

Durapipe PVC

Specification guide



INDUSTRIAL FLUID HANDLING

Durapipe PVC-U – for process chemicals and industrial fluid handling.

Our PVC-U pipe and fittings provide excellent chemical resistance making it ideal for various industrial applications.

PVC-U allows the safe transportation of many acids, alkalis and chemical concentrates without fear of corrosion and environmental pollution.

Durapipe PVC-U is a solvent welded, fully matched pipework system incorporating pipe, fittings and valves that is available in both imperial and metric sizes.

PVC-U is lightweight and is extremely easy to install which can save both time and money on any given project when compared to other, more traditional pipework materials.

Furthermore, Durapipe PVC-U is fully WRAS approved and it also meets the requirements of other internationally recognised standards and approvals.

Durapipe UK PVC-U pipe is listed in the 'List of Approved Products' published by the DWI.



Key Product Information

- Size Range: 1/2" to 12" (*Imperial*), 16mm to 315mm (*Metric*)
- Pressure Rating: (*Metric*)
Pipe – 20mm to 225mm PN16, 160mm to 315mm PN10
Fittings – 12mm to 225mm PN16, 250mm to 315mm PN10
- Temperature Rating: 0° to 60°C
- Pressure Rating: (*Imperial*)
1/2" to 6" pipe Class E
up to 12" pipe Class C
1/2" to 6" fittings Class E
8" to 12" fittings Class C

Key Product Features

- Lightweight
- Easy to install
- Corrosion resistant

Typical Applications

- Acids and alkalis
- Effluents
- Potable water
- Chemical processing
- Effluent treatment

PVC-U



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Specialist pipework system for process chemicals and industrial fluid handling



- Fully integrated range of pipe, fittings and valves (manual and actuated)
- Available in both metric and imperial systems
- Unrivalled level of third party approvals
- Easy to Install
- Corrosion resistant
- Reduced installation costs
- 50 year design life for pipe and fittings (25 year design life for valves)

What is PVC-U?

PVC-U (Polyvinyl chloride unplasticised) is a highly reliable resin with high performance properties in terms of thermal stability, chemical resistance and mechanical operation which is obtained by the presence of chlorine in the molecular structure.

The different formulations obtained by the addition of suitable additives and stabilisers, make PVC one of the most versatile plastic materials, providing several opportunities to use PVC in different industrial applications.

PVC overcomes many problems that can be associated with other pipework materials when conveying corrosive chemical fluids or the distribution or treatment of general water.



Durapipe PVC-U has been used for the conveyance of water, effluents, acids and chemical concentrates within different industrial applications for many years.

Where is typically PVC-U used?

- Water and Waste Treatment
- Chemical Processing
- Process Engineering
- Food and Beverage Manufacturing
- Marine
- Power Generation

What is PVC-U typically used for?

- Effluent Treatment
- Acids and Alkalis
- Chemical Dosing
- Brine
- Sterilants
- Flocculants



Water Treatment

Wessex Water, Dorset Waste Treatment

"The team at Durapipe provided excellent service from the initial enquiry, continuing throughout the installation process."

Mike Back, Damar Group



South West Water Water Treatment

"We wanted to standardise our pipework specification to a single manufacturer which has all the required compliances and approvals to support our industry."

**Graham Cookson,
South West Water**



Thames Water, Hampshire Effluent Treatment

"Durapipe PVC-U was the most appropriate solution due to its lightweight material and maintenance free qualities."

**Darren Brighton,
Tuke & Bell**



Durapipe FIP
PVC-U

Case Study Examples

Process Industry

Wedge Group Contaminated Water

"Durapipe PVC-U was the obvious choice to carry our contaminated water, the product is reliable and hard-wearing."

**Andrew MacLean,
Newport Galvanisers**



Autoglym Car Care Chemical Process

"Given the exacting requirements of this project, Durapipe PVC-U pipe, fittings and valves were installed for all pipework requirements, to ensure consistency throughout the factory."

**Tim Sellicks,
Brimair Engineering**



Industrial General

BB Battery Plant, China Lead Oxide Slurry Distribution

"We needed to ensure the pipework system could cater for the substances that would be passing through it and the technical advice and support offered by Durapipe UK during the specification stage of the project was exceptional."

**Mike Dunn, Chloride
Technical & Trading**



Hi-Tech Coatings Water based coatings for print

"We chose Durapipe PVC-U due to its high chemical resistance properties. Additionally Durapipe actuated valves allow us to control the flow remotely, making the operating process smoother and more efficient."

**Martin Skillen, Director,
Hi-Tech Coatings**



For Durapipe Guardian Case Studies see Page 82

Why use PVC-U?



Chemical Resistance

PVC-U has excellent chemical resistance properties which allows the safe

transportation of a range of industrial fluids and aggressive chemicals without fear of corrosion and environmental pollution.

For a full details of the chemical resistance of Durapipe PVC-U please refer to the Durapipe website (www.durapipe.co.uk/Technical/Chemical-resistance) or contact our Technical Support Team on 01543 272445.



Cost-effective Pipework

PVC-U pipe and fittings are extremely cost-effective, both in terms of material

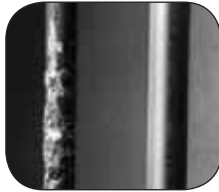
cost and even further when considering installed costs. A PVC-U system can offer economic benefits over many years due to its high performance qualities as well as low maintenance properties especially when compared to alternative materials. No expensive tooling, equipment or hot works are required for installation which makes the system extremely cost-effective.

Corrosion and Limescale Resistant

PVC-U is extremely corrosion resistant even when conveying chemical concentrates, acids and alkalis or contaminated water. Furthermore, the smooth-bore lining of PVC-U pipework prohibits any limescale build-up, which not only helps to maintain a consistent flow rate, but can also mean less maintenance costs during the lifetime of the system.



Corroded steel pipe



Copper pipe vs PVC-U pipe



Plastic pipe



Reduced Installation Costs

PVC-U is a solvent-weld jointed pipework system, which when coupled with the many other factors that make plastic pipework easier to install than traditional materials, mean that PVC-U can deliver reduced installation costs when compared to alternative pipework materials.

Lightweight

PVC-U is approximately one-sixth of the weight of steel pipework. Therefore, Durapipe PVC-U is much easier to handle, especially during installation on-site.



Fast, Simple and High Integrity Jointing

Solvent welding is a simple process which produces a permanent joint of strength equal to, or exceeding, the pipe itself. No special tools, equipment or hot works permits are required.



Sustainability and Environment

The energy used to make Durapipe PVC-U from raw material compares favourably with, for example steel pipe manufacture because lower conversion temperatures are needed. Furthermore, our processes are clean with low process emissions.

Durapipe PVC-U pipe and fittings are cheaper and easier to transport because they are lighter in weight than the equivalent metal pipes. They can be recycled at the end of life into other products, and scrap during the manufacturing process can also be recycled and reused. This minimises the need for any thermoplastic pipe scrap entering the waste stream.

Why use Durapipe FIP PVC-U?

Valves and Flow Control

A comprehensive range of valves is available to support the Durapipe FIP PVC-U system. These include ball, butterfly, diaphragm, non-return, metering ball valve, solenoid and air release valve types which can all be either pneumatically or electrically actuated.

Similarly, we also offer a wide selection of flow control products such as flowmeters and sophisticated measuring devices which can be easily incorporated into a matched Durapipe FIP PVC-U pipeline.

Our in-house Valve department, dedicated to our valves and flow control products, provides expert advice about product selection and system design.

Various tools including valve code builders can be found on the Durapipe UK website, or alternatively contact our Valve and Flow Control department.



Technical Support

We offer an unrivalled level of technical support where our experienced team can provide product training and installation advice on any given project. We will also provide material take-off advice if architects' drawings are supplied.

Unrivalled Third Party Standards and Approvals

Durapipe FIP PVC can boast the highest levels of international standards and approvals in the industry.

The system is both fully WRAS approved and is also listed in the 'List of Approved Products' published by the DWI.

This unrivalled level of third party approval offers total assurance to the designer, installer and end user that Durapipe PVC-U is a consistent and reliable pipework system.

Furthermore, Durapipe FIP PVC-U is manufactured to the highest level of quality and meets with the requirements of many international standards and approvals.

Durapipe FIP PVC-U has a 50 year design life on pipe & fittings (25 years on valves) with a residual safety factor of 2:1.



Approved for use within public water supplies and by the Secretary of State. Durapipe PVC-U is listed in the "List of Approved Products" published by the DWI.

Quality Manufacturing

Quality is central to the operation with BS EN ISO9001 certification and within an environmental management system which operates in accordance with the requirements of ISO14001.



Global Distribution Network

Durapipe FIP PVC-U is available from an extensive international network of distributors and stockists.

Please contact us for details of your nearest outlet.

Company Chemist

Our internal company chemist is at your disposal. If you have concerns regarding the chemical combination that a pipework system needs to convey, we can evaluate suitability of the chemical you wish to convey and advise on the best material to use for the system.



Abrasion Resistance

Durapipe FIP PVC-U offers good resistance to abrasion and erosion from aggressive slurries.

No Metallic Stabilisers

Durapipe FIP PVC-U does not contain any harmful metallic stabilisers, and is widely used to convey high purity deionised water in semi-conductor and pharmaceutical applications.

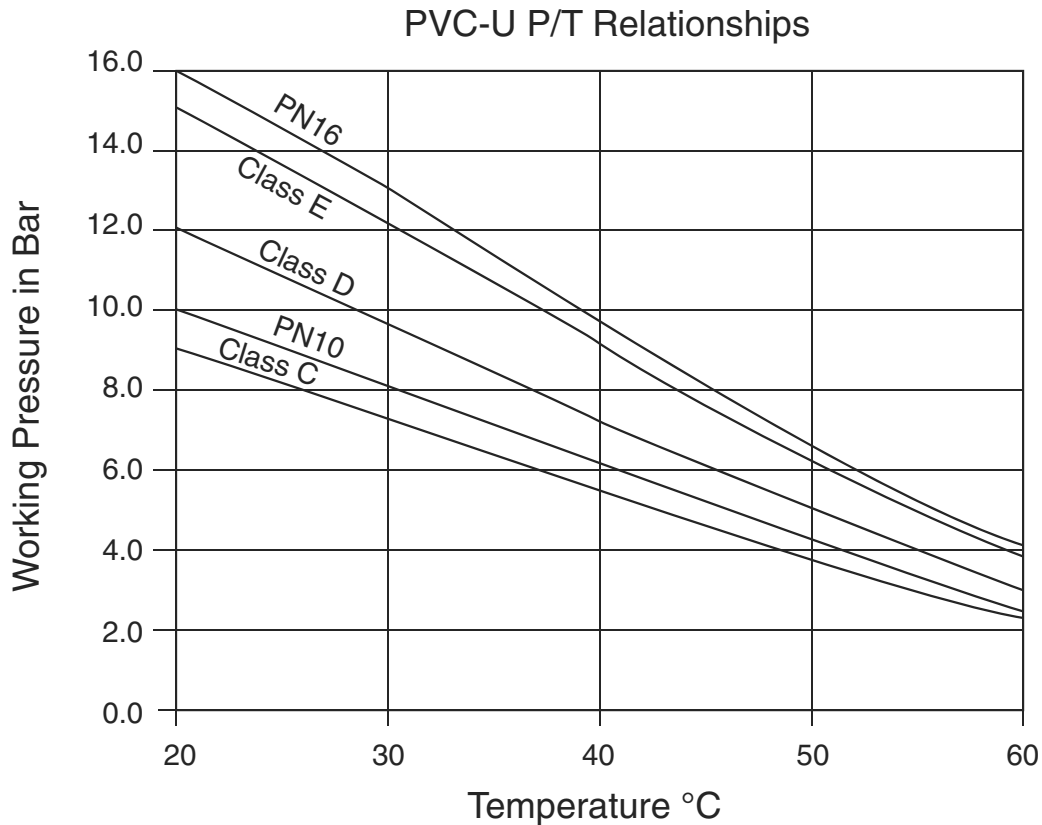
Non-Toxic

Materials used are selected for their toxicological properties, and suitability for conveying cold potable water.

Technical Information

Maximum pressure/temperature relationship

1. Graph is based on an ambient temperature of 20°C.
2. For higher ambient temperatures decrease the working pressure by 5% for every 10°C above 20°C ambient.
3. Durapipe PVC-U systems should not be used at temperatures in excess of +60°C or below 0°C.



Flow calculations

Pressure drop due to friction can be determined for practical purposes using the flow nomogram on the page 10.

The pressure drop at a given flow rate can be determined as follows:

1. Obtain the internal diameter of the pipe to be used by referring to the dimension table right:
2. Mark this diameter on Scale A.
3. Mark the required flow rate in litres per second on Scale B.
4. Draw a straight line connecting the points on Scales A and B and extend this to Scales C and D.
5. The velocity of flow in metres per second is determined from the intersection with Scale C.
6. The frictional head loss in metres per 100 metres of pipe can then be read off Scale D.

Table of Pipe Internal Diameters

Size	Class C	Class D	Class E	Class 7
1/2"	-	-	17.6	13.4
3/4"	-	-	22.3	18.3
1"	-	-	28.6	24
1 1/4"	-	37.2	36.2	31.8
1 1/2"	-	42.7	41.5	37.3
2"	54.7	53.5	51.9	48.5
2 1/2"	-	-	-	-
3"	81.3	78.9	76.5	-
4"	104.5	101.3	98.5	-
5"	-	125.4	-	-
6"	154.1	149.3	144.9	-
8"	203.2	198.2	-	-
10"	253.2	-	-	-
12"	300.2	-	-	-

Note: Dimensions are given for guidance only.

Size	PN10	Size	PN16
20	-	20	17.0
25	-	25	21.2
32	28.8	32	27.2
40	36.2	40	34.0
50	45.2	50	42.6
63	57.0	63	53.6
75	67.8	75	63.8
90	81.4	90	76.6
110	101.6	110	96.8
125	115.4	125	-
140*	125.4	-	-
160	147.6	-	-
200	184.6	200	-
250	230.8	225	-
315	290.8	315	-

*=PN12 pipe

Fittings

The calculation of pressure drop in fittings is more complex but calculations can be made for equivalent lengths of straight pipe using the Formula $E = F \times D$ where:

- E = the equivalent pipe length (metres)
- F = the fittings constant (see table)
- D = the fitting internal diameter in mm.

To calculate the total pressure drop in the system, the equivalent straight pipe lengths for fittings is then added to the total straight pipe length to obtain the total drop.

Fittings constant

90° Elbow	0.03
45° Elbow	0.01
90° Tee – straight through	0.01
90° Tee – side branch	0.06
90° Bend	0.01
45° Bend	0.01
Reducing Bush (per size reduction)	0.015
Butterfly Valves	0.13
Diaphragm Valves	0.23
Check Valves	0.05

These values are included as a guide to facilitate calculation of overall system performance and should not be used in isolation.

Flow nomogram

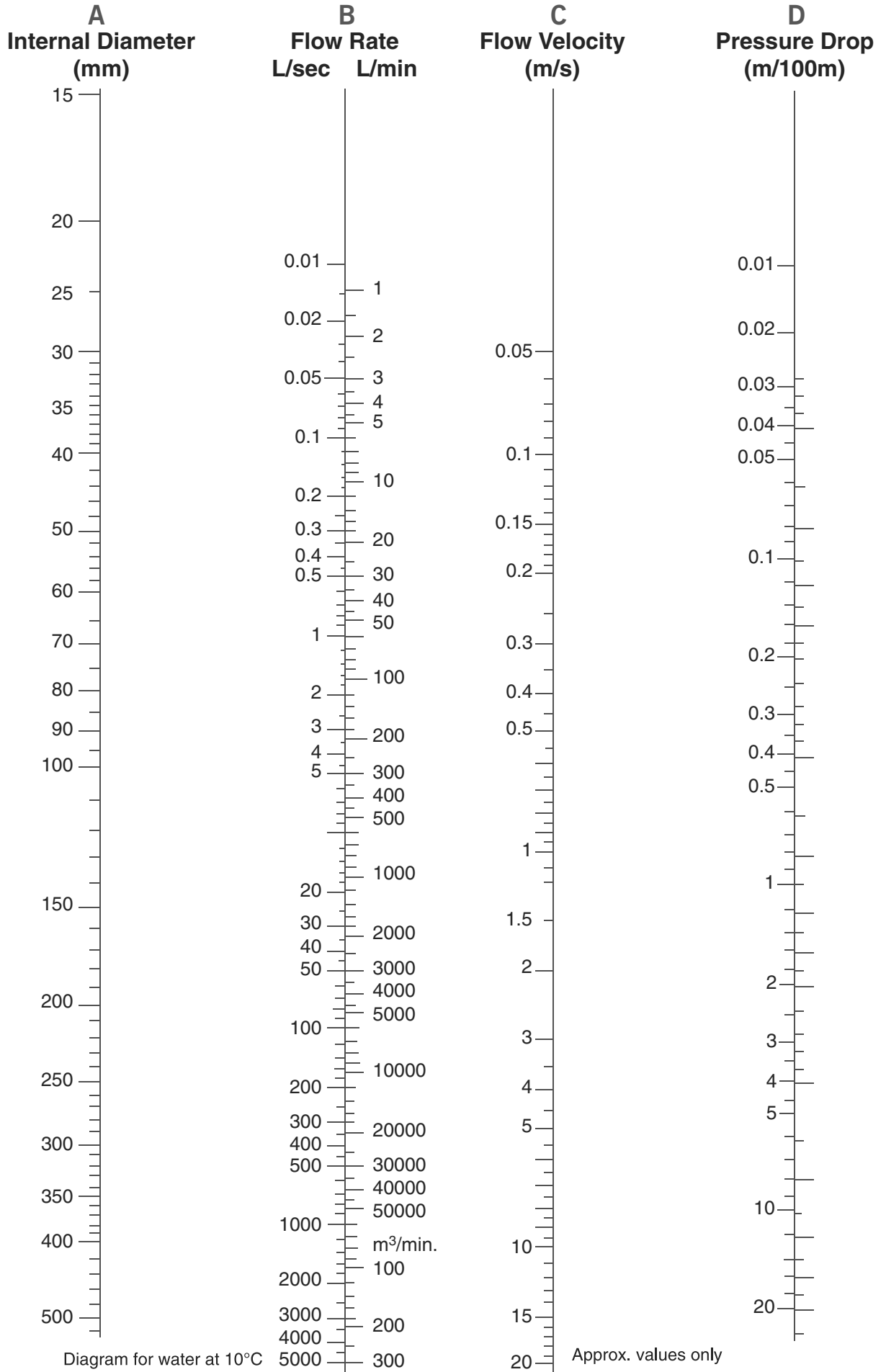


Diagram for water at 10°C

Approx. values only

Pipe routing

Systems installed above ground should be designed such that there are sufficient changes in direction to accommodate expansion or contraction. The support method described earlier will ensure that the pipework can move axially, without snaking. Utilise all available pipe flexibility. Do not place clips too close to changes in direction.

Calculating expansion and contraction

Temperature variations in a pipework system will increase or decrease the length of each pipe. This is the result of temperature changes in the fluid carried and also from ambient temperature variations.

The rate of expansion or contraction of pipework is dependent on its length, its coefficient of expansion and the temperature difference.

Increase/ decrease in pipe length is given by the formula:

$$\text{Expansion} = L \times \alpha \times \Delta T$$

where: L = length of pipe (mm)
 α = coefficient of linear expansion
 ΔT = temperature difference of the pipe (°C)

The coefficient of linear expansion for PVC-U = $6 \times 10^{-5}/^{\circ}\text{C}$
 Rule of thumb: PVC-U expands/contracts 0.6mm/ m per 10°C temperature change:

Example:

What is the expansion/contraction of an insulated, 30m long, PVC-U Condenser water main, installed at 15°C, operating at a maximum temperature of 35°C and a minimum temperature of 5°C?

Expansion:

$$\begin{aligned} L &= 30,000 \text{ mm} \\ \alpha &= 7 \times 10^{-5} \\ \Delta T &= 35 - 15 = 20^{\circ}\text{C} \\ \text{Expansion} &= 30,000 \times 7 \times 10^{-5} \times 20^{\circ}\text{C} \\ &= \underline{42\text{mm}} \end{aligned}$$

Contraction:

$$\begin{aligned} L &= 30,000 \text{ mm} \\ \alpha &= 7 \times 10^{-5} \\ \Delta T &= 15 - 5 = 10^{\circ}\text{C} \\ \text{Contraction} &= 30,000\text{mm} \times 7 \times 10^{-5} \times 10^{\circ}\text{C} \\ &= \underline{21\text{mm}} \end{aligned}$$

Hence the system must be designed, using expansion loops, the natural flexibility of pipe, or expansion bellows, to cater for a total differential movement of 63mm with an expansion of 42mm and a contraction of 21mm. When sizing expansion loops or free bending leg lengths at changes at direction, the greatest amount of movement should be used (expansion and / or contraction).

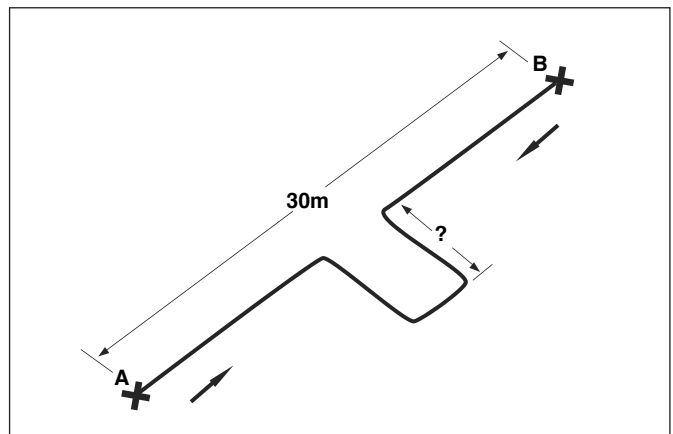
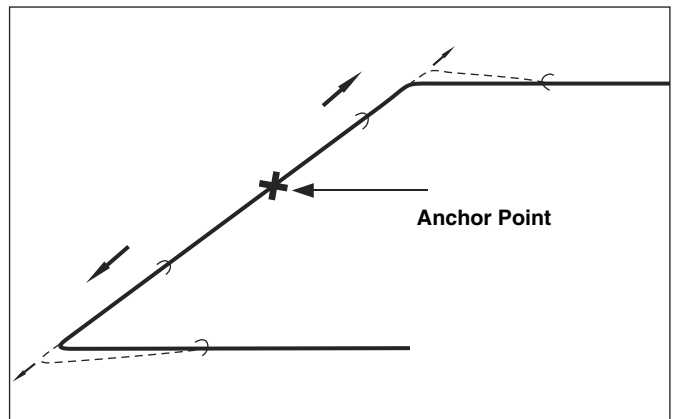
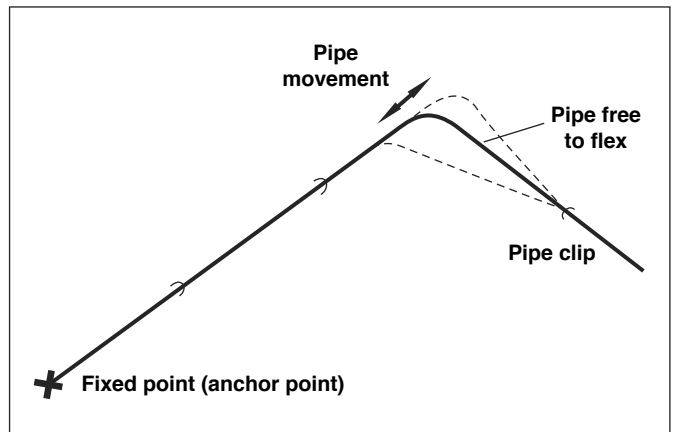
Catering for pipe movement

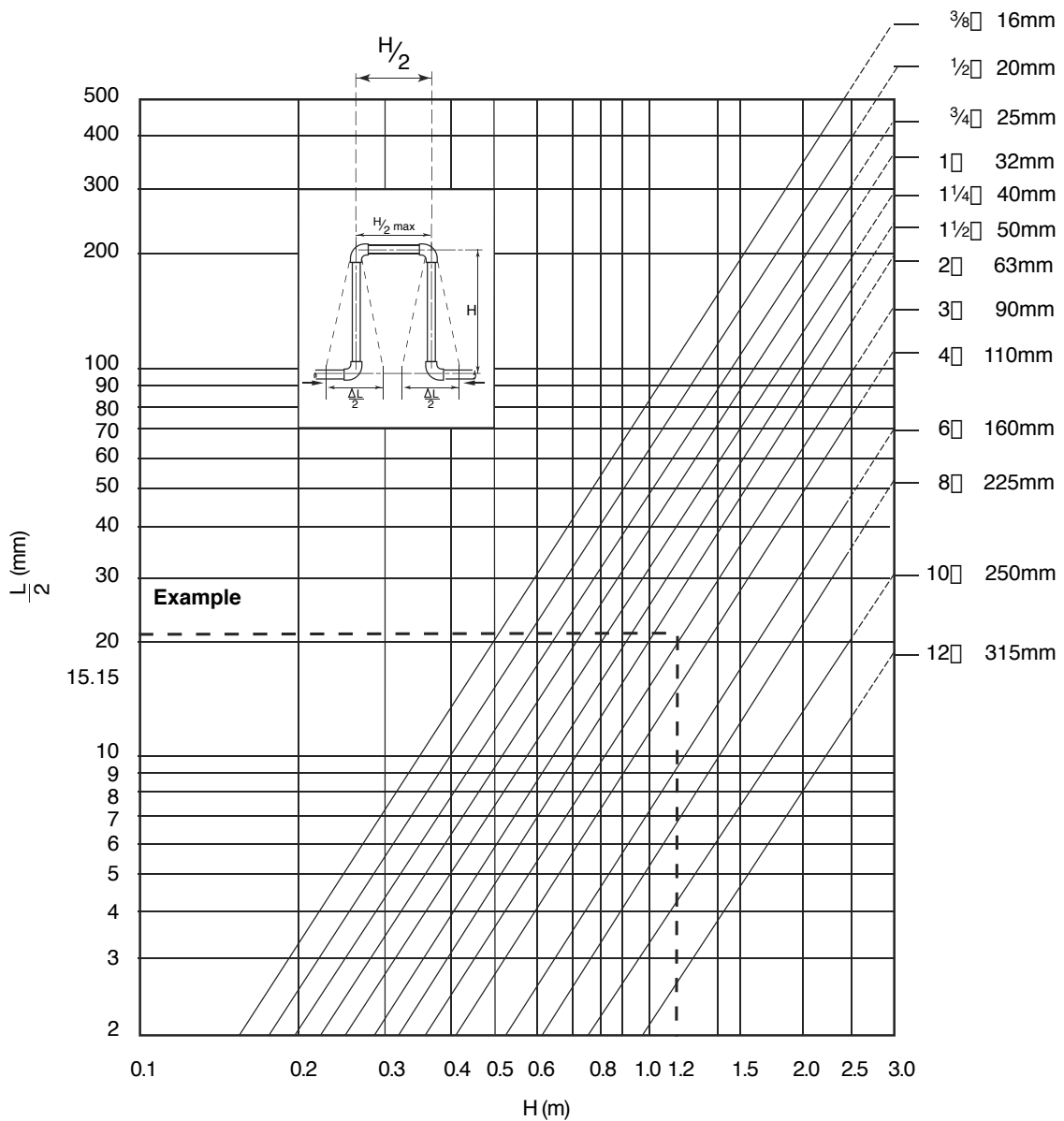
Systems installed above ground should be designed to ensure that there are sufficient changes in direction to accommodate expansion and contraction. The support method described later will ensure that the pipework can move axially without snaking.

