TetraFlow®

Technical Product Guide

Non-Pressure Plastic Pipe Systems

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INTRODUCTION

TetraFlow Plastics Ltd manufactures and markets integrated piping systems to the civil, building, DIY and construction sectors.

TetraFlow soil, waste and underground systems provide an efficient means for drainage of wastewater and foul discharge in both single and multi-story residential and commercial buildings.

Solvent weld joints are designed to provide a rigid (or restrained) joint connection. Push-fit joints provide a secure, quick and easy installation whilst allowing for subtle movements for expansion and contraction.

These products are engineered for use in a variety of applications from waste to sewer and drainage systems.

The systems are manufactured in sizes from 32mm to 200mm in black / white / light grey / olive / terracotta colours, in uPVC, ABS and PP. The range includes traps, solvent weld and push-fit systems, soil and vent systems.

Non Pressure Above Ground / Below Ground Soil, Waste and Sewerage System

MANUFACTURING STANDARDS

All ranges are manufactured in state of the art manufacturing facilities, using lead-free, REACH compliant and RoHS compliant virgin material. The products comply to the relevant British Standards as summarised below:

Standard	Product
BS 4514	Specification for plastics piping systems for PVC Soil and ventilating pipes of 82.4mm Minimum Mean OD. Unplasticized poly(vinyl chloride) (PVC-U).
BS 1451	Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure. Polypropylene (PP).
BS EN 1455	Plastics piping systems for soil and waste (low and high temperature) within the building structure. Acrylonitrile-butadiene-styrene (ABS).
BS EN 1401	Plastic piping systems for non-pressure underground drainage and sewerage. Unplasticized poly(vinyl chloride) (PVC-U).
BS EN 1329	Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure. Unplasticized poly(vinyl chloride) (PVC-U).

uPVC Physical Properties

» Specific Gravity: 1.42

» Inflammability: does not support combustion

» Specific heat: 1.00kJ/kg/0C

» Thermal conductivity: 0.180J/m2/s/0C/m

» Impact Strength: complies with relevant standard.

» Tensile Strength: in excess of 45MN/m2 at 20^0C

Characteristics of uPVC Material used:

Modulus of Elasticity = E (1 Min) > 2400 N/M^2

Average Density = 1.4 g/Cm^3

Average Co efficient of Linear Thermal Expansion =0.08 mm/ °C

PROPERTIES OF TETRAFLOW PIPE SYSTEMS

- Corrosion Resistance
  uPVC, ABS and PP Pipe do not corrode and are totally unaffected by acids, alkalis and electrolytic corrosion from any source. They are non-conductors and totally resistant to all types of galvanic and electromechanical influences which might corrode it. In this respect they outclass any other pipes material including stainless steel. In fact uPVC, ABS and PP are totally unaffected to any type of corrosion caused by water.

- Light in weight Easy and Quick to Install
  TetraFlow pipe systems are only about 1/5 the weight of an equivalent cast iron pipe and from 1/3 to ¼ the weight of an equivalent cement pipe. Thus the cost of transportation and installation is cut down enormously.

- Excellent Hydraulic Characteristics
  TetraFlow uPVC, ABS and PP, ABS and PP pipes have extremely smooth bore due to which frictional losses are at minimum and flow rates are at the highest possible than any other pipe material.

- Long Service Life
  Since plastic does not corrode and is resistant to most chemicals, the pipe does not lose strength due to either sewer gas corrosion or external galvanic soil conditions. The design of the pipe allows for a long-term deflection of 7.5%, without failure or damage.

- Flexible and resistance to breakage
  The flexible nature of TetraFlow uPVC, ABS and PP pipes means that unlike, cement or cast iron pipes, they are not liable to beam failure and thus can more readily accommodate axial deflection due to the solid movement or due to settlement of structures to which the pipes are connected.

- Resistance to biological growth
  Due to smoothness of inner surface of TetraFlow uPVC, ABS and PP Pipe, it prevents algae, bacteria and fungi formation inside the pipe.

