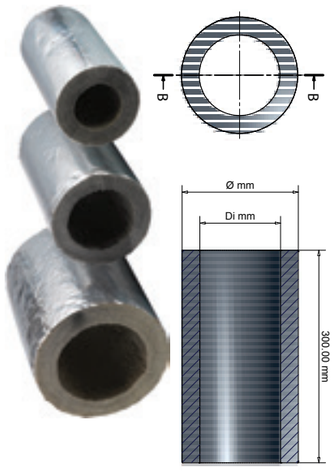

| HDPE O RING FOR SOCKETS | | | | |
|---|---|---|---|---|
| CODE | Ø mm | DI mm | H mm | WEIGHT Kg |
| 9116.40B | 40 | 39+1 | 6 | 0.005 |
| 9116.50B | 50 | 49+1 | 6 | 0.005 |
| 9116.75B | 75 | 79+1 | 6 | 0.01 |
| 9116.110B | 110 | 109+1.5 | 7 | 0.015 |
| 9116.160B | 160 | 159+1.5 | 9 | 0.035 |




| HDPE SEAL FOR EXPANSION SOCKETS | | | | | |
|---|---|---|---|---|---|
| CODE | Ø mm | H mm | B mm | DE mm | WEIGHT Kg |
| 911.40.908B | 40 | 16 | 12 | 60 | 0.025 |
| 911.50.908B | 50 | 16 | 12 | 70 | 0.035 |
| 911.56.908B | 56 | 16 | 12 | 76 | 0.04 |
| 911.75.908B | 75 | 16 | 12.5 | 95.5 | 0.05 |
| 911.110.908B | 110 | 16 | 12.5 | 130.5 | 0.07 |
| 911.160.908B | 160 | 16 | 12.5 | 180.5 | 0.115 |
| 911.200.908B | 200 | 21.8 | 11.2 | 223.7 | 0.045 |



## HDPE Firetraps

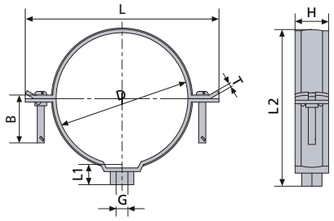



| PRODUCT | FIRETRAP SLEEVE | | | |
|---|---|---|---|---|
| | CODE | DI mm | ØD mm | H mm |
| | 1925.17 | 17 | 67 | 300 |
| | 1925.21 | 21 | 71 | 300 |
| | 1925.27 | 27 | 77 | 300 |
| | 1925.34 | 34 | 84 | 300 |
| | 1925.42 | 42 | 92 | 300 |
| | 1925.48 | 48 | 98 | 300 |
| | 1925.54 | 54 | 104 | 300 |
| | 1925.60 | 60 | 110 | 300 |
| | 1925.67 | 67 | 117 | 300 |
| | 1925.76 | 76 | 126 | 300 |
| | 1925.89 | 89 | 139 | 300 |
| | 1925.102 | 102 | 152 | 300 |
| | 1925.108 | 108 | 158 | 300 |
| | 1925.114 | 114 | 164 | 300 |
| | 1925.127 | 127 | 177 | 300 |
| | 1925.134 | 134 | 184 | 300 |
| | 1925.140 | 140 | 190 | 300 |
| | 1925.159 | 159 | 209 | 300 |
| | 1925.169 | 169 | 219 | 300 |

| FIRETRAP COLLAR | | | | | |
|---|---|---|---|---|---|
| CODE | Size mm | ØD mm | H mm | Colour | WEIGHT Kg |
| 1625.40R | 40 | 54 | 30 | RED | 0.06 |
| 1625.55R | 55 | 69 | 30 | RED | 0.08 |
| 1625.63R | 63 | 79 | 30 | RED | 0.1 |
| 1625.75R | 75 | 89 | 30 | RED | 0.1 |
| 1625.82R | 82 | 96 | 30 | RED | 0.1 |
| 1625.90R | 90 | 112 | 30 | RED | 0.18 |
| 1625.110R | 110 | 132 | 30 | RED | 0.22 |
| 1625.125R | 125 | 147 | 45 | RED | 0.34 |
| 1625.160R | 160 | 174 | 45 | RED | 0.37 |
| 1625.200R | 200 | 194 | 45 | RED | 0.7 |
| 1625.250R | 250 | 300 | 130 | RED | 2.9 |
| 1625.315R | 315 | 373 | 130 | RED | 3.5 |

# 4 Pipes and Fittings

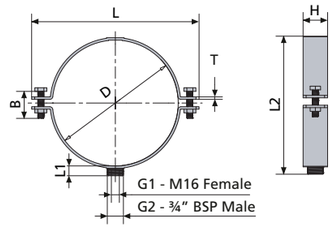
## HDPE Anchors and Brackets




| PRODUCT | M10 ANCHOR/GUIDE BRACKET | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CODE | Ø mm | H mm | L mm | $L_1$ mm | $L_2$ mm | T mm | G mm | B mm | WEIGHT Kg |
| 9140.40B | 40 | 28 | 84 | 11 | 55 | 2.5 | M10 F | M6 x 30 | 5.5 |
| 9140.50B | 50 | 28 | 95 | 11 | 62 | 2.5 | M10 F | M6 x 30 | 5.99 |
| 9140.56B | 56 | 28 | 101 | 11 | 70 | 2.5 | M10 F | M6 x 30 | 7.93 |
| 9140.75B | 75 | 28 | 120 | 11 | 90 | 2.5 | M10 F | M6 x 40 | 9.12 |
| 9140.110B | 110 | 28 | 162 | 17 | 131 | 2.5 | M10 F | M6 x 40 | 7.09 |
| 9140.160B | 160 | 28 | 210 | 17 | 218 | 2.5 | M10 F | M6 x 40 | 9.15 |
| 9140.200B | 200 | 40 | 272 | 20 | 224 | 4 | M16 F/ ¾" BSP M | M10 x 50 | 10.8 |
| 9140.250B | 250 | 50 | 354 | 32 | 288 | 6 | M16 F/ ¾" BSP M | M12 x 60 | 6.05 |
| 9140.315B | 315 | 50 | 423 | 32 | 353 | 6 | M16 F/ ¾" BSP M | M12 x 60 | 7.33 |

To use as an anchor point, remove spacer.

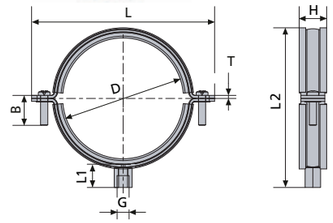
Material: Zinc plated steel.




| M16 BRACKET | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CODE | D mm | H mm | L mm | $L_1$ mm | $L_2$ mm | T mm | G mm | B mm | WEIGHT Kg |
| 9149.200B | 200 | 40 | 272 | 20 | 224 | 4 | M16 F/ ¾" BSP M | M10 x 50 | 2.18 |
| 9149.250B | 250 | 50 | 354 | 32 | 288 | 6 | M16 F/ ¾" BSP M | M12 x 60 | 2 |
| 9149.315B | 315 | 50 | 423 | 32 | 353 | 6 | M16 F/ ¾" BSP M | M12 x 60 | 2.414 |

HDPE pipe anchoring shells not required.

Material: Zinc plated steel.

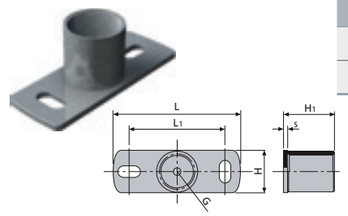



| ACOUSTIC PIPE BRACKET | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CODE | Ø mm | H mm | L mm | $L_1$ mm | $L_2$ mm | T mm | G mm | B mm | WEIGHT Kg |
| 9140.110R | 110 | 23 | 153 | 20 | 134 | 2.5 | M10 F | M6 x 25 | 6.46 |
| 9140.160R | 160 | 30 | 220 | 20 | 200 | 2.5 | M10 F | M6 x 25 | 9.07 |

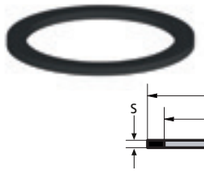
Material: Zinc plated steel.



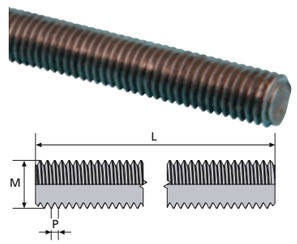
## HDPE Anchors and Brackets



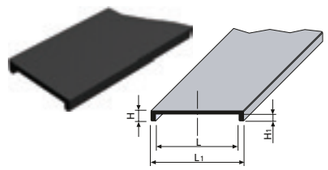

| PRODUCT | MOUNTING PLATE | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CODE | L mm | G mm | $L_1$ mm | H mm | $H_1$ mm | S mm | WEIGHT Kg |
| 9148.10B | 120 | ½" | 82 | 40 | 20 | 4 | 0.165 |
| 9148.25B | 120 | 1" | 90 | 40 | 48 | 4 | 0.250 |



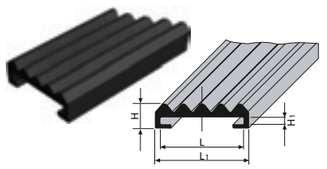

| RUBBER FLAT SEAL | | | | |
|---|---|---|---|---|
| CODE | OD mm | ID mm | S mm | WEIGHT Kg |
| 918.40.908B | 38 | 30 | 2.4 | 0.002 |
| 918.40.918B | 45 | 36 | 2 | 0.001 |




| THREADED BAR | | | | |
|---|---|---|---|---|
| CODE | D mm | L mm | P mm | WEIGHT Kg |
| 9147B | 10 | 1000 | 1.5 | 0.628 |
| 9149B | 16 | 1000 | 2 | 1.608 |




| RUBBER STRIP INSERT | | | | | |
|---|---|---|---|---|---|
| CODE | L mm | $L_1$ mm | H mm | $H_1$ mm | WEIGHT Kg |
| 9104.40B | 30 | 34 | 4 | 2 | 5.015 |




| ANTI VIBRATION RUBBER INSERT FOR CLIPS (30 METRE LENGTH) | | | | | |
|---|---|---|---|---|---|
| CODE | L mm | $L_1$ mm | H mm | $H_1$ mm | WEIGHT Kg |
| 9105.30B | 30 | 36 | 9 | 3 | 6.11 |

# 4 Pipes and Fittings

## Terrain FUZE Electrofusion Welding Machine

**PRODUCT CODE: 9000.40315.110V**

Supplied complete with yellow cable for pipe diameters up to and including 160mm and blue cables for pipe diameters greater than 160mm.


| PART NUMBER | DESCRIPTION | PIPE DIAMETERS |
|---|---|---|
| AW00-2003 | Yellow replacement leads | Up to and including 160mm |
| AW00-2004 | Blue replacement leads | Above 160mm |

### General properties

- Supply voltage: 110V
- Pipe diameters: 40-315mm
- Supply current: 10A
- Supply power: 3500W
- Supply protection: Class 1 – earthed
- Weight: 15Kg
- Size: 410 x 350 x 200mm
- Protection level: IP65
- Operating temp.: -15oC to +45oC


## Tooling

| TERRAIN FUZE PIPE CUTTER | | |
|---|---|---|
| CODE | DESCRIPTION | PIPE DIAMETERS |
| 9500.663T | Pipe Cutter – Model T1 | 40 to 63mm |
| 9500.50140T | Pipe Cutter – Model T2 | 50 to140mm |
| 9500.100160T | Pipe Cutter – Model T3 | 100 to 160mm |

### General properties

**Model T1**

- Weight: 0.6Kg
- Pipe diameters: 40-63mm

**Model T2**

- Weight: 1.4Kg
- Pipe diameters: 50-140mm

**Model T3**

- Weight: 1.6Kg
- Pipe diameters: 100-160mm

| SPARE CUTTING WHEELS | |
|---|---|
| CODE | PIPE DIAMETERS |
| 9501.168T | 50 T0 160mm |

| TERRAIN FUZE PIPE CHAMFER TOOL | | |
|---|---|---|
| CODE | DESCRIPTION | PIPE DIAMETERS |
| 9502.32160T | Pipe Chamfer Tool – Model 1 | 32 to 1603mm |
| 9500.50140T | Pipe Chamfer Tool – Model 2 | 40 to 250mm |

### General properties

**Model 1**

- Weight: 0.8Kg
- Pipe diameters: 32-160mm

**Model 2**

- Weight: 1.4Kg
- Pipe diameters: 450-250mm

**Pipe Scraper**

- Product code: 9507T

# 5 Chemical Resistance

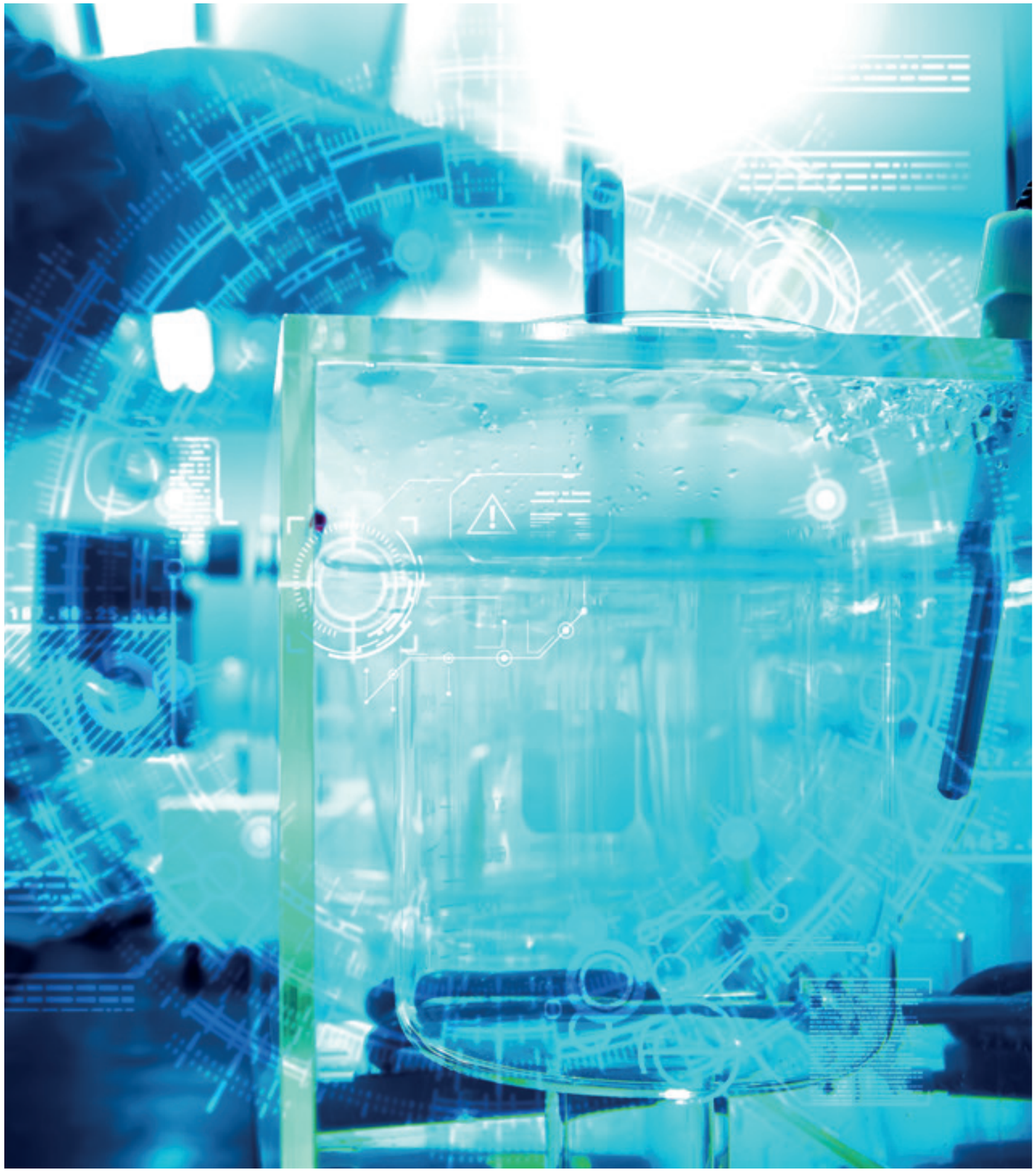
The following tables provide a list of inorganic compounds, which may be conveyed through HDPE systems with no internal pressure or mechanical stress, at temperatures up to 60°C and those fluids which are unsuitable.

The information within this section has been collated from tests carried out by both national and international standards organisations (ISO/TR10358:2021).

| TERMINOLOGY FOR CHEMICAL RESISTANCE TABLES | |
|---|---|
| **SYMBOL/TERM** | **DESCRIPTION** |
| | No data |
| S | Satisfactory |
| L | Limited |
| NS | Not satisfactory |
| Dil. sol. | Dilute aqueous solution at a concentration equal to or less than 10% |
| Sol. | Aqueous solution at a concentration higher than 10%, but not saturated |
| Sat. sol. | Saturated aqueous solution, prepared at 20°C |
| tg-l | Technical grade, liquid |
| tg-g | Technical grade, gas |
| Work. sol. | Working solution of the concentration usually used in the industry concerned |
| Susp. | Suspension of solid in a saturated solution at 20°C |

The tests were based on the use of pure chemicals.

For mixed chemicals, we would advise that pilot tests should be undertaken in order to ascertain the resistance of the material under these circumstances.



# 5 Chemical Resistance

## Table of fluids* which can be conveyed through HDPE pipe and fittings with no internal pressure, mechanical stress and temperature up to 60°.

| CHEMICAL | CONCENTRATION % | TEMPERATURE °C | | |
|---|---|---|---|---|
| | | 20 | 40 | 60 |
| Acetaldehyde | 40 | S | L | L |
| | tg-l | S | | |
| | tg-g | | L | L |
| Acetarnide | 5 | S | S | S |
| Acetic acid | Up to 10 | S | S | S |
| | 10 to 40 | S | S | S |
| | 50 | S | S | L |
| | 60 | S | L | L |
| | 80 | L | L | L |
| | 95 | L | L | L |
| Acetic acid, glacial | >96 | S | L | L |
| Acetic anhydride | tg-l | S | L | L |
| Acetone | Up to 10 | S | S | L |
| | tg-l | L | L | |
| | tg-g | | | L |
| Acetophenone | tg-l | S | L | L |
| Acetyl chloride | tg-l | L | NS | |
| | tg-g | | | |
| Acetylene, gas | tg-g | S | S | S |
| Acrylonitrile | tg-l | S | S | L |
| Adipic acid | Sat. sol. (1,4%) | S | S | S |
| Air | tg-g | S | S | S |
| Allyl alcohol | tg-l | S | S | L |
| Allyl chloride | Sat. sol. | L | NS | NS |
| Almond oil | tg-l | S | L | L |
| Alum (see Aluminium potassium sulphate) | | | | |
| Aluminium chloride | Sat. sol. | S | S | S |
| Aluminium fluoride | Susp. | S | S | S |
| Aluminium hydroxide | Susp. | S | S | S |
| Aluminium nitrate | Sat. sol. | S | S | S |
| Aluminium chloride oxyde | Susp. | S | S | S |

*Plastic pipe and fittings combined chemical resistance classification table ISO/TR10358:2021

| CHEMICAL | CONCENTRATION % | TEMPERATURE °C | | |
|---|---|---|---|---|
| | | 20 | 40 | 60 |
| Aluminium potassium sulphate | Sat.sol. | S | S | S |
| Aluminium sulphate | Sat. sol. | S | S | S |
| Ammonia, aqueous | Sat. sol. | S | S | S |
| Ammonia, dry gas | tg-g | S | S | S |
| Ammonia, wet gas | tg-g | S | S | S |
| Ammonium acetate | Sat. sol. | S | S | S |
| Ammonium bifluoride | Sat. sol. | S | S | S |
| Ammonium carbonate | Sat. sol. | S | S | S |
| Ammonium chloride | Sat. sol. | S | S | S |
| Ammonium fluoride | Up to 20 | S | S | S |
| | 25 | S | S | S |
| | Sat.sol. | S | S | S |
| Ammonium hydrogen carbonate | Sat. sol. | S | S | S |
| Ammonium metaphosphate | Sat. sol. | S | S | S |
| Ammonium molybdate | Sat. sol. | S | S | S |
| Ammonium nitrate | Sat. sol. | S | S | S |
| Ammonium persulphate | Sat. sol. | S | S | S |
| Ammonium phosphate | Sat. sol. | S | S | S |
| Ammonium sulphate | Sat. sol. | S | S | S |
| Ammonium sulphide | Sat. sol. | S | S | S |
| Ammonium thiocyanate | Sat sol. | S | S | S |
| Amyl acetate | tg-l | S | S | L |
| Amyl alcohol | tg-l | S | S | L |
| Amyl chloride | tg-l | NS | NS | NS |
| Aniline | Sat. sol. | S | S | L |
| | tg-l | S | L | L |
| Aniline hydrochloride | Sat.sol. | L | L | L |
| Anisole | tg-l | L | L | NS |
| Anthraquinone sulphonic acid | Susp. | S | S | S |
| Antimony (111) chloride | Sat.sol. | S | S | S |
| Apple juice | Work.sol. | S | S | S |
| Aqua regia | HCl:HN03 = 3:1 | NS | NS | NS |

## Table of fluids* which can be conveyed through HDPE pipe and fittings with no internal pressure, mechanical stress and temperature up to 60°.

| CHEMICAL | CONCENTRATION % | TEMPERATURE °C | | |
|---|---|---|---|---|
| | | 20 | 40 | 60 |
| Arsenic acid | Sat.sol. | S | S | S |
| Arsenic trioxide | Sol. | L | L | L |
| Barium bromide | Sat. sol. | S | S | S |
| Barium carbonate | Susp. | S | S | S |
| Barium chloride | Sat. sol. | S | S | S |
| Barium hydroxide | Sat. sol. | S | S | S |
| Barium sulphate | Susp. | S | S | S |
| Barium sulphide | Sat. sol. | S | S | S |
| Beer | Work. sol. | S | S | S |
| Benzaldehyde | 0,1 | S | S | L |
| | tg-l | S | L | L |
| Benzene | tg-l | L | L | L |
| Benzoic acid | Sat.sol. | S | S | S |
| Benzoyl chloride | tg-l | L | L | L |
| Benzyl alcohol | tg-l | S | S | L |
| Benzyl chloride | tg-l | L | NS | NS |
| Bismuth carbonate | Sat.sol. | S | S | S |
| Borax | Sol. | S | S | S |
| Boric acid | Oil. sol. | S | S | S |
| | Sat. sol. | S | S | S |
| Boron trifluoride | Sat. sol. | S | S | S |
| Bromic acid (dee. at 100°C) | 10 | S | S | S |
| | 50 | NS | NS | NS |
| Bromine, gas | tg-g | | | NS |
| Bromine, liquid | tg-l | NS | NS | |
| Bromine water | Sat. sol. | L | L | NS |
| Bromoethane | tg-l | NS | NS | |
| | tg-g | | | NS |
| Butadiene, gas | tg-g | L | NS | NS |
| Butane, gas | tg-g | S | S | S |
| Butanediol | 10 | S | S | L |
| | tg-l | L | L | L |
| n-Butanol | tg-l | S | S | S |
| Butyl acetate | tg-l | L | L | L |

*Plastic pipe and fittings combined chemical resistance classification table ISO/TR10358:2021

| CHEMICAL | CONCENTRATION % | TEMPERATURE °C | | |
|---|---|---|---|---|
| | | 20 | 40 | 60 |
| Butyl glycol | tg-l | S | L | L |
| Butylphenol | Sat. sol. | S | S | S |
| Butyl phthalate | tg-l | S | L | L |
| Butyric acid | 20 | S | S | L |
| | tg-l | S | S | L |
| Butyryl chloride | tg-l | L | L | |
| Calcium bisulphite | Sat. sal. | S | S | S |
| Calcium bromide | Sat. sal. | S | S | S |
| Calcium carbonate | Susp. | S | S | S |
| Calcium chlorate | Sat. sol. | L | L | L |
| Calcium chloride | Sat. sol. | S | S | S |
| Calcium hydroxide | Sat.sol. | S | S | S |
| Calcium hypochlorite | 10 | L | L | L |
| Calcium nitrate | Sat. sol. | S | S | S |
| Calcium sulphate | Susp. | S | S | S |
| Calcium sulphide | Dil. sol. | L | L | L |
| Calcium hydrogen sulphide | Sol. | S | S | S |
| Camphor oil | tg-l | NS | NS | NS |
| Carbon dioxide aqueous sol. | Sat.sol. | S | S | S |
| Carbon dioxide, dry gas | tg-g | S | S | S |
| Carbon dioxide, wet gas | tg-g | S | S | S |
| Carbon disulphide | tg-l | L | NS | |
| | tg-g | | | NS |
| Carbon monoxide, gas | tg-g | S | S | S |
| Carbon tetrachloride | tg-l | L | NS | NS |
| Castor oil | tg-l | S | S | S |
| Chlorine, aqueous (see Chlorine water) | | | | |
| Chlorine, dry gas | tg-g | L | NS | NS |
| Chlorine water | Sat.sol. | L | L | L |
| Chlorine, wet gas | tg-g | L | NS | NS |

The information in these tables has been supplied by other reputable sources and is to be used ONLY as a guide in selecting equipment for appropriate chemical compatibility. Before permanent installation, test the equipment with the chemicals and under the specific conditions of your application. Ratings of chemical behaviour listed in this chart apply to a 48-hr exposure period, we have no knowledge of possible effects beyond this period. We do not warrant (neither express or implied) that the information in this chart is accurate or complete or that any material is suitable for any purpose.