If sufficient changes in direction are not available within the design of the system, alternative methods of catering for pipe movement can be considered such as expansion loops or flexible rubber bellows.

Expansion loops

The length of unrestrained pipe (free leg length) required to accommodate expansion can be calculated from the graph overleaf.





Example:

Calculate the size of expansion loop required for a 90mm diameter pipe expanding 42mm and contracting 21mm:

Based on the worst case ie. 42mm expansion, $\frac{\Delta L}{2} = 21\text{mm}$

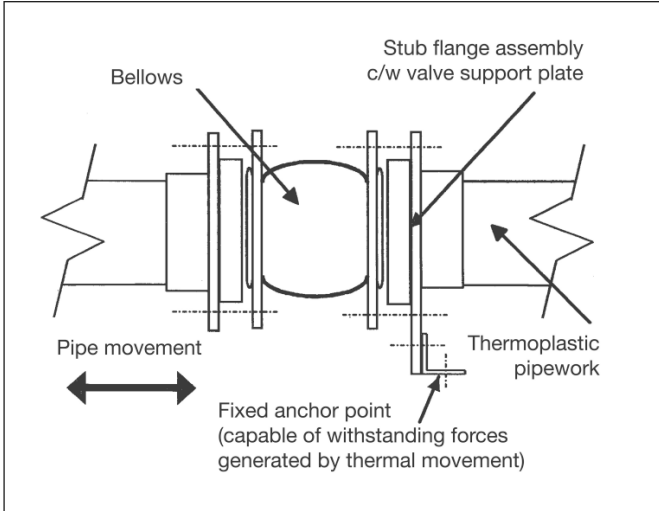
Draw a horizontal line from the vertical section to meet the 90mm pipe gradient line. Drop a perpendicular from the intersection point to the horizontal scale. The figure obtained is the free leg length of the loop required.

Hence, in this instance a loop measuring 1200mm long x 600mm wide will cater for $\pm 21\text{mm}$ movement i.e. the loop will cater for both the expansion and contraction of the pipe.

Expansion bellows

Axial expansion bellows may also be used in place of utilising the natural flexibility of the PVC-U. These must be of a suitable design to ensure correct operation with PVC-U pipework. Contact our Technical Support Department for further information.

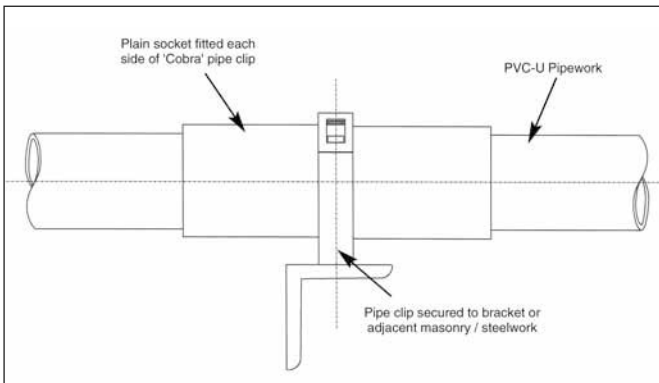
Typical bellows arrangement



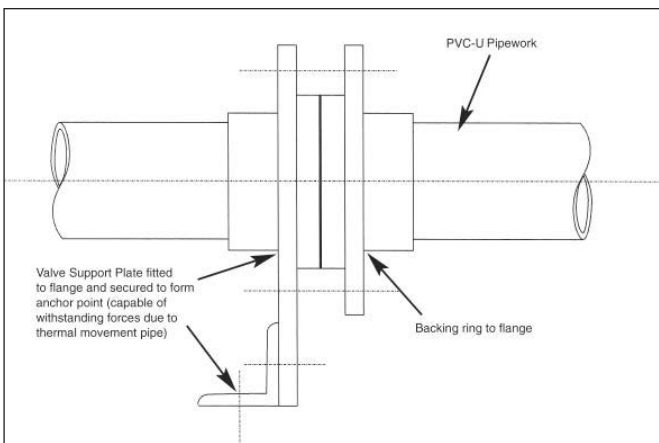
Anchor points

The direction of pipe movement can be controlled by the use of anchor points at strategic positions. There are a number of methods of securely anchoring plastic pipes, some of which are detailed below. However it should be noted that tight fitting pipe supports or U bolts should not be used since damage to the pipe could occur.

Construction of typical anchor points



1. Small Bore (up to 4" Pipework)



2. Larger pipe (above 4" Pipework)

Pipe supports and clips

Pipe supports and clips should provide lateral restraint and allow free, unrestricted, axial pipe movement. Standard 'drop rods' may not provide sufficient lateral restraint and the PVC-U pipe could start to 'snake'.

Durapipe Cobra clips are designed to meet these requirements. A suitable alternative would be mild steel saddle clips designed with a clearance between the pipe and the clip. All steel brackets in contact with the plastic pipe should be free of sharp edges to avoid damaging the pipe.

Support centres

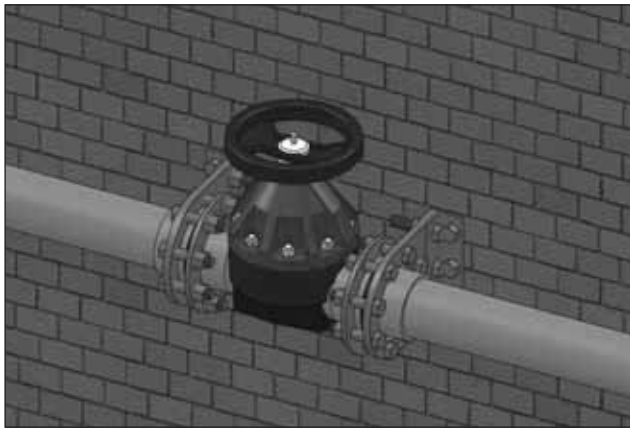
The recommended distance between supports for pipes filled with water is given in the table below. Where the contents have a specific gravity greater than 1 the distance must be decreased by dividing the recommended centre distance by the specific gravity. For vertical pipes, support centres may be increased by 50%.

Support distances

mm	Inch	20°C	30°C	40°C	50°C
20	¾	0.90	0.85	0.85	0.80
25	¾	1.00	0.95	0.90	0.90
32	1	1.10	1.05	1.00	1.00
40	1¼	1.30	1.25	1.20	1.15
50	1½	1.50	1.45	1.40	1.35
63	2	1.60	1.55	1.50	1.45
75	2½	1.80	1.75	1.70	1.60
90	3	2.10	2.05	1.95	1.90
110	4	2.40	2.30	2.25	2.10
125		2.50	2.40	2.35	2.20
140	5	2.70	2.60	2.55	2.40
160	6	2.90	2.80	2.70	2.60
200		3.20	3.10	3.00	2.90
225	8	3.45	3.30	3.25	3.10
250		3.60	3.45	3.40	3.25
280	10	3.80	3.65	3.55	3.40
315	12	4.10	3.95	3.85	3.70

Support of heavy equipment

Large valves, strainers and other heavy equipment should always be independently supported to prevent undue loading onto the PVC-U system. Durapipe valve support plates have been designed for this purpose and may be used in place of flange backing rings.



Anchor blocks

For wholly solvent welded systems the pipework is pressure balanced and anchor thrust blocks are not required. When rubber ring joints are used it is necessary to provide concrete anchor blocks of changes in direction such as elbows, bends, tees etc. This is necessary to withstand the forces generated by system pressurisation.

For greater detail, users in the U.K. are recommended to study the Code of Practice CP 312 published by the Pipe and Fittings Group of the British Standards Institute covering installations above and below ground.

Buried pipes

Recommendations covering essential requirements for installations below ground may be summarised as follows:

In general, trenches should not be less than a metre deep. Trenches should be straight sided, approximately 300mm wider than the pipe diameter to allow proper consolidation of packing materials. Trench bottoms should be as level as is practical. Large pieces of rock, debris and sharp objects should be removed. Alternatively gravel can be laid approximately 100mm deep on the floor of the trench. (Sand may be used but subterranean water is liable to wash sand away and leave the pipe unsupported.)

If pipes are jointed above ground, they should remain undisturbed for 2 hours before being lowered into the trench.

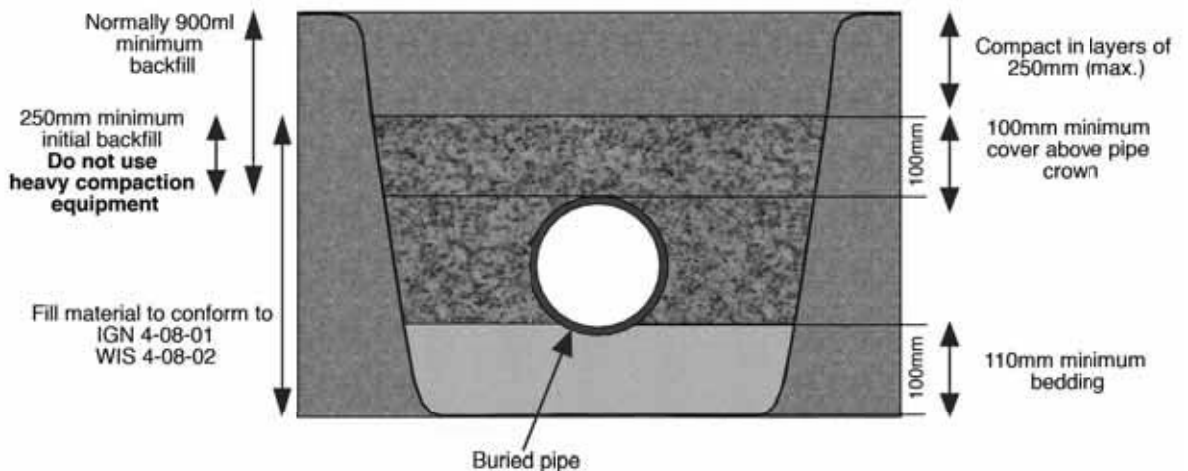
After laying, pipes should be covered with gravel or similar material to a depth of 100mm above the crown of the pipe. The gravel should be extended sideways to both trench walls and compacted. This should be done prior to testing, with joints left exposed.

Care should be taken to ensure that sharp objects, stones, etc, are prevented from falling into the trench before covering the pipe.

After pressure testing, joints should be covered with gravel or similar material, and back filling completed.

A section of pipe installed below ground to the above recommendations is shown in the illustration.

Buried Pipe Example



Additional Important Information

Thermal Insulation

Some insulation products can contain substances capable of having a detrimental effect on thermoplastic pipework.

Recommended insulation - A list of some of the common types of insulation materials known to be suitable with PVC-U pipework are as follows;

Fibre wool, such as 'Rockwool'
Armaflex Class 1 HT
Phenolic foam
Polystyrene

Note: the above list is not exclusive – please contact our Technical Support Department on 01543 272446 if further assistance is required.

Certain foam rubbers and adhesives used in conjunction with foam rubber insulation may be detrimental. We do not, therefore, recommend that insulation be bonded to the pipework. Adhesives should only be used to bond adjacent edges together.

Trace heating

Thermoplastic pipework can be damaged by plasticisers used in the outer coverings on some heating tapes. Tapes sheathed in plasticised PVC must be avoided, unless specifically approved by us. (This comment also applies to any tapes, adhesives, or other substances used to secure the heating tape to the pipework.) Recommended heating tapes - The selection of heating tapes with silicone rubber, woven wire, or woven polyester outer sheaths will eliminate the risk of plasticiser migration. These tapes are therefore preferred for use on thermoplastic systems.

Pipe contents identification

Do not put self-adhesive labels directly on to pipe surfaces as this may cause stress cracking. It is recommended that some sort of barrier, such as aluminium foil, is placed between pipe and identification label.

Intumescent mastic and mastic sealants

Certain mastic sealants are formulated with phthalates. Phthalates are known to be extremely aggressive toward PVC-U materials, and therefore confirmation of the suitability of any mastic sealant should be determined before being used in conjunction with PVC-U pipework.

Pipe clips

It is important that the composition of pipe clips and their linings do not include substances which might have a detrimental effect upon the PVC-U pipe. Please check for suitability before use. We recommend the use of Durapipe Cobra clips for pipe sizes up to and including 160mm OD / 6" NB, wherever circumstances allow.

Freezing conditions

Precautions should be taken to prevent contents freezing, as this can cause pipework to split.

Contact with fluxes

Some fluxes can be detrimental to PVC-U. Care should be taken when soldering copper pipework directly above, or close to, PVC-U pipework.

Buried pipes

Do not lay PVC-U in contaminated ground eg. 'brown-field' sites. Do not lay PVC-U in ground where spillages of chemicals may occur.

Thread sealants

Some thread sealants can damage PVC-U. PTFE tape should be used when making threaded connections. See page 20 for further information.

Resistance to UV (sunlight)

Care should be taken to avoid exposure to UV light, eg. sunlight, particularly during storage. This will cause discoloration and deterioration of the PVC-U material. Whilst this is a surface effect only, it is recommended that precautions be taken to prevent this happening. If stored outdoors pipe should be covered with opaque sheeting. If installed outdoors it can be protected from the effects of UV by insulating or painting.

Pressure surges

Durapipe PVC-U pipework can withstand pressure surges within the limitations detailed within CP312 Part 2:1973 and its amendment dated 1977. On no account should pressure surges be allowed to exceed the maximum continuous working pressure calculated using the graph on page 8.

Nominal pressure

Maximum allowed working pressure for continuous use at 20°C in conveying water must be less than or equal to the nominal pressure. If not otherwise stated, nominal pressure of Durapipe FIP fittings is as follow:

Solvent Welded Fittings:

From d16 up to d225 PN16.

From d250 up to d315 PN10.

Adaptor Fittings: From d16 up to d110 PN16.

Threaded Fittings: From 3/8" up to 4" PN16.

WARNING

DO NOT use PVC-U pipework to convey compressed air or gases. Do not test with compressed air or gases. This can result in explosive failure and may cause severe injury.

Durapipe PVC-U Jointing Guide

The cold solvent welding using 'Solvent Cement' is the standard procedure for jointing PVC-U pipes and fittings. The solvent cement operation is carried out by using solvent made from PVC-U polymer together with a mix of solvents. This mix of solvents softens the walls of the pipes and fittings and carries out the welding, resulting in a homogeneous welded joint.

Durapipe PVC-U pipes and fittings are designed for an interference fit. Although Durapipe PVC-U solvent cement has good gap filling properties no attempt should be made to increase the clearance between the pipes and fittings.

Solvent cement welding offers a simple and quick means of constructing high integrity, leak-free joints.

The solvent cement operates by chemically softening the joint surfaces. Joint integrity will be greatly reduced if these surfaces are not clean and properly prepared.

Durapipe PVC-U solvent cement **must** be used.

The jointing procedure detailed below must be followed.

This relates to the new "one-step" solvent cement. With this cement it is not necessary to abrade pipe or fitting.

Procedure

1. The pipe must be cut clean and square. A suitable wheel cutter will eliminate swarf. As an alternative (and on larger sizes) a carpenter's saw should be used, however this may create dust and swarf which can enter the system.



2. Chamfer the end of the pipe using a coarse file or suitable chamfering tool. The chamfer should be approximately 45° by 3mm to 5mm depending on the pipe size.

Recommended Chamfer Distances

Pipe size	Chamfer
1/2" - 20mm	3mm
3/4" - 25mm	3mm
1" - 32mm	3mm
1 1/4" - 40mm	3mm
1 1/2" - 50mm	3mm
2" - 63mm	5mm
2 1/2" - 75mm	5mm
3" - 90mm	5mm
4" - 110mm	5mm
5" - 140mm	5mm
6" - 160mm	5mm
8" - 225mm	5mm
10" - 250mm	5mm
12" - 315mm	5mm

This operation is very important as non-chamfering can cause the solvent cement to be scraped away from the internal surface of the fitting, causing a poor joint.



Remove any dirt, grease or moisture. A thorough wipe with a clean, dry rag is usually sufficient. Check dry fit. Pipe should insert easily into socket, approximately 1/4 to 3/4 of the total socket depth.

3. Mark the pipe a known distance from the end and clear of the area to be cleaned. This mark should be used to confirm full insertion of pipe into socket of fitting.



4. Ensure joint surfaces are clean and free from moisture. Clean surfaces thoroughly with Durapipe Eco-cleaner using lint free cloth/paper towel.



5. Using a clean brush, apply cement to the pipe and fitting. The joint surfaces should be completely covered by cement. Cement should be applied using an appropriate size brush. It is important to apply cement quickly to enable assembly without excessive force being required. When applying cement with brush, the size of the brush should be approximately half the size of the pipe to be jointed - brush size up to 2 1/2" (63mm) for 0.5 litre and up to 3" (75mm) for 1 litre tins. Generally, it is best practice to apply more cement to the pipe than the fitting, as excess cement on the fitting can result to cement pooling and potential softening of the material.



Note: Before commencing the solvent weld procedure, please check the expiry date of the solvent cement being used. Cement should be used within 24 months from the date on the base of the tin.

- Immediately after applications of cement, push pipe fully home into the fitting, as far as the internal stop, without rotation. After this operation, the fitting may be rotated if necessary for alignment (max. $\frac{1}{4}$ turn). Hold the pipe and the fitting for times varying from a few seconds on sizes $\frac{1}{2}$ " or 20mm up to 1 minute on sizes 8" or 225mm and above. The slight taper moulded into the fitting may otherwise cause it to slide off the pipe with consequent loss of joint strength. Application of the correct amount of cement will result in a neat bead of cement at the edge of the fitting and at the edge of the pipe. Excessive deposits inside the fittings must be avoided as these can weaken the wall, particularly on smaller sizes. When working under cold conditions make sure the joints are free from frost and moisture.



- Wipe off excess cement from the outside of the joint.



- Using the mark previously made, check that the pipe has been fully inserted.



- Do not disturb the joint for at least 15 minutes after assembly. Allow sufficient drying time prior to pressurisation of the system (see page 18).
- Replace lids on containers.

CAUTION

- DO NOT use near naked flames
- DO NOT smoke in the working area
- DO NOT use in confined spaces
- DO NOT joint in the rain or wet conditions
- DO NOT use dirty brushes
- DO NOT use dirty or oily cleaning cloths
- DO NOT use the same brushes for different cements
- Follow safety instructions on Durapipe solvent cement and Eco-cleaner containers
- Always wear appropriate personal protective equipment

Notes:

- The integrity of Durapipe PVC-U systems may be affected if Durapipe PVC-U solvent cement or HCR-36 chemically resistant cement is not used. Durapipe UK disclaims responsibility for any Durapipe PVC-U system constructed with any other cements or not fabricated in accordance with the instructions contained herein.
- On sizes 6" or 160mm and above use 3" wide brushes.
- To achieve the correct speed of application on sizes 4" or 110mm and above, cement should be applied simultaneously to pipe and fitting, by two people.
- Application of the correct amount of cement will result in a neat ring of cement at both ends of the joint.
- Where PVC-U pipework is to be used to convey concentrated chemicals please refer to page 18 for details on HCR-36 chemically resistant cement.
- Durapipe have produced a series of videos demonstrating the correct jointing procedures for the various pipework systems. Please visit www.durapipe.co.uk/Technical/Video/Index.asp

Branch connections - Reduced bore

Reduced branch connections can be made as follows:

Imperial range:

Bushed equal tees.

Metric range:

Bushed equal tees, reduced branch tees or bolt-on saddles.

Drying times

The drying times will vary with fit, amount of solvent cement applied, ambient temperature and working pressure. It is recommended that, wherever possible, joints of sizes up to 8"/225mm are allowed to dry for at least 24 hours, and sizes 10" and 12"/250mm and 315mm for at least 48 hours. These guidelines are based on an ambient temperature of between 10°C to 40°C. Longer drying times will be required at lower ambient temperatures.

It is recognised that there will be occasions when the system will need to be put into service within a few hours of being made. A rough but safe working guide where the ambient temperature is between 10°C to 40°C and the contents temperature does not exceed 20°C is as follows:

Size range	Drying time
Up to 4"/Up to 125mm	1.0 hour/bar
5" & 6"/140mm & 160mm	1.5 hours/bar
8"/200mm & 225mm	2.0 hours/bar
10 & 12"/250mm & 315mm	30 hours minimum

Note: Minimum drying period should never be less than 1 hour.

The consumption of solvent cement for carrying out the jointing depends on different elements (ambient conditions, pipe dimensions, viscosity of the cement, workers' experience etc).

An indication of the number of joints likely to be made per litre of Durapipe PVC-U solvent cement is as follows:

Size		Joints per 500ml PVC-U
mm	imperial	
12 - 32	3/8" - 1"	600
40 - 63	1 1/4" - 2"	240
75 - 90	3"	100
110 - 125	4"	60
140 - 160	6"	30
200 - 225	8"	16
280 - 315	10" - 12"	6

The solvent cement is made with PVC-U resin.

Instructions for use

1. Cut the pipe at right angles to its axis and chamfer it.
2. Clean surfaces to be welded together with HCR chemically resistant cleaner. Check dry fit. Pipe should insert easily into socket, approximately 1/4" to 3/4" of the total socket depth.
3. Apply solvent cement quickly in a thin and even coat into the fitting, and a thicker coat on the pipe-end, stroking the cement along and not round the surface.
4. If the solvent cement must fill a gap, a second (after 30 sec.) or even a third layer of the solvent cement can be necessary.
5. Immediately push the joint together and hold for a moment in this position. Remove any surplus cement. Do not charge the joint mechanically for the first 10 minutes. Do not use the solvent cement below temperatures of 5°C.

HCR-36 Chemically Resistant PVC-U Cement

HCR-36 Solvent Cement and HCR-36 Cleaner, is suitable for solvent weld jointing in applications where high chemical resistance may be required; HCR-36 is not sensitive to oxidation and contains no additives which dissolve in alkaline solutions, HCR-36 can be used as an effective alternative to Durapipe One Step Cement where chemical resistance is key.

Chemical resistance

For PVC-U system with the following chemicals, we would recommend the use of HCR-36 as a standard alternative to Durapipe one step solvent cement.

Sulphuric acid	Concentration higher than 70%
Nitric acid	Concentration higher than 20%
Hydrofluoric acid	Each concentration
Sodium hypochlorite	Active chlorine higher than 7.5%
Bases (caustic soda)	Concentration higher than 35%

Maximum gap 0.3mm	Maximum pressure
20°C	12 bar
50°C	6 bar
60°C	4.5 bar
80°C	1.5 bar

Maximum pressure depends also on the pipe system used and PN class.

Consumption: HCR-36 Solvent Cement:

Pipe Diameter (Amount of joints) per 1 Litre Container

Pipe Diameter (OD)	Average Joints per (1L)
1/2" - 20mm	1300
1" - 32mm	650
1 1/4" - 40mm	290
1 1/2" - 50mm	160
2 1/2" - 75mm	90
3" - 90mm	70
4" - 110mm	30



Consumption: HCR-36 Chemically Resistant Cleaner:

Pipe Diameter (Amount of joints) per 1 Litre Container

Pipe Diameter (OD)	Average Joints per (1L)
1/2" - 20mm	2000
1" - 32mm	800
1 1/4" - 40mm	700
1 1/2" - 50mm	650
2 1/2" - 75mm	330
3" - 90mm	240
4" - 110mm	140



Application

HCR-36 solvent cement is suitable for jointing pipes, couplings, fittings in PVC-U pressure and drainage systems up to 110mm. HCR-36 Cleaner should be used over standard Eco-cleaners when using HCR-36 solvent cement to ensure required chemical resistance.

Setting times

We advise when using HCR-36, please allow 48 hours drying time at a consistent temperature (medium temperature 20°C) and rinse the system with water before use.

Jointing properties

The welded joint is resistant to temperatures up to 80°C, the solvent cement joint is waterproof, and the chemical resistance against aggressive chemicals such as inorganic acids and bases is high compared with standard PVC-U one step solvent cement. **HCR 36 is not suitable for jointing in temperatures below 5°C**

Shelf life

HCR-36 Solvent Cement has a shelf life of 9 months from the date of manufacture.
HCR-36 Cleaner has a shelf life of 24 months from the date of manufacture.