- Effect of Frost
  Frost does not affect the performance of the system. However, impact strength is reduced during sub-zero temperatures.

- Effect of Solar Radiation
  Prolonged exposure to sunlight may cause the color to fade over time. We would however not expect this to seriously affect the performance of the system. It is advisable to protect the exposed parts by painting with any exterior water based paint.

- Thermal Expansion
  Coefficient of linear expansion 0.08mm /°C. Temperature raise i.e. 1.6mm per 2m length for a temperature raise of 10°C. An allowance is made for expansion of pipes and pipe fittings in each socket.

- Abrasion / Wear Resistance
  TetraFlow pipe has excellent resistance to abrasion, gouging and scouring, superior to that of most common piping materials. Plastic Pipes are up to 2.5 times more resistant to abrasions when compared to steel.

- Coefficient of Friction
  When piping systems are designed one of the main concerns is flow rate and pressure. Plastic Pipes provide smoother wall surfaces that reduce fluid friction and resistance to flow. This hydraulic smoothness inhibits slime build-up in sewers and virtually eliminates tuberculation and encrustation in water distribution mains. The end results are significantly lower maintenance costs, more efficient initial pipeline design, and superior performance over the lifetime of the pipe.

- Longer Lengths
  TetraFlow pipe is typically supplied in lengths of 3m lengths, however can be supplied in other lengths as required. This reduces the number of joints required as compared with other pipe products.

- Flame Resistance
  PVC Pipe is difficult to ignite and will not continue burning in the absence of an external ignition source. The spontaneous ignition temperature is 450°C.

- Compatibility with other UK pipe systems
  We would recommend only using our pipes in an installed system – i.e. TetraFlow pipes to by used exclusively with TetraFlow fittings. However, both the pipes and fittings can be interchangeably used with other leading UK suppliers of plastic pipe systems, as long as they are manufactured to same standard as the coinciding TetraFlow products.

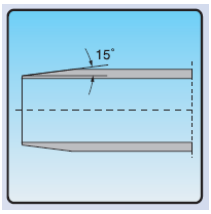
JOINTING INSTRUCTIONS

Push-fit Systems:

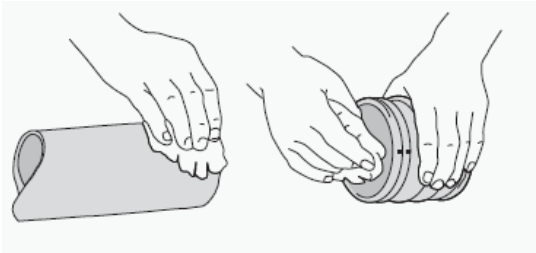
Ensure pipe is cut square and chamfered prior to assembly with fittings. Lubricate pipe and fitting with SILICONE Lubricant and push-fit to full socket depth. Withdraw pipe 5mm on waste system and 10mm on soil system to allow for expansion. Soil fittings with spigot ends should be inserted into sockets to depth marks engraved on spigot. This procedure automatically allows for expansion. Anchor fittings with a socket bracket to maintain expansion allowance.

Solvent Weld System:

Step 1. The pipe spigot to be cut square and clean all burrs to be removed. Ensure that both surfaces to be jointed are dry and free from dust or other debris. A chamfer to the depth of half the wall thickness at 15° inclination will be applied to each spigot.



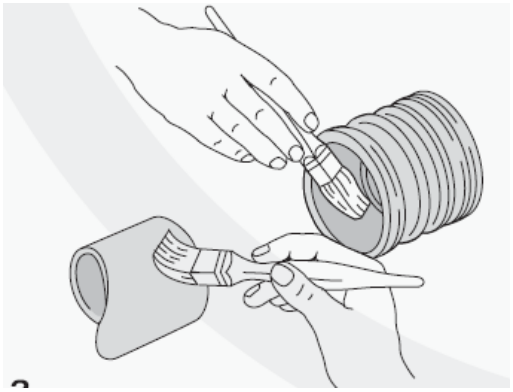
Step 2. All joints will be made with an approved solvent/cleaner, such as Weld-on solvent cement and cleaner. This removes all dirt and machine release agents and softens the surface ready for the chemical solvent weld. Failure to do this can result in joint failure.