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# 5 Chemical Resistance

## Table of fluids* which can be conveyed through HDPE pipe and fittings with no internal pressure, mechanical stress and temperature up to 60°.

| CHEMICAL | CONCENTRATION % | TEMPERATURE °C | | |
|---|---|---|---|---|
| | | 20 | 40 | 60 |
| Chloroacetic acid | Sol. | S | S | S |
| | Sat.sol. | S | S | S |
| | 50 | S | S | S |
| Chlorobenzene | tg-l | L | NS | NS |
| Chlorobromo- methane | tg-l | L | L | L |
| Chloroethanol | tg-l | S | L | L |
| Chloroform | tg-l | L | L | NS |
| Chloromethane, gas | tg-g | L | NS | NS |
| Chloropropanes | tg-l | NS | | |
| | tg-g | | | |
| Chlorosulphonic acid | 50 | NS | NS | NS |
| Chrome alum (chromium potassium sulphate) | Sol. | S | S | S |
| | Sat. sol. | S | S | S |
| Chromic acid | Sat.sol. | L | L | NS |
| | 10 | L | L | L |
| | 20 | L | L | L |
| | 25 | L | L | L |
| | 30 | L | L | L |
| | 40 | L | L | L |
| | 50 | L | L | L |
| Citric acid | Sat. sol. | S | S | S |
| Coconut oil | Work. sol. | S | S | L |
| Cod liver oil | Work. sol. | S | NS | NS |
| Copper (II) chloride | Sat. sol. | S | S | S |
| Copper (II) cyanide | Sat. sol. | S | S | S |
| Copper (II) fluoride | Oil.sol. | S | S | S |
| | Sat. sol. | S | S | S |
| | 2 | S | S | S |
| Copper (II) nitrate | Sat. sol. | S | S | L |
| | 50 | S | S | S |
| Copper (11) sulphate | Sat. sol. | S | S | S |
| Corn oil | Work sol. | S | L | L |

| CHEMICAL | CONCENTRATION % | TEMPERATURE °C | | |
|---|---|---|---|---|
| | | 20 | 40 | 60 |
| Cottonseed oil | Work. sol. | S | S | S |
| Cresols | tg-l | S | S | L |
| Cresylic acid | Sat. sol (approx. 2-3%) | L | NS | NS |
| | 50 (tg-l) | L | NS | NS |
| Crotonaldehyde | Sat. sol. (18%) | S | L | L |
| | tg-l | S | L | L |
| Crude oil (free from aromatics) | tg-l | S | L | L |
| Cyclohexane | tg-l | S | L | L |
| Cyclohexanol | Sat. sol. | S | S | L |
| Cyclohexanone | tg-l | S | L | L |
| Cyclohexylamine | tg-l | L | NS | NS |
| Decalin | tg-l | S | L | L |
| Dextrin | Dil. sol. | S | S | S |
| | Sol. | S | S | S |
| Dextrose (dee. at 200°C) | Sol. | S | S | S |
| Diacetone alcohol | tg-l | L | L | L |
| Diazonium chloride (benzene diazonium chloride) | Work. sol. | L | | |
| Dich loroacetic acid | 50 | S | S | L |
| | tg-l | L | L | L |
| Dichlorobenzene | tg-l | L | NS | NS |
| Dichloroethylene | tg-l | NS | NS | NS |
| Dichloromethane (see Methylene chloride) | | | | |
| Diesel fuel | Work. sol. | L | L | L |
| Diethanolamine | tg-l | S | L | L |
| Diethylamine | tg-l | S | L | |
| | tg-g | | | NS |
| Diethyl ether | tg-l | L | | |
| | tg-g | | NS | NS |
| Diethylene glycol | tg-l | S | S | S |
| Diglycolic acid | Dil. sol. | S | S | S |
| | Sat. sol. | S | L | L |
| | 18 | S | S | S |

*Plastic pipe and fittings combined chemical resistance classification table ISO/TR10358:2021

The information in these tables has been supplied by other reputable sources and is to be used ONLY as a guide in selecting equipment for appropriate chemical compatibility. Before permanent installation, test the equipment with the chemicals and under the specific conditions of your application. Ratings of chemical behaviour listed in this chart apply to a 48-hr exposure period, we have no knowledge of possible effects beyond this period. We do not warrant (neither express or implied) that the information in this chart is accurate or complete or that any material is suitable for any purpose.



## Table of fluids* which can be conveyed through HDPE pipe and fittings with no internal pressure, mechanical stress and temperature up to 60°.

| CHEMICAL | CONCENTRATION % | TEMPERATURE °C | | |
|---|---|---|---|---|
| | | 20 | 40 | 60 |
| Diisooctyl phthalate | tg-l | S | L | L |
| Dimethylamine | 30 | S | S | L |
| Dimethylamine, gas | tg-g | S | S | L |
| Dimethyl- formamide | tg-l | S | S | L |
| Dioctyl phthalate | tg-l | S | L | L |
| Dioxane | tg-l | S | S | S |
| Diphenylamine | Work. sol. | S | L | L |
| Ethanol | 40 | S | L | L |
| | 95 | S | S | S |
| | tg-l | S | S | S |
| Ethanolamine | tg-l | S | L | |
| Ethyl acetate | tg-l | S | L | NS |
| Ethyl acrylate | tg-l | L | L | NS |
| Ethyl chloride, gas | tg-g | L | NS | NS |
| Ethylene bromide | tg-l | L | NS | NS |
| Ethylene chlorohydrin | tg-l | L | L | L |
| 1,1 Ethylene dichloride | tg-l | L | NS | NS |
| | tg-g | | | NS |
| 1,2 Ethylene dichloride | tg-l | L | NS | NS |
| Ethylene glycol | tg-l | S | S | S |
| Ethyl ether | tg-l | L | | |
| | tg-g | | L | L |
| Ethyl glycol | tg-l | S | L | NS |
| Ethylene oxide | tg-g | S | S | S |
| Ferric chloride | Sat. sol. | S | S | S |
| Ferric nitrate | Sat. sol. | S | S | S |
| Ferric sulphate | Sat. sol. | S | S | S |
| Ferrous chloride | Sat. sol. | S | S | S |
| Ferrous sulphate | Sat. sol. | S | S | S |
| Fluoboric acid (dee. at 130°C) | Sat.sol. | S | L | L |
| Fluorine gas, dry | tg-g | NS | NS | NS |
| Fluorine gas, wet | tg-g | NS | NS | NS |

| CHEMICAL | CONCENTRATION % | TEMPERATURE °C | | |
|---|---|---|---|---|
| | | 20 | 40 | 60 |
| Fluosilicic acid | Sat.sol. | S | S | L |
| | 25 | S | | |
| | 32 | S | | |
| | 40 | S | | |
| | 50 | S | S | L |
| Formaldehyde | Oil. sol. | S | L | NS |
| | 30 to 40 | S | L | L |
| | 50 | S | L | NS |
| Formic acid | 10 | S | S | L |
| | 40 | L | L | L |
| | 50 | L | L | L |
| | 85 to tg-l | L | L | L |
| Freon 12 | Work.sol. | L | NS | NS |
| Freon 22 | tg-g | L | L | L |
| Fructose | Sol. | S | S | S |
| Fruit juice | Work. sol. | S | S | S |
| Furfuryl alcohol | tg-l | S | S | L |
| | tg-g | S | | |
| Gas, natural, dry | tg-g | S | | |
| Gas, natural, wet | tg-g | S | S | S |
| Gasoline (fuel) (free from aromatics) | Work. sol. | S | S | L |
| | Sol. | S | S | S |
| Ginger ale | Work. sol. | S | S | S |
| Glucose (dee. at> 200°C) | Sol. | S | S | S |
| Glycerine | tg-l | S | S | S |
| Glycolic acid | Sol. | L | L | L |
| | 30 | L | | |
| | 65 | L | L | L |
| Grapefruit juice | Work. sol. | S | S | S |
| Heptane | tg-l | S | L | NS |
| Hexadecanol | Work. sol. | S | S | S |
| Hexane | tg-l | S | L | L |

*Plastic pipe and fittings combined chemical resistance classification table ISO/TR10358:2021

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# 5 Chemical Resistance

## Table of fluids* which can be conveyed through HDPE pipe and fittings with no internal pressure, mechanical stress and temperature up to 60°.

| CHEMICAL | CONCENTRATION % | TEMPERATURE °C | | |
|---|---|---|---|---|
| | | 20 | 40 | 60 |
| 1-Hexanol | tg-l | S | S | S |
| Honey | Work. sol. | S | S | S |
| Horseradish | Work sol. | S | S | S |
| Hydrobromic acid | Up to 20 | S | S | S |
| | Up to 50 | S | S | S |
| | 66 | L | L | NS |
| | tg-g | L | L | L |
| Hydrochloric acid | Up to 10 | S | S | S |
| | 10 to 20 | S | S | S |
| | Up to 25 | S | S | S |
| | 30 | S | S | S |
| | 33 | S | S | L |
| | 36 | S | S | L |
| | 37,5 | S | S | L |
| Hydrochloric acid, dry gas | tg-g | S | L | NS |
| Hydrochloric acid, wet gas | tg-g | S | L | NS |
| Hydrocyanic acid | Sat.sol. | S | L | NS |
| | 10 | S | S | S |
| | tg-l | S | | |
| | tg-g | | L | NS |
| Hydrofluoric acid | Up to 10 | S | S | S |
| | 40 | S | S | L |
| | 48 | S | L | L |
| | 50 | S | L | L |
| | 60 | S | L | L |
| | 70 | S | L | L |
| Hydrofluoric acid, gas | tg-g | NS | | |
| Hydrogen | tg-g | S | S | S |
| Hydrogen peroxide | Up to 10 | L | L | L |
| | 30 | L | L | L |
| | 50 | L | L | NS |
| | 70 | L | L | NS |
| Hydrogen phosphide (see Phosphine) | | | | |
| Hydrogen sulphide, aqueous | Dil. sol, | S | S | L |
| | Sat. sol. | S | S | L |
| | tg-g | S | S | L |
| Hydrogen sulphide, dry gas | tg-g | S | S | L |
| Hydroquinone | Sat. sol. | S | L | L |
| Hypochlorous acid | Sat. sol. | L | NS | NS |
| | 70 | L | NS | NS |
| Iodine (in potassium iodine) | Sat. sol. | NS | NS | NS |
| Iodine, in alcohol | Work. sol. | NS | NS | NS |
| Isobutyl alcohol | tg-l | S | S | L |
| Isobutyronitrile | tg-l | L | L | NS |
| Isooctane | tg-l | S | L | L |
| Isopropyl acetate | tg-l | S | L | L |
| Isopropyl alcohol | tg-l | S | S | S |
| Isopropyl ether | tg-l | L | L | NS |
| Kerosene | Work. sol. | S | L | L |
| Lactic acid | 10 | S | S | S |
| | 28 | S | S | S |
| | 90 | S | S | S |
| | tg-l | S | S | S |
| Lanolin | Work. sol. | S | L | L |
| Lauryl chloride | Sat. sol. | L | L | NS |
| Lead acetate | Dil. sol. | S | S | S |
| Lead tetraethyl (dee. at 200°C) | tg-l | S | S | |
| Linseed oil | Work. sol. | S | S | L |
| Magnesium carbonate | Susp. | S | S | S |
| Magnesium chloride | Sat. sol. | S | S | S |
| | 50 | S | S | S |
| Magnesium hydroxide | Sat. sol. | S | S | S |
| Magnesium nitrate | Sat. sol. | S | S | S |
| Magnesium sulphate | Sat. sol. | S | S | S |

*Plastic pipe and fittings combined chemical resistance classification table ISO/TR10358:2021

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Table of fluids* which can be conveyed through HDPE pipe and fittings with no internal pressure, mechanical stress and temperature up to 60°.

| CHEMICAL | CONCENTRATION % | TEMPERATURE °C | | |
|---|---|---|---|---|
| | | 20 | 40 | 60 |
| Maleic acid (dee. at 160°C) | Sat. sol. | S | S | S |
| | 50 | S | S | S |
| Malic acid (subl.) | Sol. | S | S | S |
| | Sat. sol. | S | S | S |
| Margarine | Work. sol. | S | S | S |
| Mayonnaise | Work. sol. | S | S | S |
| Mercuric chloride | Sat. sol. | S | S | S |
| Mercuric cyanide | Sat. sol. | S | S | S |
| Mercurous nitrate | Sol. | S | S | S |
| | Sat. sol. | S | S | S |
| Mercury | tg-l | S | S | S |
| Mercury (11) chloride (see Mercuric chloride) | | | | |
| Mercury (11) cyanide (see Mercuric cyanide) | | | | |
| Mesityl oxide | Work. sol. | NS | NS | NS |
| Methane | tg-g | S | L | |
| Methyl acetate | tg-l | S | S | |
| | tg-g | | | |
| Methyl alcohol | 5 | S | S | S |
| | tg-l | S | S | S |
| Methyl bromide (bromo methane] | tg-g | L | NS | NS |
| Methyl butyl ketone | tg-l | L | L | NS |
| Methyl cyclohexanones | tg-l | L | L | |
| Methyl ethyl ketone | tg-l | S | L | L |
| Methyl glycol | Work. sol. | S | L | L |
| Methyl methacrylate | tg-l | S | S | S |
| Methyl sulphate | Work. sol. | L | L | |
| Methyl sulphonic acid (dee.) | tg-l | L | L | NS |
| Methylamine | Up to 32 | S | L | L |
| Methylene chloride | tg-l | L | L | |
| | tg-g | | | |
| Milk | Work. sol. | S | S | S |
| Mineral oils (free from aromatics) | Work. sol. | S | L | NS |
| Molasses | Work. sol. | S | L | L |
| Mustard, aqueous | Work. sol. | S | S | S |
| Naphtha | Work. sol. | S | L | NS |
| Naphthalene | Work. sol. | S | L | L |
| Nickel acetate | Sat. sol. | S | S | S |
| Nickel chloride | Sat. sol. | S | S | S |
| Nickel nitrate | Sat. sol. | S | S | S |
| Nickel sulphate | Sat. sol. | S | S | S |
| Nicotin acid | Susp. | S | S | S |
| Nitric acid | 5 | L | L | L |
| | 10 | L | L | L |
| | 20 | L | L | NS |
| | 25 | L | L | NS |
| | 30 | L | NS | NS |
| | 35 | L | NS | NS |
| | 40 | NS | NS | NS |
| | 45 | NS | NS | NS |
| | 50 | NS | NS | NS |
| | 60 | NS | NS | NS |
| | 85 | NS | NS | NS |
| Nitric acid, fuming (with nitrogen dioxide) | | NS | NS | NS |
| Nitrobenzene | tg-l | S | L | L |
| Nitro methane | tg-l | S | L | L |
| Oleic acid | tg-l | S | L | L |
| Oleum | | NS | NS | NS |
| Olive oil | Work.sol. | S | S | L |
| Orthophosphoric acid (see Phosphoric acid) | | | | |
| Oxalic acid (subl.) | Dil. sol. | S | S | S |
| | Sat. sol. | S | S | S |
| | 50 | S | S | S |
| Oxygen, gas | tg-g | S | L | L |
| Ozone, gas | Sat. sol. | L | NS | NS |
| | tg-g | L | NS | NS |

*Plastic pipe and fittings combined chemical resistance classification table ISO/TR10358:2021

The information in these tables has been supplied by other reputable sources and is to be used ONLY as a guide in selecting equipment for appropriate chemical compatibility. Before permanent installation, test the equipment with the chemicals and under the specific conditions of your application. Ratings of chemical behaviour listed in this chart apply to a 48-hr exposure period, we have no knowledge of possible effects beyond this period. We do not warrant (neither express or implied) that the information in this chart is accurate or complete or that any material is suitable for any purpose.

# 5 Chemical Resistance

## Table of fluids* which can be conveyed through HDPE pipe and fittings with no internal pressure, mechanical stress and temperature up to 60°.

| CHEMICAL | CONCENTRATION % | TEMPERATURE °C | | |
|---|---|---|---|---|
| | | 20 | 40 | 60 |
| Paraffin | tg-l | S | S | L |
| Paraffin oil (F65) | tg-l | S | L | L |
| Peanut oil | Work. sol. | S | S | L |
| Pentane | Work. sol. | S | S | L |
| Peppermint oil | Work. sol. | S | | |
| Perchloro- ethylene | Work. sol. | L | L | NS |
| Perchloric acid | 10 | L | L | L |
| | (ZN)20 | L | L | NS |
| | 70 | L | NS | NS |
| Petrol (aliphatic hydrocarbon/benzene) | 80/20 | S | L | L |
| Petroleum ether (ligroin) | Work sol. | S | L | L |
| Phenol | Sol. | S | S | L |
| | 5 | S | S | S |
| | 50 | S | S | |
| | 90 | S | S | L |
| | tg-l | | | |
| Phenyl hydrazine (dee.) | tg-l | L | L | NS |
| Phenylhydrazine hydrochloride (subl.) | Oil. sol. | S | L | NS |
| | 97 | S | L | NS |
| Phosphine | tg-g | L | L | L |
| Phosphoric acid | Up to 50 | S | S | S |
| | 50 to 75 | S | S | S |
| | 75 to 85 | S | S | L |
| | 98 | S | S | L |
| Phosphorus (III) chloride | tg-l | S | S | L |
| Phosphorus oxychloride | tg-l | S | S | L |
| Phthalic acid | Susp. | S | S | S |
| Picric acid (subl.) | Sat. sol. | S | S | L |
| | 10 | S | | |
| Potassium aluminium sulphate (see Aluminium potassium sulphate) | | | | |
| Potassium bicarbonate | Sat. sol. | S | S | S |
| Potassium bichromate (see Potassium dichromate) | | | | |

| CHEMICAL | CONCENTRATION % | TEMPERATURE °C | | |
|---|---|---|---|---|
| | | 20 | 40 | 60 |
| Potassium bisulphate | Sat. sol. | S | S | S |
| Potassium borate | Sat. sol. | S | S | S |
| Potassium bromate | Sat. sol. | S | S | S |
| | Up to 10 | | S | S |
| Potassium bromide | Sat. sol. | S | S | S |
| Potassium carbonate | Sat. sol. | S | S | S |
| Potassium chlorate | Sat. sol. | S | S | L |
| Potassium chloride | Sat. sol. | S | S | S |
| Potassium chlorite | Sat.sol. | S | S | S |
| Potassium chromate | Sat. sol. | S | S | L |
| | 40 | S | S | L |
| Potassium cuprocyanide | Sat. sol. | S | S | S |
| Potassium cyanide | Sol. | S | S | S |
| Potassium dichromate | Sat. sol. | S | S | L |
| | 40 | S | S | S |
| Potassium ferricyanide | Sat.sol. | S | S | S |
| Potassium fluoride | Sat. sol. | S | S | S |
| Potassium hexacyanoferrate (11) (potassium ferrocyanide) | Sat. sol. | S | S | S |
| Potassium hexacyanoferrate (111) (see Potassium ferricyanide) | | | | |
| Potassium hydrogen carbonate (see Potassium bicarbonate) | | | | |
| Potassium hydrogen sulphate (see Potassium bisulphate) | | | | |
| Potassium hydrogen sulphite | Sol. | S | S | S |
| | Sat.sol. | S | S | S |
| Potassium hydroxide | up to 10 | S | S | S |
| | 20 | S | S | S |
| | Up to 50 | S | S | S |
| Potassium hypochlorite | Sol. | L | L | NS |
| Potassium iodide | Sat. sol. | S | S | S |
| Potassium nitrate | Sat. sol. | S | S | S |
| | 50 | S | S | S |
| Potassium orthophosphate | Sat. sol. | S | S | S |

*Plastic pipe and fittings combined chemical resistance classification table ISO/TR10358:2021

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Table of fluids* which can be conveyed through HDPE pipe and fittings with no internal pressure, mechanical stress and temperature up to 60°.

| CHEMICAL | CONCENTRATION % | TEMPERATURE °C | | |
|---|---|---|---|---|
| | | 20 | 40 | 60 |
| Potassium perborate | Sat. sol. | S | S | S |
| Potassium perchlorate | Sat. sol. | L | L | L |
| | 10 | S | S | L |
| Potassium permanganate | Sat. sol. | L | L | NS |
| | 10 | S | L | L |
| | 20 | L | L | L |
| | 25 | L | L | |
| Potassium persulphate | Sat. sol. | S | S | S |
| Potassium sulphate | Sat. sol. | S | S | S |
| Potassium sulphide | Sat.sol. | S | S | S |
| Potassium sulphite | Sat. sol. | S | S | S |
| Potassium, thiosulphate | Sat. sol. | S | S | S |
| Propane, gas | tg-g | S | S | L |
| Propionic acid | 50 | S | S | S |
| | tg-l | S | L | L |
| Propyl alcohol | tg-l | S | S | S |
| Pyridine | tg-l | S | L | L |
| Salicylic acid (subl.) | Sat. sol. | S | S | S |
| Selenic acid | Sat. sol. | S | S | S |
| Silicic acid | Susp. | S | S | S |
| Silicone oil | tg-l | S | S | S |
| Silver acetate | Sat. sol. | S | S | S |
| Silver cyanide | Sat. sol. | S | S | S |
| Silver nitrate | Sat. sol. | S | S | S |
| | 50 | S | S | S |
| Sodium acetate | Sat. sol. | S | S | S |
| Sodium acid sulphate (see Sodium | | | | |
| bisulphate) | Sat sol. | S | S | S |
| Sodium antimonite | Sat. sol. | S | S | S |
| Sodium arsenite | Sat. sol. | S | S | S |
| | 35 | S | S | S |
| | 50 | S | S | S |