Recommended Brush Size	
Pipe size	Brush size
16mm - 32mm (3/8" - 1")	8mm Round Brush
40mm - 110mm (1 1/4" - 4")	25 x 3mm Flat Brush

Dates of manufacture can be located on the base of the tin.

HCR-36 Chemically Resistance Jointing Guide

1. The pipe must be cut clean and square. A suitable wheel cutter is recommended which will eliminate swarf from entering the system.
2. Chamfer the end of the pipe using a coarse file or chamfering tool, the chamfer on the outside of the pipe should be approximately 45° by 3mm to 5mm depending on the pipe size.

This operation is very important as non-chamfering can cause the solvent cement to be scraped away from the internal surface of the fitting, resulting in a poor joint.

3. Clean the mating surface of the pipe and fitting to be jointed with **HCR-36 Cleaner** (Product Code: 03 467 395) to remove any dirt, grease or moisture.
4. Measure the insertion depth of the socket and mark this onto the pipe after adding a known measurement (so insertion depth can be checked after installation).
5. Check the dry fit of the pipe and fitting, the pipe should enter the fitting easily into the socket, approximately 1/4 to 3/4 of its initial depth.
Note: Before applying the HCR-36 Cleaner or HCR-36 Solvent Cement, please check the expiry dates.
6. Apply the solvent cement to the surface of the inner fitting with a thin even coating and apply a thicker coat to the pipe end, stroking the cement along and not around the surface. The cement should be applied using an appropriate sized brush, the size of the brush should be approximately half the size of the pipe that is being jointed (Please refer to the brush sizing table).

Excess cement deposits inside the fitting must be wiped away with a clean dry cloth, as this can weaken the wall, particularly on the smaller sizes.

7. If HCR-36 is required to fill a gap, please allow 30 seconds before a second or third coat is due to be applied.
8. Immediately after the application of cement, push the pipe fully into the fitting, as far as the internal stop without rotation, hold the joint still for a few seconds ensuring the pipe is secured into the fitting (Larger sizes may require extra time). After this operation, the fitting may be rotated if necessary. A neat bead of solvent cement should be evident around the pipe and fitting juncture, which will indicate the correct amount of solvent cement has been applied,
9. Replace lids securely on the **HCR-36 CR Solvent Cement** and **HCR-36 CR Cleaner** to avoid unnecessary evaporation.
10. Do not disturb the joint for at least 15 minutes after the initial assembly, allow 48 hours drying time at a consistent temperature prior to pressurisation or testing of the system see page 18.

Technical Information

The use of bushes and reducers

Reducing bushes

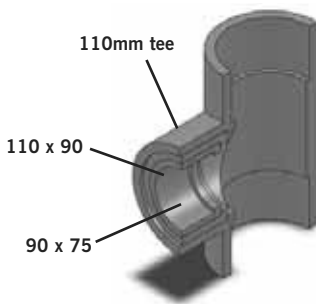
Reducing bushes offer a neat and simple method of reducing socket size in the minimum of space. Care must be taken to prepare properly all jointing surfaces as recommended earlier, with the end of the bush being chamfered (unless a moulded chamfer is included).

Ensure that adequate solvent cement is applied to surfaces to be jointed. The shape of the bush can make it difficult to hold when applying cement to the outer surface. A short length of pipe pushed into the bush can be used as a handle, to make this operation easier.

The correct amount of solvent cement will result in a complete ring of cement being formed at both ends of the joint.

The use of reducers

All fittings have female ends, dimensionally controlled for cold fusion jointing. In addition the metric series reducers are provided with controlled outside diameter at the large end. They can therefore be used as male or female components as shown.



Example in the use of reducing bushes.

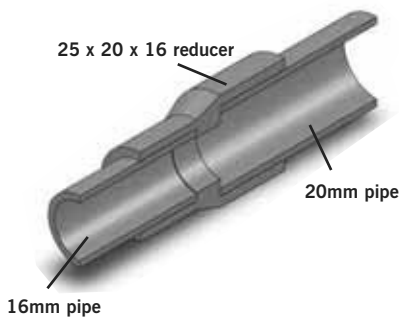


Illustration shows use of the inner socket of the reducer.

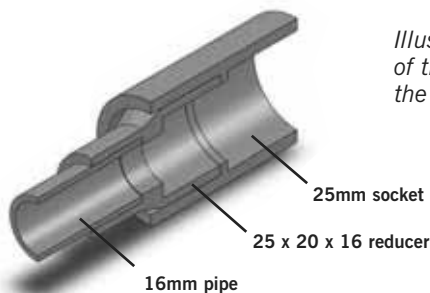


Illustration shows use of the outer spigot of the reducer.

Threaded connections

Connections - plastics to metal

There are several recommended methods to connect metal and plastic systems:

- Composite unions
- Flanges
- Male threaded fittings
- Female threaded fittings

Plastics expand or contract more than metals for any given change in temperature. The practice of connecting plastic threaded fittings to metal threads is not recommended where the joint is likely to experience a temperature change of more than +/-5°C, otherwise leaks may occur.

Composite unions are available with brass male or female BSP threaded adaptors.

If it is required to cut a thread on to Durapipe PVC-U pipe, use a sharp die especially reserved for plastic pipes and cut full thread depth without lubricant, in one operation.

This should only be attempted on pipe sizes up to 2" n.b. Class 7 pipe must be used. Pipes from Durapipe PVC-U metric range are not suitable for threading.

Assembly should be carried out by hand and final tightening by a strap wrench, if necessary.

Extra care must be taken not to overtighten or damage the thread. **Pipe wrenches must not be used.**

It is recommended that PTFE tape be used when making threaded joints/connections.

Any other sealing compound must be confirmed by Durapipe UK as being suitable.

'Boss White' and anaerobic adhesive sealants, such as Loctite 542 and 572, can chemically attack PVC-U and must **not** be used.

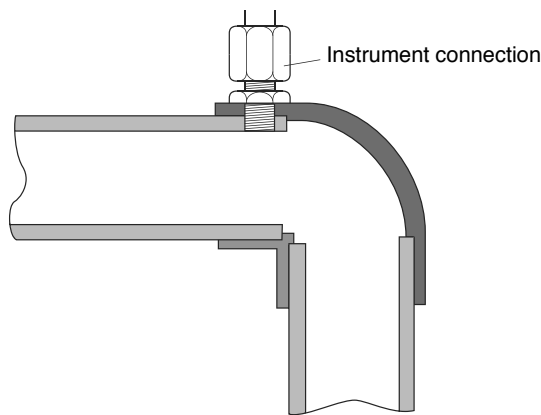


Connections for instrumentation

Instrumentation connections can be made by drilling through pipe and socket where the material is at its thickest and tapping the hole to receive a threaded fitting, as shown below:

Pipe size	Size of connection
16mm-63mm/3/8"-2"	Use tees, reducing bushes and threaded fittings
75mm-110mm/2 1/2"-4"	Max. tapping 1/2" BSP
125mm-140mm/5"	Max. tapping 3/4" BSP
160mm & above/6" & above	Max. tapping 1" BSP

Such connections, if correctly drilled and tapped with a full thread form, will be limited to Class C pressures.



Flanged joints

Full face flanges are available from 1/2" to 4" and 25mm to 110mm. Stub flanges are available from 2" to 12" and in metric sizes from 20mm to 315mm.

The correct galvanised mild steel backing ring and rubber gasket must be used with stub flanges (backing rings not required on moulded full face flanges).

Flange bolting procedure

The following procedure is recommended for installing Durapipe PVC-U flanges:

1. Inspect flange faces and ensure that they are clean and undamaged.
2. Check that the correct backing ring and rubber gaskets have been supplied. Durapipe UK supplies a matched system of flanges and backing rings - do not interchange Metric and Imperial components.
3. Loosely assemble flanges. Ensure that flanges and bolt holes align and that the flange faces are parallel. Ensure that the gasket is correctly positioned between the flanges.
4. Ensure that the appropriate sized washer are placed under both bolt heads and nuts.
5. Tighten the nuts and bolts in a diagonally opposite sequence (see right) to ensure even loading around the flange to avoid distortion. It is recommended that the nuts and bolts be tightened as uniformly as possible progressively from a finger tight start.
6. Repeat as necessary until recommended torque value at all bolts is achieved.

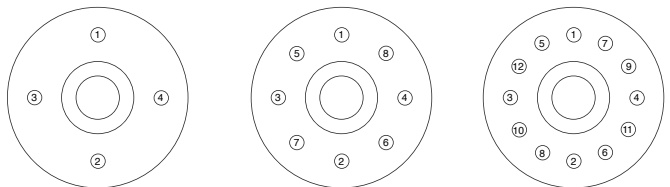
Tightening torques for flange bolts in PVC-U piping systems

Recommended Torque Values (Nm)

Size	Torque
16	15
20	15
25	15
32	15
40	20
50	30
63	35
75	40
90	40
110	40
125	50
140	50
160	60
200	70
225	70
250	80
315	100

The tolerance on torque is +/- 10%

Tightening sequence



Comparison of PVC-U Imperial and Metric Sized Pipe

Tabulated below is a comparison of imperial sized PVC-U pipe to BS3505 and metric sized pipe to EN 1452-2. They are produced to different standards, but can be joined together using flanges or adaptors.

The systems are also designated differently; the imperial system refers to the nominal bore size; the metric system relates to the outside diameter.

Both systems are produced with the outside diameter as the controlled dimension. This enables the same fitting of a particular size to be joined to all classes of pipe in that size.

Please refer to the pipe section in this brochure for pipe sizes available from Durapipe UK.

Threaded systems

Imperial systems Class 7 pipe can be machined to BSP parallel or BSP taper thread forms. Metric pipe is not produced with an outside diameter suitable for threading.

Imperial System (BS EN 1452)							Metric System (EN 1452-2)				Design Coefficient
Size (nominal bore) (inch)	Minimum mean outside diameter (mm)	Minimum wall thickness (mm)					Size outside diameter (mm)	Min. mean outside diameter (mm)	Min. wall thickness (mm)		
		Class B	Class C	Class D	Class E	Class 7			PN10	PN16	
							16	16.0			2.5 up to 90mm
1/2	21.2				1.7	3.7	20	20.0		1.5	
3/4	26.6				1.9	3.9	25	25.0		1.9	
1	33.4				2.2	4.5	32	32.0	1.6	2.4	
1 1/4	42.1				2.7	4.8	40	40.0	1.9	3.0	
1 1/2	48.1			2.5	3.1	5.1	50	50.0	2.4	3.7	
2	60.2		2.5	3.1	3.9	5.5	63	63.0	3.0	4.7	
2 1/2	75.2		3.0	3.9	4.8		75	75.0	3.6	5.6	
3	88.7	2.9	3.5	4.6	5.7		90	90.0	4.3	6.7	2.0 from 110mm
4	114.1	3.4	4.5	6.0	7.3		110	110.0	4.2	6.6	
							125	125.0	4.8	7.4	
5	140.0	3.8	5.5	7.3	9.0		140	140.0	5.4	8.3	
6	168.0	4.5	6.6	8.8	10.8		160	160.0	6.2	9.5	
							180	180.0	6.9	10.7	
							200	200.0	7.7	11.9	
8	218.8	5.3	7.8	10.3	12.6		225	225.0	8.6	13.4	
10	272.6	6.6	9.7	12.8	15.7		250	250.0	9.6	14.8	
12	323.4	7.8	11.5	15.2	18.7		315	315.0	12.1	18.7	

Properties guide

Chemical resistance and performance data	Typical applications	Unsuitable for the following uses	Sizes and jointing information
Strong mineral acids Caustic and ammoniacal solutions Some organics Most detergents Temperature range 0°C to 60°C	Chemicals, potable water, general purpose water, waste water etc.	Aromatic solvents temperatures below 0°C temperatures over 60°C	Pipe and fittings for solvent welding manufactured in metric sizes 12mm to 315mm to DIN and ISO standards and 3/8" to 12" British Standards. Threaded fittings also available.

Note: Temperatures given are for guidance only, please check before specifying.

General Information

Handling and storage

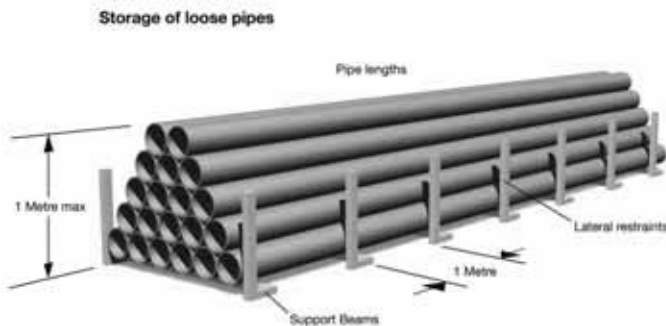
The high impact strength of Durapipe PVC-U systems provides some protection against damage but care should be taken at all stages of handling, transportation and storage.

Pipe must be transported by a suitable vehicle and properly loaded and unloaded, eg., wherever possible moved by hand or mechanical lifting equipment. It must not be dragged across the ground.

The storage should be flat, level and free from sharp stones.

Lengths

Pipe lengths stored individually should be stacked in a pyramid not more than one metre high, with the bottom layer fully restrained by wedges. Where possible, the bottom layer of pipes should be laid on timber battens at one-metre centres. On site, pipes may be laid out individually in strings. (Where appropriate, protective barriers should be placed with adequate warning signs and lamps.)

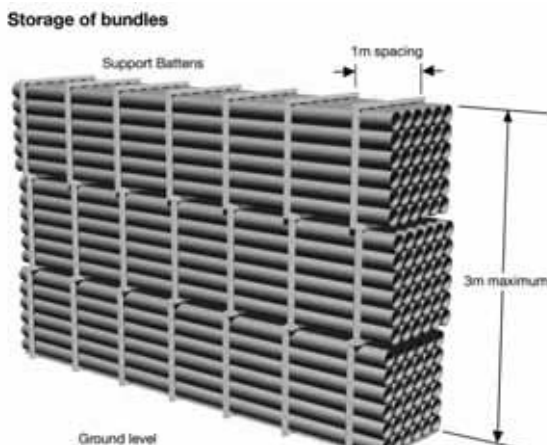


Bundles

Bundled packs of pipe should be stored on clear, level ground with the battens supported from the outside by timbers or concrete blocks. For safety, bundled packs should not be stacked more than three metres high.

Smaller pipes may be nested inside larger pipes. Side bracing should be provided to prevent stack collapse.

Similar precautions should be taken with fittings and these should be kept in protective wrappings until required for use.



Health and Safety at Work Act and COSHH Regulations

Attention is drawn to the requirements in the UK of this Act and to the Control of Substances Hazardous to Health (COSHH) Regulations. Durapipe UK cannot accept responsibility for accidents arising from the misuse of its products because of bad installation or incorrect application.

Material safety data

Material Safety Data sheets are available on our website.

Filling and flushing

When purchasing chemicals for either flushing or long-term system use, suppliers should be advised that this is for PVC-U material. Guidance on the suitability of various system flushing or filling fluids with PVC-U can be found in the Durapipe Chemical Resistance brochure, 04900004 for further details.

Testing

It is suggested that the following test procedure be followed, after joints have been allowed to dry for the appropriate minimum time (at least 24 hours up to 8"/225mm, sizes 10"/250mm and 12"/315mm require a minimum of 48 hours at 20°C).

The system should be divided conveniently into test sections.

Fill section with cold water making sure that no air pockets remain. Do not pressurise at this stage.

Check system for leaks. If none are apparent, check for and remove any remaining air. Increase pressure up to 3 bar. Do not pressurise further at this stage.

Leave section pressurised for 10 minutes. If pressure decays, inspect for leaks and rectify as necessary. If pressure remains constant, slowly increase the hydrostatic pressure to 1½ times nominal operating pressure.

Leave section pressurised for a period not exceeding 1 hour. During this time pressure should not change.

Caution

Personnel must stand well clear when pressure testing systems. Similarly, under no circumstances should pressure tests be carried out using pressurised gases. Such a test could be extremely dangerous and serves no useful purpose.

Note: If extended times are required to achieve hydrostatic pressure, either leakage has occurred or air remains in the line. Inspect for leakage and if none is apparent, reduce pressure and check for trapped air. This must be removed before further pressurisation commences.

Colour

Durapipe PVC-U products are a grey colour, generally in accordance with BS5252, colour ref. RAL 7011.

Auto CAD drawings

Both 2D & 3D drawings of both metric and imperial products contained in this brochure are available either on our website www.durapipe.co.uk or via our technical support department.

Approvals and Quality Marks

Durapipe PVC-U pipe and fittings

Durapipe UK offer PVC-U pipework systems comprising pipes, fittings and valves, joined by solvent welding, together with associated accessories. Products are available in Imperial sizes from 1/2" to 12" (nominal bore) and Metric sizes from 16mm to 315mm (outside diameter).

PVC-U dimensions and standards

Imperial

The Durapipe PVC-U Imperial System is manufactured in accordance with the relevant British Standards as shown below. Kitemark licences are also held, where applicable, for both pipes and fittings BS 5391 (pipe) BS 5392 (fittings).

Metric

The Durapipe PVC-U Metric System is manufactured generally in accordance with the relevant international standards as shown below:

ISO 15493
EN 1452-2

Threaded fittings conform to the requirements of BS 21/DIN 2999/ISO7. Socket dimensions of Durapipe PVC-U Metric fittings for solvent welding comply with ISO/DIS 727-1.

Materials

Durapipe PVC-U material is UK Water Regulations Advisory Scheme approved for cold water services and is listed in the Water Fittings and Materials Directory.

Gaskets and seals

Gaskets and O-Ring seals are made from EPDM except where stated otherwise.

Compatibility

The components of each dimensional system are not interchangeable with each other, except for sizes 75mm/2 1/2" and 140mm/5". They can be joined by using the mm/imperial adaptor fittings or by flanges. They are, however, interchangeable with other piping products manufactured in accordance with the standards referred to.

Approvals and quality marks

- **BSI (British Standard Institution UK) Licence N. KM 05802**
Durapipe FIP PVC-U Imperial series fittings are covered by Kitemark Licence No. KM 05802 BS 4346-1.
Durapipe FIP PVC-U solvent cement is covered by Kitemark Licence No. KM6218 to BS 4346: Part 3.
- **WRAS (Water regulations advisory scheme - UK) Certificate N. M103019 / 0402050 / 0201506 and 0201512**
Durapipe FIP PVC-U Imperial series pipes and fittings are UK Water Regulations Advisory Scheme approved for conveying potable water certificate number M103019 / 0402050
Durapipe FIP PVC-U materials are also UK Water Regulations Advisory Scheme approved and are listed under 0706050 (2012), 0902701 (2014) and 1012518 (2015).
Durapipe FIP PVC-U solvent cement is UK Water Regulations Advisory Scheme approved under 1011527.
- **Regulation 31 approved**
Approved for use within public water supplies and by the Secretary of State and listed in the 'List of Approved Products' published by the DWI.
- **IIP N. 122 Istituto Italiano dei Plastici (Italian Institute of Plastics)**
Durapipe FIP PVC-U fittings are manufactured in accordance with UNI EN 1452.
- **ACS France (Attestation de conformité Sanitaire) N. 98 MAT NY 418**
Durapipe FIP PVC-U is suitable for alimentary applications.
- **NSF (National Sanitation Foundation USA) Certificate N. 11370/11371A**
Suitability of Durapipe FIP PVC-U for use with drinking water.
- **KIWA (Keurings Institut Voor Waterleiding Artikelen Holland) Certificate N. K5034/01**
PVC-U fittings according to KIWA BRL K504.
- **IRH**
Durapipe FIP PVC-U fittings are acknowledged by IRH for ACS Certificate N. 05 MAT NY 006.
- **BUREAU VERITAS (France) Certificate N. 07123 / C0 BV**
Suitability of Durapipe FIP PVC-U for transporting and treatment of sanitary water for naval applications.
- **Ukrainian hygienic, safety and quality regulation. Certificate N. UA1.094.0052575-04**
Durapipe FIP PVC-U fittings are certified in compliance with Ukrainian hygienic, safety and quality regulation.
- **RINA – Registro Italiano Navale (Italian Register Naval) Certificate N. MAC/36401/TO/01**
Suitability of Durapipe FIP PVC-U for transport and treatment of sanitary water and of conditioning for naval applications.



Reference standards that product is produced to

- **ISO 15493** - Plastics piping systems in PVC-U for industrial applications.
- **BS EN 1452** - Characteristics of PVC-U fittings and pipes of piping systems for water supply.
- **ISO 727** - Pipes and fittings in PVC-U. Dimensions and tolerances metric series.
- **ISO 4422** - Characteristics of PVC-U fittings of piping systems for water supply.
- **DIN 8063** - PVC-U fittings, dimensions.
- **KIWA (Keurings Instituut Voor Waterleiding Artikelen Holland) KIWA BRL – K504 e KIWA BRL502** Characteristics of PVC-U fittings and pipes of piping systems for water supply.
- **BSI (British Standard Institution UK) BS 4346-1** - Characteristics of PVC-U fittings of piping systems for fluids under pressure.
- **BS 3505-3506** - Characteristics of PVC-U pipes for industrial fluids and cold water.
- **UNI ISO 228/1:1983** - PVC-U fittings with threaded connections.
- **DIN 2999** - PVC-U fittings with threaded connections.
- **BS 21** - PVC-U fittings with threaded connections.
- **ISO R7:1984** - PVC-U fittings with threaded connections sealing tight.
- **ISO 161/1** - PVC-U pipes and fittings dimensions, metric series.
- **DIN 8062** - PVC-U pipes dimensions.
- **ASTM D696 e DIN 53752** - Coefficient of linear thermal expansion, test and method.
- **DVS 2204-1** - Solvent welding of thermoplastic materials PVC-U.
- **UNI 11242** Solvent welding of PVC-U pipes, fittings and valves.

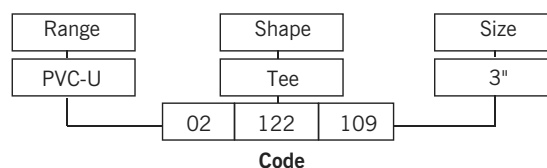
The production of the PVC-U product is in accordance with the highest quality standards and in full observance of the environmental practices imposed by current legislation.

All products are manufactured in accordance with **ISO 9001** certified quality assurance programme. For more information please visit our website www.durapipe.co.uk

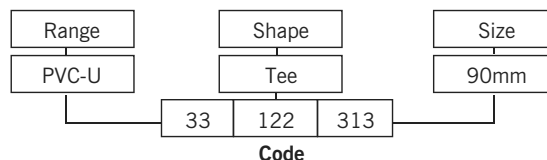
Ordering by code

Code numbers should be used when ordering products eg.

Imperial



Metric



Abbreviations

The following list of abbreviations is used in this catalogue:

ABS	–	Acrylonitrile Butadiene Styrene
ANSI	–	American National Standards Institute
BS	–	British Standards
BSP	–	British Standard Pipe Thread
DIN	–	Deutsche Industrie Normen (German Industrial Standards)
EPDM	–	Ethylene Propylene Rubber
FPM	–	Fluorine Rubber (eg. Viton®)
ISO	–	International Standards Organisation
MEK	–	Methyl Ethyl Ketone
PN	–	Nominal Pressure
PTFE	–	Polytetrafluoroethylene (eg. Teflon®)
PVC-C	–	Corzan, Chlorinated Polyvinyl Chloride
PVC-U	–	Unplasticised Polyvinyl Chloride

® Dupont registered trade name.

Mechanical, Physical and Electrical Data	Value
Mechanical	
Ultimate tensile strength (23°C)	53 MN/m ²
Tensile strength at break	45.00 MPa
Young's Modulus	3060 MPa
Compressive strength	55 MN/m ²
Poisson's Ratio	0.35
Izod impact strength at 23°C (notched)	0.08 kJ/m ²
Physical	
Specific gravity	1.41
Softening point (ISO 306: 1994 method B120)	77°C
Linear coefficient of thermal expansion	0.6mm/m/10°C
Heat distortion point	74°C
ASTM D648 – 4.5 MN/m	
Thermal Conductivity	0.147 W/m °C
Specific heat	0.84-2.1 J/g
Electrical	
Dielectric constant	3.0 at 10 ⁶ Hz
Volume resistivity	10 ¹⁶ ohm/cm

Product Specification

IMPERIAL RANGE

DURAPIPE PVC-U PIPES

In accordance with the dimensional and testing requirements of BS EN 1452, Third Party Approved with British Standard Kitemark Licence.

DURAPIPE PVC-U FITTINGS

In accordance with the dimensional and testing requirements of BS 4346 Part 1, Third Party Approved with British Standard Kitemark Licence.

MATCHED SYSTEM

The PVC-U products are designed to ensure complete integrity, quality and compatibility between pipes, fittings and valves. Manufacturers warranties may be compromised if a system is installed with materials from various manufacturers. Where this is not possible then any alternative products should be confirmed as being at least equivalent to that which is normally supplied.

QUALITY SYSTEM

Pipes, fittings and valves shall be manufactured in an environment, which operates a Quality Assurance System assessed to ISO 9001.

ENVIRONMENTAL SYSTEM

The manufacturer of pipes, fittings and valves shall be able to demonstrate compliance with applicable environmental legislation and products shall be manufactured in an environment where documented performance reviews are undertaken and an Environmental Management System is successfully assessed to ISO 14001.

DRINKING WATER/ APPROVAL FOR USE IN CONTACT

Within private property boundaries all PVC-U pipes, fittings and solvent cement shall be listed in the Water Fittings and Materials Directory to show compliance with the requirements of the United Kingdom Water Regulations Advisory Service.

In any situation which could result in the PVC-U pipes, fittings and solvent cement coming into contact with water which is intended for human consumption these shall be in accordance with the requirements of BS 6920 Part 1.

Copies of certification of compliance with these approvals are available for inspection.

Approved for use within public water supplies and by the Secretary of State. Durapipe UK PVC-U pipe is listed in the 'List of Approved Products' published by the DWI.