Step 3. The spigot and socket to be jointed should be carefully examinedfor any damage which would impair the jointing procedure.

Step 4. The spigot insertion depth should be measured as the depth from the mouth to the root of the socket. The insertion depth should then be marked on the spigot using an indelible crayon.

Step 5. Using a brush apply an even layer solvent cement to the spigot and socket mating surfaces. The cement should be applied in a lengthwise direction and NOT with a circular motion. For joints of nominal diameter 3 and above, the cement should be applied simultaneously to the spigot and socket by two people.



Step 6. Immediately following cement application ensure that the parent pipe is suitably anchored, and push the spigot fully home in the socket without turning the pipe.

Step 7. The spigot should be inserted with a steady, continuous motion and held in place for 20 seconds.

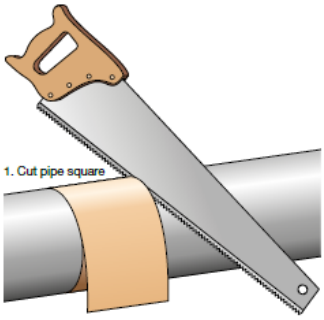
Step 8. Remove the surplus cement from around the mouth of the socket

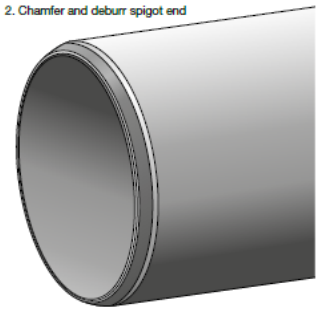
* Leave the joints to fully cure for 24 hours if hydrotesting is required.

Pipe Cutting Procedure:

1. Cut pipe cleanly at right angles to its axis (see Figure).
2. De-burr the cut end with a scraper if the cut end is to be inserted into a ring-seal or push-fit joint.
3. Chamfer the spigot end: this is essential to ensure that the socket is not displaced during insertion.

Figure : Pipe preparation



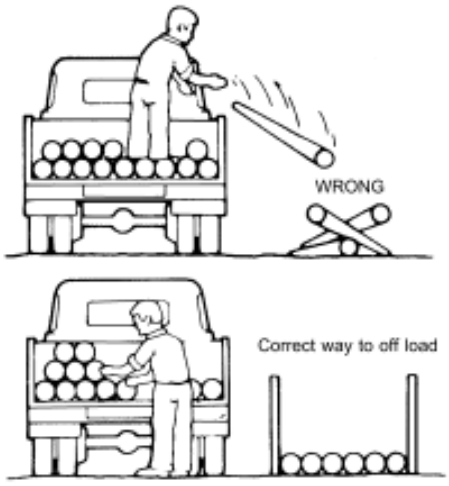


HANDLING, TRANSPORT AND STORAGE

TetraFlow pipes and fittings are manufactured from uPVC, ABS and PP material, which are less than a fifth of the weight of ductile iron. Pipes and fittings made from these materials are lightweight and there may be a tendency to employ improper handling techniques which result in damage to the pipes and fittings. Reasonable care should be taken in the handling and transport, which should be undertaken according to the following recommendations.

Handling

a) Pipes should not be dropped onto hard surfaces and should not be dragged along the ground. This is particularly important where the pipe ends have been prepared in the form of spigots (eg. chamfered ends) and integral sockets.



b) Where ever possible the loading and unloading of pipes should be carried out by hand and can be carried by to men in normal site conditions.

c) If mechanical lifting equipment is used no metallic slings, hooks or chains should be used in direct contact with the pipe. Rope or web slings are preferred, which will not gouge or cut the pipe wall. Gouges and cuts in the pipe wall can affect the pressure resisting capabilities of the pipe.

d) When pipes are being handled at or near freezing conditions, they should never be dropped of conversely have objects dropped on them. The impact strength of material is high but is reduced somewhat at lower temperatures and extra care is required. Pipes and fitting which have been subjected to abuse must be thoroughly examined before use for any evidence of structural damage.