*Plastic pipe and fittings combined chemical resistance classification table ISO/TR10358:2021

| CHEMICAL | CONCENTRATION % | TEMPERATURE °C | | |
|---|---|---|---|---|
| | | 20 | 40 | 60 |
| Sodium bicarbonate | Sat. sol. | S | S | S |
| Sodium bisulphate | Sat. sol. | S | S | S |
| | 50 | S | S | S |
| Sodium bromide | Sat. sol. | S | S | S |
| | 50 | S | S | S |
| Sodium carbonate | Sat. sol. | S | S | S |
| | 25 | S | S | S |
| | Up to 50 | S | S | S |
| Sodium chlorate | Sat. sol. | S | L | L |
| Sodium chloride | Sat.sol. | S | S | S |
| | 10 | S | S | S |
| Sodium chlorite | 2 | S | L | NS |
| | 20 | S | L | NS |
| Sodium chromate | Dil. sol. | S | S | S |
| Sodium cyanide | Sat. sol. | S | S | S |
| Sodium dichromate | Sat. sol. | S | L | L |
| Sodium ferricyanide | Sat. sol. | S | S | S |
| Sodium ferrocyanide | Sat. sol. | S | S | S |
| Sodium fluoride | Sat. sol. | S | S | S |
| Sodium hexacyanoferrate | | | | |
| (II) (see Sodium ferrocyanide) | | | | |
| Sodium hexacyanoferrate | | | | |
| (III) (see Sodium ferricyanide) | | | | |
| Sodium hydrogen carbonate (see Sodium bicarbonate) | | | | |
| Sodium hydrogen sulphate (see bisulphate) | | | | |
| Sodium hydrogen sulphite | Sat. sol. | S | S | S |
| Sodium hydroxide | Dil. Sol. | S | S | S |
| | Sat sol. | S | S | S |
| | 1 | S | S | S |
| | 5 | S | S | S |
| | 10 to 60 | S | S | S |
| Sodium hypochlorite | 2%Cl (percentage of free chlorine) | L | L | |

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# 5 Chemical Resistance

## Table of fluids* which can be conveyed through HDPE pipe and fittings with no internal pressure, mechanical stress and temperature up to 60°.

| CHEMICAL | CONCENTRATION % | TEMPERATURE °C | | |
|---|---|---|---|---|
| | | 20 | 40 | 60 |
| Sodium hypochlorite (cont'd) | 12,5 % Cl (percentage of free chlorine) | L | L | |
| Sodium metaphosphate | Sol. | S | S | S |
| Sodium nitrate | Sat. sol. | S | L | L |
| Sodium nitrite | Sat. sol. | S | S | S |
| Sodium orthophosphate (see Sodium phosphate, neutral) | | | | |
| Sodium perborate | Sat. sol. | S | S | S |
| Sodium phosphate, acid | Sat. sol. | S | S | S |
| Sodium phosphate, neutral | Sat. sol. | S | S | S |
| Sodium silicate | Sol. | S | S | S |
| | Sat. sol. | S | S | S |
| Sodium sulphate | Sat. sol. | S | S | S |
| | 0,1 | S | S | S |
| Sodium sulphide | Sat. sol. | S | S | S |
| Sodium sulphite | Sat. sol. | S | S | S |
| | 40 | S | S | S |
| Sodium thiosulphate (hyposulphite) | Sat. sol. | S | S | S |
| | 50 | S | S | S |
| Soybean oil | Work. sol. | S | L | L |
| Stearic acid | Work. sol. | S | L | L |
| Stearin | Work. sol. | S | L | L |
| Styrene | Sat. sol. | L | NS | NS |
| Sugar, aqueous sol. | Sol. | S | S | S |
| Sulphur dioxide, dry gas | Work. sol. | S | S | S |
| Sulphur dioxide, wet gas | Work.sol. | S | S | L |
| Sulphur ether (thioether) | Work.sol. | L | L | NS |
| Sulphuric acid | 10 | S | S | S |
| | 15 | S | S | S |
| | 30 | S | S | S |
| | 50 | S | S | S |
| | 70 | S | S | L |
| | 80 | L | L | NS |
| | 90 | L | L | NS |
| Sulphuric acid (cont'd) | 95 | NS | NS | NS |
| | 96 | NS | NS | NS |
| | 98 | NS | NS | NS |
| | Fuming | NS | NS | NS |
| Sulphurous acid | Sat.sol. | S | S | L |
| | Up to 30 | S | S | L |
| Tannie acid | Sol. | S | L | L |
| | Sat.sol. | S | L | L |
| Tartaric acid (dee.) | Sol. | S | S | S |
| | Sat.sol. | S | S | S |
| Tetrahydrofuran | tg-l | L | NS | NS |
| Tetralin | tg-l | S | L | NS |
| Thionyl chloride | tg-l | NS | NS | NS |
| Thiophene | tg-l | L | L | L |
| Tin (II) chloride | Sat. sol. | S | S | S |
| Tin (IV) chloride | Sol. | S | S | S |
| Toluene | tg-l | L | NS | NS |
| Tributyl- phosphate | Sat. sol. | S | S | S |
| Trichloroacetic acid | Up to SO | S | | S |
| Trichloro- benzene | Work. sol. | NS | NS | NS |
| Trichloro- ethylene | tg-l | NS | NS | NS |
| Triethanolamine | Sol. | S | S | L |
| | tg-l | S | S | L |
| Triethylene glycol | Sol. | S | S | S |
| Trimethylol- propane | Up to 10 | S | S | S |
| Trisodium phosphate (see Sodium phosphate, neutral) | | | | |
| Turpentine | tg-l | L | L | NS |
| Urea | Sol. | S | S | S |
| | Sat. sol. | S | S | S |
| | 10 | S | S | S |
| Uric acid (dec.at> 400°C) | Work. sol. | S | S | S |
| Urine | Work. sol. | S | S | S |

*Plastic pipe and fittings combined chemical resistance classification table ISO/TR10358:2021

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| CHEMICAL | CONCENTRATION % | TEMPERATURE °C | | |
|---|---|---|---|---|
| | | 20 | 40 | 60 |
| Sodium hypochlorite (cont'd) | 12,5 % Cl (percentage of free chlorine) | L | L | |
| Sodium metaphosphate | Sol. | S | S | S |
| Sodium nitrate | Sat. sol. | S | L | L |
| Sodium nitrite | Sat. sol. | S | S | S |
| Sodium orthophosphate (see Sodium phosphate, neutral) | | | | |
| Sodium perborate | Sat. sol. | S | S | S |
| Sodium phosphate, acid | Sat. sol. | S | S | S |
| Sodium phosphate, neutral | Sat. sol. | S | S | S |
| Sodium silicate | Sol. | S | S | S |
| | Sat. sol. | S | S | S |
| Sodium sulphate | Sat. sol. | S | S | S |
| | 0,1 | S | S | S |
| Sodium sulphide | Sat. sol. | S | S | S |
| Sodium sulphite | Sat. sol. | S | S | S |
| | 40 | S | S | S |
| Sodium thiosulphate (hyposulphite) | Sat. sol. | S | S | S |
| | 50 | S | S | S |
| Soybean oil | Work. sol. | S | L | L |
| Stearic acid | Work. sol. | S | L | L |
| Stearin | Work. sol. | S | L | L |
| Styrene | Sat. sol. | L | NS | NS |
| Sugar, aqueous sol. | Sol. | S | S | S |
| Sulphur dioxide, dry gas | Work. sol. | S | S | S |
| Sulphur dioxide, wet gas | Work.sol. | S | S | L |
| Sulphur ether (thioether) | Work.sol. | L | L | NS |
| Sulphuric acid | 10 | S | S | S |
| | 15 | S | S | S |
| | 30 | S | S | S |
| | 50 | S | S | S |
| | 70 | S | S | L |
| | 80 | L | L | NS |
| | 90 | L | L | NS |
| Sulphuric acid (cont'd) | 95 | NS | NS | NS |
| | 96 | NS | NS | NS |
| | 98 | NS | NS | NS |
| | Fuming | NS | NS | NS |
| Sulphurous acid | Sat.sol. | S | S | L |
| | Up to 30 | S | S | L |
| Tannie acid | Sol. | S | L | L |
| | Sat.sol. | S | L | L |
| Tartaric acid (dee.) | Sol. | S | S | S |
| | Sat.sol. | S | S | S |
| Tetrahydrofuran | tg-l | L | NS | NS |
| Tetralin | tg-l | S | L | NS |
| Thionyl chloride | tg-l | NS | NS | NS |
| Thiophene | tg-l | L | L | L |
| Tin (II) chloride | Sat. sol. | S | S | S |
| Tin (IV) chloride | Sol. | S | S | S |
| Toluene | tg-l | L | NS | NS |
| Tributyl- phosphate | Sat. sol. | S | S | S |
| Trichloroacetic acid | Up to SO | S | | S |
| Trichloro- benzene | Work. sol. | NS | NS | NS |
| Trichloro- ethylene | tg-l | NS | NS | NS |
| Triethanolamine | Sol. | S | S | L |
| | tg-l | S | S | L |
| Triethylene glycol | Sol. | S | S | S |
| Trimethylol- propane | Up to 10 | S | S | S |
| Trisodium phosphate (see Sodium phosphate, neutral) | | | | |
| Turpentine | tg-l | L | L | NS |
| Urea | Sol. | S | S | S |
| | Sat. sol. | S | S | S |
| | 10 | S | S | S |
| Uric acid (dec.at> 400°C) | Work. sol. | S | S | S |
| Urine | Work. sol. | S | S | S |

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# 6 Polypipe Advantage

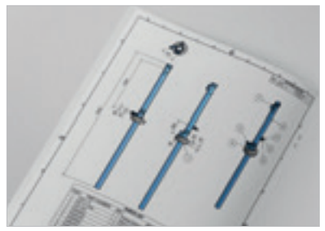
We recognise this is not a fabricated product but our Polypipe Advantage Service is more than fabrication, it is a service that supports and offers design and technical support on your next project. Find out more about how Polypipe Advantage can help you get the results you want.

**Visit: polypipe.com/polypipeadvantage**
**Call us on 01622 795200**

POLYPIPE ADVANTAGE

## ASSESSMENT AND ESTIMATION

Every good project begins with a thorough plan. The Polypipe Advantage team is on hand from the outset, to appraise your enquiry to identify any unique project requirements before creating a draft estimate.



## DESIGN

The Polypipe Advantage team will produce detailed CAD drawings for approval, all designs are compliant to as-drawn dimensions. This means you save vital planning time and won't have to compromise with inappropriate or over-engineered solutions.

## ORDERING AND FABRICATION

Once the design is finalised, our state-of-the-art fabrication facility will create your system whilst ensuring only the highest quality for first-fix testing. All solutions comply with existing BS EN 12056 (Parts 2 and 3) and Building Regulations Part H Standards/Regulations.

## DISPATCH AND DELIVERY

We know that time and scheduling are critical for any project, so we ensure your system is delivered how and when you need it – while keeping you updated along the way. Our team of logistics experts work with your project timelines to ensure each element of your system arrives to site as scheduled.

## MERCHANT INTEGRATION

You can purchase fabricated systems from our approved merchants, who will be happy to take your order, arrange the details with the Polypipe Advantage team – and deliver it in time for your next job.

## SUSTAINABILITY

Our streamlined approach to fabrication helps make your projects more efficient, whilst offering wide-reaching sustainability benefits. There are no spare parts or unnecessary extras to dispose of for example, and we've invested heavily to ensure our pipes are 100% recyclable at the end of life.





# Terrain FUZE installed throughout major central London residential project

Polypipe Terrain met challenging requirements at a mixed-use housing development in the heart of London's Docklands.

**Terrain FUZE fabricated drainage stacks across 42 storeys**

Working alongside main contractor Balfour Beatty Construction and M&E contractor Briggs and Forrester MEP Ltd, Polypipe designed and delivered prefabricated drainage stacks utilising its popular Terrain FUZE for the Providence Tower and Bar Building apartment buildings, which stand at 42 and 12 storeys respectively.

Terrain FUZE incorporates a number of engineered fittings to aid installation and is ideally suited to off-site fabrication where repetition is prevalent, such as in high rise buildings.

Unique to this development, which encompasses high-end luxury apartments and affordable housing, was the use of 160mm diameter low entry manifold piping, a wide pipe suitable for the project.

This ability to prefabricate bespoke products off-site, in turn driving quick turn around times, and the reduced labour, made Polypipe a key project partner.

The light weight nature of Terrain FUZE brought many advantages over traditional materials, not least in its manoeuvrability on-site, while the use of prefabrication meant that the system could be installed quickly and efficiently, providing significant time and resource savings.

Paul Campbell, Project Director of Briggs and Forrester MEP Ltd, said: "Whilst there were many benefits to using Terrain FUZE over alternative solutions, it was Polypipe Terrain's ability to custom engineer low entry manifold piping that really impressed us. Being engineered specific to the project, in Polypipe's on-site fabrication facilities, meant the turnaround time was minimal, ensuring a smooth installation."

Damian Farrell, London & South East Sales Director, of Polypipe Terrain, said: "Our experience on delivering on projects of this nature, combined with our extensive system knowledge, means that we can create engineered solutions that meet the needs of the development, such as the 160mm diameter low entry manifold piping that was unique to this project."

## CASE STUDY

**Project**
Providence Tower and Bar Building

**Client**
Briggs and Forrester MEP Ltd

**Application**
Fabricated drainage system

**Products**
Terrain FUZE

# 6 Polypipe Advantage

## Millbrook Tower stands tall following replacement of rainwater drainage stacks

One of the tallest buildings in Southampton has had a complete drainage solution designed and installed without the temporary re-homing of any residents.

**Using Polypipe Advantage, the installation of the system was 40% faster than the average for such works.**

Formerly the tallest building in Southampton, the Millbrook Tower stands at 240 feet. Built over 50 years ago, the building had a cast iron drainage system installed that had started to rust and fail, causing excessive leaking in the 144 flats in the development. Southampton City Council (SCC) who wanted a complete holistic approach to the design, manufacture and installation of the replacement drainage system, approached Polypipe. In January 2016, eight members of the Direct Labour Organisation (DLO) department of SCC came to Polypipe's Centre of Excellence in Aylesford for training to gain a better understanding of the specification, assembly and installation of plastic fabricated drainage stacks.

Working with SCC, as experts in providing intelligently engineered solutions for the movement of water and air around tall buildings, Polypipe assessed the failing drainage stacks in Millbrook Tower, and designed a new high-density polyethylene system. Terrain FUZE was installed due to a number of its key benefits over other more traditional materials.

Lighter in weight than cast iron, Terrain FUZE can feature longer pipe runs, so less jointing is required. As the system is jointed using electrofusion welding, where the weld area is as strong as the host material, the system integrity is increased and consequently the risk of leaks in the development is dramatically reduced.

As the system is jointed using electrofusion welding, where the weld area is as strong as the host material, the system integrity is increased and consequently the risk of leaks in the development is dramatically reduced. Due to the inherent material characteristics, Terrain FUZE lends itself to fabrication. Utilising the unique Advantage Service, the system was fabricated to exact specification and delivered to the site, where Southampton's DLO were able to complete the installation work across the 144 properties 40% faster than the average for such works. This meant that the residents of Millbrook Tower were able to remain in their properties, a key consideration when designing the drainage stacks of the building.

### CASE STUDY

**Project**
Millbrook Tower, Southampton

**Client**
Southampton City Council

**Application**
Live Stack Replacement

**Products**
Terrain Fuze



## Polypipe provides water management solutions for No.1 Old Trafford

Polypipe Building Services, provided an array of key services for mechanical and electrical specialists, Aberla M&E, on a luxurious new development in Manchester.

**Major development benefits from market-leading Polypipe products**


The £72m No1 Old Trafford development consists of two towers, 15 and 18 storeys, across 214,000 sq ft on the waterfront at Trafford Park. The towers are made up of 354 apartments including six penthouses.

The area around the site is already extensively developed so space was at a premium for Aberla M&E, who decided to use Polypipe's Advantage Service. The Polypipe Advantage off-site fabrication service brings together manufacturing process, project management and logistics methods to provide M&E contractors with a simple, transparent production-based approach that helps to achieve project productivity targets.

Using the Advantage Service, Aberla opted for three market-leading Polypipe products: Terrain FUZE, Terrain PVC and MecFlow - the award-winning water supply system. The project required a fast and reliable installation which was one of the reasons Aberla opted for the MecFlow system.

To save time and space on site, MecFlow components are supplied as a complete Kit – for quick assembly – and connected in position. The use of clip connections also removes the need for clamping and allows for repositioning before the final welding is applied.

This easy installation allows skilled labour to be freed up for other crucial areas and reduces on-site installation time, reduces risk and brings the overall cost down. It's estimated that this technology helps to save when compared to M&E contractors and project managers up to 75% of on-site install time on complex water systems when compared to traditional methods.

The No1 Old Trafford project also used Polypipe Building Services' Terrain FUZE system.

Terrain FUZE is the high performance, modern drainage system used on a wide range of prestigious commercial buildings.

It is manufactured from high density polyethylene (HDPE) so has strong abrasion, chemical and temperature resistance.

**Dan Watchorn, Aberla's Project Manager, said:** "Working with Polypipe Building Services is always a pleasure. From initial design meetings through to installation. This was the first project we have installed MecFlow and we have already specified to use on our next upcoming projects. The speed and ease which it went in was great and we can confirm there were no failed joints throughout the full works."

HDPE was specifically used in the in lower levels to avoid the risk of leaks with homogenous welding in the commercial and communal spaces such as the reception area.

### CASE STUDY

**Project**
No.1 Old Trafford

**Client**
Aberla

**Application**
Tall building water supply and drainage system

**Products**
MecFlow, Terrain FUZE and Terrain PVC

# 7 Storage & Handling

## Good Site Practice

### GOOD SITE PRACTICE

- Pipes should not be thrown, dropped or dragged along hard surfaces
- In case of mechanical handling, use protective slings and padded supports. Metal chains and hooks should not make contact with the pipe

### ON-SITE STORAGE

- Stack pipe lengths
  - on a flat base
  - on level ground
  - or on 75mm x 75mm timber at 1m centers (Fig. 1)
- Provide side support with 75mm wide battens at 1m centres (Fig. 1)
- Maximum stack should not exceed 1.5m high
- Ideally, stacks should contain one diameter pipe size only. Where this is not possible, stack largest diameter pipes at base of stack. Small pipes may be nested inside larger pipes
- If stored in the open for long periods or exposed to strong sunlight, cover the stack with opaque sheeting
- Store fittings under cover. Do not remove from cartons or packaging until required

### STORAGE IN HOT CLIMATES

- Ultra-violet light can affect pipes and fittings: pipe colour may change and rubber seals may be degraded
- Store accordingly:
  - store all materials in well-ventilated, shady conditions
  - do NOT expose to direct sunlight
  - keep fittings in original packaging until required for use
- Maximum stack (hot conditions): six layers high

### SITE SAFETY

- The relevant regulations detailed in the Health & Safety at Work Act 1974, Construction Design and Management Regulations 2015, must be adhered to on-site
- MSDS data sheets are available on request

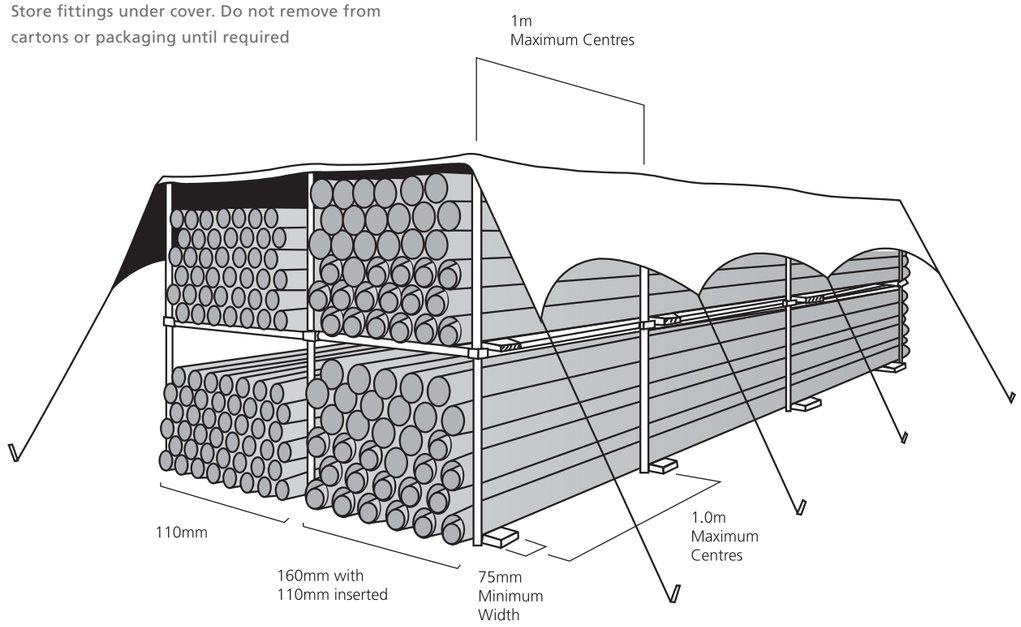



Fig. 1 Pipe stacking

## Disposal

### POLYPIPE ADVANTAGE SERVICE

Supplying fabricated drainage stacks and water supply systems means less packaging is needed for the pipes and fittings. When customers choose to use our Polypipe Advantage Service, they are dramatically reducing the amount of cardboard and plastic packaging reaching their sites.

### PACKAGE RECYCLING

At Polypipe Building Services we aim to re-use and recycle as much of our packaging as possible. We encourage all customers to return both metal and wood stillages and plastic totes as these can be re-used multiple times.

Whilst we try to limit the amount of packaging used when delivering to our sites, we do have to ensure products are safeguarded against damage and arrive in the best condition. We therefore use, where appropriate, cardboard and plastic packaging which can be recycled.

Polypipe Building Services accepts the following packaging to be returned to for recycling;

- Shrink wrap
- Banding
- Cardboard
- Paper labels
- White plastic wrapping

### PRODUCT RECYCLING

We can provide a service for all end caps and pipe cut-offs to be returned to Polypipe Building Services, where they will be recycled. Please speak with your Sales representative for further information.

Products can also be recycled via waste recycling centres. Please check with your local recycling centre for accepted materials.

# 8 Jointing Methods

Terrain FUZE offers workable and effective solutions to a wide range of project constraints through the availability of a number of jointing methods. Each connection is categorised according to its varying properties, with the different classifications assembled as follows:

### REMOVABLE

Connections which can be disconnected after assembly.

### NON-REMOVABLE

Connections which cannot be disconnected after assembly.

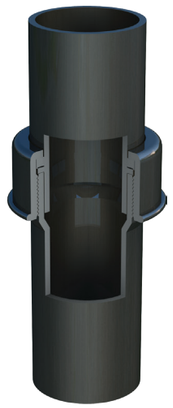
### TENSION-RESISTANT

Connections which cannot be disconnected by tensional forces.

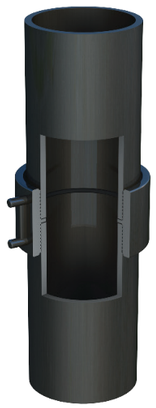
### NON-TENSION-RESISTANT

Connections which can be disconnected by tensional forces.