THIRD PARTY APPROVALS

The manufacturer shall have the following Third Party Approvals:

BRITISH STANDARD KITEMARK LICENCE

KM06218 for solvent cement to BS 4346 Part 3

WRAS WATER REGULATIONS ADVISORY SCHEME

0112065 for Imperial fittings

0610503 for Durapipe solvent cement (5560)

DWI PRODUCT APPROVAL

DWI 56.4.937 Durapipe grey PVC-U pipe NGS

DESIGN LIFE

Durapipe pipes and fittings are designed to operate continuously for 50 years at their maximum rated pressure at a working temperature of 20°C (valves have a design life of 25 years).

CHEMICAL SUITABILITY

The manufacturer shall publish detailed chemical resistance data to enable the suitability of the PVC-U material, seals and gaskets to be determined by designers and specifiers.

The manufacturer shall also employ a qualified and experienced Chemist and provide a free-of-charge advisory service for assessing the suitability of its PVC-U material, seals and gaskets.

INSTALLATION SPECIFICATION

The installation must be carried out by competent persons.

The contractor shall be required to provide technical documentation relating to the manufacturers recommended Installation procedures.

The manufacturer shall publish Installation recommendations, and shall also provide a free-of-charge training service for designers and installers, with appropriate written confirmation of attendance.

Temperature range 0°C to +60°C (see page 8 for more details).

DURAPIPE PVC-U BALL VALVES

True union design, end load resistant with full pressure and shock resistant anti blow out device which conforms to design and endurance testing requirements of DIN 3441 Part 1, and DIN 3230 Part 3 Leak Rate One (Water and Air).

Drop Tight and Bubble Tight testing have been satisfactorily completed.

In addition, the following testing has been successfully conducted:

Hydrostatic Shell Test 1.5 x Maximum Working Pressure.

Seat Test 1.1 x Maximum Working Pressure.

PRESSURE RATING

PN16 at 20°C

SEATS AND SEALS

Seats: PTFE material fitted with O-Ring compensators.

Seals: Standard size O-Ring type for ease of replacement, in EPDM or FPM material.

END CONNECTIONS

Plain socket ends, or BSP threaded.

ACTUATION

Options: Electric or pneumatic.

DURAPIPE PVC-U TKD 3-WAY BALL VALVES

True union design. Options of 'L' or 'T' port configuration.

The following testing will have been successfully completed:

Drop Tight and Bubble Tight Test.

Hydrostatic Shell Test 1.5 x maximum recommended pressure.

Seat Test 1.1 x maximum working pressure.

PRESSURE RATING

1/2" to 2" – PN16 at 20°C.

SEATS AND SEALS

Seats: PTFE material fitted with O-Ring compensators.

Seals: Standard size O-Ring type for ease of replacement, in EPDM or FPM material.

END CONNECTIONS

Plain socket ends or BSP threaded.

DURAPIPE PVC-U DIAPHRAGM VALVES

Will be equipped with a maintenance free hand wheel actuator with spindle extension to indicate the position of the valve open or closed.

The body retaining bolts will be fixed from the underside, to provide a crevice free outer surface to prevent accumulation of debris or risk of corrosion of exposed steel bolts from chemical spillage.

Valves will have been hydrostatically pressure tested to the requirements BS 4346 Part 1, BS 5156, ISO 7508 and DIN 3230 Part 3 Leak Rate One.

PRESSURE RATING

1/2" to 4" – PN10 at 20°C

DIAPHRAGM TYPE

Choice of EPDM, FPM or PTFE will be available.

END CONNECTION

Socket union ended 1/2" to 2". Spigot ended 2 1/2" to 4".

ACTUATION

Options – Pneumatic

DURAPIPE PVC-U BALL CHECK VALVES

These shall be double union with plain socket or BSP threaded end.

PRESSURE RATING

1/2" to 2" – PN16 at 20°C.

SEALS

Seals: Will be EPDM or FPM material.

DURAPIPE BUTTERFLY VALVES

Reinforced Polypropylene body, fully lined, with PVC disc.

Full flanged design, with oval holes/inserts to suit various standard flange drillings.

Lever operated, with 10 x 10° position stops, and locking device.

PRESSURE RATING

1 1/2" to 2" – PN16

2" to 10" – PN10 at 20°C

12" – PN8 at 20°C

PRIMARY LINER

Available in EPDM or FPM

ACTUATION

Electric, Pneumatic, or Gearbox (standard on sizes over 8")

METRIC RANGE

DURAPIPE PVC-U PIPES

In accordance with the requirements of EN 1452-2, DIN 8061/2, and ISO DIS 15493. Pressure rating PN10 or 16.

DURAPIPE PVC-U FITTINGS

In accordance with the requirements of EN 1452-3, DIN 8063, ISO 727 and ISO DIS 15493. Pressure rating PN16 up to size 160mm, and PN10 in larger sizes.

MATCHED SYSTEM

Durapipe PVC-U products are designed to ensure complete integrity, quality and compatibility between pipes, fittings and valves. Warranties are compromised if a system is installed with materials from various manufacturers. Where this is not possible then any alternative products should be confirmed as being at least equivalent to that which is normally supplied.

QUALITY SYSTEM

Pipes, fittings and valves shall be manufactured in an environment which operates a Quality Assurance System assessed to ISO 9001.

ENVIRONMENTAL SYSTEM

The manufacturer of pipes, fittings, and valves shall be able to demonstrate compliance with applicable environmental legislation and products shall be manufactured in an environment where documented performance reviews are undertaken and an Environmental Management System is successfully assessed to ISO 14001.

APPROVAL FOR USE IN CONTACT WITH DRINKING WATER

Within private property boundaries all PVC-U pipes, fittings and solvent cement shall be listed in the Water Fittings and Materials Directory to show compliance with the requirements of the United Kingdom Water Regulations Advisory Service.

In any situation which could result in the PVC-U pipes, fittings and solvent cement coming into contact with water which is intended for human consumption these shall be in accordance with the requirements of BS 6920 Part 1.

Copies of certification of compliance with these approvals are available for inspection.

Approved for use within public water supplies and by the Secretary of State. Durapipe UK PVC-U pipe is listed in the 'List of Approved Products' published by the DWI.

THIRD PARTY APPROVALS

The manufacturer shall have the following Third Party Approvals:

WRAS WATER REGULATIONS ADVISORY SCHEME

0402050 for Metric size pipe and fittings

0610503 for Durapipe solvent cement (5560)

DWI PRODUCT APPROVAL

DWI 56.4.937 Durapipe grey

PVC-U pipe NGS

DESIGN LIFE

Durapipe pipes and fittings are designed to operate continuously for 50 years at their maximum rated pressure at a working temperature of 20°C (valves have a design life of 25 years).

CHEMICAL SUITABILITY

The manufacturer shall publish detailed chemical resistance data to enable the suitability of the PVC-U material, seals and gaskets to be determined by designers and specifiers.

The manufacturer shall also employ a qualified and experienced Chemist and provide a free-of-charge advisory service for assessing the suitability of its PVC-U material, seals and gaskets.

INSTALLATION SPECIFICATION

The installation must be carried out by competent persons.

The contractor shall be required to provide technical documentation relating to the manufacturers recommended Installation procedures.

The manufacturer shall publish Installation recommendations, and shall also provide a free-of-charge training service for designers and installers, with appropriate written confirmation of attendance. Temperature range +5°C to +60°C (see page 8 for more details).

DURAPIPE PVC-U BALL VALVES

True union design, end load resistant with full pressure and shock resistant anti blow out device which conforms to design and endurance testing requirements of DIN 3441 Part 1, and DIN 3230 Part 3 Leak Rate One (Water and Air).

Drop Tight and Bubble Tight testing have been satisfactorily completed.

In addition, the following testing has been successfully conducted:

Hydrostatic Shell Test 1.5 x Maximum Working Pressure.

Seat Test 1.1 x Maximum Working Pressure.

PRESSURE RATING

PN16 at 20°C

SEATS AND SEALS

Seats: PTFE material fitted with O-Ring compensators.

Seals: Standard size O-Ring type for ease of replacement, in EPDM or FPM material.

END CONNECTIONS

Plain socket ends, BSP threaded or flanged.

ACTUATION

Options: Electric or Pneumatic.

DURAPIPE PVC-U TKD 3-WAY BALL VALVES

True union design. Options of 'L' or 'T' port configuration.

The following testing will have been successfully completed:

Drop Tight and Bubble Tight Test.

Hydrostatic Shell Test 1.5 x maximum recommended pressure.

Seat Test 1.1 x maximum working pressure.

PRESSURE RATING

16mm to 63mm – PN16 at 20°C.

SEATS AND SEALS

Seats: PTFE material fitted with O-Ring compensators.

Seals: Standard size O-Ring type in EPDM or FPM material.

END CONNECTIONS

Plain socket ends or BSP threaded.

DURAPIPE PVC-U DIAPHRAGM VALVES

These are equipped with a maintenance free hand wheel actuator with spindle extension to indicate the position of the valve open or closed.

The body retaining bolts are fixed from the underside to provide a crevice free outer surface to prevent accumulation of debris or risk of corrosion of exposed steel bolts from chemical spillage.

Valves have been hydrostatically pressure tested to the requirements of DIN 8063, ISO 5208, ISO 7508 and DIN 3230 Part 3 Leak Rate One.

PRESSURE RATING

20mm to 110mm – PN10 at 20°C

DIAPHRAGM TYPE

Choice of EPDM, FPM or PTFE will be available.

END CONNECTION

Socket union ended 20mm to 63mm. Spigot ended 75mm to 110mm.

ACTUATION

Options: Pneumatic

DURAPIPE PVC-U BALL CHECK VALVES

These shall be double union with plain socket or BSP threaded end.

PRESSURE RATING

20mm to 63mm – PN16 at 20°C.

SEALS

Seals: Will be EPDM or FPM material.

DURAPIPE BUTTERFLY VALVES

Reinforced Polypropylene body, fully lined, with PVC disc.

Full flanged design, with oval holes/inserts to suit various standard flange drillings.

Lever operated, with 10 x 10° position stops, and locking device

PRESSURE RATING

50mm to 63mm – PN16

75mm to 250mm – PN10 at 20°C

315mm – PN8 at 20°C

PRIMARY LINER

Available in EPDM or FPM

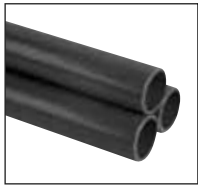
ACTUATION

Electric, Pneumatic, or Gearbox (standard on sizes over 225mm).

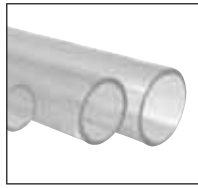
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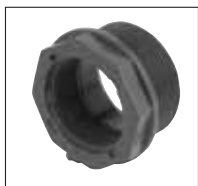
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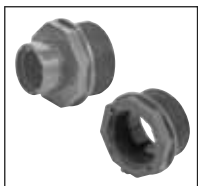
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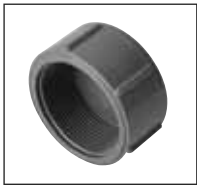
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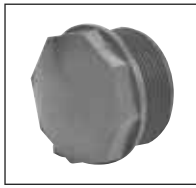
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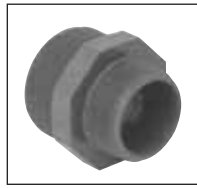
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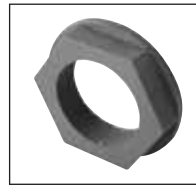
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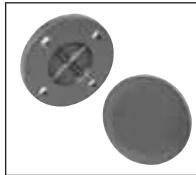
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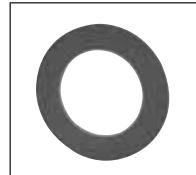
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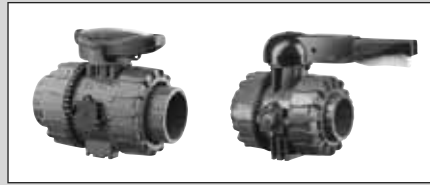


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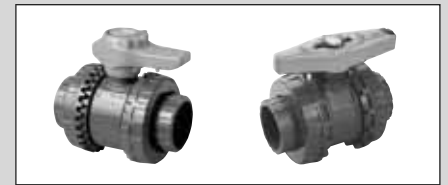
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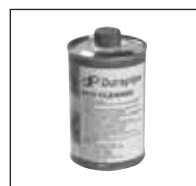
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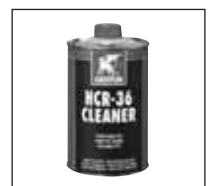
One-step solvent cement
page 54



Eco-cleaner
page 54



HCR-36 Chemically
resistant PVC cement
page 54



Cleaner for use with
HCR-36 Chemically
resistant PVC cement
page 54



Cobra pipe clips
page 54



Saddle clips
page 55



Chamfering and
de-burring tools
page 55



Pipe cutters
page 55

Durapipe offers two different PVC-U Pipe options... you decide!



Option 1

Premium Price
For enhanced testing levels of approvals

Fully approved PVC-U pipe

For where approved materials are required

Approvals

- WRAS approved
- BSI Kitemark licensed
- Regulation 31 (DWI)

Application

- Drinking water supply
- Water treatment

Option 2

Up to 27%
LOWER PRICE
From Approved pipe

Optima PVC-U pipe

For where standard PVC-U is ideal

Approvals

- WRAS approved

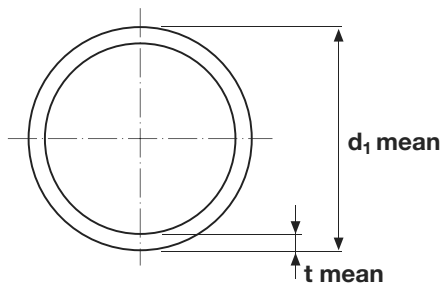
Application

- Standard PVC-U applications

See page 58 for metric sizes.

Optima Pipe Plain

NEW



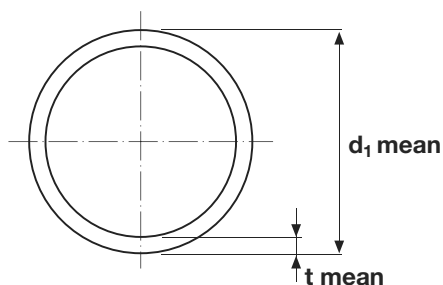
Class C 9 bar @ 20°C

Size	d ₁	t	SL	kg/m	Code
2	60.3	2.8	6	0.73	06 515 107
3	88.9	3.8	6	1.05	06 515 109
4	114.3	4.9	6	2.43	06 515 110
5	140.0	5.9	6	3.49	06 515 111
6	168.3	7.1	6	4.89	06 515 112
10	272.6	9.7	6	11.90	06 511 114
12	323.4	11.5	6	16.80	06 511 115

Class E 15 bar @ 20°C

Size	d ₁	t	SL	kg/m	Code
1/2	21.4	1.9	6	0.16	06 516 102
3/4	26.7	2.2	6	0.23	06 516 103
1	33.6	2.5	6	0.32	06 516 104
1 1/4	42.2	3.0	6	0.52	06 516 105
1 1/2	48.3	3.4	6	0.67	06 516 106
2	60.3	4.2	6	1.00	06 516 107
3	88.9	6.2	6	2.13	06 516 109
4	114.3	7.9	6	3.73	06 516 110
6	168.3	11.7	6	8.02	06 516 112

PVC-U Pipe Imperial System Plain



Class C 9 bar @ 20°C

Size	d ₁	t	SL	kg/m	Code
2	60.3	2.8	6	0.73	06 511 107
3	88.9	3.8	6	1.05	06 511 109
4	114.3	4.9	6	2.43	06 511 110
6	168.3	7.1	6	4.89	06 511 112
8	218.8	8.4	6	7.69	06 511 113

Class D 12 bar @ 20°C

Size	d ₁	t	SL	kg/m	Code
1 ¹ / ₄	42.2	2.5	6	0.42	06 512 105
1 ¹ / ₂	48.3	2.8	6	0.54	06 512 106
2	60.3	3.4	6	0.84	06 512 107
3	88.9	5.0	6	1.85	06 512 109
4	114.3	6.5	6	3.12	06 512 110
5	140	7.3	6	4.54	06 512 111
6	168.3	9.5	6	6.97	06 512 112
8	218.8	11.1	6	9.98	06 512 113

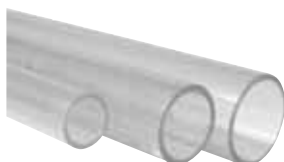
Class E 15 bar @ 20°C - 6m lengths

Size	d ₁	t	SL	kg/m	Code
1/2	21.4	1.9	6	0.16	06 513 102
3/4	26.7	2.2	6	0.23	06 513 103
1	33.6	2.5	6	0.32	06 513 104
1 ¹ / ₄	42.2	3.0	6	0.52	06 513 105
1 ¹ / ₂	48.3	3.4	6	0.67	06 513 106
2	60.3	4.2	6	1.00	06 513 107
3	88.9	6.2	6	2.13	06 513 109
4	114.3	7.9	6	3.73	06 513 110
6	168.3	11.7	6	8.02	06 513 112

Class 7 12 bar @ 20°C after threading

Size	d ₁	t	SL	kg/m	Code
1/2	21.4	4.0	6	0.31	06 514 102
3/4	26.7	4.2	6	0.43	06 514 103
1	33.6	4.8	6	0.62	06 514 104
1 ¹ / ₄	42.2	5.2	6	0.85	06 514 105
1 ¹ / ₂	48.3	5.5	6	1.04	06 514 106
2	60.3	5.9	6	1.43	06 514 107

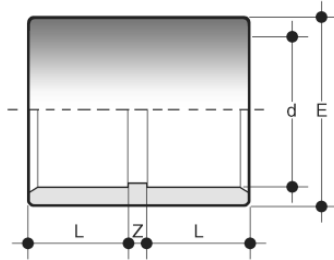
PVC-U Clear Pipe Plain



Size	Class	d ₁	t	SL	kg/m	Code
1/2	E	21.4	1.52	3	0.23	06 517 102
3/4	E	26.7	2.42	3	0.30	06 517 103
1	E	33.4	2.61	3	0.46	06 517 104
1 ¹ / ₄	E	42.2	3.45	3	0.62	06 517 105
1 ¹ / ₂	E	48.3	4.03	3	0.72	06 517 106
2	D	60.3	5.19	3	0.98	06 517 107
3	D	88.9	7.27	3	2.00	06 517 109
4	D	114.3	10.15	3	3.05	06 517 110
5	C	168.3	15.32	3	2.30	06 517 112
8	C	218.8	20.17	3	7.91	06 517 113

Sockets Plain

MLV



Size	PN	L	Z	E	gms	Code
1/2	15	17	2	27	13	02 100 102
3/4	15	20	2	33	15	02 100 103
1	15	23	2	41	36	02 100 104
*1 1/4	12	26	3	50	58	02 100 105
1 1/2	15	31	3	61	118	02 100 106
2	15	38	3	76	206	02 100 107
*2 1/2	12	44	4	90	250	33 100 312
3	15	51	6	108	420	02 100 109
4	15	63	5	131	680	02 100 110
5	15	78	7	171	1240	33 100 316
6	15	90	10	195	1800	02 100 112
*8	12	116	12	257	4950	02 100 113
**10	9	150	10	307	5800	02 100 114
**12	9	165	13	362	9800	02 100 115

*Class D **Class C

Reducing bushes Plain

DLV

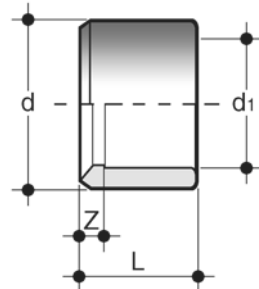


Fig. A

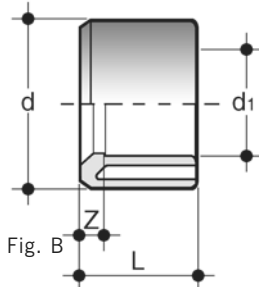


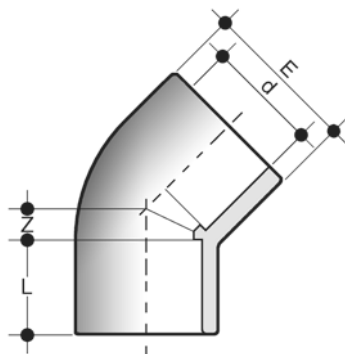
Fig. B

Size	PN	L	Z	gms	Fig	Code
3/4 x 1/2	15	20	3	6	A	02 109 122
1 x 1/2	15	23	7	18	A	02 109 123
1 x 3/4	15	23	3	10	A	02 109 124
1 1/4 x 1	15	27	4	19	A	02 109 125
1 1/2 x 3/4	15	30	10	40	B	02 109 119
1 1/2 x 1	15	30	8	42	A	02 109 126
1 1/2 x 1 1/4	15	31	4	20	A	02 109 127
2 x 3/4	15	36	17	75	B	02 109 120
2 x 1	15	36	7	50	B	02 109 128
2 x 1 1/4	15	38	12	80	B	02 109 129
2 x 1 1/2	15	38	7	50	B	02 109 130
2 1/2 x 2	15	44	8	100	A	02 109 131
3 x 1 1/2	15	51	21	200	B	02 109 134
3 x 2	15	51	13	167	B	02 109 135
3 x 2 1/2	15	51	7	125	A	02 109 136
4 x 2	15	63	27	250	B	02 109 140
4 x 3	15	63	12	331	A	02 109 141
5 x 4	15	76	15	460	B	02 329 142
*6 x 4	12	93	27	972	B	02 109 147
*8 x 6	12	110	23	1400	B	02 109 152
**10 x 8	9	144	25	3500	A	02 109 151
**12 x 10	9	169	26	4100	A	02 109 153

*Class D **Class C

Elbows 45° Plain

HLV

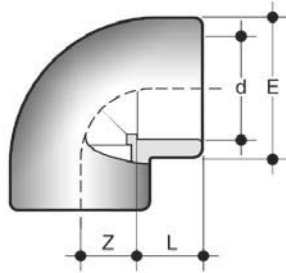


Size	PN	L	Z	E	gms	Code
1/2	15	17	5	27	13	02 119 102
3/4	15	20	6	33	20	02 119 103
1	15	23	7	41	45	02 119 104
1 1/4	15	26	11	50	85	02 119 105
1 1/2	15	31	12	61	155	02 119 106
2	15	38	14	76	291	02 119 107
2 1/2	15	44	17	90	315	33 119 312
3	15	51	22	108	565	02 119 109
4	15	61	26	131	740	02 119 110
5	15	115	37	173	1660	33 119 316
6	15	134	41	198	3080	02 119 112
8	9	182	65	259	7250	02 119 113
**10	9	206	66	307	9800	02 119 114
**12	9	243	78	363	15500	02 119 115

** Class C

Elbows 90° Plain

GLV

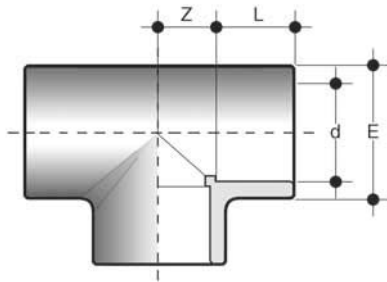


Size	PN	L	Z	E	gms	Code
1/2	15	17	11	27	15	02 115 102
3/4	15	20	14	33	30	02 115 103
1	15	23	17	41	45	02 115 104
*1 1/4	12	27	22	54	110	02 115 105
1 1/2	15	31	27	61	160	02 115 106
2	15	38	34	76	340	02 115 107
*2 1/2	12	44	41	90	427	33 115 312
3	15	51	48	108	768	02 115 109
4	15	63	58	131	972	02 115 110
5	15	153	76	173	2080	33 115 316
*6	12	90	90	195	3480	02 115 112
*8	12	116	170	257	8850	02 115 113
**10	9	286	146	307	13300	02 115 114
**12	9	340	175	365	20300	02 115 115

* Class D
** Class C

Tees 90° Equal plain

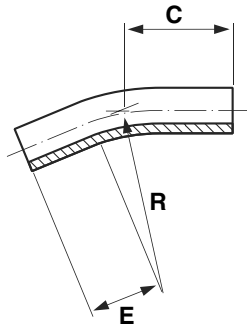
TLV



Size	PN	L	Z	E	gms	Code
1/2	15	17	11	27	26	02 122 102
3/4	15	20	14	33	30	02 122 103
1	15	23	17	41	55	02 122 104
*1 1/4	12	26	22	50	90	02 122 105
1 1/2	15	31	27	61	257	02 122 106
2	15	38	34	76	495	02 122 107
*2 1/2	12	44	41	90	560	33 122 312
3	15	51	48	108	570	02 122 109
4	15	63	59	131	1260	02 122 110
5	15	76	77	174	4150	33 122 316
*6	12	90	90	195	4400	02 122 112
*8	12	116	116	257	10500	02 122 113
**10	9	159	150	306	18600	02 122 114
**12	9	176	175	361	27200	02 122 115

* Class D
** Class C

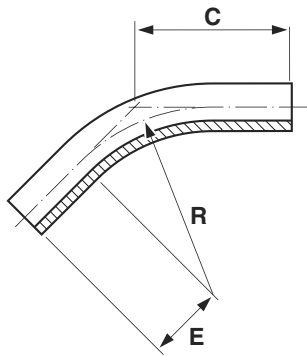
Bends 22½° Long radius



Size	PN	C	E	R	gms	Code
1	15	76	38	102	50	02 311 104
1½	15	110	57	225	148	02 311 106
2	15	113	73	270	285	02 311 107
3	15	202	114	392	858	02 311 109
4	15	262	152	518	1804	02 311 110
6	15	385	229	740	5993	02 311 112

Tolerance on angle ±3°

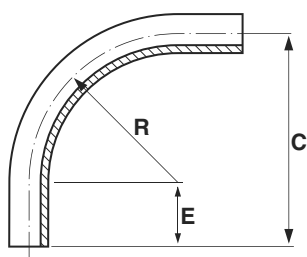
Bends 45° Long radius plain



Size	PN	C	E	R	gms	Code
1	15	75	37	102	77	02 310 104
1½	15	113	55	225	204	02 310 106
2	15	152	73	270	316	02 310 107
3	15	238	121	392	1080	02 310 109
4	15	300	145	518	2235	02 310 110
6	15	440	218	740	7340	02 310 112

Tolerance on angle ±3°

Bends 90° Long radius plain

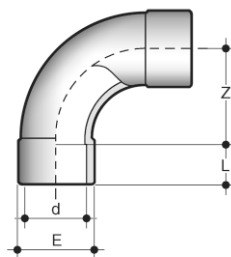


Size	PN	C	E	R	gms	Code
3	15	403	98	392	1510	02 309 109
4	15	545	138	518	3350	02 309 110
6	15	817	207	740	11000	02 309 112

Tolerance on angle ±3°

Bends 90° Short radius plain

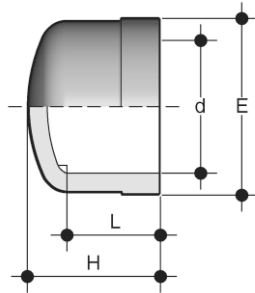
SLV



Size	PN	E	L	Z	gms	Code
½	15	28	16	40	45	02 118 102
¾	15	34	19	50	75	02 118 103
1	15	41	22	64	120	02 118 104
1¼	15	51	26	80	205	02 118 105
1½	15	65	31	100	310	02 118 106
2	15	77	38	126	510	02 118 107
2½	15	94	44	150	1000	33 118 312
3	15	113	51	180	1765	02 118 109
4	15	137	61	220	2805	02 118 110

End caps Plain

CLV

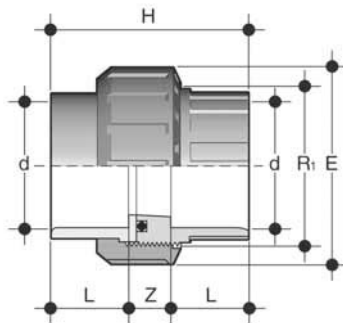


Size	PN	L	H	E	gms	Code
1/2	15	17	19	27	13	02 140 102
3/4	15	20	22	33	15	02 140 103
1	15	23	25	41	36	02 140 104
*1 1/4	15	26	29	50	58	02 140 105
1 1/2	15	31	34	61	118	02 140 106
2	15	38	41	76	206	02 140 107
*2 1/2	15	44	48	90	250	12 149 312
3	15	51	57	108	420	02 140 109
4	15	63	68	131	680	02 140 110
5	15	76	108	164	1100	33 140 316

*Class D

Socket unions plain

BLV

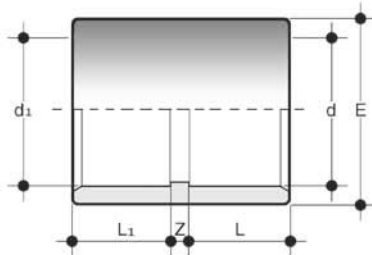


Size	PN	E	H	L	R ₁	Z	gms	Code
1/2	15	41	45	16	1"	13	39	02 205 102
3/4	15	50	51	19	1 1/4"	13	65	02 205 103
1	15	58	57	22	1 1/2"	13	94	02 205 104
1 1/4	15	72	67	26	2"	15	150	02 205 105
1 1/2	15	79	79	31	2 1/4"	17	190	02 205 106
2	15	98	98	38	2 3/4"	21	400	02 205 107
3	9	131	76	51	4"	25	750	02 205 109
4	9	159	86	61	5"	25	1300	02 205 110

EPDM seal as standard.
For FPM seal order by type 204.