Transport

a) If the pipe is to be transported the vehicles used should have a flatbed free from sharp projections of any kind.

Incorrect way to load pipes

Correct way to load pipes

b) The pipes should be evenly supported throughout their length and should not overhang the vehicle bed by more than 1 metre. Pipe should be loaded with sockets at alternate ends.

c) Larger diameter and/or thicker walled pipes should be loaded first and the vehicle should be fitted with side supports at no greater than 1.5 m. centers or continuously supported. These supports should be free of sharp edges.

Storage

To ensure that deterioration of pipe and fittings does not occur during storage, it is imperative that the following recommendations are adhered to.

Bundled Pipe

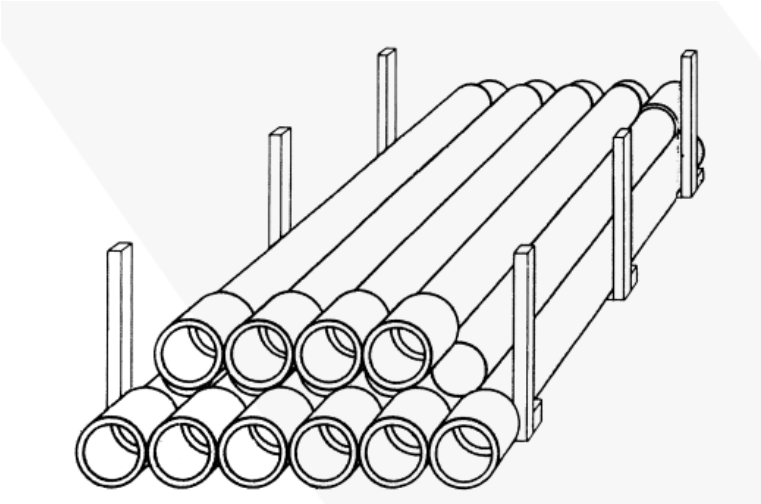
Pipes supplied in factory made bundles should be stored on a flat surface; bundles should not be stored on top of each other. The bundles should remain undisturbed until the pipe is required and any loose pipe should be stored according to the following recommendations.

Loose Pipe

a) TetraFlow Pipes should be stacked on a flat surface free from sharp projections, stones or other protuberances likely to cause point loading or pipe deformation.
b) It may be necessary to level the ground at the storage point in order that pipes may be uniformly supported throughout their length. An alternative means of storage is to lay the pipes on stout timber bearers not less than 75mm wide , placed at not greater than 1.5 m centres along the length of the pipe.

c) Side supports should be provided in the form of stout timber posts, not less than 75 mm square, placed at not greater than 1.5m centers along the length of the pipe. The width of stacked pipes should not exceed 3 meters.

When socketed pipes are stacked, the sockets should be placed at alternate ends of the stack with the socket protruding so that pipes are evenly supported along their entire length. Pipes of different sizes or wall thicknesses, should be should be stored separately or where this is not possible, those with larger diameters and/or thicker walls should be placed at the bottom of the stack.



d) The height of pipe stacks should never exceed seven layers or 2 metres, maximum height.