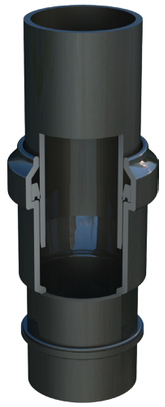
Butt weld



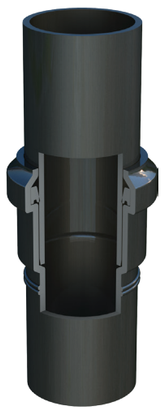
Screw-threaded coupling



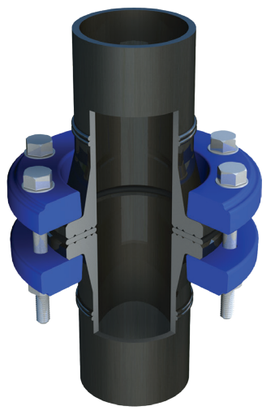
Electrofusion coupling



Expansion socket



Ring-seal socket



Flange joint

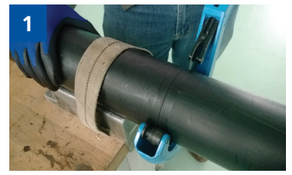
Mechanical

Rigid fixing

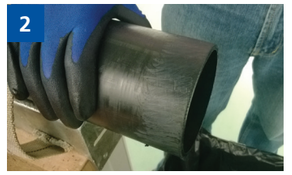


## Electrofusion Welding

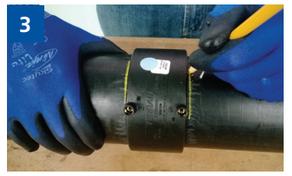
1. Cut the pipe or fitting using the appropriate pipe cutter or saw. Make sure the end of the pipe or fitting is square and clean.
2. Scrape the oxidation layer from the spigot of the pipe or fitting to at least the insertion depth of the coupling using the appropriate pipe scraper. Ensure that the spigot ends and the couplers are kept clean and free from dirt, water and grease.
3. Insert into the centre stop of the coupling. Mark the spigots using a wax pencil.
4. Unpack your Polypipe Terrain FUZE electrofusion welding machine and ensure you have the correct leads attached.
5. Ensuring that the pipe work is supported correctly, attach the leads to the coupling and push the start/stop button. This will begin the electrofusion welding process.
6. There will be two visual indications showing that the weld has been completed successfully. The first will be on the screen showing that the welding is 100% complete. The second will be a visual indication on the coupling, as shown below.











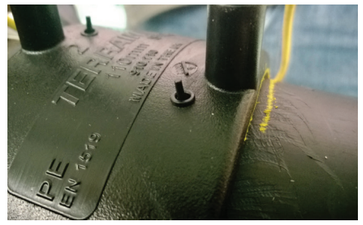


# 8 Jointing Methods

## Electrofusion Welding

### The before and after.


Before

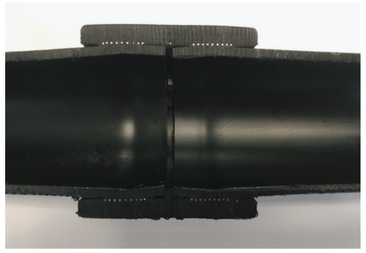


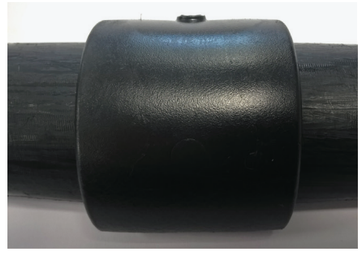

After

### Examples of electrofusion welded joints which have been made correctly and incorrectly:

#### EXAMPLE OF A GOOD ELECTROFUSION WELD JOINT

You can see that the pipe surface has been scraped and the fitting has been welded once. The pipe and coupling surfaces have welded together to make a good joint.

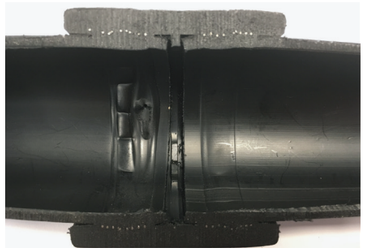


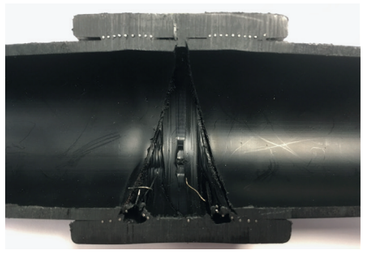


#### EXAMPLES OF INCORRECTLY PREPARED ELECTROFUSION WELD JOINTS

This shows where the coupling was welded twice without the coupling being left to cool down after the first weld. This has resulted in the pipe becoming distorted due to the excess heat.

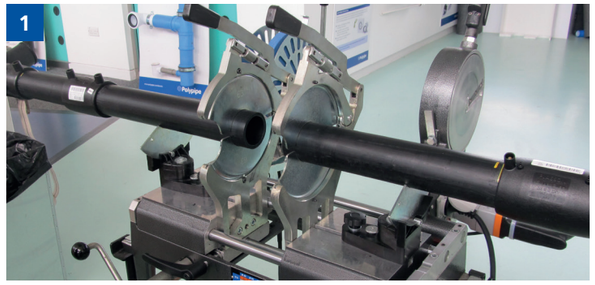
In the joint to the right the pipe has not been cut square and you can also see that the pipe surface has not been scraped. This joint is likely to leak.

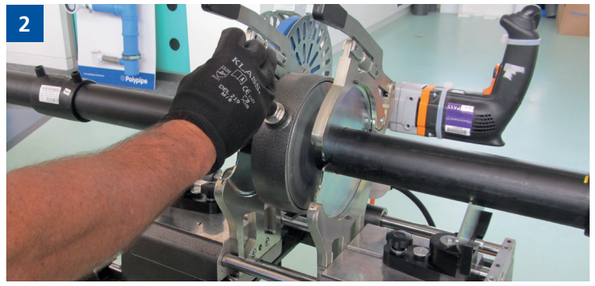


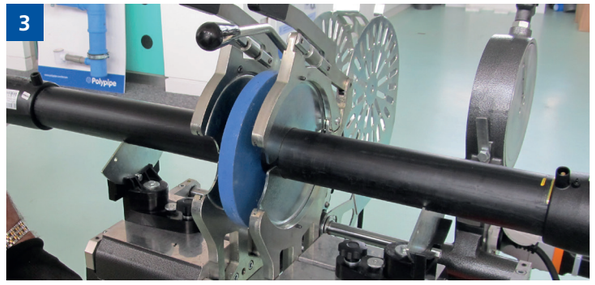


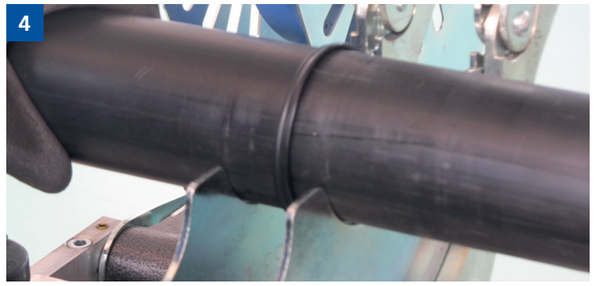

## Butt Welding

1. Prepare pipe ends and insert into butt welding machine.
2. Use the planing tool to ensure that the pipe ends are square and free of any burr's.
3. Press the pipe/fitting ends lightly against the hot plate melting the pipe ends until a small bead is visible around both ends.
4. Remove hot plate and press the ends together with the necessary pressure (as advised by welding machine) and lock the clamps in place until the weld begins to cool.



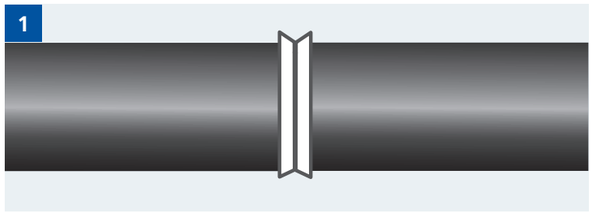
# 8 Jointing Methods

## Butt Welding

Examples of butt welded joints which have been made correctly and incorrectly. These can be easily identified with a visual inspection:

### EXAMPLE OF A GOOD BUTT WELD JOINT

1. Two equal size beads continuing all the way around the pipe on both sides of the joint.

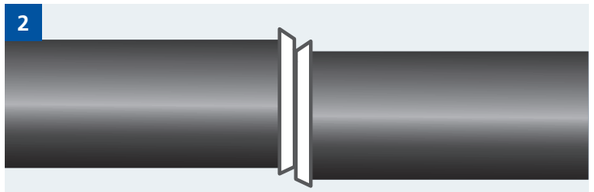


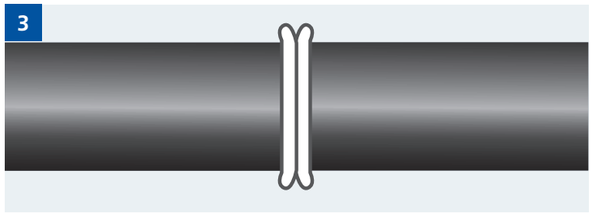

### EXAMPLES OF INCORRECT BUTT WELD JOINTS

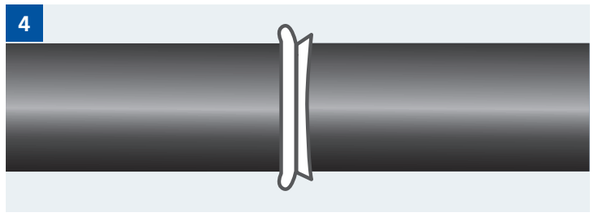
2. The pipes have been misaligned during the welding process.

3. Too much pressure has been exerted during the welding process when the pipe ends are on the hot plate. No pressure should be applied at this stage.

4. The two pipe ends have not heated evenly on the hotplate. Possibly one of the pipe ends was not cut/planed square.






## Ring Seal

### Available in sizes 40 – 315mm

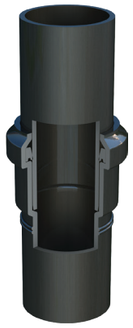
CONNECTION PROPERTIES:

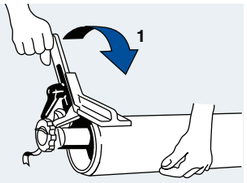
a) Removable

a) Non-tension-resistant

### Use

Ring-seal sockets facilitate the assembly of pre-fabricated sections.



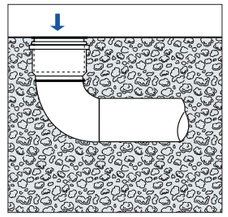


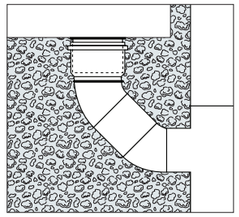

**The pipe should be chamfered to approximately 15° and lubricated with suitable Polypipe product. Do not use oil or grease which can damage the rubber seal.**

### Assembly

The ring-seal socket is suitable for use on both horizontal and vertical applications with the small dimensions providing a space-saving advantage. Assembly instructions are also available for ring-seal sockets, with the insertion depth corresponding for the same diameters. Ring seal sockets are also provided with a cap to prevent dirt entering the pipe on-site. The pipe must be fully inserted into the socket as it is not intended to act as an expansion socket.

A flush fit is obtained by chamfering the pipe end to approximately 15° and lubricating it with silicone oil. To avoid damage to the rubber seal, do not use oil or grease.





Protection Cap.

## Expansion

### Available in sizes 40 – 315mm

CONNECTION PROPERTIES:

a) Removable

a) Non-tension-resistant

### Use

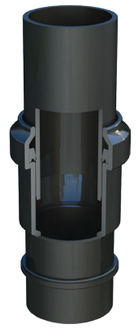
Expansion sockets must be provided on horizontal runs and vertical stacks running from floor to floor and for rainwater pipes both inside and outside the building.

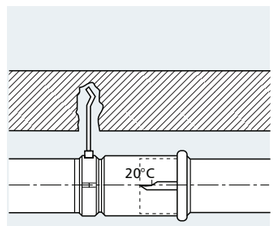
### Installation

Expansion sockets are suitable for use in both vertical and horizontal applications with the depth of the sleeve enabling the assembly of stacks and collector pipelines. The design of the seal allows for pipe movement during expansion and contraction, ensuring that the connection remains water tight even under substantial hydraulic load.

To ensure easy assembly of the sleeve, the following conditions must be observed:

- Chamfer the inserted pipe end to approximately 15°.
- Lubricate the pipe end with a suitable Terrain product. **Note:** do not use oil or grease which can compromise the rubber seal.
- Observe the indications on the outer surface of the expansion socket for insertion depth.
- There are two markings, one for installation at 0°C and the other at 20°C, which are marked 85mm and 103mm respectively from the seal end.

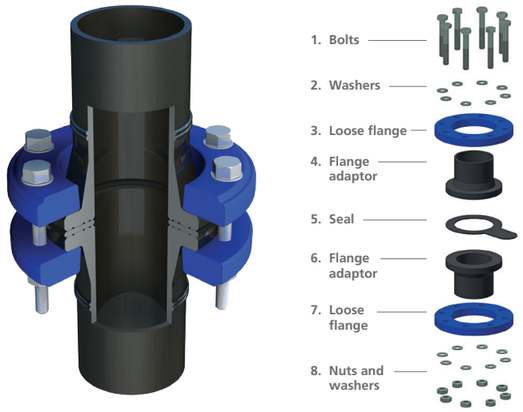





**Horizontal assembly (e.g. at an ambient temperature of 20°C).**

# 8 Jointing Methods

## Flanged Joints




### Available in sizes 50 – 315mm

CONNECTION PROPERTIES:

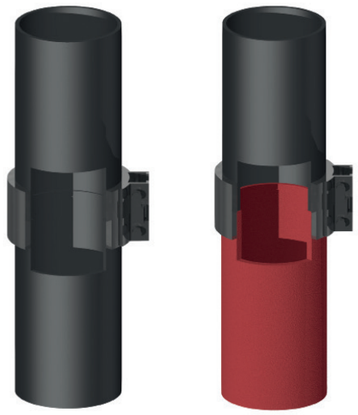
a) Removable

a) Tension-resistant

### Use

The backing flanges are made of a special, painted aluminium alloy and have standard dimensions to suit EN1092-1/04 PN10/16 manufacturing standard/PN rating. These are most commonly used to create a removable connection in industrial plants. By using a blank flange, it is possible to create an inspection access opening for large diameter pipes (200, 250 and 315mm).

## Mechanical



### Available in sizes 90 – 160mm

CONNECTION PROPERTIES:

a) Removable

a) Non-tension-resistant

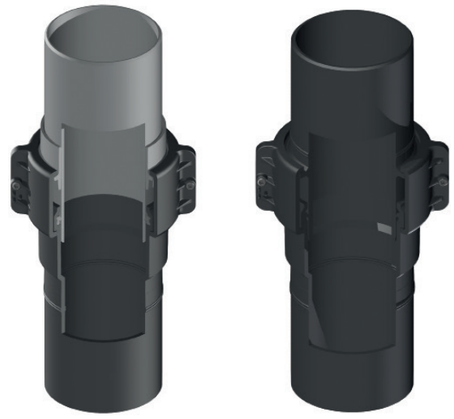
### Use

Mechanical couplings are used in retrofit and live stack scenarios. They can be used when removing or replacing products in wet sections.

### Available in two types:

- For connecting HDPE to HDPE stacks
- For connecting HDPE to existing Cast Iron stacks

## Rigid Fixing



### Available in size 110mm

CONNECTION PROPERTIES:

a) Removable

a) Tension-resistant

### Use

Allows for the provision of thermal expansion of HDPE whilst retaining a rigid fixing.

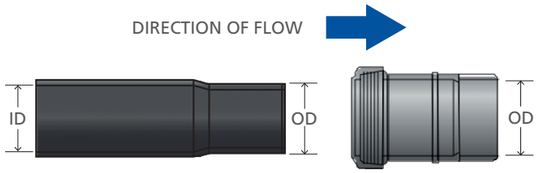
### Available in two types:

- For connecting HDPE to HDPE
- For adapting PVC to HDPE

Patented design, patent no. 1703849.8

# 9 Adapting to other materials

Adapting from one material to another can sometimes require a number of different fittings. Terrain FUZE offers a wide range of solutions that can adapt our system with other materials, with specific products for adapting in direction of flow.




| OD | | | | | | |
|---|---|---|---|---|---|---|
| MATERIAL | SIZE | | | | | |
| | 1¼" | 1½" | 2" | 3" | 4" | 6" |
| PVC-c | 36mm | 43mm | 56mm | 82mm | 110mm | 160mm |
| PP | 35mm | 41mm | 54mm | | | |
| HDPE | 40mm | 50mm | 56mm | 90mm | 110mm | 160mm |
| Terrain Q | 40mm | | 50mm | | 110mm | 160mm |
| Iron | 42mm | 47.8mm | 60mm | | | |
| Copper | 35mm | 42mm | 54mm | | 108mm | |
| Clay | | | | | 100mm | |
| Vulcathene | | 48mm | 60mm | 89mm | 114mm | |
| Cast Iron | | | | | 112mm | |
| Ridgidrain | | | | | 118mm | 176mm |
| Chrome | 32mm | | | | | |

| ID | | | | | | |
|---|---|---|---|---|---|---|
| MATERIAL | SIZE | | | | | |
| | 1¼" | 1½" | 2" | 3" | 4" | 6" |
| PVC-c | 32mm | 39mm | 52mm | 76mm | 104mm | 154mm |
| PP | 31mm | 37mm | 50mm | | | |
| HDPE | 34mm | 44mm | 46mm | 83mm | 101mm | 148mm |
| Terrain Q | 36mm | | 50mm | | 104mm | 153mm |
| Iron | 32mm | 38mm | 51mm | | | |
| Copper | 32mm | 39mm | 54mm | | 104mm | |
| Clay | | | | | 76mm | |
| Vulcathene | | 38mm | 51mm | 76mm | 102mm | |
| Cast Iron | | | | | 98mm | |
| Ridgidrain | | | | | 100mm | 150mm |
| Chrome | 28mm | | | | | |

Note: Pipes to be chamfered and lubricated when being used with ring seal, use 9136250L Silicone grease.

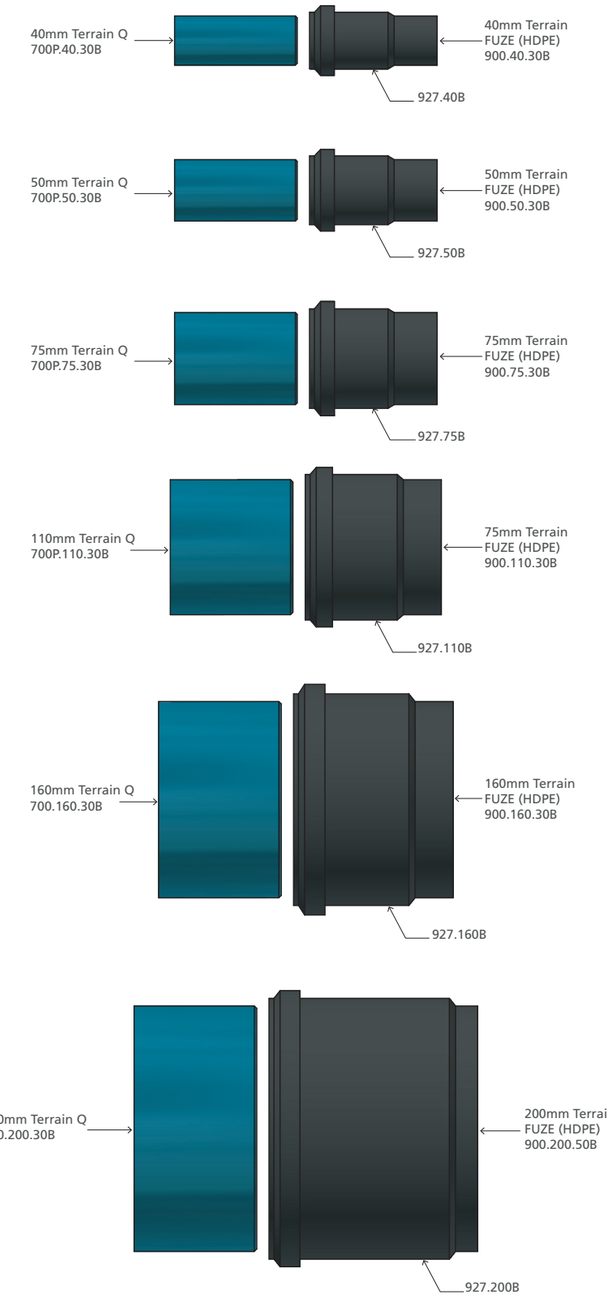
References: 1. Terrain Soil and Waste Product Installation guide. 2. BSEN12056 Gravity drainage systems inside buildings. Sanitary pipework, layout and calculation. For more information please call our Technical Team on 01622 795200

The table below shows a range of five adaptors available and you can use this table to find the adaptor to suit your requirements.

| COMPATIBILITY TABLE | | | | | |
|---|---|---|---|---|---|
| PART NUMBER | TERRAIN FUZE SIZE | COMPATIBILITY | | | |
| | | PVC (200 SERIES) | PP (300 SERIES) | ABS (600 SERIES) | COPPER |
| 927.4036B | 40mm | 32mm | 32mm | 32mm | 35mm |
| 927.5036B | 50mm | 32mm | 32mm | 32mm | 35mm |
| 927.5043B | 50mm | 32mm | 32mm | 32mm | 42mm |
| 927.5636B | 56mm | 32mm | 32mm | 32mm | 35mm |
| 927.5643B | 56mm | 32mm | 32mm | 32mm | 42mm |

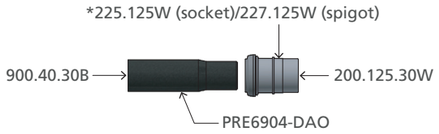


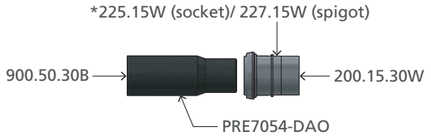
## Terrain Q – Terrain FUZE (HDPE)

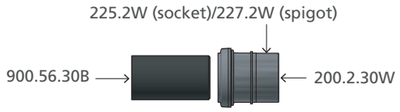


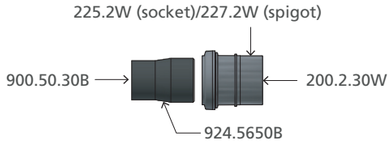
# 9 Adapting to other materials

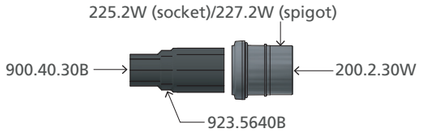
## FUZE (HDPE) – PVC-c

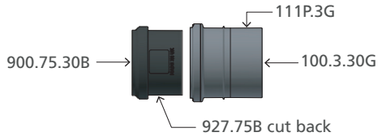


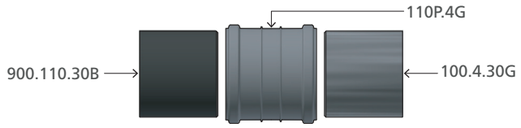



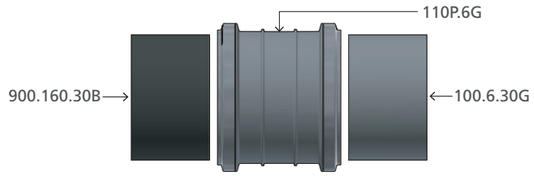



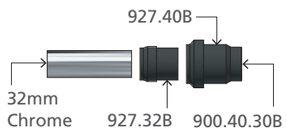



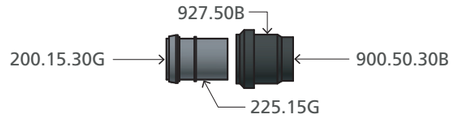



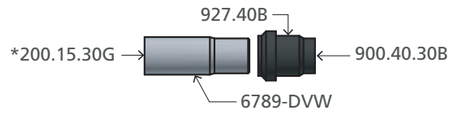

*This will cause a reduction in bore in the direction of flow.

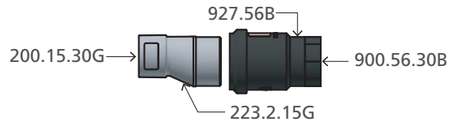
## Chrome - FUZE (HDPE)

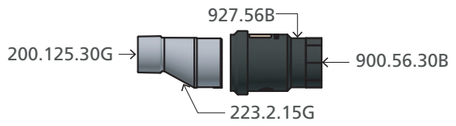


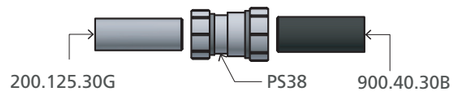

## PVC-c - FUZE (HDPE)

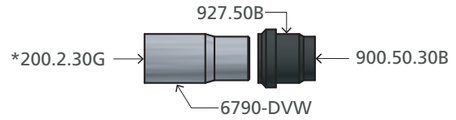



*Note: This will cause a reduction in bore in the direction of flow.