Imperial/metric socket adaptors Plain

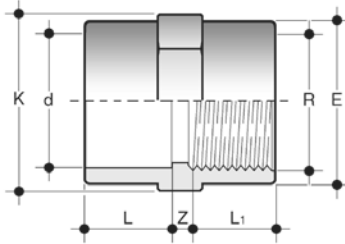
MILV



Size	PN	L	L ₁	E	Z	gms	Code
1/2 x 20	15	16	17	27	3	12	33 345 102
3/4 x 25	15	19	20	33	3	22	33 345 103
1 x 32	15	22	23	41	3	44	33 345 104
1 1/4 x 40	15	26	27	50	2	65	33 345 105
1 1/2 x 50	15	31	30	61	4	125	33 345 106
2 x 63	15	38	36	76	5	210	33 345 107
2 1/2 x 75	15	44	44	90	4	1250	33 345 108
3 x 90	15	51	51	108	6	438	33 345 109
4 x 110	15	61	63	131	4	852	33 345 110

Sockets Plain/BSP threaded

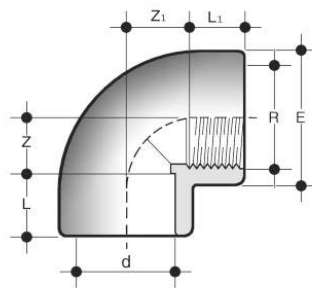
MLFV



Size	PN	L	L ₁	Z	E	K	gms	Code
1/2	12	16	15	4	27	24	15	02 101 102
3/4	12	20	17	5	33	29	25	02 101 103
1	12	23	20	5	41	35	45	02 101 104
1 1/4	12	27	21	4	50	43	65	02 101 105
1 1/2	12	30	21	8	61	50	100	02 101 106
2	12	36	26	9	76	61	160	02 101 107
2 1/2	12	44	31	18	90	76	260	33 101 108
3	12	51	34	23	108	108	449	02 101 109
4	12	61	39	10	129	129	555	02 101 110

Elbows 90° Plain/BSP threaded

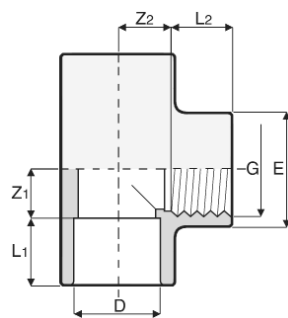
GLFV



Size	PN	L	L ₁	Z	Z ₁	E	gms	Code
1/2	12	17	15	11	12	27	13	02 116 102
3/4	12	20	17	14	17	33	25	02 116 103
1	12	23	19	17	20	41	55	02 116 104
1 1/4	12	27	22	22	27	54	120	02 116 105
1 1/2	12	31	21	27	37	61	170	02 116 106
2	12	38	26	34	46	76	340	02 116 107
2 1/2	12	44	30	41	54	90	420	02 116 108
3	12	51	33	48	66	108	750	02 116 108
4	12	63	39	58	82	131	1050	02 116 110

Tee Plain/threaded branch

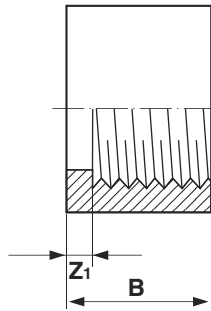
TLFV



Size	PN	L ₁	L ₂	Z ₁	Z ₂	E	gms	Code
1/2	12	16	15	11	12	28	49	02 123 102
3/4	12	19	16	14	16	34	55	02 123 103
1	12	22	19	17	20	42	75	02 123 104
1 1/4	12	26	21	21	25	51	125	02 123 105
1 1/2	12	31	21	26	35	61	200	02 123 106
2	12	38	25	33	45	75	380	02 123 107
2 1/2	12	44	30	39	52	89	530	02 123 108
3	12	51	33	47	64	106	845	02 123 109

Reducing bushes Plain/BSP threaded

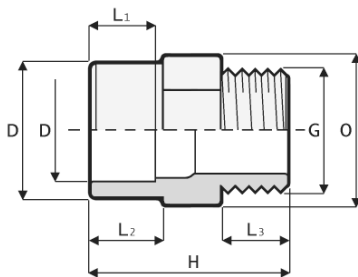
DLFV



Size	PN	B	Z ₁	gms	Code
1/2 x 3/8	12	16	6	5	02 111 121
3/4 x 1/2	12	20	5	9	02 111 122
1 x 3/4	12	25	6	15	02 111 124

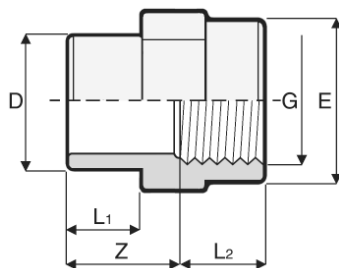
Male threaded adaptors Plain/male BSP threaded

ILFV



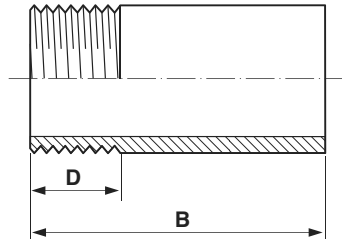
Size	PN	L ₁	L ₂	L ₃	H	O	gms	Code
1/2 x 1/2	12	16	19	15	46	30	15	02 151 102
3/4 x 3/4	12	19	22	16	50	36	25	02 151 103
1 x 1	12	22	26	19	57	46	40	02 151 104
1 1/4 x 1 1/4	12	26	31	21	67	55	70	02 151 105
1 1/2 x 1 1/2	12	31	38	21	74	65	115	02 151 106
1 1/2 x 1 1/2	12	31	38	21	74	65	115	02 151 107

Female threaded adaptors Plain/female BSP threaded



Size	PN	L	L ₁	Z	H	K	gms	Code
1/2 x 1/2	12	16	15	4	27	24	15	02 153 102
3/4 x 3/4	12	20	16	5	33	29	25	02 153 103
1 x 1	12	23	19	5	41	35	45	02 153 104
1 1/4 x 1 1/4	12	27	21	4	50	43	65	02 153 105
1 1/2 x 1 1/2	12	30	21	8	61	50	100	02 153 106
2 x 2	12	36	26	9	76	61	160	02 153 107

Barrel nipples Plain/BSP threaded

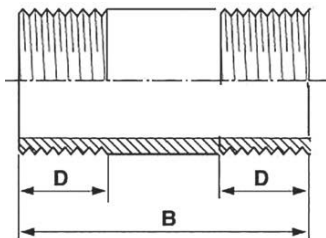


Size	PN	B	D	gms	Code
1/2	12	49	16	15	02 316 102
3/4	12	55	18	20	02 316 103
1	12	62	21	35	02 316 104
1 1/4	12	72	23	60	02 316 105
1 1/2	12	87	30	45	02 316 106
2	12	87	30	115	02 316 107
2 1/2	12	106	35	180	02 316 108
3	9	129	31	300	02 316 109
4	9	153	37	560	02 316 110

PVC nipples are made from Durapipe PVC-U pipes.

NEW

Threaded barrel nipple Plain/BSP threaded

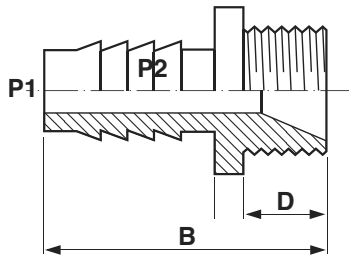


Size	PN	B	D	gms	Code
1/2	12	49	16	15	02 317 102
3/4	12	55	18	20	02 317 103
1	12	62	21	35	02 317 104
1 1/4	12	72	23	55	02 317 105
1 1/2	12	87	30	75	02 317 106
2	12	87	30	105	02 317 107
2 1/2	12	105	30	169	02 317 108
3	9	127	38	250	02 317 109
4	9	150	40	500	02 317 110

PVC nipples are made from Durapipe PVC-U pipes.

Hose adaptors Male BSP threaded – short pattern

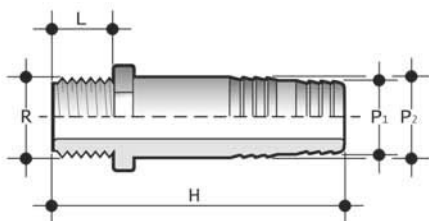
AFV



Size R x P1 x P2	PN	B	D	gms	Code
1/2 x 13 x 14	12	61	16	10	02 157 102
3/4 x 19 x 21	12	65	16	19	02 157 103
1 x 26 x 27	12	73	19	37	02 157 104

Hose adaptors Male BSP threaded – long pattern

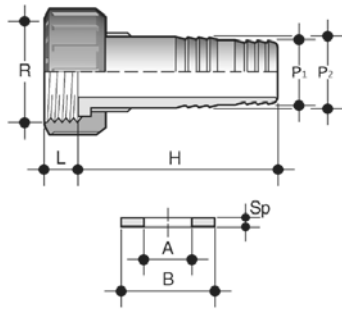
AFV



Size R x P1 x P2	PN	L	H	gms	Code
1/4 x 12 x 14	16	11	56	7	02 157 600
3/8 x 16 x 18	16	11	58	14	02 157 602
1/2 x 20 x 22	16	15	66	19	02 157 605
3/4 x 25 x 27	16	16	81	30	02 157 608
1 x 30 x 32	16	19	97	45	02 157 612
1 1/4 x 40 x 42	16	21	104	85	02 157 616
1 1/2 x 50 x 52	16	21	111	120	02 157 622
2 x 60 x 64	16	26	123	180	02 157 630

Hose adaptors Female BSP threaded – loose nut with EPDM gasket

ADV

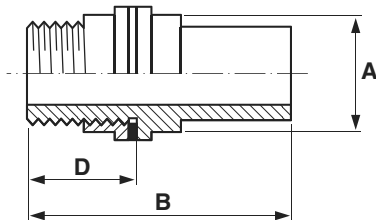


Size R x P ₁ x P ₂	PN	L	H	gms	Code	A	B	Sp.
*1/2 x 12 x 14	16	14	56	15	02 156 601	11	18	2
*3/4 x 16 x 18	16	12	60	24	02 156 603	17	24	2
*1 x 20 x 22	16	11	67	35	02 156 606	19	30	2
*1 1/4 x 25 x 27	16	14	81	55	02 156 609	24	39	2
*1 1/2 x 30 x 32	16	16	97	80	02 156 613	32	44	3
*2 x 40 x 42	16	18	104	140	02 156 616	42	55	3
*2 1/4 x 50 x 52	16	18	111	200	02 156 623	46	62	3
*2 1/2 x 60 x 64	16	19	123	290	02 156 312	50	61	2
*2 3/4 x 60 x 64	16	20	123	300	02 156 630	60	78	3

* Thread size designation.

Tank connectors Plain/BSP threaded EPDM gasket

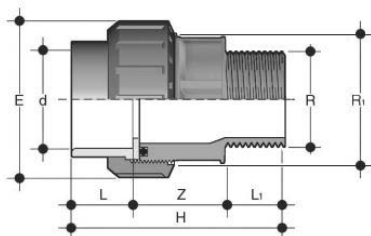
LIFV



Size	PN	A	B	D	gms	Code
1/2	12	28	70	29	34	02 235 102
3/4	12	33	76	32	39	02 235 103
1	12	46	102	42	110	02 235 104
1 1/4	12	50	120	44	154	02 235 105
1 1/2	12	59	165	61	207	02 235 106
2	12	79	153	59	358	02 235 107
2 1/2	12	90	164	94	471	02 235 108
3	12	105	204	90	656	02 235 109
4	12	135	230	130	1345	02 235 110

Composite unions Plain/BSP threaded male brass

BIROV

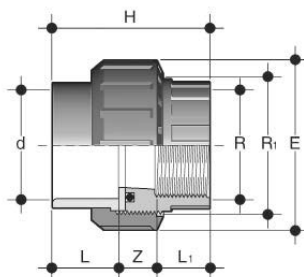


Size	PN	L ₁	Z	L	H	K	Code
1/2	16	13.5	35.5	16	65	41	02 217 102
3/4	16	15	38.5	19	72.5	50	02 217 103
1	16	17.5	40.5	22	80	58	02 217 104
1 1/4	16	19.5	45.5	26	91	72	02 217 105
1 1/2	16	19.5	50.5	31	101	79	02 217 106
2	16	24	60.5	38	122.5	98	02 217 107

Fitted with brass retaining nut and EPDM rubber seal.
Stainless steel options also available on request.

Composite unions Plain/BSP threaded female brass

BIFOV

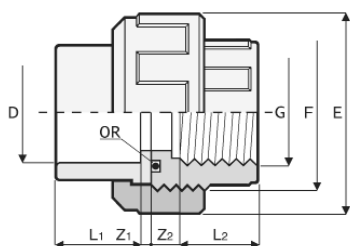


Size	PN	L ₁	Z	L	H	K	Code
1/2	16	16.5	16	16	48.5	25	02 212 102
3/4	16	18.5	17	19	54.5	32	02 212 103
1	16	19.5	18	22	59.5	38	02 212 104
1 1/4	16	21.5	21	26	68.5	48	02 212 105
1 1/2	16	23	24.5	31	84.5	55	02 212 106
2	16	27	29.5	38	94.5	69	02 212 107

Fitted with brass retaining nut and EPDM rubber seal.
Stainless steel options also available on request.

Socket unions Plain/BSP threaded

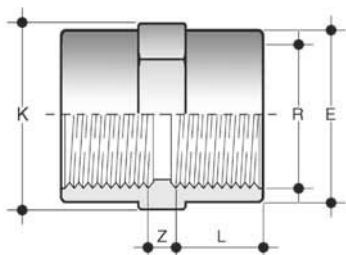
BIFV



Size	PN	L ₁	L ₂	Z ₁	Z ₂	F	E	gms	Code
1/2	12	16	15	3	11	1	42	42	02 202 102
3/4	12	19	16	3	13	1 1/4	52	70	02 202 103
1	12	22	19	3	13	1 1/2	59	96	02 202 104
1 1/4	12	26	21	3	17	2	72	155	02 202 105
1 1/2	12	31	21	3	24	2 1/4	79	237	02 202 106
2	12	38	25	3	30	2 3/4	96	405	02 202 107

Sockets BSP threaded

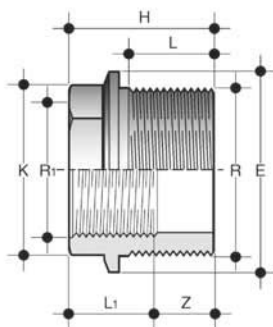
MFV



Size	PN	L	Z	E	K	gms	Code
1/2	16	15	7	29	29	17	02 102 102
3/4	16	16	9	35	35	26	02 102 103
1	16	19	9	43	43	42	02 102 104
1 1/4	16	21	11	50	50	53	02 102 105
1 1/2	16	21	18	61	61	108	02 102 106
2	16	26	20	76	76	190	02 102 107
2 1/2	16	30	31	90	90	275	02 102 108
3	16	33	41	108	108	500	02 102 109
4	16	39	49	130	131	665	02 102 110

Reducing bushes BSP threaded

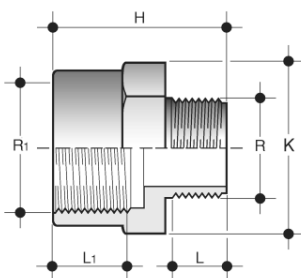
DFV



Size	PN	L ₁	L	H	Z	K	E	gms	Code
1/2 x 3/8	16	15	11	24	13	23	28	7	02 113 121
3/4 x 1/2	16	16	15	27	12	28	34	9	02 113 122
1 x 3/4	16	19	16	31	14	35	40	17	02 113 124
1 1/4 x 1	16	21	19	34	15	44	52	30	02 113 125
1 1/2 x 1 1/4	16	21	21	35	14	51	58	30	02 113 127
2 x 1 1/2	16	26	21	40	19	64	70	72	02 113 130

Reducers BSP threaded, female / reduced male

IFFV



Size	PN	L	L ₁	H	K	gms	Code
3/4 x 1/2	16	15	16	41	36	22	02 174 122
1 x 1/2	16	15	19	44	46	30	02 174 123
1 x 3/4	16	16	19	45	46	42	02 174 124
1 1/4 x 1	16	19	21	55	55	55	02 174 125
1 1/2 x 1 1/4	16	21	21	62	65	102	02 174 127
2 x 1 1/2	16	21	26	69	80	165	02 174 130
2 1/2 x 2	16	26	30	81	95	210	02 174 131
3 x 2 1/2	16	30	33	93	110	360	02 174 136
4 x 3	16	33	39	106	130	500	02 174 141

Reducers BSP threaded, reduced socket

RFV



Fig A

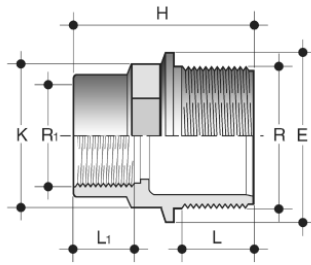
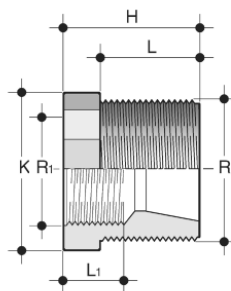


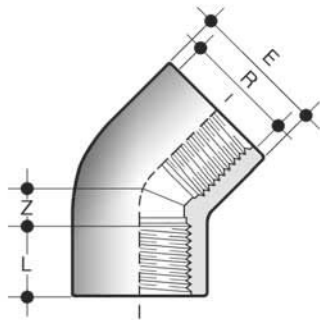
Fig B



Size	PN	H	L ₁	L	E	K	Fig	gms	Code
1/2 x 3/8	16	35	11	15	28	23	A	10	02 173 121
3/4 x 3/8	16	36	11	16	34	28	A	12	02 173 164
3/4 x 1/2	16	39	15	16	34	28	A	15	02 173 122
1 x 3/8	16	41	11	19	40	35	A	20	02 173 166
1 x 1/2	16	44	15	19	40	35	A	24	02 173 123
1 x 3/4	16	46	16	19	40	35	A	25	02 173 124
1 1/4 x 1/2	16	48	15	21	52	44	A	37	02 173 116
1 1/4 x 3/4	16	49	16	21	52	44	A	37	02 173 117
1 1/4 x 1	16	52	19	21	52	44	A	40	02 173 125
1 1/2 x 1/2	16	52	15	21	58	51	A	46	02 173 118
1 1/2 x 3/4	16	50	16	21	58	51	A	47	02 173 119
1 1/2 x 1	16	55	19	21	58	51	A	52	02 173 126
1 1/2 x 1 1/4	16	57	21	21	58	51	A	54	02 173 127
2 x 3/4	16	60	16	26	70	64	A	80	02 173 120
2 x 1	16	63	19	26	70	64	A	80	02 173 128
2 x 1 1/4	16	65	21	26	70	64	A	85	02 173 129
2 x 1 1/2	16	65	21	26	70	64	A	102	02 173 130
2 1/2 x 1 1/4	12	64	30	21	51	80	A	15	02 173 167
2 1/2 x 1 1/2	12	64	30	21	58	80	A	25	02 173 168
2 1/2 x 2	16	56	26	30	-	80	B	155	02 173 131
3 x 1 1/2	12	68	33	21	58	95	A	40	02 173 134
3 x 2	16	66	26	33	-	93	B	185	02 173 135
3 x 2 1/2	16	66	30	33	-	93	B	200	02 173 136
4 x 2	12	79	39	26	72	120	A	70	02 173 140
4 x 2 1/2	12	83	39	30	89	120	A	115	02 173 169
4 x 3	16	79	33	39	-	118	B	500	02 173 141

Elbows 45° BSP threaded

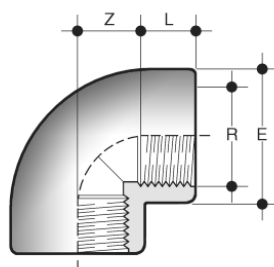
HFV



Size	PN	L	Z	E	gms	Code
1/2	16	15	7	28	18	02 120 102
3/4	16	16	8	33	24	02 120 103
1	16	19	11	41	45	02 120 104
1 1/4	16	21	15	50	68	02 120 105
1 1/2	16	2	21	64	154	02 120 106
2	16	26	26	76	255	02 120 107
2 1/2	16	30	31	90	345	02 120 108
3	16	33	39	107	325	02 120 109

Elbows 90° BSP threaded

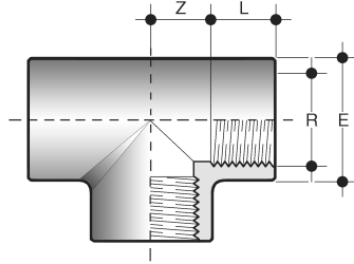
GFV



Size	PN	L	Z	E	gms	Code
3/8	16	15	7	28	18	02 117 101
1/2	16	15	13	29	24	02 117 102
3/4	16	16	17	35	40	02 117 103
1	16	19	21	43	72	02 117 104
1 1/4	16	21	27	54	130	02 117 105
1 1/2	16	21	36	61	185	02 117 106
2	16	26	46	76	350	02 117 107
2 1/2	16	30	55	91	450	02 117 108
3	16	33	66	108	835	02 117 109
4	16	39	80	130	1135	02 117 110

Tees 90° equal BSP threaded

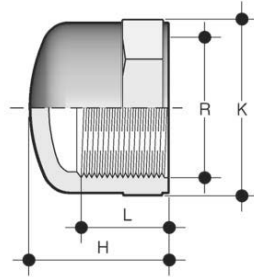
TFV



Size	PN	L	Z	E	gms	Code
1/2	16	15	13	29	32	93 125 102
3/4	16	16	17	35	52	93 125 103
1	16	19	22	43	92	93 125 104
1 1/4	16	21	27	50	117	93 125 105
1 1/2	16	21	37	61	260	93 125 106
2	16	26	46	76	465	93 125 107
2 1/2	16	30	55	91	640	93 125 108
3	16	33	66	109	1135	93 125 109
4	16	39	83	133	1710	93 125 110