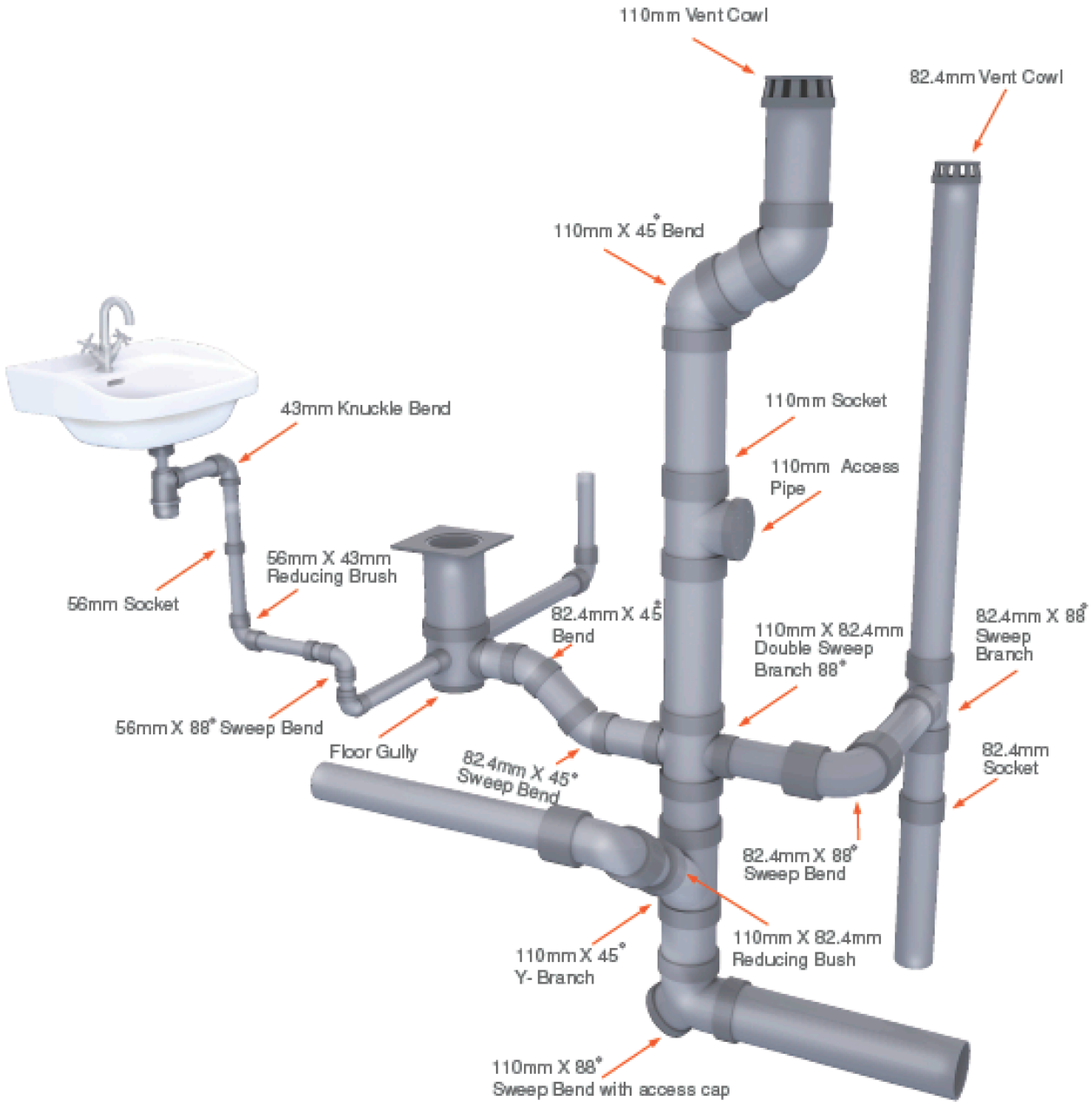
If prolonged storage (greater than one month) or storage in areas of high temperature (above 23° C) is anticipated the stack height should never exceed 4 layers or 1 metre maximum height. Such stacks should be protected from the effects of weathering (particularly ultra violet exposure) by placing tarpaulins or similar sheets over them, secularly fixed to the timber support posts, to provide protected and shaded conditions, which allow a free passage of air around the pipes.

e) Pipe fittings may be subjected to damage and/or the affects of corrosion or weathering if stored for long periods. For this reason fittings should be stored in sheltered conditions in such a way that they are protected from the effects of weathering and accidental damage.