# 10 Installation

## HDPE Thermal Expansion

Terrain FUZE HDPE pipe work systems expand and contract with changes in temperature, both ambient temperature and from the temperature of the waste discharge through the pipework. This guide describes the principles of thermal movement allowance and provides advice covering assembly and jointing techniques.

The advice and guidance is based on typical situations only. For further information contact the Terrain Technical Services Department. Terrain FUZE HDPE offers substantial durability against the flow of hot water. A waste pipe with no mechanical load will tolerate temperatures of up to 80°C and up to 95°C is permissible for a maximum of two minutes.

Thermal movement MUST always be accounted for in both locked and expansion systems (explained in the following pages).

### CALCULATING THERMAL MOVEMENT

Terrain FUZE HDPE has a coefficient of expansion of 0.2 (mm/m/°C), the design and installation of above ground drainage systems must be able to accommodate for this. Calculate the thermal movement on straight lengths between anchors using:

$$\Delta L = \alpha \, L \Delta T$$

**Where**

$\Delta L$ = expansion (mm) OR contraction (-mm)

$\alpha$ = co-efficient of linear expansion (mm/m/°C) Terrain FUZE HDPE, 0.2

$L$ = Total length of the pipe between anchor points (m)

$\Delta T$ = Temperature difference (°C)

NB. For waste discharges $\Delta T$ should always be calculated from 0°C, so if the temperature of the water in the pipe is to be 60°C, then $\Delta T$ is 60°C.

**Example 1 - Typical vertical stack**

Example 1 - Typical vertical stack A 10 storey foul drainage stack will collect and convey domestic waste (assumed temperature 60°C) and connect directly to drain. Each storey is 3m high.

$\Delta L = \alpha \, L \Delta T$

$\Delta L = 0.2 \times 3.0 \times 60$ = 36mm thermal movement per floor

**Example 2 - Typical suspended pipe run**

A 20 metre, high-level lateral run has been designed in an open car park area. The maximum length between anchor points should be 5m. The assumed temperature of the waste fluid is 50°C.

$\Delta L = \alpha \, L \Delta T$

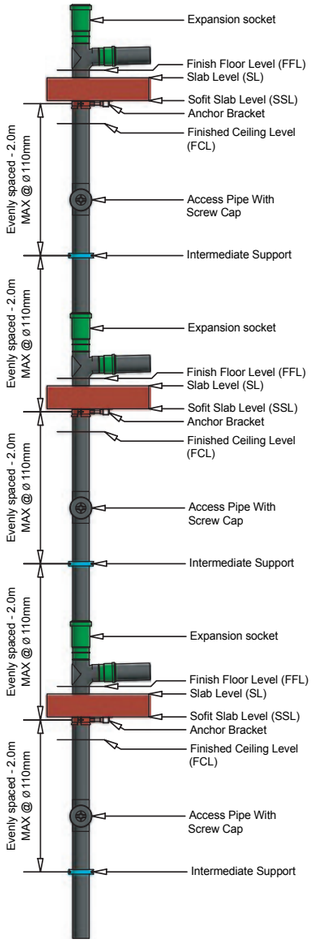
$\Delta L = 0.2 \times 5.0 \times 50$ = 50mm thermal movement between anchor points

# 10 Installation

## Vertical Expansion System

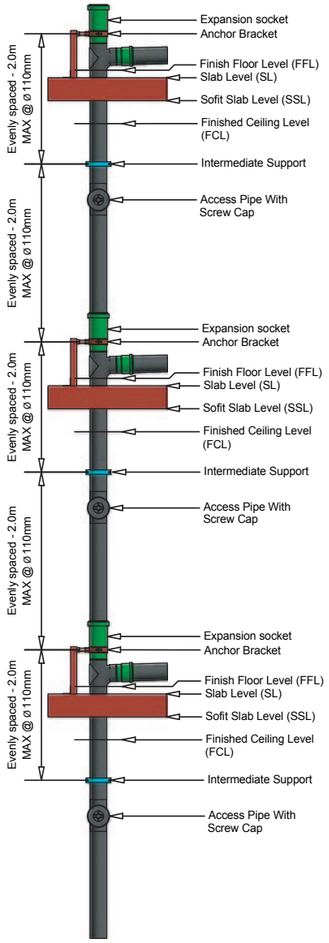
### Expansion system anchored below slab

Rail system rules apply as per page 92.

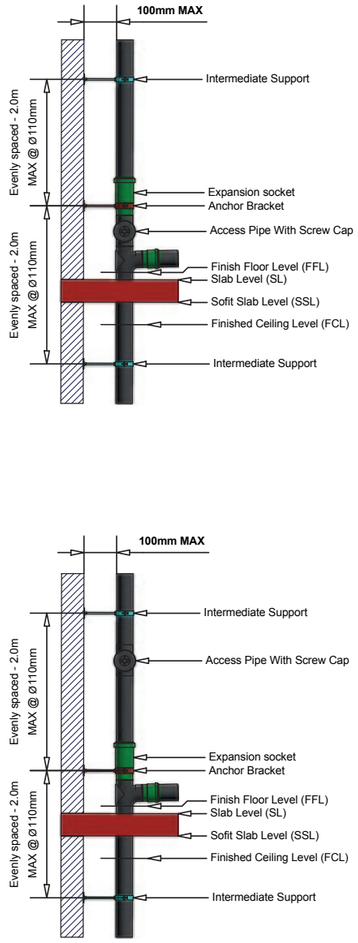



### Expansion system anchored above slab

Rail system rules apply as per page 97.




### Examples of expansion system anchored to a structural wall




## Horizontal Expansion System

### SUPPORT AND EXPANSION SOCKET DISTANCES

Unless there is an alternative provision for thermal movement, pipework should be fitted with expansion sockets in the following locations:

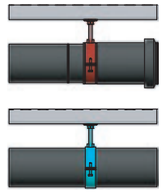
- At spacing's no greater than 5m for pipework OD Ø75mm and above
- At spacing's no greater than 2m for pipework OD Ø63mm and below
- Where the maximum distance between fixed points exceeds 2m
- At changes of direction or branch runs greater than 1m in length
- Any point where pipework passes through a floor or wall and is made good or fire-stopped must be treated as an anchor point when determining positions of expansion sockets
- Low Level WC Manifolds incorporate ring seal adaptors at each branch connection to compensate for thermal movement and also allow the branch to be 'turned' to the correct angle to allow connection to the WC

| HORIZONTAL EXPANSION SYSTEM | | |
|---|---|---|
| Pipe size diameter (OD mm) | Maximum distance between expansion sockets (m) | Intermediate support at any change of direction and at below maximum centres (mm) |
| 40 | 2.0 | 400 |
| 50 | 2.0 | 500 |
| 56 | 2.0 | 560 |
| 75 | 5.0 | 750 |
| 110 | 5.0 | 1100 |
| 160 | 5.0 | 1600 |
| 200 | 5.0 | 2000 |
| 250 | 5.0 | 2500 |
| 315 | 5.0 | 3000 |

* See table on page 97 for pipe weights (empty and full).

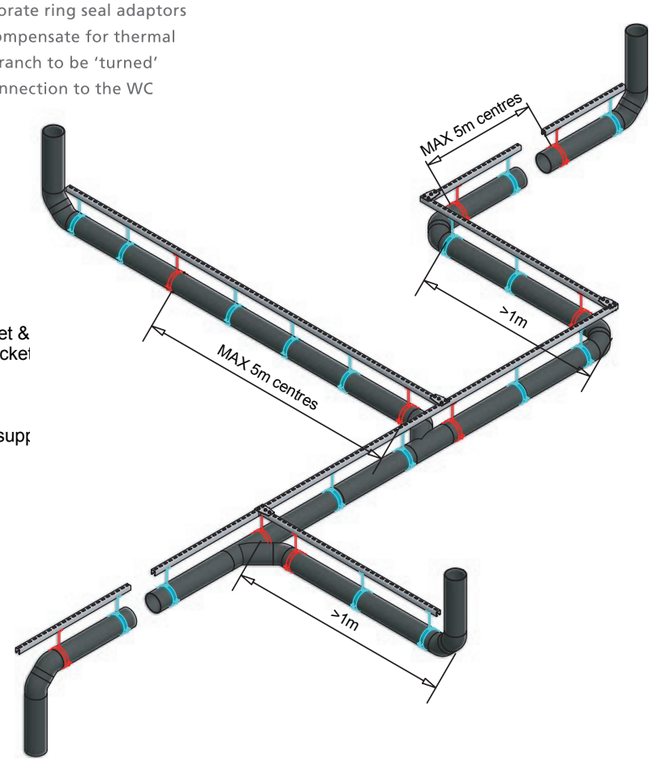
### Example - Ø160mm Pipe

**Key**



Anchor bracket &
Expansion socket

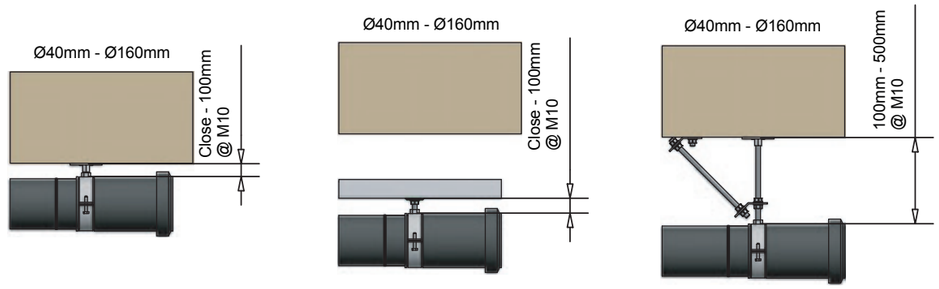
Intermediate supp

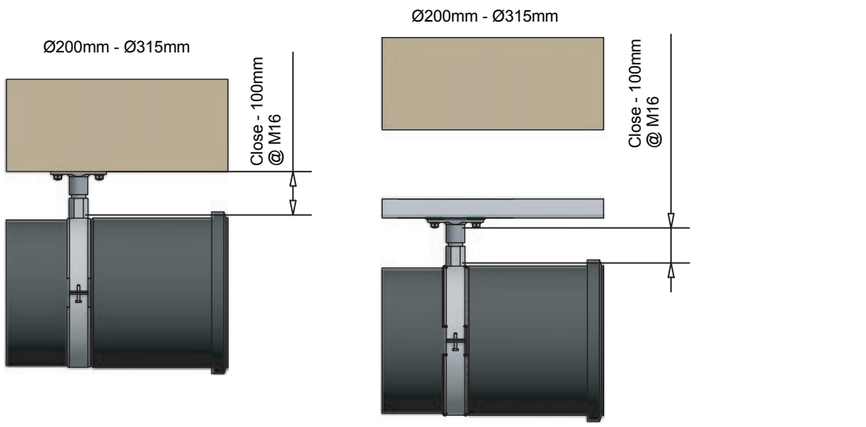


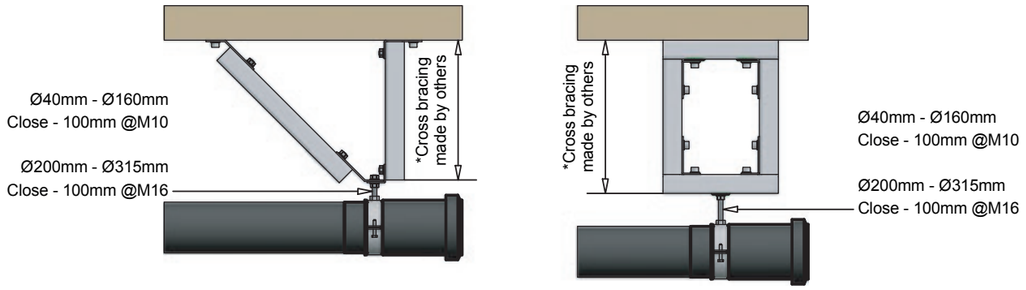
# 10 Installation

## Bracketing an Expansion System

- Terrain FUZE HDPE can be anchored from the slab or off a rail system
- Cross bracing must be used for drop rods longer than figures shown below
- Rails are not supplied by Polypipe Building Services



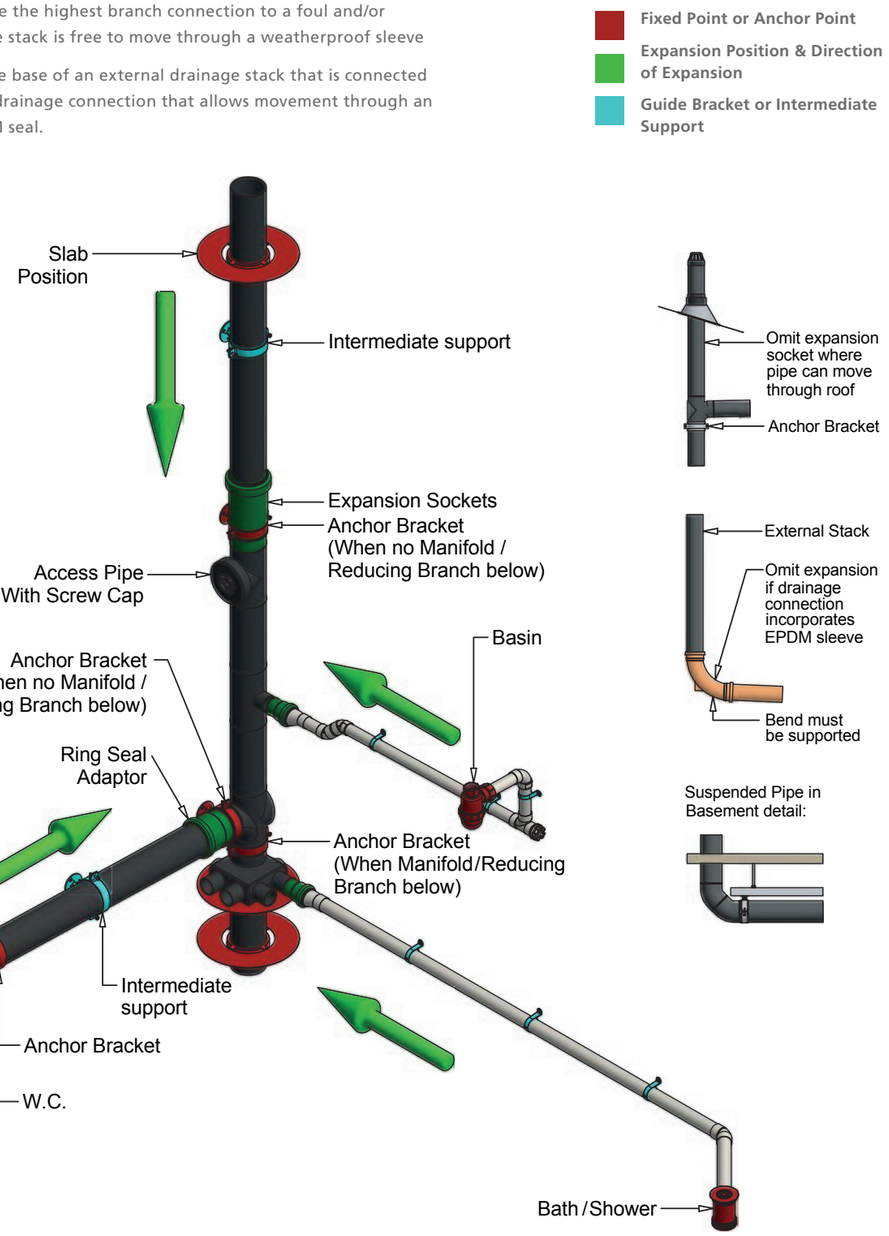




## Example of an Expansion System

Expansion sockets may be omitted if alternative provision is created in one of the following ways.

- Above the highest branch connection to a foul and/or waste stack is free to move through a weatherproof sleeve
- At the base of an external drainage stack that is connected to a drainage connection that allows movement through an EPDM seal.

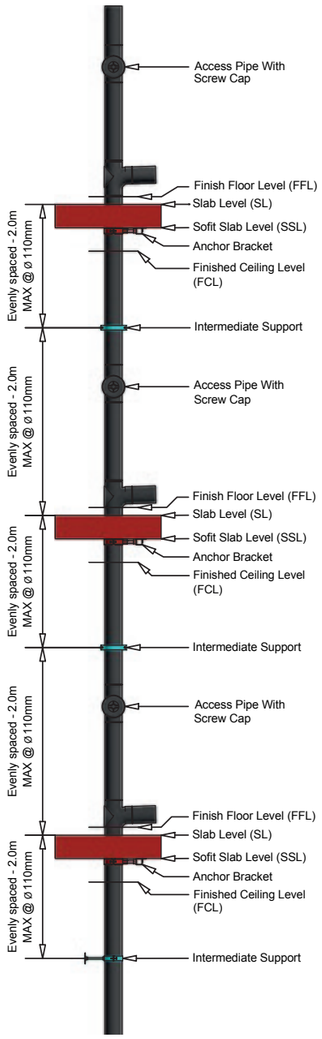


# 10 Installation

## Vertical Locked System

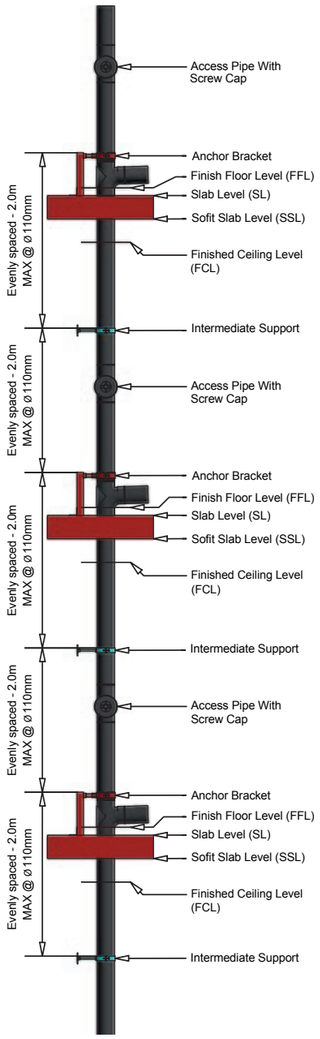
### Locked system anchored below slab

Rail system rules apply as per page 96.

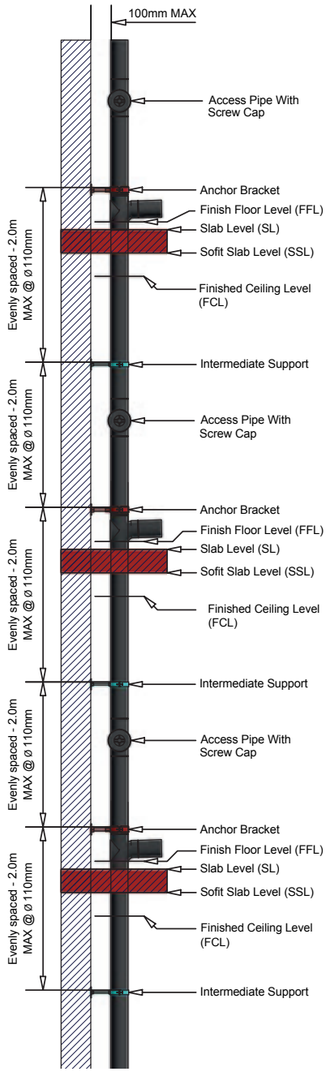



### Locked system anchored above slab

Rail system rules apply as per page 96.




### Locked system anchored to a structural wall




## Horizontal Locked System

### SUPPORT AND ANCHOR BRACKETS

Unless there is an alternative provision for thermal movement, pipework should be fitted with anchor brackets in the following locations:

- At spacing's no greater than 5m for pipework OD Ø75mm and above
- At spacing's no greater than 2m for pipework OD 63mm and below
- Where the maximum distance between fixed points exceeds 2m
- At changes of direction or branch runs greater than 1m in length
- Any point where pipework passes through a floor or wall and is made good or fire-stopped must be treated as a fixed point when determining positions of anchor brackets

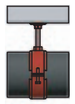
Pipe will still expand and contract into itself in a locked system. Even in a locked system, thermal movement needs to be accounted for.

| HORIZONTAL LOCKED SYSTEM | | |
|---|---|---|
| Pipe size diameter (OD mm) | Maximum distance between anchor brackets on straight pipe run (m) | Maximum distance between intermediate supports (mm) |
| 40 | 2.0 | 400 |
| 50 | 2.0 | 500 |
| 56 | 2.0 | 560 |
| 75 | 5.0 | 750 |
| 110 | 5.0 | 1100 |
| 160 | 5.0 | 1600 |
| 200 | 5.0 | 2000 |
| 250 | 5.0 | 2500 |
| 315 | 5.0 | 3000 |

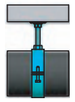
* See table on page 97 for pipe weights (empty and full).