End caps BSP threaded

CFV



Size	PN	L	H	K	gms	Code
1/2	16	15	25	28	10	02 141 102
3/4	16	16	27	34	15	02 141 103
1	16	19	28	42	27	02 141 104
1 1/4	16	21	31	51	40	02 141 105
1 1/2	16	21	36	58	53	02 141 106
2	16	26	42	71	85	02 141 107
2 1/2	12	30	50	89	251	02 141 108
3	16	33	55	109	310	02 141 109
4	12	39	59	130	623	02 141 110

Plugs BSP threaded

PFV

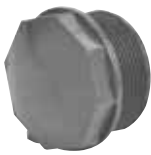


Fig A

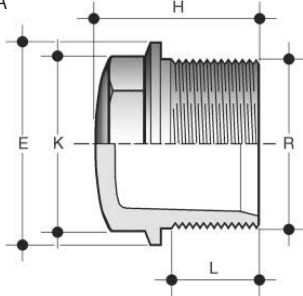
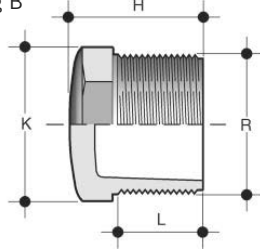


Fig B



Size	PN	L	H	E	K	Fig	gms	Code
1/2	16	15	26	28	23	A	8	02 155 102
3/4	16	16	30	34	28	A	11	02 155 103
1	16	19	34	40	35	A	21	02 155 104
1 1/4	16	21	38	52	44	A	30	02 155 105
1 1/2	16	21	40	58	51	A	46	02 155 106
2	16	26	47	70	64	A	74	02 155 107
2 1/2	12	30	51	-	80	B	160	02 155 108
3	12	33	55	-	95	B	235	02 155 109
4	12	39	61	-	120	B	360	02 155 110

Hexagon nipples BSP threaded

NFV



Fig A

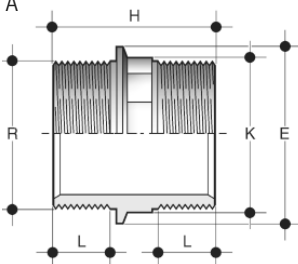
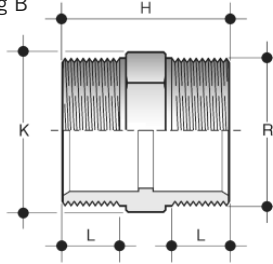


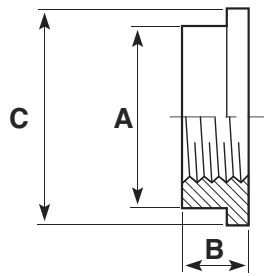
Fig B



Size	PN	H	K	E	L	Fig	gms	Code
1/2	16	41	23	28	15	A	10	02 106 102
3/4	16	45	28	34	16	A	16	02 106 103
1	16	51	35	40	19	A	27	02 106 104
1 1/4	16	57	44	52	21	A	40	02 106 105
1 1/2	16	58	51	58	21	A	55	02 106 106
2	16	68	64	70	26	A	93	02 106 107
2 1/2	12	78	80	-	30	B	150	02 106 108
3	12	85	95	-	33	B	225	02 106 109
4	12	97	120	-	39	B	380	02 106 110

Back nuts BSP threaded

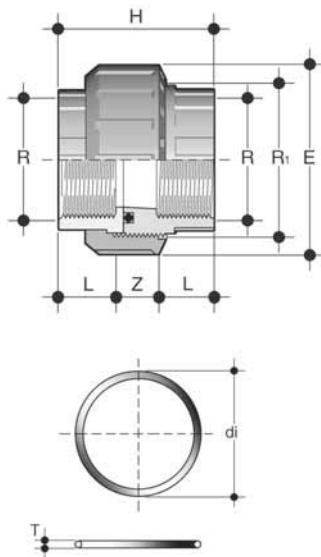
JFV



Size	PN	A	B	C	gms	Code
1/2	12	28	13	38	10	02 159 102
3/4	12	33	13	38	19	02 159 103
1	12	45	16	54	24	02 159 104
1 1/4	12	50	18	58	25	02 159 105
1 1/2	12	60	19	69	39	02 159 106
2	12	79	21	91	83	02 159 107
2 1/2	12	94	22	106	-	02 159 108
3	12	110	26	125	-	02 159 109
4	12	138	29	151	-	02 159 110

Socket unions BSP threaded/EPDM seals

BFV

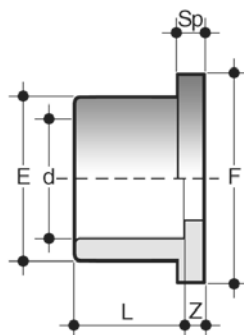


Size	R ₁	PN	H	L	Z	E	gms	Code
3/8	3/4	16	40	11	17	33	22	02 203 101
1/2	1	16	46	15	16	41	35	02 203 102
3/4	1 1/4	16	51	16	18	50	65	02 203 103
1	1 1/2	16	57	19	19	58	85	02 203 104
1 1/4	2	16	65	21	22	72	145	02 203 105
1 1/2	2 1/4	16	65	21	22	79	180	02 203 106
2	2 3/4	16	78	26	27	98	325	02 203 107

C	O-Ring dia	T
3062	15.54	2.62
4081	20.22	3.53
4112	28.17	3.53
4131	32.93	3.53
6162	40.65	5.34
6187	47.00	5.34
6237	59.69	5.34

Flanges stub serrated

QLV

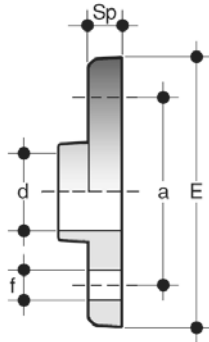


Size	PN	L	Z	Sp	E	F	gms	Code
1/2	15	19	3	6	27	34	10	02 135 102
3/4	15	22	3	7	33	41	14	02 135 103
1	15	25	3	7	41	50	33	02 135 104
1 1/4	15	29	3	8	50	61	37	02 135 105
1 1/2	15	34	3	8	61	73	60	02 135 106
2	15	38	3	9	76	90	110	02 135 107
2 1/2	15	44	3	10	90	106	165	12 135 312
3	15	51	5	11	108	125	270	02 135 109
4	15	61	5	12	131	150	445	02 135 110
6	12	86	5	16	188	212	1250	02 135 112
8	9	115	9	20	250	270	2150	02 135 113
10	6	147	8	29	308	326	3450	02 135 114
12	6	169	9	33	362	378	5060	02 135 115

Imperial Fittings

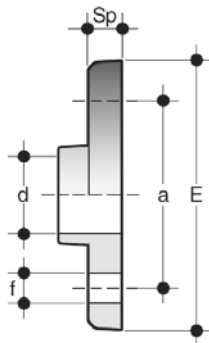
Flanges full face Plain/drilled

FLV



Drilled to BS10:1962 – Table E

Size	PN	E	a	L	Z	No. Holes	Hole Dia.(f)	Sp	Weight gms	Code
1/2	15	95	67	17	4	4	14	11	100	02 130 102
3/4	15	105	73	19	4	4	14	12	140	02 130 103
1	15	115	83	23	4	4	14	14	200	02 130 104
1 1/4	15	125	88	27	5	4	14	15	265	02 130 105
1 1/2	15	140	99	31	5	4	14	16	350	02 130 106
2	15	165	115	38	6	4	18	18	500	02 130 107
2 1/2	15	180	127	44	5	4	18	19	670	02 130 108
3	15	200	146	51	8	4	18	21	860	02 130 109
*4	15	220	178	63	6	8	18	23	1100	02 130 110

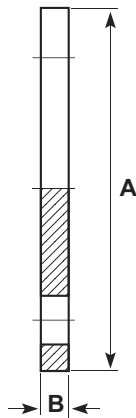


Drilled to BS4504: Table 10/3 and Table 16/3

Size	PN	E	a	L	Z	No. Holes	Hole Dia.	Sp	Weight gms	Code
1/2	15	95	65	20	5	4	14	11	70	02 319 102
3/4	15	105	75	24	5	4	14	12	105	02 319 103
1	15	115	85	27	5	4	14	14	148	02 319 104
1 1/4	15	142	100	31	5	4	18	15	225	02 319 105
1 1/2	15	152	110	36	5	4	18	16	285	02 319 106
2	15	165	125	43	5	4	18	18	420	02 319 107
3	15	200	160	58	7	8	18	20	735	02 319 109
4	15	220	180	69	8	8	18	22	930	02 319 110

Galvanised Backing Rings are not required on FIP moulded full face flanges.

Flanges blanking Plain/drilled



Drilled to BS10:1962 – Table E

Size	PN	A	B	P.C.D.	No. Holes	Hole Dia.	gms	Code
1/2	15	95	11	67	4	14	99	02 313 102
3/4	15	105	12	73	4	14	106	02 313 103
1	15	115	14	83	4	14	206	02 313 104
1 1/2	15	150	16	98	4	14	327	02 313 106
2	15	165	13	115	4	18	300	02 313 107
3	15	197	19	145	4	18	690	02 313 109
4	15	214	19	178	8	18	950	02 313 110
6	15	286	26	235	8	22	2100	02 313 112

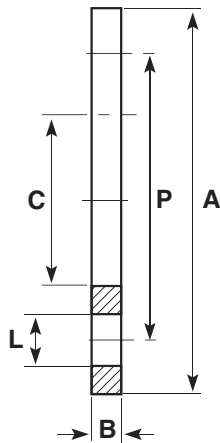
Drilled to BS4504:Table 16/3 & 10/3 (1/2" to 6")

Size	PN	A	B	P.C.D.	No. Holes	Hole Dia.	gms	Code
1/2	15	95	11	65	4	14	99	02 323 102
3/4	15	105	12	75	4	14	106	02 323 103
1	15	115	14	85	4	14	206	02 323 104
1 1/2	15	150	16	110	4	18	327	02 323 106
2	15	165	13	125	4	18	300	02 323 107
3	15	197	19	160	8	18	690	02 323 109
4	15	214	19	180	8	18	950	02 323 110
6	15	286	26	240	8	22	2100	02 323 112

Undrilled

Size	PN	A	B	gms	Code
1/2	15	95	13	120	02 131 102
3/4	15	105	13	145	02 131 103
1	15	116	13	160	02 131 104
1 1/2	15	150	13	250	02 131 106
2	15	165	13	300	02 131 107
3	15	197	20	690	02 131 109
4	15	214	19	950	02 131 110
6	15	286	26	2100	02 131 112
8	12	337	26	3020	02 131 113

Backing rings Galvanised mild steel drilled



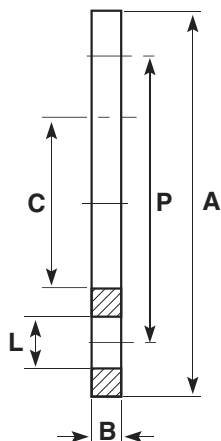
Drilled to BS10:1962 – Table E

Size	A	B	C	P	L	No. of Holes	Bolt Size	Weight gms	Code
1/2	96	6	29	68	16	4	M12x50	320	13 416 102
3/4	104	7	34	73	14	4	M12x50	340	13 416 103
1	114	7	42	84	14	4	M12x50	430	13 416 104
1 1/4	121	7	51	87	14	4	M12x50	430	13 416 105
1 1/2	134	8	62	98	14	4	M12x50	520	13 416 106
2	152	8	78	114	18	4	M16x65	900	13 416 107
3	184	10	110	145	18	4	M16x70	1130	13 416 109
*4	216	8	133	178	18	8	M16x80	1480	13 416 110
6	279	10	196	235	22	8	M20x90	2660	13 416 112
8	337	15	250	292	22	8	M20x100	3100	13 416 113
10	406	20	308	356	22	12	M20x130	7050	13 416 114

*4" BS10 Table D has 4 holes and should be ordered as 13 415 110. The bore of the 10" backing rings is machined to mate with the taper of the stub flanges.

Continued >>

Backing rings Galvanised mild steel drilled



Drilled to DIN8063 (BS4504) PN10/PN16

Size	A	B	C	P	L	No. Holes	Weight gms	Code
1/2" - 20mm	95	6	28	65	14	4	330	13 421 306
3/4" - 25mm	105	6	34	75	14	4	380	13 421 307
1" - 32mm	115	6	42	85	14	4	440	13 421 308
1 1/4" - 40mm	140	6	51	100	18	4	660	13 421 309
1 1/2" - 50mm	150	6	62	110	18	4	730	13 421 310
2" - 63mm	165	8	78	125	18	4	1100	13 421 311
2 1/2" - 75mm	185	8	92	145	18	4	1340	13 421 312
3" - 90mm	200	8	110	160	18	8	1500	13 421 313
4" - 110mm	220	8	133	180	18	8	1630	13 421 314
125mm	250	8	150	210	18	8	2090	13 421 315
5" - 140mm	250	10	167	210	18	8	2290	13 421 316
6" - 160mm	285	10	190	240	22	8	3050	13 421 317

Drilled to DIN 8063 (BS4504) PN10

Size	A	B	C	P	L	No. Holes	Weight gms	Code
200mm*	340	10	235	295	22	8	3200	13 421 318
8" - 225mm**	340	12	250	295	22	8	3000	13 421 319
250mm	395	20	274	350	22	12	9900	13 421 320
10" - 280mm	395	16	303	355	26	12	9900	13 421 321
12" - 315mm	445	20	355	400	22	12	9300	13 421 323

Drilled to DIN8063 (BS4504) PN16

Size	A	B	C	P	L	No. Holes	Weight gms	Code
200mm*	340	11	235	295	22	12	3200	13 420 318
8" - 225mm**	340	11	249	295	22	12	3000	13 420 319
250mm	405	20	278	355	26	12	9900	13 420 320
10" - 280mm	395	20	303	350	22	12	9900	13 420 321
12" - 315mm	460	20	355	410	26	12	9300	13 420 323

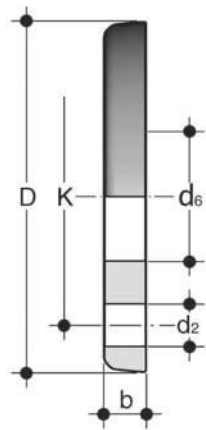
*The 200mm (NW175) stub flange supplied by Durapipe UK when used in conjunction with backing ring; code number 421 318 and 420 318 has a bolt circle diameter which matches 225mm (NW200) valves and fittings (295mm).

**Not for use with FK Butterfly valve, use 8 hole backing ring code 04 996 131.

Drilled to ANSI Class 150

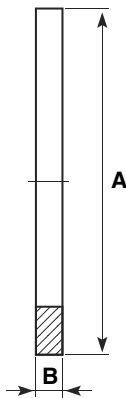
Size	A	B	C	P	L	No. Holes	Weight gms	Code
1/2" - 20mm	90	8	28	61	16	4	350	13 448 306
3/4" - 25mm	100	8	34	70	16	4	390	13 448 307
1" - 32mm	110	9	42	79	16	4	470	13 448 308
1 1/4" - 40mm	118	8	51	90	16	4	590	13 448 309
1 1/2" - 50mm	129	8	62	99	16	4	650	13 448 310
2" - 63mm	154	10	78	121	19	4	1133	13 448 311
3" - 90mm	192	11	110	153	19	4	1570	13 448 313
4" - 110mm	230	11	133	190	19	8	2310	13 448 314

Backing rings Pre-drilled – Manufactured from PVC-U



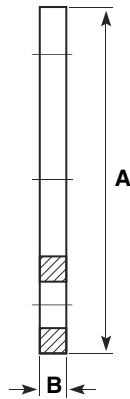
d	PN	E	d ₁	a	Sp	f	U	b	gms	Code
20	10	96	28	65	11	14	4	M12x70	60	33 180 306
25	10	107	34	75	12	14	4	M12x70	85	33 180 307
32	10	117	42	85	14	14	4	M12x70	120	33 180 308
40	10	143	51	100	15	18	4	M16x85	190	33 180 309
50	10	153	62	110	16	18	4	M16x85	225	33 180 310
63	10	168	78	125	18	18	4	M16x95	280	33 180 311
75	10	188	92	145	19	18	4	M16x95	390	33 180 312
90	10	203	109	160	20	18	8	M16x105	460	33 180 313
110	10	222	132	180	22	18	8	M16x105	515	33 180 314
125	10	230	149	190	24	18	8	M16x115	530	33 180 315
140	10	251	166	210	26	18	8	M16x120	715	33 180 316
200	10	340	235	295	30	22	8	M20x140	1210	33 180 317
225	10	340	252	295	30	22	8	M20x140	1090	33 180 318
280	10	396	309	350	35	22	12	M20x160	1880	33 180 320

Gaskets flat Stub flange EPDM



Size	A	B	gms	Code
1/2	32	2	2	02 431 102
3/4	39	2	3	02 431 103
1	48	2	4	02 431 104
1 1/2	71	2	5	02 431 106
2	97	3	21	03 431 107
2 1/2	106	3	22	13 411 312
3	128	3	23	03 431 109
4	160	4	36	03 431 110
5	180	4	60	13 411 316
6	214	4	74	03 431 112
8	269	4	92	03 431 113
10	327	4	186	03 411 114
12	378	4	218	03 411 115

Gaskets full face Drilled EPDM



Drilled to BS10:1962 – Table E

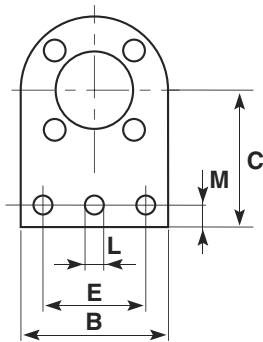
Size	A	B	P.C.D.	No. of Holes	Hole Dia.	Weight gms	Code
1/2	95	3	67	4	14	31	03 410 102
3/4	112	3	73	4	14	37	03 410 103
1	115	3	83	4	14	37	03 410 104
1 1/4	121	3	87	4	14	41	03 410 105
1 1/2	133	3	98	4	14	55	03 410 106
2	153	3	115	4	18	56	03 410 107
3	184	3	145	4	18	98	03 410 109
*4	216	3	178	8	18	112	03 410 110

*4" BS10 Table D has 4 holes and should be ordered as 03 409 110.

Drilled to BS4504 Table 10/3 and Table 16/3

Size	A	B	P.C.D.	No. of Holes	Hole Dia.	Weight gms	Code
1/2	95	3	65	4	14	31	03 408 102
3/4	112	3	75	4	14	37	03 408 103
1	115	3	85	4	14	37	03 408 104
1 1/4	121	3	100	4	18	41	03 408 105
1 1/2	133	3	110	4	18	55	03 408 106
2	153	3	125	4	18	56	03 408 107
3	184	3	160	8	18	98	03 408 109
4	216	3	180	8	18	112	03 408 110

Valve support plates Galvanised mild steel drilled



Drilled to DIN8063 (BS4504) PN10/PN16

No. Size	B	C	E	L	M	N	No. Holes	Weight gms	Code
1/2" - 20mm	97	86	49	14	16	2	4	640	31 459 306
3/4" - 25mm	105	89	76	14	16	2	4	750	31 459 307
1" - 32mm	114	96	77	14	12	2	4	860	31 459 308
1 1/2" - 50mm	150	125	100	14	22	2	4	1480	31 459 310
2" - 63mm	160	134	100	14	24	2	4	2100	31 459 311
2 1/2" - 75mm	185	144	125	14	22	2	4	2500	31 459 312
3" - 90mm	203	150	127	14	23	2	8	2660	31 459 313
4" - 110mm	214	160	150	14	22	3	8	2960	31 459 314

N = No. of holes in base.

For details of flange drillings see the corresponding backing ring.

Flange assemblies



PVC Full Face Flange – PN16 Drilling

Size	Description	Code
1/2	PVC F/F FLG 16/3 KIT 1/2	02 359 102
3/4	PVC F/F FLG 16/3 KIT 3/4	02 359 103
1	PVC F/F FLG 16/3 KIT 1	02 359 104
1 1/4	PVC F/F FLG 16/3 KIT 1 1/4	02 359 105
1 1/2	PVC F/F FLG 16/3 KIT 1 1/2	02 359 106
2	PVC F/F FLG 16/3 KIT 2	02 359 107
3	PVC F/F FLG 16/3 KIT 3	02 359 109
4	PVC F/F FLG 16/3 KIT 4	02 359 110

PVC Full Face Flange – Table E Drilling

Size	Description	Code
1/2	PVC F/F FLG BS10E KIT 1/2	02 362 102
3/4	PVC F/F FLG BS10E KIT 3/4	02 362 103
1	PVC F/F FLG BS10E KIT 1	02 362 104
1 1/4	PVC F/F FLG BS10E KIT 1 1/4	02 362 105
1 1/2	PVC F/F FLG BS10E KIT 1 1/2	02 362 106
2	PVC F/F FLG BS10E KIT 2	02 362 107
3	PVC F/F FLG BS10E KIT 3	02 362 109
4	PVC F/F FLG BS10E KIT 4	02 362 110



PVC Stub Flange – PN16 Drilling

Size	Description	Code
2	PVC S FLG 16/3 KIT 2	02 364 107
2 1/2	PVC S FLG 16/3 KIT 75	33 364 312
3	PVC S FLG 16/3 KIT 3	02 364 109
4	PVC S FLG 16/3 KIT 4	02 364 110
5	PVC S FLG 16/3 KIT 140	33 364 316
6	PVC S FLG 16/3 KIT 6	02 364 112
8	PVC S FLG 16/3 KIT 8	02 364 113

PVC Stub Flange – ASA150 Drilling

Size	Description	Code
2	PVC S FLG ASA 150 KIT 2	02 366 107
3	PVC S FLG ASA 150 KIT 3	02 366 109
4	PVC S FLG ASA 150 KIT 4	02 366 110
6	PVC S FLG ASA 150 KIT 6	02 366 112
8	PVC S FLG ASA 150 KIT 8	02 366 113

PVC Stub Flange – Table E Drilling

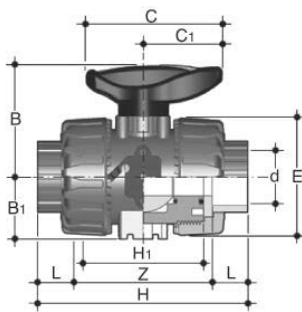
Size	Description	Code
2	PVC S FLG BS10E KIT 2	02 367 107
3	PVC S FLG BS10E KIT 3	02 367 109
4	PVC S FLG BS10E KIT 4	02 367 110
6	PVC S FLG BS10E KIT 6	02 367 112
8	PVC S FLG BS10E KIT 8	02 367 113

Pre-packed flange assemblies are also available and consist of a PVC flange, galvanised mild steel backing ring and gasket on one code. Ordering these products guarantees a correct fit between the components.

Valves

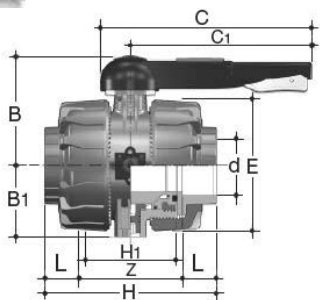
Premium Quality
Valve for Demanding
Environments

VKD Double union ball valves Manual – EPDM seals



with BS series plain female ends for solvent welding

d	DN	PN	L	Z	H	H ₁	E	B	B ₁	C	C ₁	gms	Code
1/2	15	16	16	70	103	65	54	54	29	67	40	205	HO DKE 102
3/4	20	16	19	77	115	70	65	65	35	85	49	335	HO DKE 103
1	25	16	22	83	128	78	73	70	39	85	49	433	HO DKE 104
1 1/4	32	16	26	94	146	88	86	83	46	108	64	703	HO DKE 105
1 1/2	40	16	30	106	164	91	98	89	52	108	64	925	HO DKE 106
2	50	16	36	127	199	111	122	108	62	134	76	1577	HO DKE 107



d	DN	PN	Z	L	H	H ₁	E	B	B ₁	C	C ₁	gms	Code
2 1/2	65	16	147	44	235	133	164	164	87	225	175	4380	HO DKE 312
3	80	16	168	51	270	149	203	177	105	327	272	7200	HO DKE 109
4	100	16	186	61	308	167	238	195	129	385	330	11141	HO DKE 110

Options:

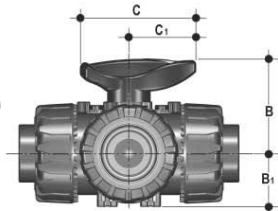
EPDM seals (threaded ends) order HO DKE B**

FPM seals (plain ends) order HO DKF ***

FPM seals (threaded ends) order HO DKF B**

Premium Quality
Valve for Demanding
Environments

TKD 3-way ball valves Plain EPDM



T-Port design

d	DN	PN	H	H ₁	Z	C	C ₁	B	B ₁	L	gms	Code
1/2	15	16	118	80	85	67	40	54	29	17	310	HO TTE 102
3/4	20	16	145	100	107	85	49	65	35	19	535	HO TTE 103
1	25	16	160	110	115	85	49	69	39	22	725	HO TTE 104
1 1/4	32	16	189	131	137	108	64	83	46	26	1170	HO TTE 105
1 1/2	40	16	219	148	159	108	64	89	52	31	1600	HO TTE 106
2	50	16	267	179	194	134	76	108	62	37	2845	HO TTE 107

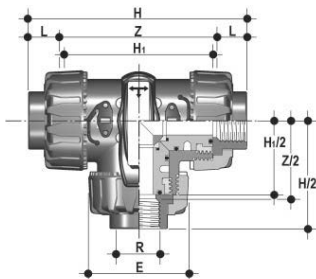
Options:

EPDM seals (threaded ends) order HO TTE B**

FPM seals (plain ends) order HO TTF ***

FPM seals (threaded ends) order HO TTF B**

Manual valves can be supplied with locking kits - further information is available from our Valve Department.