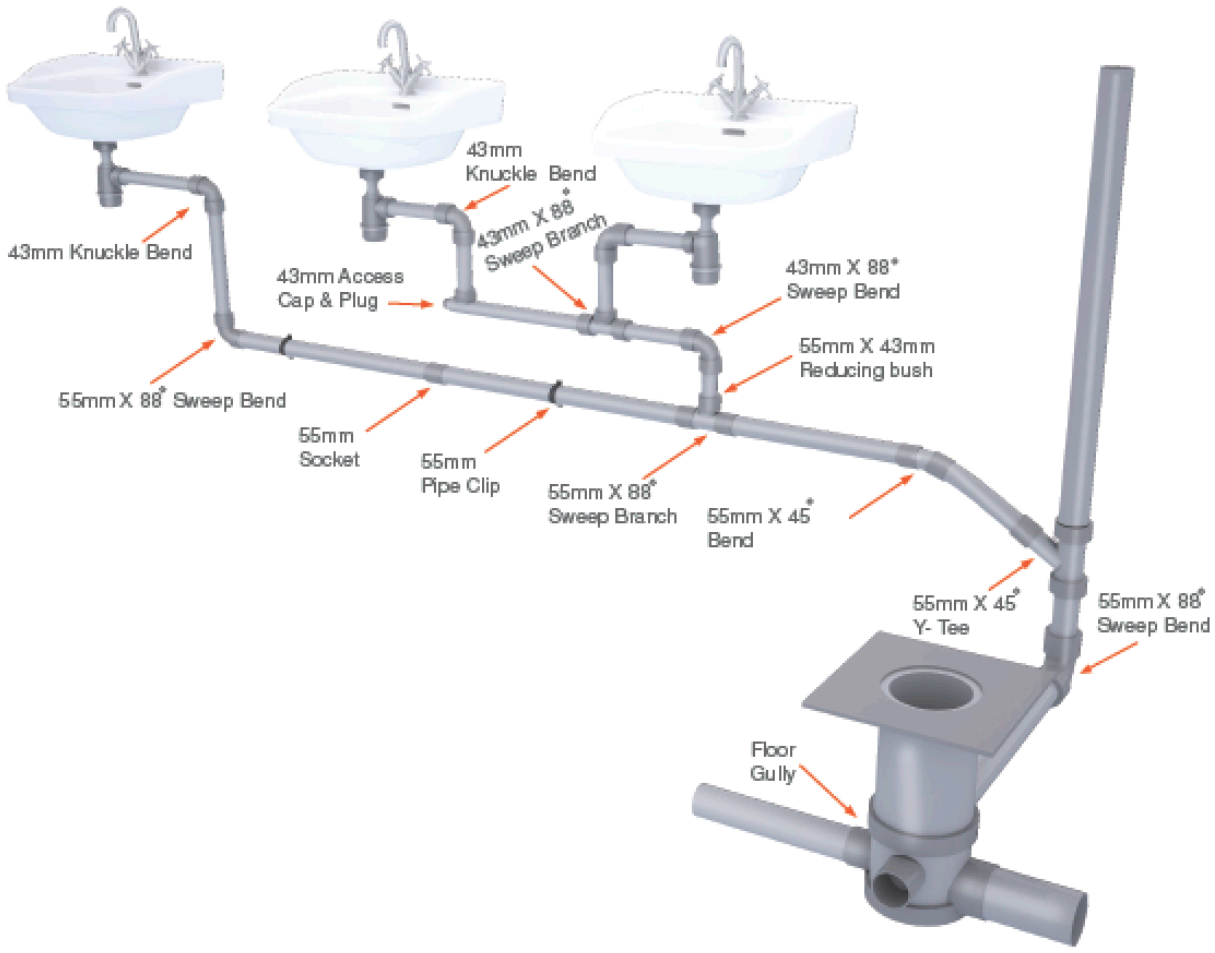
*Fittings will be stored in sheltered conditions in the boxes as supplied to protect them from weathering and accidental damage.

TYPICAL INSTALLATION

Typical S.W.V. Solvent Weld Systems



Typical Solvent Weld Waste System



Typical Underground Sewer System