### Example - Ø160mm Pipe

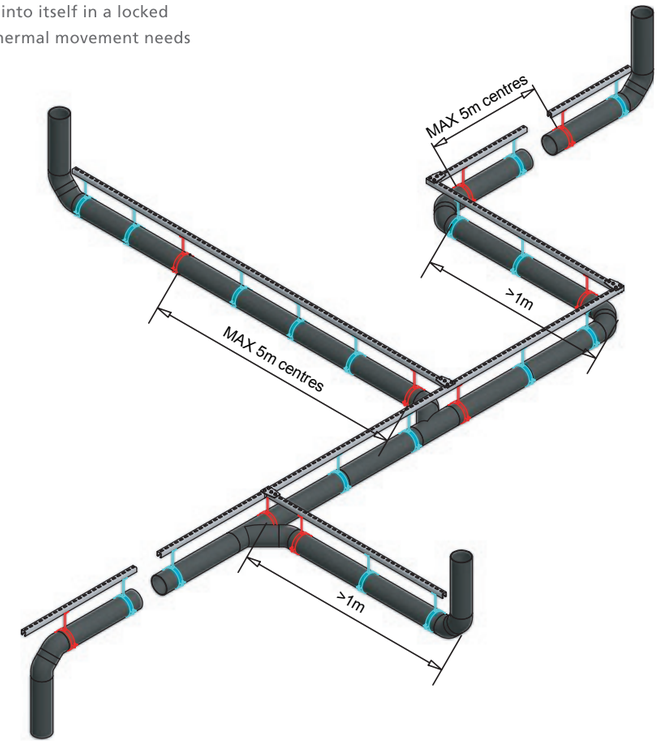
**Key**



Anchor bracket

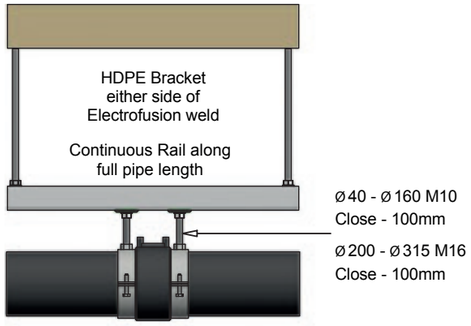


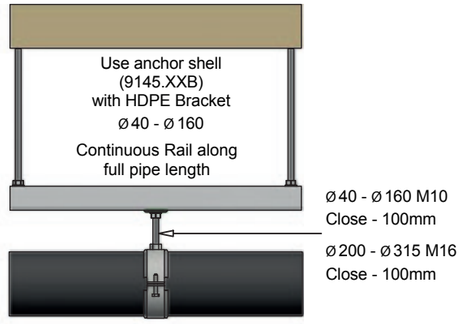
Intermediate support

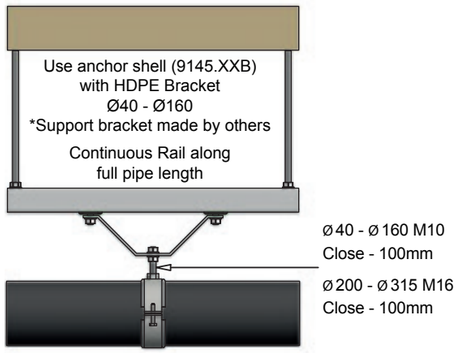


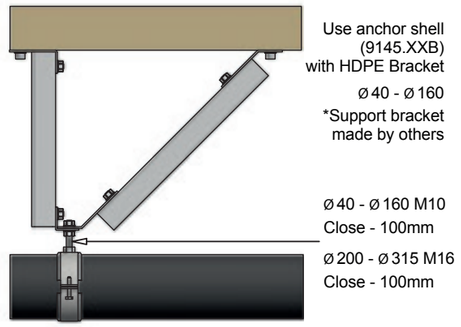
# Bracketing a Locked System

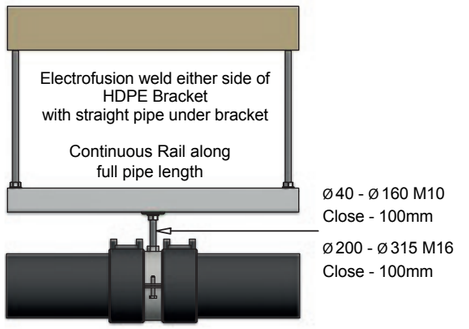
### Types of Anchor Brackets on locked rail system

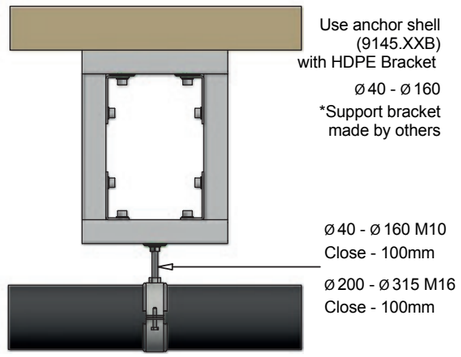





# Summary of Expansion & Locked Systems

## EXPANSION SYSTEMS

Rulings for anchor brackets in an expansion system:

- Pipe diameters up to 160mm - M10 drop rods up to 100mm below slab or rail
- Pipe diameters up to 160mm - M10 drop rods with M10 cross brace up to 500mm below slab or rail
- Pipe diameters up to 160mm where the vertical drop is greater than listed above use either the rail system or use Unistrut as a drop rod with a cross brace and an M10 connection to the bracket
- Pipe diameters 200-315mm - M16 drop rods up to 100mm below slab or rail
- Pipe diameters 200-315mm where the vertical drop is greater than listed above use either the rail system or use Unistrut as a drop rod with a cross brace and an M16 connection to the bracket

## LOCKED SYSTEMS

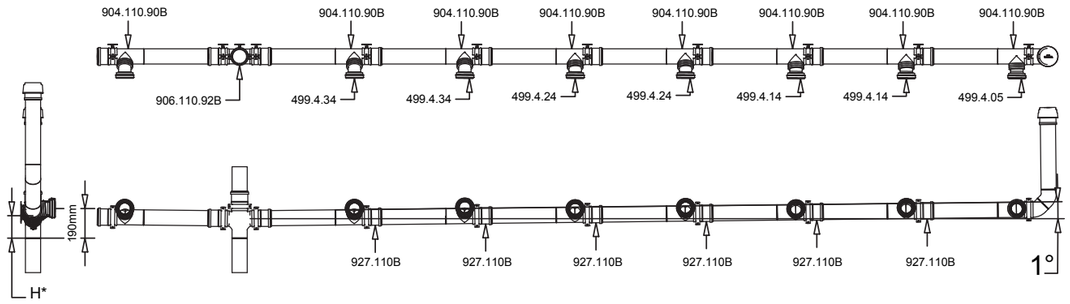
Rulings for anchor brackets in a locked system:

- In no circumstances should drop rods alone be used to support a locked anchor point
- Close coupled rail system up to 160mm diameter - M10 connection between bracket and rail
- Close coupled rail system 200-315mm diameter - M16 connection between bracket and rail
- Pipe diameters 200-315mm - M16 drop rods up to 100mm below slab or rail
- If the rail is not being used a suitable drop support needs to be created using Unistrut and a cross brace with the same size connections to brackets as listed above for a rail system

| HORIZONTAL EXPANSION SYSTEM | | |
|---|---|---|
| FUZE HDPE pipe diameter (OD mm) | Pipe weight full of water (Kg/m) | Pipe weight empty (Kg/m) |
| 40 | 1.278 | 0.370 |
| 50 | 1.986 | 0.460 |
| 56 | 2.493 | 0.530 |
| 75 | 4.479 | 0.740 |
| 110 | 9.525 | 1.450 |
| 160 | 20.190 | 3.080 |
| 200 | 31.741 | 4.100 |
| 250 | 49.252 | 6.100 |
| 315 | 78.045 | 9.510 |

# 10 Installation

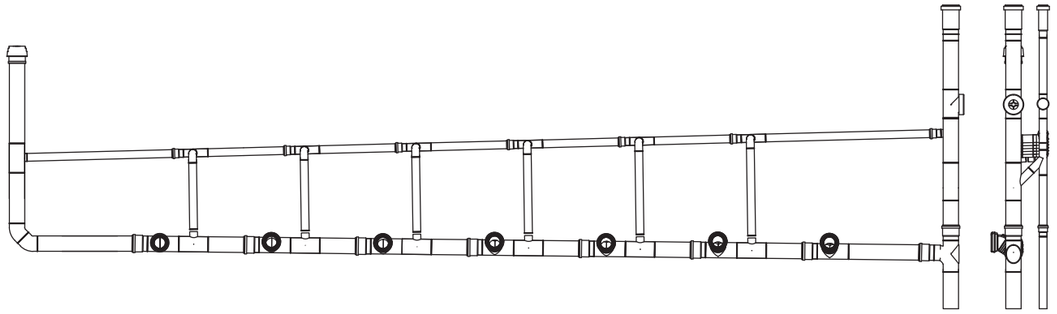
## WC Connections




### Float laid to a fall of 1° (17mm drop/1 metre run)

Note: If a secondary ventilation system is being installed then expansion must be provided to both the soil and waste stack and the secondary ventilation stack. Note: It is important to lubricate the ring seal adaptor with silicone grease.(9136.250L).

| WC POSITION (HEIGHT H* FROM FFL) | | | | | | | |
|---|---|---|---|---|---|---|---|
| H* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| mm | 170 | 156 | 142 | 128 | 114 | 100 | 86 |



### RISERS AND BRANCHES

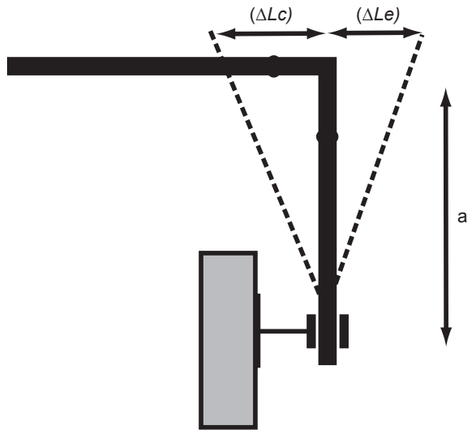
It is recommended that an expansion socket is incorporated at each floor level when designing and installing FUZE HDPE stacks in multi-storey buildings. Where a branch is taken off a main run, the thermal movement of the main run is going to affect the branch

- Establish the distance between the branch and the nearest anchor
- Calculate the movement at the point where the branch joins the run
- Establish the hole size through the wall and ensure that there is enough space for the branch to naturally flex, taking into account that the movement of the branch will be limited where it passes through a wall
- Pipe diameters 200-315mm - M16 drop rods up to 100mm below slab or rail
- If there is not enough room for the required offset, think about adding expansion sockets and anchor points to the main run to reduce the amount of movement experienced by the branch

## Deflection Leg

The flexibility of Terrain FUZE permits expansion or contraction to be compensated for by means of directional change within a pipe system (deflection leg) as shown below.

To allow the pipe to deflect at a change in direction it is essential to calculate the distance to the first bracket (a) so that the pipe is free to expand and contract.




### Step 1: Calculate the change in length

$$\Delta L = \alpha \times L \times \Delta T$$

Where:

ΔL = Expansion (mm) or contraction (-mm)

α = Co-efficient of linear expansion (mm/m/°C). For Terrain FUZE α = 0.2

L = Total length of the pipe between anchor points (m)

ΔT = Temperature difference (°C)

NB. For waste discharges ΔT should always be calculated from 0°C, so if the temperature of the water in the pipe is to be 60°C, then ΔT is 60°C.

### Step 2: Determine the length of the deflection leg

$$a = 10 \times \sqrt{(\Delta L \times Ø)}$$

Where:

a = Deflection leg length (distance to first bracket)

ΔL = Expansion (mm) or contraction (-mm) from Step 1 above

Ø = Total length of the pipe between anchor points (m)

ΔT = Pipe outside diameter (mm)

# 10 Installation

## Non-pressure Underground Installation

Terrain FUZE HDPE pipes and fittings marked (BD) are also suitable for underground applications.

Strict attention must be given to the trench where the pipe is to be laid. This must be completely flat and should be void of any sharp objects or stones which could cause localised deformation of the pipeline. A minimum bedding of 10cm of sand should be used to provide continual support along the whole length of the pipe and minimise the risk of point-loading within the trench. Following this, the first 15-20cm of cover should be of sand again and this must be compressed to avoid pipe movement. Compacting of the cover material should take place immediately after the pipe has been covered to restrict the initial stages of movement. The depth of the trench is dependent upon whether the application is trafficked or non-trafficked and the possibility of freezing temperatures. Official guidelines, standards and regulations should be observed to calculate this requirement.
(See illustrations on the right)

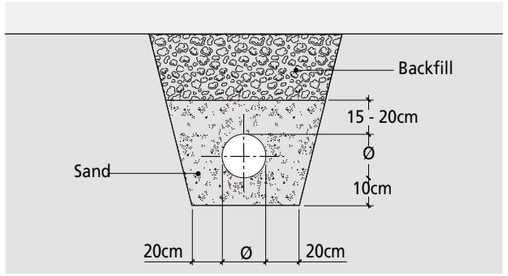
A minimum depth of 80cm must cover the pipe. To evenly distribute ground pressure on trafficked applications it is recommended to cover the layer of sand with a light concrete casting.

Two or more pipes laid in the same trench should not come into contact. A recommended distance of 10-15cm should remain between each pipeline to facilitate future maintenance. As with a standard pipe installation, this void should be filled with sand and compacted.

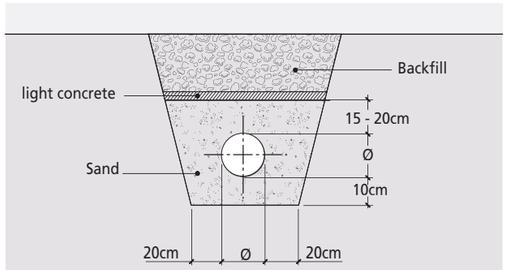
Rigid installations, where the pipeline is covered with concrete, do not undergo the same stresses as normal laying conditions and therefore the pipe is at no risk of deformation.

In underground installations, the ambient temperature is fairly stable and the fluid temperatures from the varying inlets have mixed and stabilised within the above ground pipe system. Expansion sockets are not required every six metres.

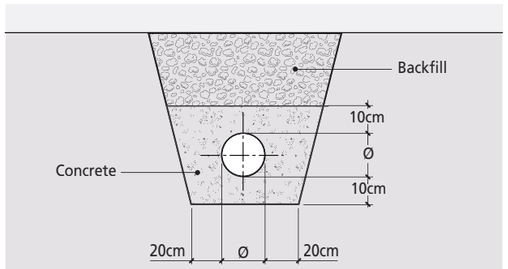
### Light traffic

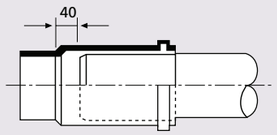



### Heavy traffic




### Rigid installation




N.B.: The spigot should be pushed fully into the expansion socket, marked at the socket edge and withdrawn by 40mm.

Seal areas should be protected from ingress of materials when being buried.



## Special Consideration for Buried Drain Application

The Terrain FUZE HDPE system is suitable for buried drain applications under the envelope of the building at reasonable shallow depths and normal conditions.

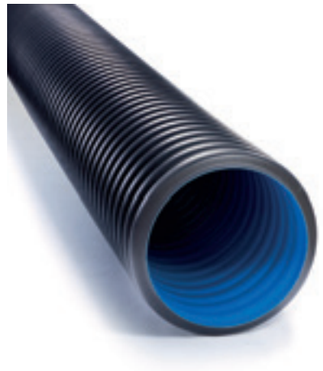
When any of the following conditions exist please contact Polypipe Terrain for confirmation on its suitability:

- Pipes at depths greater than 4 metres below ground level
- Pipes subjected to external water pressures exceeding 2 metres head (high water table)
- Contaminated ground conditions
- Pipes subjected to internal negative pressures
- If during the construction stage high point loads will be experienced due to heavy plant etc.
- If other manufacturers components are to be incorporated into the system
- Non domestic type discharges are expected, for example:
  - High volume discharges that could subject the pipe to more than 1.5 bar pressure
  - Combined high temperature and high volume discharges
  - Chemical waste
  - Radioactive waste

When leaving the footprint of the building we would recommend adapting onto a system designed for this purpose. Ridgidrain, for surface water drainage, or Polysewer, for foul sewers from Polypipe Civils are suitable systems for these applications.

### Ridgidrain

- Surface water applications
- 100-900mm diameter HDPE pipes and fittings
- BBA approved

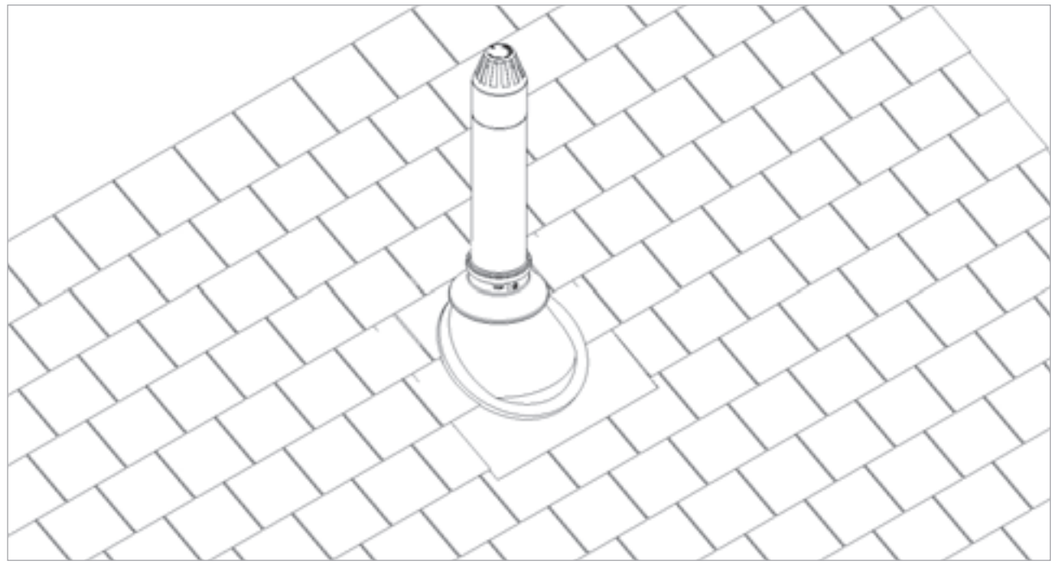


### Polysewer

- Foul and combined applications
- 150 – 300mm diameter PVCu pipes and fittings
- BSi Kitemarked and BBA approved

For further information please contact Polypipe Civils on **01509 615100** or **civils@polypipe.com**

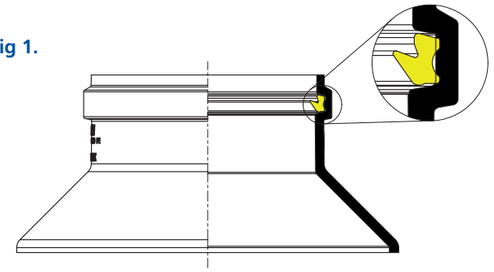
# Weathering Apron and Vent Cowl



## WEATHERING SLATES FOR PITCHED ROOFS

- Slide the 149 weathering slate over the stack using Terrain 9136 silicone lubricant.
- Dressing the weathering slate over the lower tiles first,then lay the side and upper tiles over the remaining portion of the weathering slate.
- Slide the weathering apron (931.110.200B) down to the rubber cone on the weathering slate into position ensuring the seal is facing in a downwards orientation as per fig 1.
- Affix the vent cowl (950.110B) onto the top of the stack by either an electrofusion or butt weld joint.

**Fig 1.**



NOTE: On low pitched roofs, optimum weathering may be achieved by making a single weld to the lower edge of the base plate.



## WEATHERING SLATES FOR FLAT ROOFS (three layers felt)

- Dress the first layer of felt up to the pipe
- Slide the 149 weathering slate over the stack, ensuring the aluminium plate is dressed flush with a good contact onto the first layer of felt.
- Prime the aluminium baseplate with a good quality bitumen primer.

CAUTION: Keep hot material away from rubber cone

- Place a second layer of felt over the baseplate up to the cone and trim accordingly. Repeat for a third layer of felt.
- Slide the weathering apron (931.110.200B) down the stack to the rubber cone into position using Terrain 9136 silicone lubricant ensuring the seal is facing in a downwards orientation as per fig 1.
- Affix the vent cowl (950.110B) onto the top of the stack by either an electrofusion or butt weld joint.

## WEATHERING SLATES FOR FLAT ROOF (three layers felt)

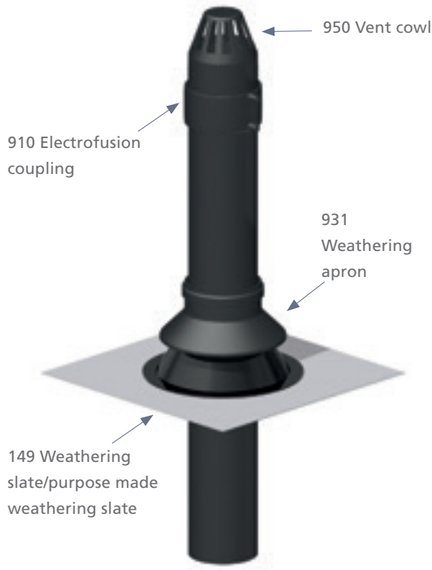
- Dress the first layer of felt up to the pipe
- Slide the 149 weathering slate over the stack, ensuring the aluminium plate is dressed flush with a good contact onto the first layer of felt.
- Prime the aluminium baseplate with a good quality bitumen primer.

CAUTION: Keep hot material away from rubber cone

- Place a second layer of felt over the baseplate up to the cone and trim accordingly. Repeat for a third layer of felt.
- Slide the weathering apron (931.110.200B) down the stack to the rubber cone into position using Terrain 9136 silicone lubricant ensuring the seal is facing in a downwards orientation as per fig 1.
- Affix the vent cowl (950.110B) onto the top of the stack by either an electrofusion or butt weld joint.

## WEATHERING TO PITCHED ROOFS USING PURPOSE MADE SLATE (e.g. Lead)

- Position the weathering slate onto the open end of the soil stack.
- Slide the weathering apron (931.110.200B) down the stack to the weathering slate using Terrain 9136 silicone lubricant, ensuring the seal is facing in a downwards orientation as per fig 1.
- Affix the vent cowl (950.110B) onto the top of the stack by either an electrofusion or butt weld joint.




## WEATHERING TO ASPHALT ROOFS USING PURPOSE MADE SLATE (e.g. Lead)

- Position the weathering slate onto the open end of the soil stack.
- Lay the asphalt as normal over the weathering slate up to the lead upstand around the stack. Feather this edge off with the asphalt.
- Slide the weathering apron (931.110.200B) down the stack to the weathering slate using Terrain 9136 silicone lubricant, ensuring the seal is facing in a downwards orientation as per fig 1.
- Affix the vent cowl (950.110B) onto the top of the stack by either an electrofusion or butt weld joint.

# 11 Firetrap Sleeves and Collars

## Firetrap Sleeves

The Terrain Firetrap Sleeve is a cost-effective product for the fire stopping of pipe penetrations whilst maintaining similar thermal and acoustic properties as standard mineral fibre insulation. The Terrain Firetrap Sleeve was developed with ease of installation in mind.

The sleeve can be quickly and simply fitted onto the pipe and slid into the penetration ensuring that there are no air gaps around the sleeves by filling with mortar or mastic. In a fire situation, the sleeve expands to fill the available space (15mm max) between the pipe and the penetration and will crush and close off plastic drainage pipes. The pipe forms a solid char preventing the passage of fire and smoke to the adjacent compartment.

### APPLICATIONS

For Terrain PVC, Terrain FUZE above ground drainage through:

- Concrete, masonry or plasterboard partitions
- Concrete floor constructions

### FEATURES

- Up to 4 Hour Fire Rating to BS 476 Part 20, BS EN 1366-3
- Protects pipe above and below the slab
- Cost effective
- One sleeve can replace two collars on a horizontal installation
- Easy installation
- Don’t have to drill slab
- No need for mechanical fixings
- No mastic is required, providing close fit
- Easily cut to size to minimise wastage
- Simple to install without special tools or skills
- Can be retro-fitted
- Offers excellent acoustic insulation
- Maintains the thermal insulation of the pipe through the slab or wall penetration
- Maintains vapour seal of existing insulation
- Allows for thermal movement of pipe

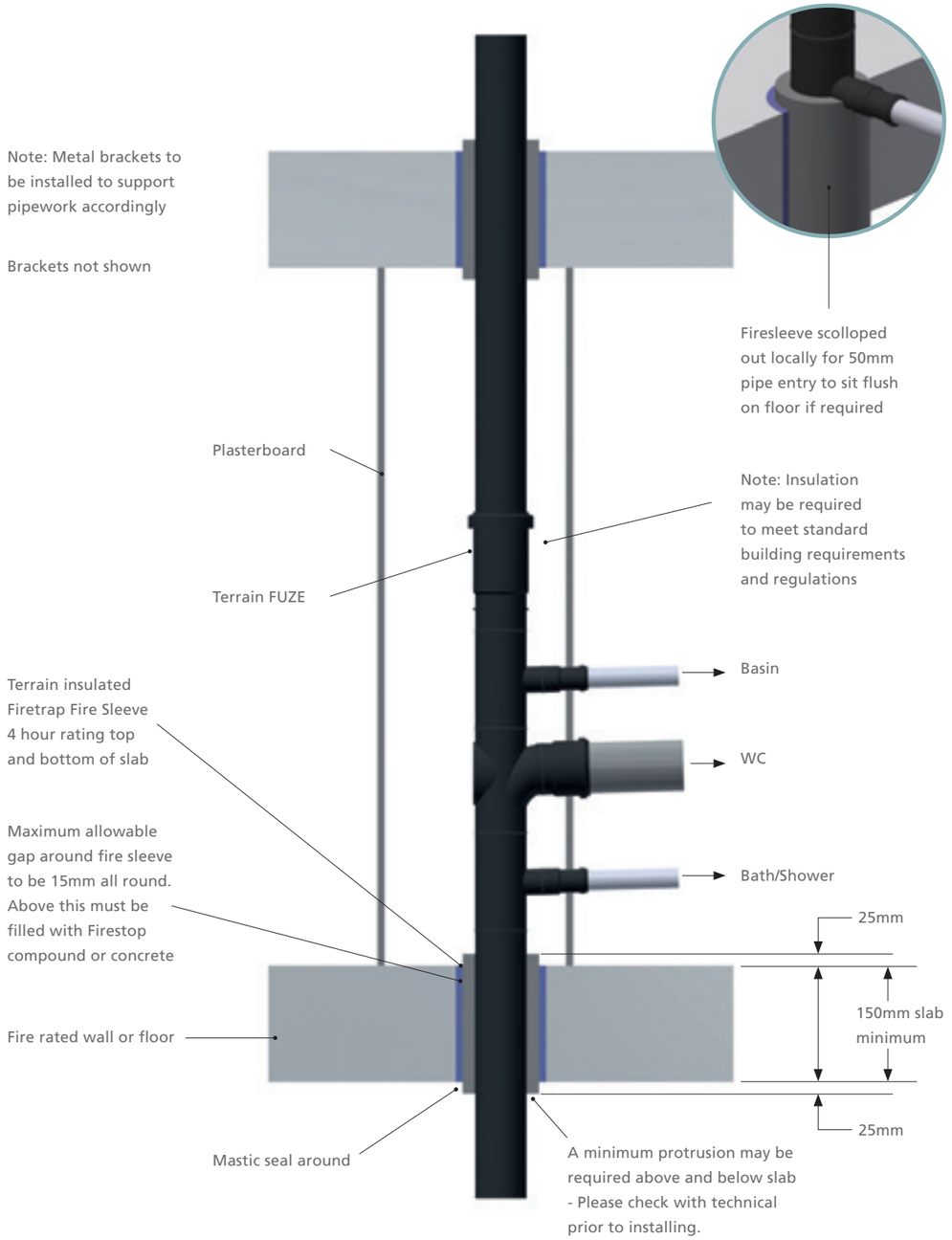
*Depending on pipe composition and application.
See datasheet FF109 for further information.