L-Port design

d	DN	PN	H	H ₁	Z	C	C ₁	B	B ₁	L	gms	Code
1/2	15	16	118	80	85	67	40	54	29	17	310	HO LTE 102
3/4	20	16	145	100	107	85	49	65	35	19	535	HO LTE 103
1	25	16	160	110	115	85	49	69	39	22	725	HO LTE 104
1 1/4	32	16	189	131	137	108	64	83	46	26	1170	HO LTE 105
1 1/2	40	16	219	148	159	108	64	89	52	31	1600	HO LTE 106
2	50	16	267	179	194	134	76	108	62	37	2845	HO LTE 107

Options:

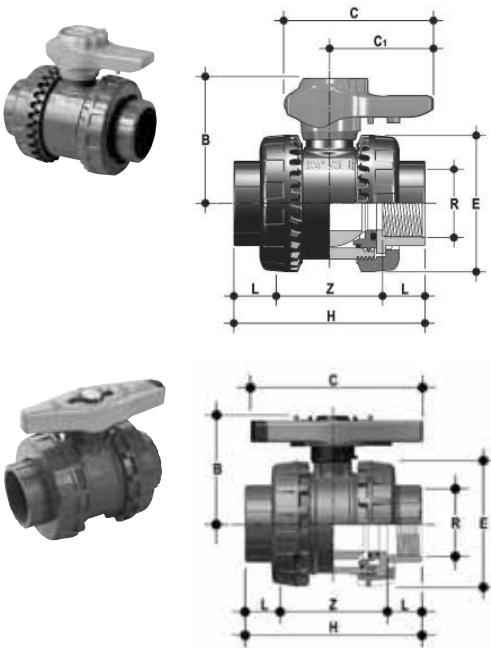
EPDM seals (threaded ends) order HO LTE B**

FPM seals (plain ends) order HO LTB ***

FDM seals (threaded ends) order HO LTF B**

VKD and TKD ball valves can be supplied electrically or pneumatically actuated.

VXE Double union ball valves Manual – EPDM seals



with BS series plain female ends for solvent welding

d	DN	PN	L	Z	H	E	B	C	C ₁	gms	Code
1/2	15	16	15	60	90	54	49	64	20	175	HO XEE 102
3/4	20	16	16	60	93	63	62	78	23	260	HO XEE 103
1	25	16	19	72	110	72	71	87	27	365	HO XEE 104
1 1/4	32	16	21	84	127	85	82	102	30	565	HO XEE 105
1 1/2	40	16	21	88	131	100	92	109	33	795	HO XEE 106
2	50	16	26	110	161	118	110	133	39	1325	HO XEE 107

d	DN	PN	L	Z	H	E	B	C	C ₁	gms	Code
2 1/2	65	10	44	128	216	154	133	222	-	2600	HO XEE 312
3	80	10	51	142	244	189	154	270	-	4330	HO XEE 109
4	100	6	63	183	309	221	175	270	-	7450	HO XEE 110

SXE Easyfit ball check valves Plain ends – EPDM seals (other options available)



d	DN	PN	L	Z	H	E	gms	Code
1/2	15	16	16.5	49	82	54	148	HO SXE 102
3/4	20	16	19	53	91	63	190	HO SXE 103
1	25	16	22.5	58	103	72	300	HO SXE 104
1 1/4	32	16	26	68	120	85	460	HO SXE 105
1 1/2	40	16	30	79	139	100	675	HO SXE 106
2	50	16	36	102	174	118	1080	HO SXE 107

Options:

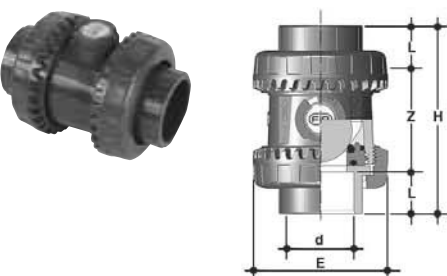
EPDM seals (threaded ends) order HO SXE B**

FPM seals (plain ends) order HO SXF ***

FPM seals (threaded ends) order HO SXF B**

d	DN	PN	L	Z	H	E	gms	EPDM Code
2 1/2	65	16	44	123	211	157	2605	HO SXE 312
3	80	16	51	146	248	174	3300	HO SXE 109
4	100	16	63	157	283	212	5570	HO SXE 110

SXA Easyfit air release valves Plain ends – EPDM seals (other options available)



d	DN	PN	L	Z	H	E	gms	Code
1/2	15	16	16.5	50	82	54	148	HO SAE 102
3/4	20	16	19	53	91	63	190	HO SAE 103
1	25	16	22.5	59	103	72	300	HO SAE 104
1 1/4	32	16	26	68	120	85	460	HO SAE 105
1 1/2	40	16	30	77	139	100	675	HO SAE 106
2	50	16	36	98	174	118	1080	HO SAE 107

Options:

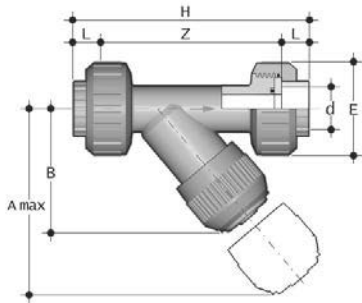
EPDM seals (threaded ends) order HO SAE B**

FPM seals (plain ends) order HO SAF ***

FPM seals (threaded ends) order HO SAF B**

Note: this valve must be installed at a minimum distance of 10 x nominal diameter (eg. 20" for size 2") from pump flange.

RV Y-Type strainers Socket union ends – EPDM seals



Grey (HO UV* ***) or Transparent (HO UT* ***)
with BS series plain female ends for solvent welding

d	DN	PN	A	B	E	L	Z	H	K	gms	Code	
Grey Trans. max											(Grey)	
1/2	15	15	15	125	72	55	16	103	135	-	211	HO UVE 102
3/4	20	15	15	145	84	66	19	120	158	-	358	HO UVE 103
1	25	15	15	165	95	75	22	132	176	-	526	HO UVE 104
1 1/4	32	15	10	190	111	87	26	155	207	-	733	HO UVE 105
1 1/2	40	15	10	210	120	100	31	181	243	-	1095	HO UVE 106
2	50	15	10	240	139	120	38	222	298	-	1843	HO UVE 107

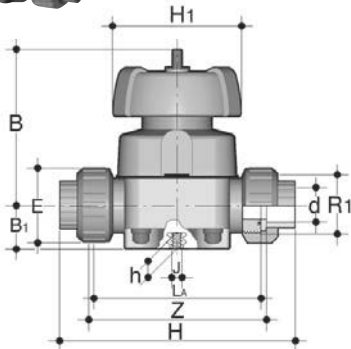
Options:

EPDM seals (threaded ends) order HO UVE B**

FPM seals (plain ends) order HO UVF ***

FPM seals (threaded ends) order HO UVF B**

VM Diaphragm valves Manual – plain union ends EPDM diaphragm



BS series plain female ends

d	DN	PN	B	B ₁	H	h	H ₁	L _A	J	E	R ₁	gms	Code
1/2	15	10	95	20	146	12	90	108	M6	41	1	830	HO UME 102
3/4	20	10	95	20	152	12	90	108	M6	50	1 1/4	860	HO UME 103
1	25	10	95	26	166	12	90	116	M6	122	1 1/2	895	HO UME 104
1 1/4	32	10	126	36	192	16	115	134	M8	140	2	1650	HO UME 105
1 1/2	40	10	126	40	222	16	115	154	M8	160	2 1/4	1730	HO UME 106
2	50	10	148	49	266	16	140	184	M8	190	2 3/4	2800	HO UME 107
2 1/2	65	10**	225	55	284	23	200	-	M12	-	-	7000	HO VME 412
3	80	10**	225	55	300	23	200	-	M12	-	-	7000	HO VME 209
4	100	10**	295	69	300	23	200	-	M12	-	-	0500	HO VME 210

*2 1/2", 3" & 4" are all spigot-ended products.

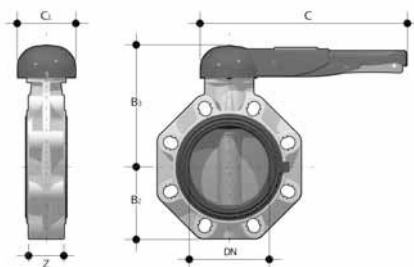
** PN6 for PTFE diaphragm.

Options:

FPM diaphragm (plain ends) order HO UMF ***

PTFE diaphragm (plain ends) order HO UMG ***

FK Butterfly valves EPDM seals



d	DN	PN	B ₂	B ₃	C	C ₁	gms	U	Code
1 1/2	40	16	60	137	175	100	900	4	HO FKE 106
2	50	16	70	143	175	100	1080	4	HO FKE 107
2 1/2	65	10	80	164	272	110	1470	4	HO FKE 108
3	80	10	93	178	272	110	1870	8	HO FKE 109
4	100	10	107	192	272	110	2220	8	HO FKE 110
5	125	10	120	212	330	110	3100	8	HO FKE 111
6	150	10	134	225	330	110	3850	8	HO FKE 112
8	200	10	161	272	420	122	6750	8	HO FKE 113

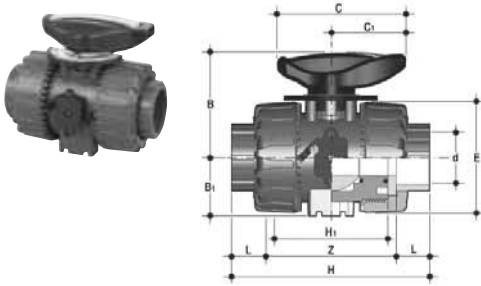
Sizes 6" to 12" are available with gearbox operation.

10" and 12" are available, these are dimensionally identical to the 250mm & 315mm products featured on Page 77. Contact 01543 272424 for more details.

Options:

FPM seals order HO FKF ***

VKR Metering ball valve



d	DN	PN	L	Z	H	H ₁	E	B	B ₁	C	C ₁	gms	Code
3/8	15	16	16.5	70	103	65	54	54	29	67	40	205	H0 MBE 101
1/2	15	16	16.5	70	103	65	54	54	29	67	40	205	H0 MBE 102
3/4	20	16	19	77	115	70	65	65	34.5	85	49	335	H0 MBE 103
1	25	16	22.5	83	128	78	73	70	39	85	49	433	H0 MBE 104
1 1/4	32	16	26	94	146	88	86	83	46	108	64	703	H0 MBE 105
1 1/2	40	16	30	104	164	91	98	89	52	108	64	925	H0 MBE 106
2	50	16	36	127	199	111	122	108	62	134	76	1577	H0 MBE 107

Options:
FPM seals (Plain ends) order H0 MBF ***

Set of transparent service plugs and white PVC tag holders

For insertion in handle for (VXE) Easyfit valve customisation



Size mm/inch	Standard pack quantity in units	Product Code
16-20 / 1/2	20	LCE020
25 / 3/4	20	LCE025
32 / 1	20	LCE032
40 / 1 1/4	20	LCE040
50 / 1 1/2	20	LCE050
63 / 2	20	LCE063

Die cut labels plus software White waterproof A4 sheets and freeware editing software to be used with inkjet printers for easyfit valve customisation.



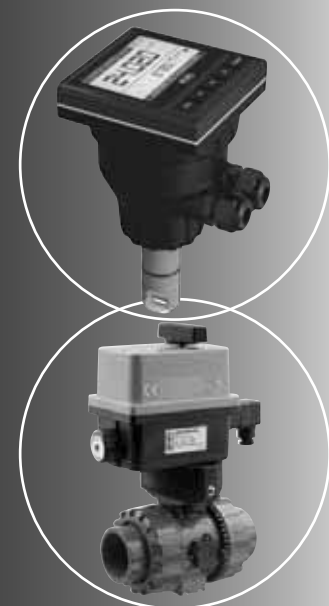
Size mm/inch	No. of sheets	Total labels	Product Code
16-20 / 1/2	10	500	LSE020
25 / 3/4	10	500	LSE025
32 / 1	10	500	LSE032
40 / 1 1/4	10	500	LSE040
50 / 1 1/2	10	400	LSE050
63 / 2	10	400	LSE060

Actuated Valves and Flow Control

The valves in this catalogue are only a selection of the complete range of thermoplastic valves available.

Durapipe UK offer a comprehensive range of actuated valves with either pneumatic or electric actuators. These are assembled at our in-house actuation department and meet the demands of a wide range of applications found in industrial pipework installations.

To further complement the Durapipe UK valve offering, there is a complete range of Flow Meters, Solenoid Valves and the flow control system FLOW X3/CHEM X3.



For further information on any of these products, please do not hesitate to contact your local Area Sales Manager or our Valves and Flow Control Department on 01543 272424.

Accessories

One-step solvent cement



Litres	gms	Code
0.5	500	03 462 395

Durapipe PVC-U solvent cement must be used for jointing of Durapipe PVC-U pipework systems.

HCR-36 Chemically resistant PVC cement



Description	Code
1 litre	03 468 396

Eco-cleaner



Litres	gms	Code
0.5	500	03 457 395

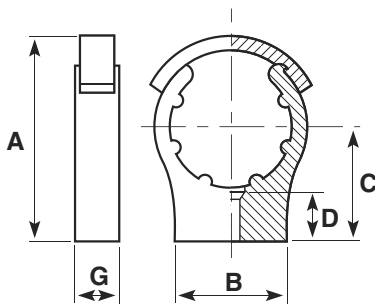
Durapipe Eco-cleaner must be used for jointing of Durapipe PVC-U pipework systems.

Cleaner for use with HCR-36 Chemically resistant PVC cement



Description	Code
1/2 litre	03 467 395

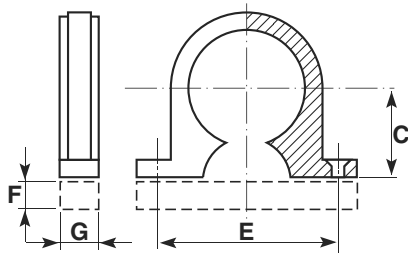
Cobra pipe clips Polypropylene



Size	A	B	C	D	G	Bolt/Screw size	gms	Code
3/8	-	35	25	19	16	M.4/3BA/No 8	7	13 434 305
1/2	-	35	30	14	16	M.5/1BA/No 10	8	13 434 306
3/4	-	35	35	16	17	M.5/1BA/No 10	11	13 434 307
1	-	40	40	17	17	M.5/1BA/No 10	14	13 434 308
1 1/4	75	45	45	20	20	M.5/1BA/No 10	21	13 434 309
1 1/2	85	50	50	22	21	M.6/OBA/No 10	30	13 434 310
2	102	60	60	19	21	M.6/OBA/No 10	42	13 434 311
2 1/2	122	70	70	27	31	M.8	94	13 434 312
3	148	80	90	39	31	M.8	121	13 434 313
4	171	90	96	36	35	M.8	185	13 434 314
5	211	156	132	40	40	M.8	252	13 434 316
6	243	170	150	40	40	M.8	185	13 434 317

Clips 1 1/4" and above are fitted with a pipe retaining strap.
Bolts/screws not supplied.

Saddle clips Polypropylene



Size	C	E	F	G	Bolt/Screw size	gms	Code
3/8	13	37	-	14	M.4/3BA/No 8	3	03 455 101
1/2	18	41	-	14	M.4/3BA/No 8	4	03 455 102
3/4	21	45	-	16	M.5/2BA/No 10	6	03 455 103
1	23	56	-	16	M.5/2BA/No 10	7	03 455 104
1 1/4	29	65	-	16	M.5/2BA/No 10	11	03 455 105
1 1/2	34	67	-	16	M.5/2BA/No 10	12	03 455 106
2	38	87	-	22	M.6/0BA/No 12	25	03 455 107
3	50	122	8	34	M.10/38UNC	45	03 455 109
4	65	156	13	38	M.10/38UNC	70	03 455 110

Backing plate shown dotted supplied with 3" and 4" only. Bolts/screws not supplied. Bolt holes in 3" and 4" clips are not countersunk.

Chamfering and de-burring tools



Description	Code
E 16-63mm pipe outer milling cutter tool	FT 55 65 12
32-160mm chamfering tool	FT 55 05 10

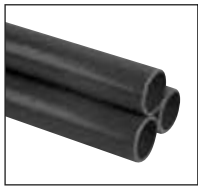
Durapipe PVC-U solvent cement must be used for jointing of Durapipe PVC-U pipework systems.

Pipe cutters



Description	Code
16-63mm pipe cutter	FT 80 00 01
50-125mm pipe cutter	FT 80 00 03
16-63mm spare cutter wheel	FT 80 00 02
50-125mm spare cutter wheel	FT 80 00 04

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Cross
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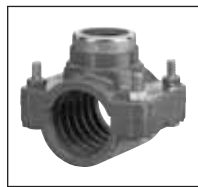
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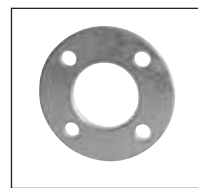
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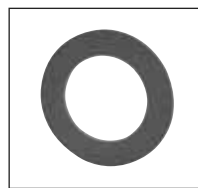
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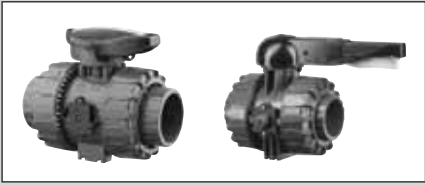


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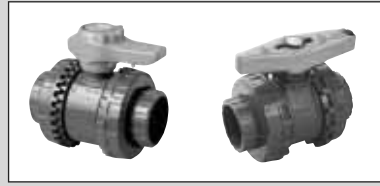
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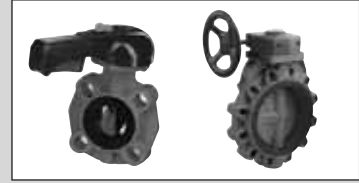
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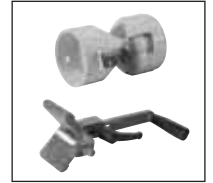
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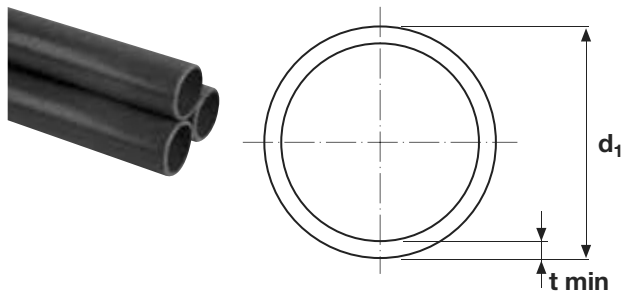
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NEW

Optima Pipe Plain



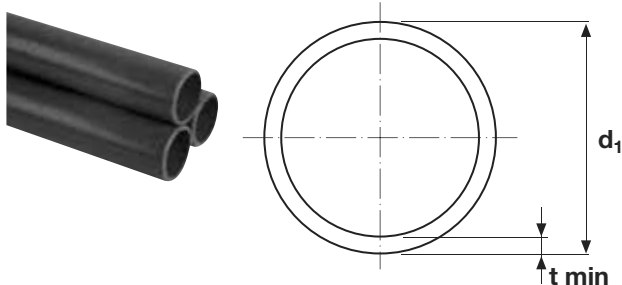
PN10

d ₁ Size	t min	kg/m	length m	Code
32	1.6	0.24	5	33 556 308
40	1.9	0.35	5	33 556 309
50	2.4	0.55	5	33 556 310
63	3.0	0.71	5	33 556 311
75	3.6	1.00	5	33 556 312
90	4.3	1.44	5	33 556 313
110	4.2	2.11	5	33 556 314
125	4.8	2.72	5	33 556 315
160	6.2	4.49	5	33 556 317

PN16

d ₁ Size	t min	kg/m	length m	Code
20	1.5	0.13	5	33 557 306
25	1.9	0.20	5	33 557 307
32	2.4	0.34	5	33 557 308
40	3.0	0.51	5	33 557 309
50	3.7	0.79	5	33 557 310
63	4.7	1.25	5	33 557 311
75	5.6	1.50	5	33 557 312
90	6.7	2.15	5	33 557 313
110	6.6	3.20	5	33 557 314

PVC-U Pipe 16 bar



PN10

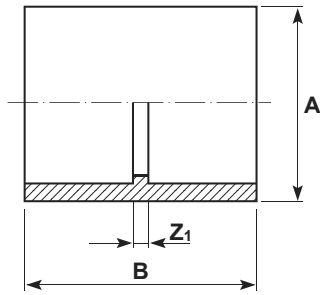
d ₁ Size	t min	kg/m	length m	Code
32	1.6	0.24	5	33 555 308
40	1.9	0.35	5	33 555 309
50	2.4	0.55	5	33 555 310
63	3.0	0.71	5	33 555 311
75	3.6	1.00	5	33 555 312
90	4.3	1.44	5	33 555 313
110	4.2	2.11	5	33 555 314
125	4.8	2.72	5	33 555 315
140	7.3	4.54	6	06 512 111
160	6.2	4.49	5	33 555 317
200	7.7	6.98	5	33 555 318
250	9.6	10.87	5	33 555 320
315	12.1	17.5	5	33 555 323

PN16

d ₁ Size	t min	kg/m	length m	Code
20	1.5	0.13	5	33 560 306
25	1.9	0.20	5	33 560 307
32	2.4	0.34	5	33 560 308
40	3.0	0.51	5	33 560 309
50	3.7	0.79	5	33 560 310
63	4.7	1.25	5	33 560 311
75	5.6	1.50	5	33 560 312
90	6.7	2.15	5	33 560 313
110	6.6	3.20	5	33 560 314

Sockets Plain

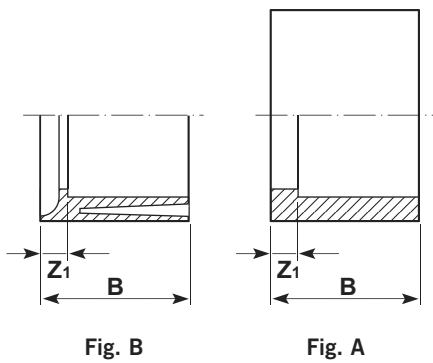
MIV



Size	PN	A	B	Z ₁	gms	Code
16	16	21	31	3	7	33 100 305
20	16	26	35	3	11	33 100 306
25	16	32	41	2	20	33 100 307
32	16	40	47	3	30	33 100 308
40	16	50	55	3	55	33 100 309
50	16	61	65	3	90	33 100 310
63	16	76	79	3	160	33 100 311
75	16	90	91	3	250	33 100 312
90	16	108	106	4	415	33 100 313
110	16	131	130	8	715	33 100 314
125	16	145	145	7	960	33 100 315
140	16	164	160	8	1240	33 100 316
160	16	186	181	9	1680	33 100 317
200	16	232	223	11	3050	33 100 318
225	16	260	249	11	4600	33 100 319
250	10	286	272	10	5760	33 100 320
315	10	355	339	11	9780	33 100 323

Reducing bushes Plain

DIV

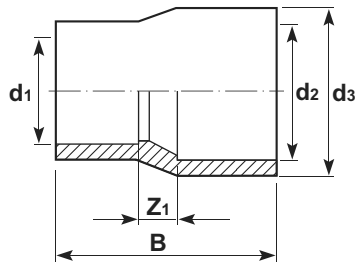


Size	PN	B	Z ₁	Fig	gms	Code
20 x 16	16	18	2	A	3	33 109 412
25 x 20	16	22	3	A	5	33 109 415
32 x 20	16	28	6	A	15	33 109 418
32 x 25	16	26	4	A	10	33 109 419
40 x 20	16	35	9	B	25	33 109 421
40 x 25	16	33	7	B	24	33 109 422
40 x 32	16	30	4	A	17	33 109 423
50 x 25	16	33	13	B	29	33 109 425
50 x 32	16	40	9	B	35	33 109 426
50 x 40	16	36	5	A	32	33 109 427
63 x 32	16	38	16	B	73	33 109 430
63 x 40	16	38	12	B	75	33 109 431
63 x 50	16	38	7	A	65	33 109 432
75 x 50	16	44	13	B	120	33 109 437
75 x 63	16	44	6	A	85	33 109 438
90 x 50	16	51	20	B	200	33 109 442
90 x 63	16	51	13	B	210	33 109 443
90 x 75	16	51	7	A	150	33 109 444
110 x 63	16	61	23	B	340	33 109 449
110 x 75	16	61	17	B	360	33 109 450
110 x 90	16	61	9	A	270	33 109 451
125 x 110	16	69	8	A	285	33 109 459
140 x 90	16	76	25	B	730	33 109 465
140 x 110	16	76	17	A	645	33 109 466
140 x 125	16	76	10	A	350	33 109 467
160 x 90	16	86	35	B	1040	33 109 473
160 x 110	16	86	24	B	945	33 109 474
160 x 140	16	86	10	A	565	33 109 476
200 x 160	16	110	21	B	109	33 109 487
225 x 160	16	119	33	B	1840	33 109 495
225 x 200	16	119	13	A	1380	33 109 496
250 x 160	10	132	45	B	4250	33 109 497
250 x 200	10	132	25	A	3820	33 109 498
250 x 225	10	132	12	A	2230	33 109 499
315 x 200	10	165	58	B	8650	33 109 501
315 x 225	10	165	45	B	8100	33 109 502
315 x 250	10	165	33	B	5080	33 109 503