**Terrain Firetrap Sleeve was developed with ease of installation in mind.**

UP TO 4HR RATING*

| PRODUCT CODE | PIPE DIAMETER SUITABLE FOR (mm) | SLEEVE HOLE DIAMETER (mm) | SLEEVE HOLE OUTSIDE DIAMETER (mm) | LENGTH (mm) |
|---|---|---|---|---|
| 1925.42 | 40 | 42 | 92 - 104 | 300 |
| 1925.54 | 50 | 54 | 104 - 116 | 300 |
| 1925.60 | 56 | 60 | 110 - 122 | 300 |
| 1925.76 | 75 | 76 | 126 - 138 | 300 |
| 1925.114 | 110 | 114 | 164 - 176 | 300 |
| 1925.169 | 160 | 169 | 219 - 231 | 300 |

## Fire protection for vertical Terrain drainage pipework in a NON fire rated duct



# 11 Firetrap Sleeves and Collars

## Firetrap Collars

Terrain Firetrap Collars have been specifically designed to re-instate the fire resistance of a wall or floor which has been penetrated by services such as Terrain PVC, Terrain FUZE or Terrain Q.

Manufactured in steel, each fire collar contains an internal lining of intumescent graphite impregnated organic polymer. Anchoring hooks are also supplied. The collars will seal pipes from 40mm to 315mm diameter and can be face fixed or set-in to a wall or ceiling structure. They are suitable for use on concrete, masonry and plasterboard partitions.

They have a up to 2 hour fire rating and feature mounting tabs for quick and easy installation.

### APPLICATIONS

For Terrain PVC, Terrain FUZE above ground drainage through:

- Concrete, aerated concrete, masonry or plasterboard partition walls
- Concrete, aerated concrete or masonry floor construction

### FEATURES

For Terrain PVC, Terrain FUZE above ground drainage through:

- Up to 4 Hour fire rating
- Powder coated steel sleeve
- Can be surface mounted or built in
- Mounting tabs for quick and easy installation
- Seals against smoke, toxic gases, flames and heat
- Can be installed in a recessed area to minimise overall dimensions
- Maintains vapour seal of existing insulation
- Allows for thermal movement of pipe

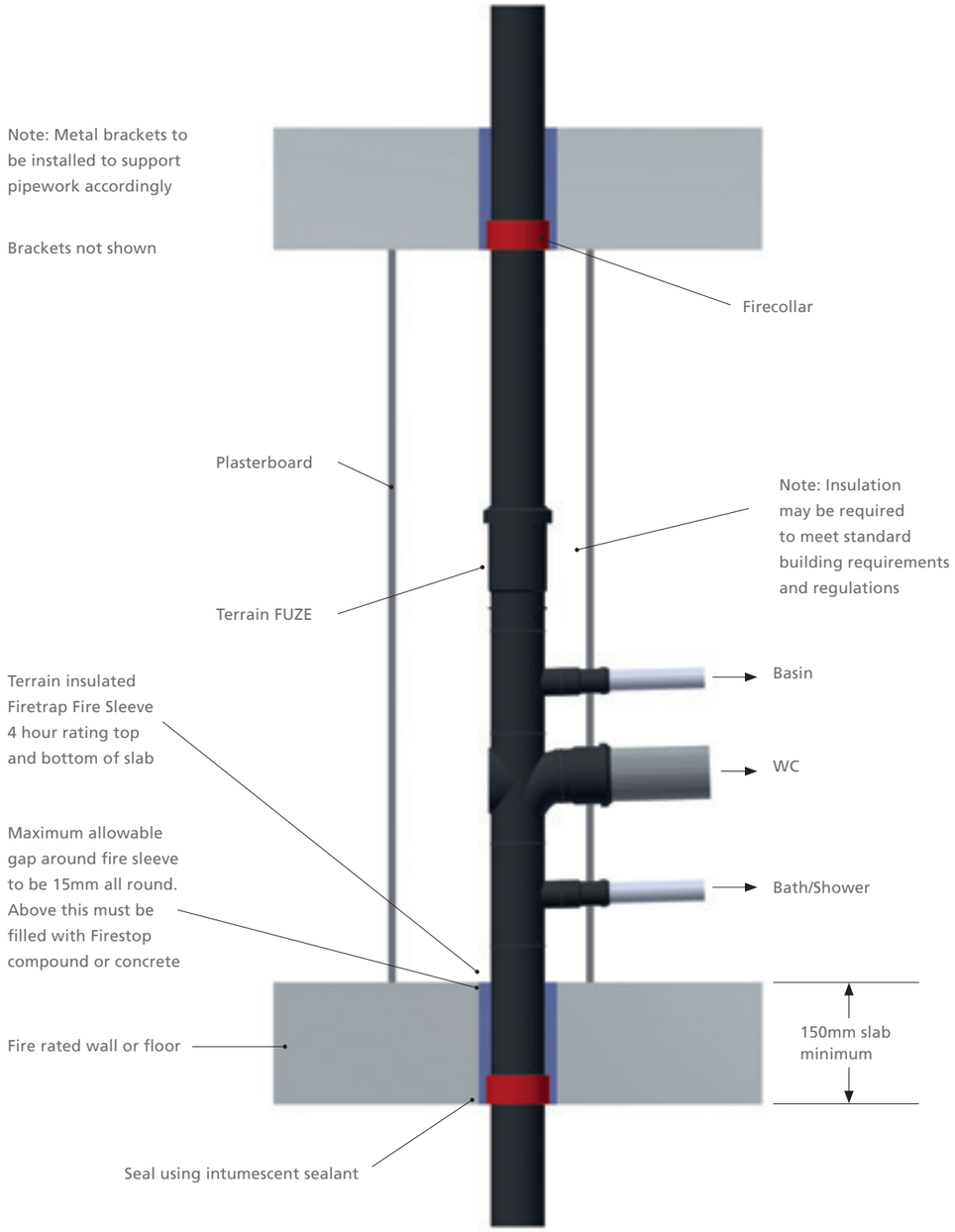
*Depending on pipe composition and application.
See datasheet TDSCIPC for further information.

| PRODUCT CODE | Ø |
|---|---|
| 1625.40R | 40mm |
| 1625.55R | 55mm |
| 1625.75R | 75mm |
| 1625.82R | 82mm |
| 1625.110R | 110mm |
| 1625.160R | 160mm |
| 1625.200R | 200mm |
| 1625.250R | 250mm |
| 1625.315R | 315mm |

**Collars will seal pipes from 40mm to 315mm diameter and can be face fixed or set-in to a wall or ceiling structure.**

UP TO 2HR RATING*

## Fire protection for vertical Terrain drainage pipework in a NON fire rated duct



# 12 System Testing and Maintenance

## NG.3 Testing

Terrain FUZE should be tested in accordance with guidelines stated within BS EN 12056-2 (Annex NG.3.1) which lays out the following:

### NG.3.1 AIR TEST

NOTE Normally this test is carried out to confirm that all pipes and fittings are airtight. It should be completed in one operation but for large multi-storey systems testing in sections may be necessary.

### NG.3.1.1 PREPARATION

The water seals of sanitary appliances should be fully charged and test plugs or bags inserted into the open ends of the pipework to be tested. To ensure that there is a satisfactory air seal at the base of the stack, or at the lowest plug or bag in the stack if only a section of the pipework is to be tested, a small quantity of water sufficient to cover the plug or bag can be allowed to enter the system.

One of the remaining test plugs should be fitted with a tee piece, with a cock on each branch, and one branch being connected by means of a flexible tube to a manometer. Alternatively, a flexible tube from a tee piece fitted with cocks on its other two branches can be passed through the water seal of a sanitary appliance. Any water trapped in this tube should be removed and then a manometer can be connected to one of the branches.

### NG.3.1.2 APPLICATION

Air is pumped into the system through the other branch of the tee piece until a pressure equal to 38 mm water gauge is obtained. The air inlet cock is then closed and pressure in the system should remain constant for a period of not less than 3 min.

### NG.3.1.3 LEAK LOCATION

NOTE Defects revealed by an air test may be located by the methods given in NG.3.1.3.1, NG.3.1.3.2 and NG.3.1.3.3.

### NG.3.1.3.1 SMOKE

A smoke producing machine may be used which will introduce smoke under any pressure into the defective pipework. Leakage may be observed as the smoke escapes. Smoke cartridges containing special chemicals should be used with caution, taking care that the ignited cartridge is not in direct contact with the pipework and that the products of combustion do not have a harmful effect upon the materials used for the discharge pipe system. Smoke testing of plastics pipework should be avoided due to naphtha having a detrimental effect, particularly on ABS, PVC-U and MUPVC. Rubber jointing components can also be adversely affected.

### NG.3.1.3.2 SOAP SOLUTION

With the pipework subject to an internal pressure using the smoke machine method as described in NG.3.1.3.1, a soap solution can be applied to the pipes and joints. Leakage can be detected by the formation of bubbles.

### NG.3.1.3.3 WATER TEST

There is no justification for a water test to be applied to the whole of the plumbing system. The part of the system mainly at risk is that below the lowest sanitary appliance, and this may be tested by inserting 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, provided that the static head does not exceed 6m.

*For accurate readings, please ensure equipment is regularly checked.





## Air pressure test to comply with BS EN 12056-2 for testing a stack with connections

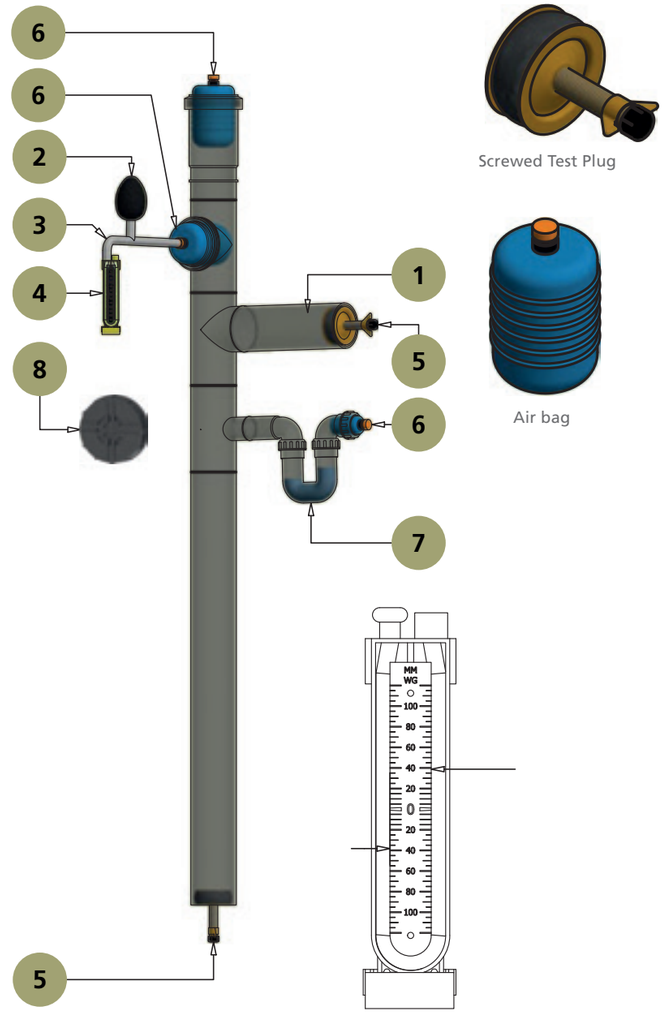
### SCREWED TEST PLUG

- Blank or open
- For use in pipe ends
- Manufactured and supplied by others

### AIR BAG

- Blank
- For use in access pipe/ expansion socket/pipe ends
- Manufactured and supplied by others

Traps must be filled with water to ensure there is positive pressure within the system to seal the waste inlet.




Screwed Test Plug

Air bag

| KEY | |
|---|---|
| NO. | PART |
| 1 | Pipework to test |
| 2 | Bellow |
| 3 | Hose |
| 4 | U-Gauge (should read 38mm) |
| 5 | Screwed Test Plug |
| 6 | Air Bag |
| 7 | Trap (must be filled with water) |
| 8 | Screwed Cap (for access door) |

Note: Blue temporary caps are not to be used for air pressure testing, only black threaded caps are to be used.
Further information is available on technical bulletin:2016 - PT06 - Air pressure test to comply with BS EN 12056-2 - Version 6

# 12 System Testing and Maintenance

## System Maintenance

### NG.4.1 GENERAL

Discharge pipe systems should be kept in a clean and sound condition in order to maintain maximum efficiency. This is facilitated by designing in accordance with the recommendations in this national annex. The following points should be noted:

- When access covers, caps and clearing eyes are removed, damaged packing, ring seals, washers and loose fittings should be renewed before replacement.
- Care should be taken in the use of chemical descaling agents, which are often of a corrosive nature and materials employed in the pipe system should be clearly identified before treatment to ensure that the internal surfaces are not subject to damaging chemical attack.
- Caution is necessary when employing the methods of clearing obstructions which involve the use of air or water at high pressures.
- Hand operated rods for removing blockages in discharge pipes should be capable of passing through the system without damaging the internal surfaces of pipes and fittings.
- Mechanised rodding equipment should only be used by properly trained operators and the pipework to be cleared should be thoroughly examined in advance to enable selection of the appropriate cleaning attachments.
- In renewing paintwork care should be taken to preserve any distinguishing colours which may have been used for identification purposes. Reference should be made to BS 1710.

### NG.4.2.DEPOSITS DUE TO MISUSE OF THE DISCHARGE SYSTEM

Completely or partial blockages due to large objects or compacted masses, such as toilet paper and sanitary towels, can usually be loosened by rodding. All such material should be removed from the system at the nearest access point.

### NG.4.3 PERIODIC INSPECTION

In addition to general maintenance work, periodic inspections and tests may be advisable to ascertain if there is any misuse or negligence. All defects should be fixed.

# 13 Support

**As the industry moves forward, we're here right by its side. Terrain FUZE is proof of our commitment to making things simple for our customers, an innovative plastic drainage system that's designed for the future.**

Our website also provides useful information to keep you up to date with news and innovations as they happen, including how Terrain FUZE can further enhance your project.

To find out more visit:
**polypipe.com/this-is-our-terrain/terrain-fuze**







# Polypipe Building Services

Investing in our business and our people enables us to bring more expertise, more support and more innovation to our customers, helping them to create safe and sustainable commercial buildings, whether newbuild or refurbishment projects.

## BUILDING SERVICES SPECIALISM

Having made significant investment in expanding our portfolio to include not only our trusted and well-established Terrain drainage systems, but also MecFlow, our new water supply system, we're committed to working with our customers to provide the best building services solutions for their project. From schools, hospitals and tall buildings to shopping centres, local authorities and commercial and industrial developments, we provide drainage and water supply solutions that help our customers create safe and sustainable services within buildings.

## SERVICE AND SUPPORT

Recognising the challenges the construction industry faces, we continuously research and develop products and services that enable us to support our customers more – from working with Engineers to design the best solutions for complex projects to helping Contractors overcome labour shortage issues, a lack of on-site storage and on-site waste management. We develop services to support our customers so that together, we can achieve more.

### POLYPIPE ADVANTAGE SERVICE

The Polypipe Advantage service has been specially developed to complement our products and services offering. The Polypipe Advantage team is with you every step of your project, from initial design and project planning, through to manufacture and delivery. By creating fabricated Terrain drainage stacks and MecFlow Kits off-site, we're able to provide our customers quick and more efficient installations on-site. For more information on how the Polypipe Advantage service could benefit your next project, email:
**buildingservice.technical@polypipe.com**

## SUPPORTING PRODUCTS AND LITERATURE

With both drainage and water supply systems in its portfolio, Polypipe Building Services has a number of solutions for your next project. More information on these systems can be found at:
**polypipe.com/commercial-building-services**

### TAKING YOUR PROJECT FURTHER

As part of the Genuit Group, we have a number of complementary water and climate management systems available to maximise the comfort and efficiency of your commercial building:

**Nuaire Ventilation Systems**
Our Nuaire brand has been at the forefront of packaged Air Handling Units (AHUs) for over 20 years, designing and manufacturing market leading ranges. Explore the full range of Nuaire ventilation systems at **www.nuaire.co.uk**.

**Polypipe Underfloor Heating**
Underfloor heating systems are increasingly popular and are rapidly becoming the heat source of choice for commercial and multi-occupancy residential developments. For more information on our range of Underfloor Heating Systems, controls and manifolds visit: **www.polypipeUFH.com**.

**Polypipe: Inspiring Green Urbanisation**
To help address the pressures that urbanisation and climate change place on our built environment, we've developed a new generation of technologies that sustain and optimise urban green assets through extended and fully integrated water management solutions. Systems that make space for water, alleviate flooding and capture, store and reuse rainwater, whilst enabling and inspiring Green Urbanisation.
**www.polypipe.com/civils/gi**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Polypipe Building Services
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Polypipe Advantage
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# 14 Approval

## Terrain FUZE, HDPE Soil and Waste

Terrain FUZE is made to the manufacturing standards stated below. These standards set out the dimensional, physical and mechanical characteristics that each individual product shall conform to.

### PIPES AND ELECTROFUSION COUPLINGS

Pipes and Electrofusion Couplings are manufactured in accordance with BS EN 1519 Standard, Kitemark certificate KM 729217, and is covered by the British Board of Agrément (BBA), certificate 07/4479.

### FITTINGS

Fittings are also covered by the British Board of Agreement (BBA), certificate 07/4479.

### FIRETRAP COLLARS AND FIRETRAP SLEEVES

Firetrap Collars hold a European Technical Assessment (ETA-12/0332).

Fire collars comply to standards BS EN 13501-1 & 13501-2.

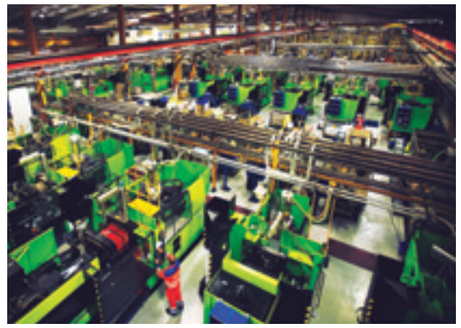
Fire sleeves comply to standards BS EN 1363-1 & 1366-3.

For copies of certificates please visit: **www.polypipe.com/commercial-building-services**

### P.A.P.A. AND AAV

Terrain P.A.P.A. - BBA - Certificate No. 18/5551

Terrain Air Admittance Valves - BS EN 12380/BBA - Certificate No. 09/4650





## Polypipe Quality Assurance

Our Terrain products are accredited to the following Quality Management Systems:

**BS EN ISO 9001** - Quality Management System

**BS EN ISO 14001** - Environmental Management System

**BS ISO 45001** - Occupational Health & Safety Management System

**PAS 99** - Integrated Management Registration

**BS ISO 56002** - Innovation Management System

### FURTHER INFORMATION AND ASSISTANCE

Terrain products are backed by a comprehensive technical advisory service, available to provide advice and design guidance on all aspects of above and below ground drainage.

Technical services include:

- On-site advice and problem solving.
- Terrain Drainage Stacks are designed and fabricated through our Polypipe Advantage Service. Any items ordered through this service have a 21-day lead time.

For more information, please see page 70.

For prompt assistance, please contact the Polypipe Advantage team: **Tel: 01622 795200**

Email: **buildingservices.technical@polypipe.com**

**www.polypipe.com/commercial-building-services**

# 14 Approval

## Terms and Conditions

### 1. GENERAL

1.1 In these conditions

1.1.1 "the Company" means Polypipe Limited, a company registered in England and Wales with registered number 1099323. Registered office: Broomhouse Lane, Edlington, Doncaster, DN12 1ES, United Kingdom.

1.1.2 "Customer" means the person with whom the Company contracts for the supply of Product pursuant to these conditions;

1.1.3 "Order" means any order submitted to the Company by a Customer;

1.1.4 "Order Confirmation" means any order confirmation submitted to the Customer by the Company;

1.1.5 "Product(s)" means the goods and/or services to be supplied by the Company as referred to and described in an Order which is accepted by the Company;

1.1.6 "Quotation" means the quotation submitted to the Customer by the Company prior to submission of an Order which details the prices at which the Customer may make an offer to purchase the Products;

1.1.7 "Writing" includes telex, cable, facsimile transmission, electronic data transfer and comparable means of communication.

1.2 A contract shall come into force between the Parties each time an Order is accepted by the Company, whether by issuing an Order Confirmation, by delivery, or otherwise, but not before. Subject to clause 1.3, (i) the terms of each contract shall be as set out in these conditions and the terms of any Order accepted by the Company, and (ii) in the event of any conflict between these conditions and any such Order, the terms of the Order shall prevail.

1.3 Save to the extent contemplated at clause 2.1, the parties agree that any terms and conditions submitted at any time by the Customer which have not been written specifically for the purposes of the Product requirement to which a specific Order relates (including, without limitation, any standard terms and conditions of purchase which are printed on any order documentation submitted by the Customer), shall not apply to any contractual dealings between the parties and shall not be deemed to constitute a counter-offer to purchase Products in accordance with those terms unless a specific intention is expressed for such terms and conditions to apply in respect of a specific Order notwithstanding this clause 1.3, and any failure by the Company to challenge or respond to any such terms and conditions does not imply and shall not constitute acceptance of those terms and conditions.

1.4 Unless otherwise stated therein Quotations shall be valid for a maximum period of 30 days from issue and may be withdrawn at any time by written or oral notice.

1.5 Any statement or representation (other than in the Company's Quotation or these terms and conditions) by the Company its servants or agents upon which the Customer wishes to rely must be set out in Writing and attached to or endorsed on the Customer's Order and in any such case the Company may confirm, reject or clarify the point and submit a new Quotation. Any statement or representation which is not so confirmed in Writing is followed or acted upon entirely at the Customer's own risk, and shall not form any part of the contract between the parties, and shall be deemed not to have influenced the Customer in deciding whether to enter into the contract.

1.6 The contract is between the Company and the Customer as principals; neither the benefit nor the burden is assignable by the Customer without the Company's written consent; the contract may be assigned or subcontracted by the Company.

1.7 Unless specifically agreed to the contrary all trade terms shall be interpreted in accordance with current INCOTERMS.

1.8 If, subsequent to any contract of sale which is subject to these conditions, a contract of sale is made with the same Customer without reference to any conditions of sale or purchase, such contract howsoever made shall be deemed to be subject to these conditions or (if different) the standard Conditions of Sale of the Company current at the time when such contract of sale is made.

### 2. ELECTRONIC TRADING

2.1 If the Company and Customer agree that electronic trading between them shall be a basis for order processing and invoicing then these terms and conditions shall apply subject to any special terms and conditions terms which are specific to electronic trading and which have been agreed by the parties in writing.

2.2 Electronic orders shall be valid if all the information agreed between the Customer and the Company as being required is properly set out in the agreed format and the order is transmitted by the Customer to the Company by reference to the correct identification code and is received by the Company when collecting its electronic mail from the relevant system.

### 3. DELIVERY

3.1 Unless otherwise agreed in Writing by the Company delivery shall be deemed to take place in the case of ex-works sales when the Products are made available by the Company for collection by the Customer or its carrier and in all other cases upon delivery by the Company to the agreed mainland UK delivery point airport or port but before the Products are unloaded, which shall be the responsibility of the Customer.

3.2 The Company shall not be obliged to make delivery unless and until the Company has received all necessary information, drawings, final instructions and approvals from the Customer and the Customer acknowledges that any delays or alterations by the Customer may result in delayed delivery for which the Company shall not be responsible.

3.3 All dates and periods for delivery are estimated and do not constitute fixed times for delivery by the Company. Unless such a right or rights are expressly agreed in Writing by the Company, the Customer shall have no right to damages or to cancel the contract for failure arising from any cause to meet any delivery times given in the contract or subsequently set.

3.4 Notwithstanding clause 3.3 the Customer shall be obliged to accept delivery on the date or within the period stated in the Quotation or (if none is so stated) no later than one month after the issue or notice in Writing by the Company requiring the Customer to accept delivery. Failure by the Customer either to take delivery or to make payment in respect of any one or more installments of Products shall entitle the Company to terminate the Contract (such right is without prejudice to any other rights and remedies available to the Company whether expressly provided for in these Conditions or implied by any rule of law).

3.5 Where the Customer requests and the Company agrees to postpone delivery or where delivery is otherwise postponed or delayed without default by the Company, the Customer shall pay upon receipt of written demand from the Company all costs and expenses including a reasonable charge for storage and transportation occasioned thereby and the Customer shall pay for the Products in accordance with these conditions as if the same had been delivered in the ordinary course without reference to the postponement or delay. In addition, the Company shall be entitled to claim interest pursuant to Clause 7.3.2 of these Conditions from the date on which payment would have fallen due, had the Products been delivered in the ordinary course but for the postponement or delay.

3.6 Unless otherwise expressly agreed in Writing the Company may effect delivery in one or more installments. Where delivery is effected by installments each installment shall be treated as a separate contract governed by these conditions. No delay in the delivery of any installment of Products or any defect therein shall entitle the Customer to terminate the remainder of the contract.

### 4. RISK AND TITLE

4.1 Risk of damage to or loss of the Products shall pass to the Customer upon delivery and the Customer is then solely responsible for all loss damage or deterioration to the Products.

4.2 Title to the Products shall not pass to the Customer until either:-

4.2.1 The Company has received in cash or cleared funds all monies payable (whether or not due) to the Company under this and any other contracts whenever made between the Company and the Customer including contracts made after this contract; or

4.2.2 When the Company serves on the Customer notice in Writing specifying that title in the Products or any part thereof has passed.

4.3 Until title has passed to the Customer the Company may require the Customer to deliver up to the Company all products in respect of which the Company has title and if the Customer fails to do so forthwith the Company's officers, employees, representatives or agents shall be entitled to enter upon any premises where such Products are kept for the purposes of recovering the same.

4.4 Until title to the Products has passed to the Customer pursuant to these conditions it shall possess the Products as fiduciary agent and bailee of the Company and shall store the Products separately from other goods not owned by the Company and shall ensure that they are fully insured on an all risks basis and clearly identifiable as belonging to the Company and the Company shall be entitled to enter upon any premises where such Products are kept for the purpose of satisfying itself that this condition is being complied with by the Customer.

4.5 In the event that the Customer has any contract with any other company under the ultimate control of the parent company that has ultimate control of the Company under which any monies are outstanding (whether or not due) then the Customer shall not (notwithstanding that title would otherwise pass pursuant to Clause 4.2 above) obtain title to the Products or other goods supplied by the Company under this or any other contracts between them until such other company has received in cash or cleared funds all such monies.

### 5. CANCELLATION AND AMENDMENT

5.1 No contract can be amended or cancelled except with the Company's approval in Writing and should such approval be given the Customer shall indemnify the Company against any costs, losses or expenses resulting from any cancellation or amendment.

### 6. PRICES

6.1 Unless otherwise agreed in Writing all prices shall be as stated in the valid Quotation or, if no valid Quotation is in place, the Company's prevailing standard price at the time of receipt of an Order, and are for delivery ex works and are exclusive of VAT and any other applicable taxes, which are payable in addition. Unless otherwise stipulated by the Company in Writing prices are payable in Sterling or if the Sterling currency has ceased to exist when the contract is made, shall be payable in such currency as replaces the Sterling currency.

6.2 The Company will endeavour to ensure that all prices on display/provided to Customers are correct and up to date. However, should a Customer place an Order using an incorrect price then the Customer agrees that the Company may substitute the incorrect price set out in the Order for the correct price (whether the price specified on a valid Quotation or the Company's prevailing standard price, as appropriate) and charge accordingly.

6.3 The Company shall be entitled at any time by giving notice in Writing, before or after final invoicing to make a reasonable adjustment to the price in the event of any alteration in quantity, design or specification requested by the Customer.

6.4 The Company reserves the right at any time prior to delivery by giving notice in Writing to increase the price if there is any increase in the cost of materials, labour, transport, or utilities or if the costs of the Company are increased by any other factor beyond the reasonable control of the Company.

6.5 Charges made on the Company's invoice for cases will be credited on their return to the Company's premises carriage paid and in good reusable condition. Cases shown as returnable but not charged on the Company's invoice must be returned to the Company's premises carriage paid and in good re-usable condition otherwise an additional charge will be made in respect of their cost.



6.6 The Customer shall be liable to the Company for any demurrage costs incurred in the event of vehicles being unduly delayed at the point of delivery.

### 7. TERMS OF PAYMENT

7.1 Unless otherwise agreed by the Company in Writing, the Customer shall make payment by the last day of the month following the month of invoice and the Company shall be entitled to issue invoices in the month in which the Products are delivered or would have been delivered, save for postponement or delay otherwise than due to default on the part of the Company. Time for payment of the price is of the essence of the contract.

7.2 No disputes arising under this contract shall serve to permit payment by the Customer of sums due to the Company to be delayed nor shall disputes interfere with prompt payment in full. The Buyer shall not be entitled to make any deduction from or set off against any sums owing to the Company by reason of any such dispute or at all.

7.3 In the event of default in payment by the Customer the Company shall be entitled, without prejudice to any other right or remedy:

7.3.1 to suspend without notice all further deliveries on this or any other contract between the Company and the Customer;

7.3.2 to charge interest on a daily basis (after as well as before judgement) on any amount outstanding at the rate of 4% above the Base Rate of Lloyds Bank plc from time to time: and/or

7.3.3 to serve notice on the Customer requiring immediate payment for all goods supplied by the company under this and all other contracts between them whether or not payment is otherwise due or invoiced.

### 8. SPECIFICATIONS

8.1 Subject to Clause 8.2 the Products shall in all material respects be of such specification agreed between the Company and the Customer under the contract, or (if not so agreed) shall be generally in all materials respects in accordance with any published specification issued by the Company.

8.2 The Company reserves the right to make changes in dimensions or other specifications of the Products as are required to conform to applicable standards or laws or are otherwise within reasonable limits having regard to the nature of the Products. Dimensions specified by the Company are to be treated as approximate only unless it is specifically agreed in Writing that exact measurements are required.

8.3 The Customer acknowledges that it has not specified any particular use for the Products and that it is entirely its own responsibility to satisfy itself that the Product is suitable for the use which it intends.

### 9. LOSS SHORTAGES AND DAMAGE APPARENT ON DELIVERY INSPECTIONS

9.1 The Customer shall have no claim for loss, shortages or damage on delivery which are or would be apparent on inspection unless the Customer:

9.1.1 unpacks and inspects the Products as soon as reasonably practicable following receipt:

9.1.2 notifies the Company of any loss, shortages or damage (otherwise than by a qualified signature on the delivery note) within ten working days of receipt: and

9.1.3 demonstrates to the satisfaction of the Company that such loss, shortages or damage occurred prior to delivery.

9.2 The Customer shall have no rights in respect of loss, shortages or damage unless the Company is given a reasonable opportunity to inspect the Products and investigate any complaint before any use of or alteration to or interference with the Products.

9.3 On a valid complaint made in accordance with this Clause the Customer shall be entitled (in the case of notified shortages) to receive within a reasonable time a delivery of Products equivalent to the shortfall and (in the case of defects) to repairs to or replacements for the affected Products or at the Company's option a credit for the price thereof but the Company shall have no further liability whatsoever. If a complaint of loss, shortages or damage on delivery is not made to the Company in accordance with this Clause 9 within 5 working days of the date of delivery, then the Products shall be deemed to be delivered complete and undamaged in accordance with the contract and the Customer shall be bound to pay for the same accordingly.

9.4 Loss, shortages or damage in a delivery or any installment delivery shall not be a ground for termination of the contract or the remainder of the contract (as the case may be).

### 10. WARRANTY

10.1 The Company warrants that Products which do not comply with either Clause 8.1 or Sections 13 to 15 of the Sale of Goods Act 1979 (as amended) are shown to have been defective at delivery as a result of faulty design workmanship or materials (other than free-issue materials), shall either be repaired or replaced or that, at the Company's option, a credit or refund for the price thereof shall be given provided always that:

10.1.1 the Company receives written notice of the defect within 12 months of delivery;

10.1.2 no alteration to or interference with the Products takes place before the Company is given access to the Products to inspect and test the same;

10.1.3 the defect does not consist of a loss shortage or damage to which Clause 9 is expressed to apply;

10.1.4 the defect does not arise by reason of a design specification or instruction given by the Customer;

10.1.5 the Customer has not defaulted in its obligation to make payment of the contract price for the Products;

10.1.6 the defect shall not be attributable to incorrect storage or use of the Products by the Customer.

10.2 The benefit of Clause 10.1 shall only extend to Products or parts not manufactured by the Company to the extent that the Company has equivalent recourse against the manufacturer or supplier thereof.

10.3 The Customer shall indemnify the Company in respect of loss or damage arising from any use made of Products after the Customer became or ought reasonably to have been aware of a defect.

10.4 In the event of a valid claim being made in accordance with Clause 10.1:

10.4.1 the Customer shall be bound to accept repaired or replacement Products or at the Company's option credit or repayment and shall not be entitled to terminate the contract;

10.4.2 if the Company does not repair or replace Products within 60 days or such longer time as may be reasonable then the Customer's sole remedy shall be an entitlement to full credit or repayment in respect of the defective Products; and the Company shall be under no further liability in respect of any loss or damage arising from the defect or from any delay before repair replacement credit or refund is effected.

### 11. LIABILITY

11.1 The Company does not exclude liability arising under Section 12 of the Sale of Goods Act 1979 (good title) (as amended) or for death or personal injury caused by its negligence as defined in the Unfair Contract Terms Act 1977, fraudulent misrepresentation or any other type of liability which cannot by law be excluded or limited

11.2 Save as provided under Clauses 9, 10 and 11.1 the Company shall have no liability to the Customer in connection with or arising from any defect or failure in the Products or otherwise due to the quality, condition, suitability, durability, safety or any other aspect or feature of the Products. The Company's liability, whether in respect of one claim or in the aggregate, shall not exceed the contract price payable under this contract for the supply of Products to be provided under it. The price of the Products is predicated on the basis of the limitations and exclusions set out in these conditions. The Customer acknowledges that without those exclusions and limitations, the price of the Products would be higher and that the limitation of the Company's liability is therefore reasonable in all the circumstances. The Customer agrees that it is its own responsibility to insure adequately to cover any loss or damage in excess of the aforesaid limit of the Company's liability. Subject to reaching agreement on terms, the Company and the Customer may determine an increased level of liability which is to be accepted in Writing by the Company to cover, in particular specific types of loss or damage which both parties reasonably foresee and anticipate.

11.3 In Clause 11.2 the term "liability" means any form of liability whatsoever including but not limited to liability in misrepresentation and under contract, common law, equity and any statutory provision whether or not based on negligence or breach of any express or implied duty to act with care or skill.

11.4 Notwithstanding any other provisions of these conditions the Customer shall have no claim against the Company in respect of any loss other than strictly direct losses (meaning for these purposes the increased costs of purchasing products from a third party or the cost of remedial repair work) and specifically consequential, financial economic loss whether direct or indirect including but not limited to any incidental costs of dismantling fitting or other ancillary work required in connection with the provision of a repair or replacement, any loss or production profits contracts loss of use or anticipated savings and any claims made against the Customer by any third party are excluded even if reasonably foreseeable.

11.5 To the extent that any liability of the Company is expressed to be limited or excluded by these conditions the Customer shall indemnify the Company in respect thereof.

### 12. CONFIDENTIAL INFORMATION ETC.

12.1 All drawings, documents, records, computer software and other information supplied by the Company are supplied on the express understanding that all intellectual property rights therein is reserved to the Company and that the Customer will not without written consent of the Company either give away, loan, exhibit, or sell the same or extracts therefrom or copies thereof or use the same in any way except in connection with the Products in respect of which they are issued.

### 13. PATENT INDEMNITIES

13.1 If the Customer is subject to a claim or threatened with any action alleging that the Products in the form supplied infringe any patent, copyright, design right or other intellectual property right then provided that the Customer promptly informs and fully co-operates with the Company and if requested allows the Company the conduct and defence thereof on the Customer's behalf, the Company will indemnify the Customer against any award or damages for infringement made in any such action by a court or other competent body against the Customer. Further, if the Products are infringing the Customer agrees that the company shall have the option at its own expense either to modify the Products so that they do not infringe: to replace the Products with a non-infringing substitute: to procure for the Customer the right for the Customer to continue its use of the Products: or to repurchase the Products from the Customer at the price paid by the Customer less an allowance for the use made thereof.

# 14 Approval

13.2 The Company shall have no liability in respect of claims for infringement or alleged infringement of third parties patent or other intellectual property rights arising from the manufacture or supply of the Products to the Customer's instructions or in accordance with designs plans or specifications given by the Customer and the Customer shall indemnify the Company against all losses damages expenses costs or other liability arising from such claims.

**14. CUSTOMER'S DRAWINGS**

14.1 The Customer shall be solely responsible for ensuring that all drawings information advice and recommendations specified or given to the Company by the Customer or its agents, servants, consultants or advisers are accurate correct and suitable. Examination or consideration by the Company of such drawings information advice or recommendations shall not result in any liability on the part of the Company.

**15. COMPANY LITERATURE**

15.1 The information contained in the advertising, sales, technical, and other literature issued by the Company may be relied upon to be accurate in the exact circumstances in which it is expressed otherwise any illustrations performance details examples of installations and methods of assembly and all other information and data in such literature are based on experience and upon trials under test conditions and are provided for general guidance only. No such information or data shall form part of the contract unless it is specifically referred to in the Quotation.

**16. TERMINATION**

16.1 Without prejudice to any other rights or remedies of the Company it shall be entitled in any of the following circumstances to terminate (in whole or in part) this and any other contract whenever made between the Company and the Customer and/or to suspend deliveries and/or to receive upon demand payment of all monies payable under any such contracts whether or not otherwise due:

16.1.1 the Customer made or proposes any voluntary arrangement with its creditors or becomes subject to an administration order or becomes bankrupt or goes into liquidation;

16.1.2 an encumbrancer takes possession or a receiver is appointed of any of the property or assets of the Customer;

16.1.3 the Customer becomes unable to satisfy its debts as they fall due or cease, or threatens to cease to carry on business;

16.1.4 the Company reasonably believes that any of the events mentioned above or any equivalent or similar event under any relevant laws to which the Customer or any connected person is subject has or may occur;

16.1.5 the Customer or any connected person commits any breach of this or any either contract whenever made between the Customer and the Company.

**17. FORCE MAJEURE**

17.1 The Company shall be excused performance of its obligations whilst and if affected by act of God governmental restriction condition or control, any act done or not done pursuant to a trade dispute whether such dispute involves its employees or not, default by suppliers of the Company, shortage of materials or by any other act matter or thing beyond its reasonable control including failure by the other party to carry out anything required for performance of the contract.

17.2 In the event that the Company does not perform its obligations by reason of any of the causes referred to in Clause 17.1 within six months after the time for performance then the Company or the Customer may by written notice terminate the contract without liability save that the Customer shall pay for any Products delivered or completed at the time of termination.

**18. TOOLS**

18.1 Any tools (such as jigs, dies, etc) which the Company may construct or acquire specifically in connection with the Products shall, notwithstanding any charges the Company may make for them, be and remain the Company's sole and unencumbered property and in the Company's possession and control without restriction.

**19. FREE-ISSUE MATERIAL**

19.1 Free-issue material shall be insured by and remain at the risk of the Customer at all times and the Company shall be indemnified by the Customer against any loss, damage, injury or expense whatsoever arising directly or indirectly therefrom and the company shall not be liable for loss of or damage to any such materials during fabrication by the Company or sub-contractor employed by Company or whilst on the premises of the Company or of any such sub-contractor or in transit to or from the premises of the Company or of any such sub-contractor provided that the Company may at its sole discretion make a contribution towards the replacement costs of such materials.

19.2 An allowance for material lost as process scrap is (where applicable) included in the contract price and no such losses shall be the subject of any claim by the Customer or contribution by the Company.

19.3 Where materials are supplied by or on behalf of the Company the Customer shall be responsible to ensure that the material is of satisfactory quality and is fit for its purpose and shall indemnify be Company against any loss damage, injury or expenses whatsoever arising directly or indirectly from any fault in or incorrect specification of the said materials.

**20. CONSUMER PROTECTION ACT 1987**

20.1 Where the Customer purchases the Products for use or incorporation with any other products to be assembled, produced, processed packed or supplied by the Customer or for resale or supply ancillary to any such other products or other products supplied by the Customer then:

20.1.1 the Customer shall forthwith on demand produce for inspection by the Company copies of all written instructions information and warnings to be supplied by the Customer in relation thereto provided nevertheless that such inspection or right to inspect shall not give rise to any responsibility or liability on the part of the Company; and

20.1.2 the Customer shall indemnify the Company against any losses, costs and damages that the Company may suffer or incur in the event any claim is made against the Company in relation thereto if the Products did not comprise the detective element thereof or were rendered defective by reason of actions or omissions of the Customer (including without limitation the supply of defective free-issue materials) or were rendered defective by reason of instructions or warnings given or omitted by the Customer or other reseller.

20.2 For the purpose of Clause 20.1 the term "defective" shall be interpreted in accordance with the definition contained in Part 1 of the Consumer Protection Act 1987.

**21. HEALTH & SAFETY**

21.1 The Customer agrees to pay due regard to any information supplied by the Company relating to the use for which the Products are designed or have been tested or concerning conditions necessary to ensure that they will be safe and without risk to health at all times when they are being set, used, cleaned, serviced or maintained by any person and the Customer undertakes to take such steps as may be specified by such information or otherwise necessary to ensure that as far as is reasonably practicable the Products will be safe and without risk to health at all times as mentioned above.

**22. LAW AND JURISDICTION ETC.**

22.1 The Contract shall be governed and interpreted exclusively according to the Laws of England. The parties hereby agree to submit to the exclusive jurisdiction of the English courts provided that the Company may at its option take proceedings in the courts of the state in which the Customer is domiciled including action to obtain any remedy (including injunctive relief). In the case of any order for the export of Products, the Schedule to the Uniform Law on International Sales Act 1967 shall not in any circumstances apply to the Contract and neither shall the limits imposed by the Unfair Contract Terms Act 1977 on the extent to which liability can be excluded or limited.

22.2 No waiver of or delay or failure by the Company to exercise any rights or remedies shall prejudice or preclude any future or further exercise thereof.

22.3 If any provision of these conditions shall be held invalid or unenforceable in whole or in part then the unaffected provisions shall remain in full force and effect. Headings appear for convenience only and shall not affect the Construction of these conditions.

22.4 If the Contract provides for the supply of services and no general conditions of the Company relating specifically to the supply of services are made applicable to such services then these conditions shall mutatis mutandis apply to such services as they would apply to Products and in such event Clause 10.1 will be deemed to include a reference to Sections 3 to 5 of the Supply of Goods and Services Act 1982 (as amended), either in addition to or in place of the reference to Sections 13 to 15 of the Sale of Goods Act 1979 (as amended) as may be appropriate. For the avoidance of doubt the following provisions apply where the Company supplies services to the Customer in accordance with clause 22.4:-

22.4.1 the Company's obligation to provide the services is in any event conditional upon payment of the agreed price for the services. Any default or delay in payment according to the terms agreed between the Company and the Customer shall entitle the Company at its option to decline to perform or decline to continue to perform its obligations hereunder but without thereby incurring any liability to the Customer.

22.4.2 Save to the extent that by reason of negligence on the part of the Company in the performance of the services which results in death or personal injury (which the Company does not limit or exclude), the Company's liability under the contract shall be limited to the amount of charges paid to the Company in return for the services and in particular the Company accepts responsibility only for direct and unavoidable loss or damage arising from any negligence in the provision of services and in particular all other types of loss whether economic, financial, indirect or consequential and whether reasonably foreseeable or not are excluded to the fullest extent permitted by law.

22.4.3 The Customer shall lend all such reasonable assistance to the Company in the performance of the services as the Company shall reasonably require.

22.4.4 The Customer shall indemnify and keep the Company, its employees, agents and contractors indemnified at all times from and against any loss or damage and injury caused to persons or property in the course of the provision of the services where such loss or damage arises by reason of the Customer's negligence or negligence of persons under the control of the Customer.

22.4.5 The Customer acknowledges and agrees that if due to the act or omission of the Customer, the Company is not able, having attended at the Customer's premises to perform the services, the Company shall be entitled to claim reasonable additional costs and expenses from the Customer occasioned by any resulting delay in the provisions of the services.

22.5 In cases for the sale or supply of Products overseas, the following additional provisions shall apply unless otherwise stipulated in writing by the Company:

22.5.1 the Customer shall be solely responsible for obtaining all necessary import authorisations, the payment of any applicable import taxes, duties or imposts and the Company shall be under no obligation to give the Customer the notice specified in Section 32(3) of the Sale of Goods Act 1979 (or any re-enactment thereof);

22.5.2 Quotations issued in a currency other than Sterling may at the Company's option, unless otherwise agreed in writing, be subject to amendment in the event of fluctuations in the applicable exchange rate prior to the date of invoice;

22.5.3 payment in respect of Products for export is due on the date specified by the Company at the date when the Contract is made, in the currency stated in the invoice and in accordance with the method of payment stipulated by the Company. All costs incurred by the Company in connection with the designated particular method of payment shall be met by the customer.

22.5.4 If you are a consumer within the meaning of the Distance Selling Regulations 2000 and you have bought the products detailed overleaf over telephone, internet or via mail order then within seven days of receipt of you products you have the right to cancel your order and return the Products for a full refund. Trading terms were accurate at point of publication, to check for updates, please go to Trading Terms & Conditions at www.Polypipe.com/trading-terms-conditions.



## Notes

# Terrain FUZE

Design, specification
and installation guide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