Metric Fittings

Reducing sockets Plain

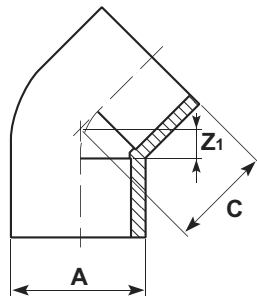
RIV



Size d ₃ x d ₂ x d ₁	PN	B	Z ₁	gms	Code
20 x 16	16	35	5	8	33 114 305
25 x 20 x 16	16	39	9	9	33 114 412
25 x 20 x 20	16	41	9	12	33 114 306
32 x 25 x 20	16	46	11	16	33 114 415
32 x 25 x 25	16	49	11	20	33 114 307
40 x 32 x 20	16	52	14	23	33 114 418
40 x 32 x 25	16	55	14	27	33 114 419
40 x 32 x 32	16	58	14	34	33 114 308
50 x 40 x 20	16	60	18	36	33 114 421
50 x 40 x 25	16	63	18	40	33 114 422
50 x 40 x 32	16	66	18	48	33 114 423
50 x 40 x 40	16	70	18	55	33 114 309
63 x 50 x 25	16	73	23	75	33 114 425
63 x 50 x 32	16	76	23	80	33 114 426
63 x 50 x 40	16	80	23	90	33 114 427
63 x 50 x 50	16	85	23	110	33 114 310
75 x 63 x 50	16	93	24	130	33 114 432
75 x 63 x 63	16	100	24	175	33 114 311
90 x 75 x 40	16	100	30	160	33 114 436
90 x 75 x 50	16	105	30	185	33 114 437
90 x 75 x 63	16	112	30	225	33 114 438
90 x 75 x 75	16	118	30	255	33 114 312
110 x 90 x 50	16	119	37	260	33 114 442
110 x 90 x 63	16	126	37	300	33 114 443
110 x 90 x 75	16	132	37	345	33 114 444
110 x 90 x 90	16	139	37	400	33 114 313
160 x 110	16	186	-	1270	33 114 474

Elbows 45° Plain

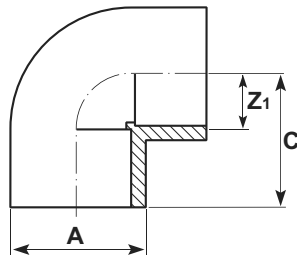
HIV



Size	PN	A	C	Z ₁	gms	Code
16	16	21	20	5	6	33 119 305
20	16	28	22	6	20	33 119 306
25	16	33	25	6	26	33 119 307
32	16	41	30	8	45	33 119 308
40	16	50	37	11	70	33 119 309
50	16	61	42	12	120	33 119 310
63	16	76	52	14	200	33 119 311
75	16	90	61	17	320	33 119 312
90	16	107	72	22	550	33 119 313
110	16	130	87	26	915	33 119 314
125	16	147	100	31	1315	33 119 315
140	16	163	110	34	1660	33 119 316
160	16	192	124	38	3060	33 119 317
200	10	230	156	48	4500	33 119 318
225	10	260	176	55	6400	33 119 319
250	10	286	189	58	7700	33 119 320
280	10	320	208	62	10460	33 119 321
315	10	359	230	66	15500	33 119 323

Elbows 90° Plain

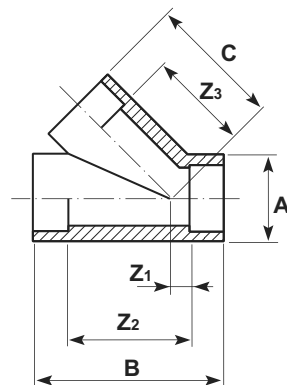
GIV



Size	PN	A	C	Z ₁	gms	Code
16	16	22	23	9	11	33 115 305
20	16	26	28	12	15	33 115 306
25	16	32	34	15	30	33 115 307
32	16	40	41	19	50	33 115 308
40	16	50	48	22	90	33 115 309
50	16	61	59	28	160	33 115 310
63	16	76	72	34	290	33 115 311
75	16	91	85	41	450	33 115 312
90	16	108	99	48	680	33 115 313
110	16	130	122	61	1180	33 115 314
125	16	148	133	64	1650	33 115 315
140	16	163	153	77	2080	33 115 316
160	16	193	175	89	2980	33 115 317
200	16	229	206	100	5360	33 115 318
225	16	258	291	172	8700	33 115 319
250	10	287	319	188	12480	33 115 320
280	10	325	357	210	17000	33 115 321
315	10	359	400	236	23370	33 115 323

Tees 45° Plain

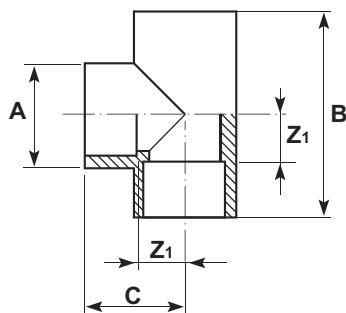
TEE



Size	PN	A	B	C	Z ₁	Z ₂	Z ₃	gms	Code
20	16	28	68	45	7	36	29	40	33 418 306
25	16	34	81	55	7	43	36	60	33 418 307
32	16	41	97	66	9	53	44	105	33 418 308
40	16	50	117	80	11	65	54	175	33 418 309
50	16	60	139	96	12	77	65	255	33 418 310
63	16	73	170	118	14	94	80	420	33 418 311

Tees 90° Equal

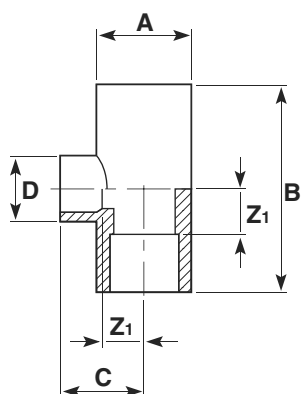
TIV



Size	PN	A	B	C	Z ₁	gms	Code
16	16	22	46	23	9	15	33 122 305
20	16	27	54	27	11	25	33 122 306
25	16	33	66	33	14	40	33 122 307
32	16	40	80	40	18	65	33 122 308
40	16	50	96	48	22	114	33 122 309
50	16	61	116	58	27	185	33 122 310
63	16	76	144	72	34	380	33 122 311
75	16	91	169	85	41	605	33 122 312
90	16	109	199	100	49	985	33 122 313
110	16	133	244	122	61	1760	33 122 314
125	16	151	266	133	64	2430	33 122 315
140	16	174	306	153	77	4150	33 122 316
160	16	193	348	174	88	5250	33 122 317
200	16	228	414	207	101	6810	33 122 318
225	16	258	466	233	114	12680	33 122 319
250	10	286	518	259	128	13250	33 122 320
280	10	319	580	290	144	17840	33 122 321
315	10	360	652	326	162	25300	33 122 323

Tees 90° Reducing plain

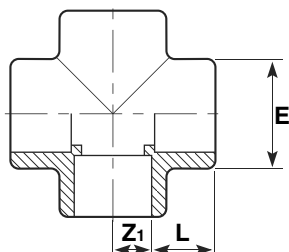
TRIV



Size	PN	A	B	C	D	Z ₁	gms	Code
25 x 25 x 20	16	33	66	30	28	14	37	33 124 415
32 x 32 x 20	16	41	79	34	28	18	60	33 124 418
32 x 32 x 25	16	41	79	37	34	18	65	33 124 419
40 x 40 x 20	16	50	96	38	29	22	100	33 124 421
40 x 40 x 25	16	50	96	41	34	22	100	33 124 422
40 x 40 x 32	16	50	96	44	42	22	105	33 124 423
50 x 50 x 20	16	61	116	43	30	27	160	33 124 424
50 x 50 x 25	16	61	116	46	35	27	160	33 124 425
50 x 50 x 32	16	61	116	49	42	27	165	33 124 426
50 x 50 x 40	16	61	116	53	51	27	170	33 124 427
63 x 63 x 25	16	76	143	53	36	34	290	33 124 429
63 x 63 x 32	16	76	143	56	43	34	295	33 124 430
63 x 63 x 40	16	76	143	60	52	34	300	33 124 431
63 x 63 x 50	16	76	143	65	62	34	315	33 124 432

Cross

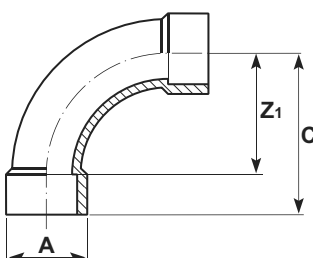
XIV



Size	PN	E	L	Z ₁	gms	Code
25	16	35	19	14	60	33 108 307
32	16	43	22	18	105	33 108 308
40	16	52	26	23	75	33 108 309
50	16	64	31	27	265	33 108 310
63	16	79	38	34	505	33 108 311

Bends 90°

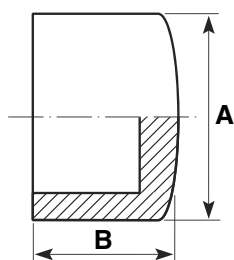
SIV



Size	PN	A	C	Z ₁	gms	Code
20	16	27	57	41	35	33 118 306
25	16	33	69	50	55	33 118 307
32	16	41	88	66	100	33 118 308
40	16	50	107	81	175	33 118 309
50	16	61	132	101	280	33 118 310
63	16	76	165	127	515	33 118 311
75	16	94	194	150	1100	33 118 312
90	16	112	229	178	1750	33 118 313
110	16	136	281	147	2280	33 118 314
160	10	189	293	207	5020	33 118 317

End caps Plain

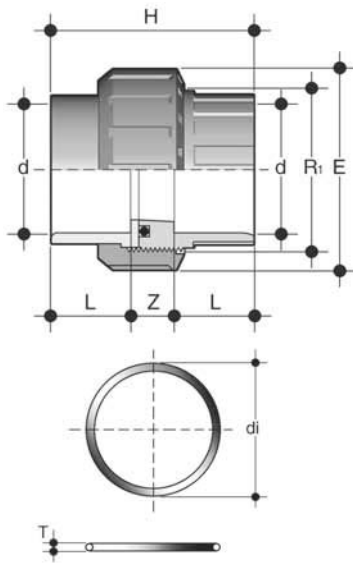
CIV



Size	PN	A	B	gms	Code
16	16	21	17	4	33 140 305
20	16	28	23	9	33 140 306
25	16	34	27	15	33 140 307
32	16	41	31	25	33 140 308
40	16	51	36	40	33 140 309
50	16	62	43	60	33 140 310
63	16	77	51	110	33 140 311
75	16	91	59	190	33 140 312
90	16	110	69	330	33 140 313
110	16	133	85	575	33 140 314
160	16	192	128	1900	33 140 317
225	10	260	163	3000	33 140 319

Socket unions Plain

BIV



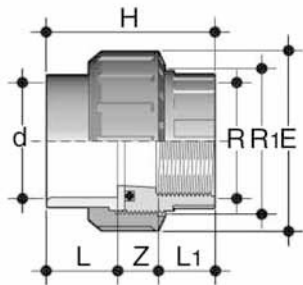
Size	R ₁	PN	H	L	Z	E	gms	Code
16	3/8	16	41	14	13	33	20	33 205 305
20	1	16	45	16	13	41	35	33 205 306
25	1 1/4	16	51	19	13	50	60	33 205 307
32	1 1/2	16	57	22	13	58	85	33 205 308
40	2	16	67	26	15	72	150	33 205 309
50	2 1/4	16	79	31	17	79	175	33 205 310
63	2 3/4	16	98	38	22	98	320	33 205 311
75	3 1/2	10	116	44	21	120	590	33 205 312
90	4	10	125	51	23	135	770	33 205 313
110	5	10	145	61	23	163	1300	33 205 314

EPDM seal as standard.
For FPM seal order by type 204.

C	O-Ring dia	T
3062	15.54	2.62
4081	20.22	3.53
4112	28.17	3.53
4131	32.93	3.53
6162	40.65	5.34
6187	47.00	5.34
6237	59.69	5.34
6300	75.57	5.34
6362	91.45	5.34
6450	113.67	5.34

Socket unions Plain socket/female BSP thread

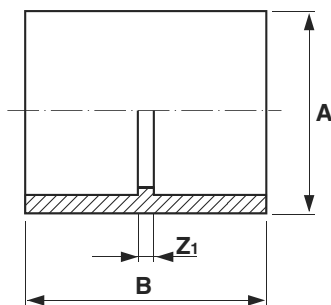
BIFV



d x R	PN	R ₁	L	L ₁	H	Z	E	gms	Code
16 x 3/8	16	3/4	14	11	41	16	33	22	33 202 305
20 x 1/2	16	1	16	15	45	14	41	35	33 202 306
25 x 3/4	16	1 1/4	19	16	51	16	50	62	33 202 307
32 x 1	16	1 1/2	22	19	57	16	58	85	33 202 308
40 x 1 1/4	16	2	26	21	67	20	72	45	33 202 309
50 x 1 1/2	16	2 1/4	31	21	72	20	79	180	33 202 310
63 x 2	16	2 3/4	38	26	88	24	98	315	33 202 311
75 x 2 1/2	10	3 1/2	44	30	108	34	123	643	33 202 312
90 x 3	10	4	51	33	124	40	140	859	33 202 313
110 x 4	10	5	61	39	138	38	165	1240	33 202 314

Imperial/metric socket adaptors

MILV



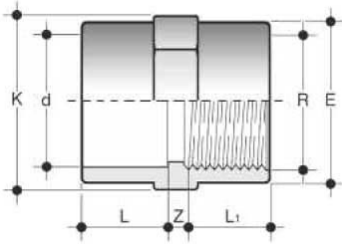
Size	PN	A	B	Z ₁	gms	Code
*1/2 x 20	15	27	35	3	12	33 345 102
*3/4 x 25	15	33	41	3	22	33 345 103
*1 x 32	15	41	47	3	44	33 345 104
*1 1/4 x 40	15	50	55	2	65	33 345 105
*1 1/2 x 50	15	61	65	4	125	33 345 106
*2 x 63	15	76	79	5	210	33 345 107
*3 x 90	15	108	107	6	438	33 345 109
*4 x 110	15	131	128	4	852	33 345 110
*6 x 160	15	198	185	7	1700	33 345 112

*Sizes shown in inch n.b. designation.

Metric Fittings

Sockets Plain/female BSP thread

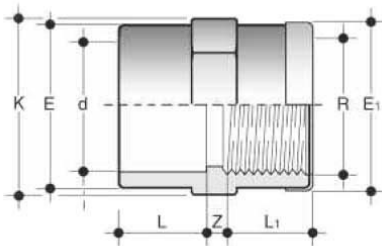
MIFV



d x R	PN	L	L ₁	Z	E	K	gms	Code
16 x 3/4	16	14	11	6	24	24	12	33 101 101
20 x 1/2	16	16	15	4	29	29	20	33 101 102
25 x 3/4	16	19	16	5	35	35	30	33 101 103
32 x 1	16	22	19	6	43	43	48	33 101 104
40 x 1 1/4	16	26	21	5	50	50	56	33 101 105
50 x 1 1/2	16	31	21	8	61	61	102	33 101 106
63 x 2	16	38	26	8	76	76	181	33 101 107
75 x 2 1/2	16	44	30	5	88	95	300	33 101 108
90 x 3	16	51	33	16	110	110	470	33 101 109
110 x 4	16	61	39	11	131	131	550	33 101 110

Sockets Plain/female BSP thread with metal reinforcing ring

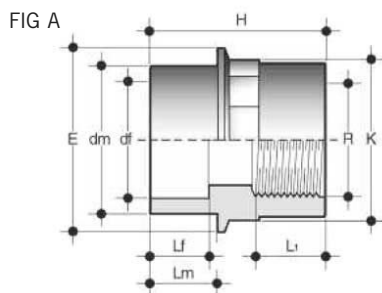
MIMV



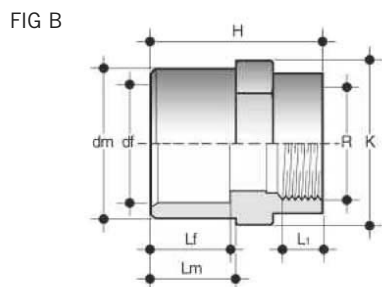
d x R	PN	L	L ₁	Z	E	E ₁	K	gms	Code
16 x 3/8	16	14	11	6	24	24	24	14	33 103 101
20 x 1/2	16	16	15	4	29	29	29	23	33 103 102
25 x 3/4	16	19	16	5	35	35	35	34	33 103 103
32 x 1	16	22	19	6	43	43	43	53	33 103 104
40 x 1 1/4	16	26	21	5	50	50	50	62	33 103 105
50 x 1 1/2	16	31	21	8	61	61	61	110	33 103 106
63 x 2	16	38	26	8	76	76	76	190	33 103 107

Reducers Plain spigot/female BSP thread

DIFV

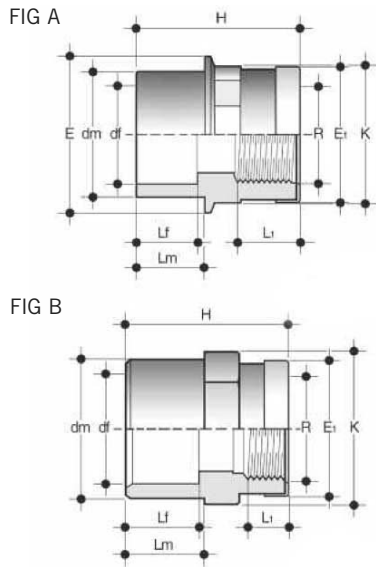


dm x df	PN	H	Lm	Lf	L ₁	E	K	Fig	gms	Code
20 x 16 x 3/8	16	36	16	14	11	28	24	A	11	33 169 101
25 x 20 x 1/2	16	42	19	16	15	34	29	A	17	33 169 102
32 x 25 x 3/4	16	49	22	19	16	40	35	A	26	33 169 103
40 x 32 x 1	16	57	26	22	19	52	44	A	49	33 169 104
50 x 40 x 1 1/4	16	67	31	26	21	59	54	A	66	33 169 105
63 x 50 x 1 1/2	16	77	38	31	21	70	64	A	129	33 169 106
90 x 75 x 2 1/2	16	84	51	44	30	-	95	B	300	33 169 107
110 x 90 x 3	16	100	61	51	33	-	110	B	450	33 169 108



Reducers Plain spigot/female BSP thread with metal reinforcing ring

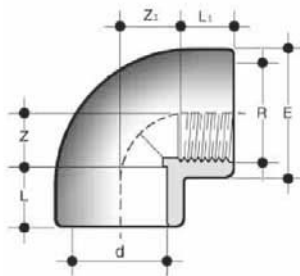
DIMV



dm x R	PN	H	Lm	Lf	L ₁	E	K	Fig	gms	Code
20 x 3/8	16	37	16	14	11	28	24	A	11	33 170 101
20 x 1/2	16	40	16	14	15	34	29	A	17	33 170 333
25 x 1/2	16	43	19	16	15	40	35	A	26	33 170 102
25 x 3/4	16	46	19	16	16	52	44	A	49	33 170 335
32 x 3/4	16	50	22	19	16	59	54	A	66	33 170 103
32 x 1	16	52	22	19	19	70	64	A	129	33 170 337
40 x 1	16	58	26	22	19	70	64	A	129	33 170 104
40 x 1 1/4	16	63	26	22	21	-	95	B	300	33 170 339
50 x 1 1/4	16	68	31	26	21	-	95	B	300	33 170 105
50 x 1 1/2	16	73	31	26	21	-	95	B	300	33 170 341
63 x 1 1/2	16	78	38	31	21	-	95	B	300	33 170 106
63 x 2	16	87	38	31	26	70	64	A	129	33 170 343
75 x 2	16	77	44	38	26	-	110	B	450	33 170 345

Elbows 90° Plain socket/female BSP thread

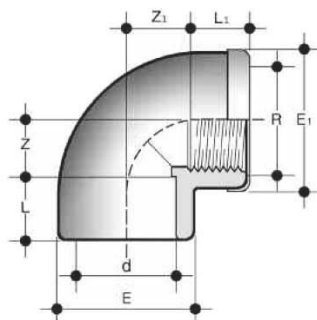
GIFV



d x R	PN	L	L ₁	Z	Z ₁	E	gms	Code
16 x 3/8	16	14	11	10	13	24	16	33 116 101
20 x 1/2	16	16	15	12	13	29	24	33 116 102
25 x 3/4	16	19	16	14	17	35	40	33 116 103
33 x 1	16	22	19	18	21	43	72	33 116 104
40 x 1 1/4	16	26	21	23	27	54	125	33 116 105
50 x 1 1/2	16	31	21	27	37	61	175	33 116 106
63 x 2	16	38	26	33	46	76	320	33 116 107
75 x 2 1/2	16	44	30	41	55	91	465	33 116 108
90 x 3	16	51	33	48	66	108	795	33 116 109
110 x 4	16	61	39	60	80	131	1130	33 116 110

Elbows 90° Plain socket/female BSP thread with metal reinforcing ring

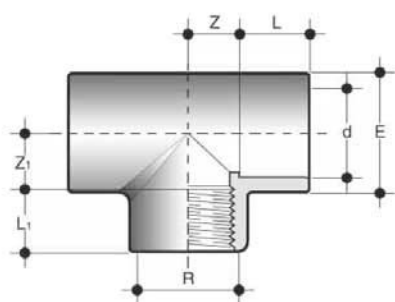
GIMV



d x R	PN	L	L ₁	Z	Z ₁	E	E ₁	gms	Code
16 x 3/8	16	14	11	10	13	24	25	16	33 178 101
20 x 1/2	16	16	15	12	13	29	30	24	33 178 102
25 x 3/4	16	19	16	14	17	35	36	40	33 178 103
32 x 1	16	22	19	18	21	43	44	72	33 178 104
40 x 1 1/4	16	26	21	23	27	5	55	125	33 178 105
50 x 1 1/2	16	31	21	27	37	61	62	175	33 178 106
63 x 2	16	38	26	33	46	76	77	320	33 178 107

Tees 90° Plain socket/female BSP threaded branch

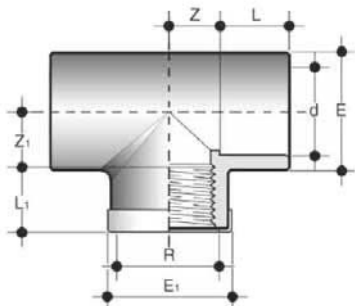
TIFV



d x R	PN	L	L ₁	Z	Z ₁	E	gms	Code
16 x 3/8	16	14	11	9	11	24	20	33 146 602
20 x 1/2	16	16	15	12	13	29	32	33 146 605
25 x 3/4	16	19	16	15	17	35	52	33 146 608
32 x 1/2	16	22	15	18	18	41	92	33 146 610
32 x 1	16	22	19	18	21	43	71	33 146 612
40 x 1 1/4	16	26	21	22	27	50	110	33 146 616
50 x 1/2	16	31	15	27	28	61	160	33 146 618
50 x 1 1/2	16	31	21	27	37	61	195	33 146 622
63 x 1/2	16	38	15	34	38	76	305	33 146 624
63 x 2	16	38	26	34	46	76	405	33 146 629
75 x 2 1/2	16	44	30	41	55	91	605	33 146 636
90 x 3	16	51	33	49	66	109	1070	33 146 644
110 x 4	16	61	39	62	83	133	1690	33 146 652

Tees 90° equal Plain sockets/female BSP threaded with metal reinforcing ring

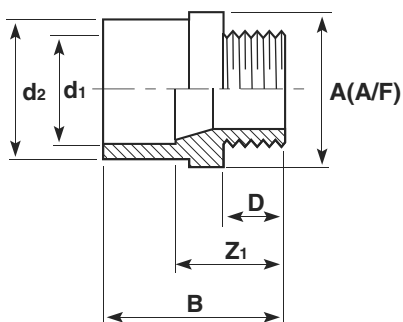
TIMV



d x R	PN	L	L ₁	Z	Z ₁	E	E ₁	gms	Code
16 x 3/8	16	14	11	9	11	24	25	24	33 123 101
20 x 1/2	16	16	15	12	13	29	29	38	33 123 605
25 x 3/4	16	19	16	15	17	35	36	60	33 123 608
32 x 1	16	22	19	18	21	43	44	105	33 123 612
40 x 1 1/4	16	26	21	22	27	50	51	125	33 123 616
50 x 1/2	16	31	21	27	37	61	62	210	33 123 622
63 x 2	16	38	26	34	46	76	77	415	33 123 629

Male threaded adaptors BSP male thread

KIFV

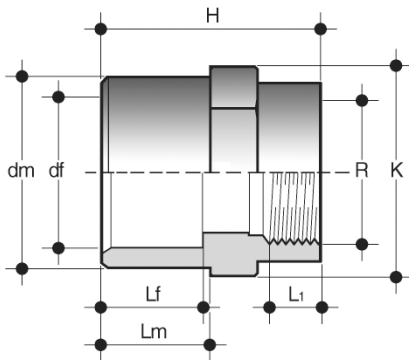


Size d ₂ x d ₁ x T*	PN	A	B	D	Z ₁	Weight gms	Code
16 x 12 x 3/8	16	18	33 1/2	11	21	4	33 151 331
20 x 16 x 3/8	16	22	34	11	20	6	33 151 332
20 x 16 x 1/2	16	22	38	15	24	10	33 151 333
25 x 20 x 1/2	16	28	41	15	25	12	33 151 334
25 x 20 x 3/4	16	30	48	16	31	19	33 151 335
32 x 25 x 1/2	16	34	45	15	26	15	33 151 352
32 x 25 x 3/4	16	36	52	16	33	30	33 151 336
32 x 25 x 1	16	36	55	19	36	32	33 151 337
40 x 32 x 3/4	16	42	50	15	28	28	33 151 353
40 x 32 x 1	16	42	53	19	31	34	33 151 338
40 x 32 x 1 1/4	16	46	60	21	37	50	33 151 339
50 x 40 x 1	16	52	58	19	32	50	33 151 354
50 x 40 x 1 1/4	16	52	61	21	35	60	33 151 340
50 x 40 x 1 1/2	16	52	61	21	35	70	33 151 341
63 x 50 x 1 1/4	16	65	68	21	37	95	33 151 355
63 x 50 x 1 1/2	16	65	66	21	35	105	33 151 342
63 x 50 x 2	16	65	71	26	40	150	33 151 343
63 x 75 x 1 1/2	16	75	76	21	38	125	33 151 356
75 x 63 x 2	16	75	79	26	41	145	33 151 345
90 x 75 x 2	16	95	93	26	49	275	33 151 346
90 x 75 x 2 1/2	16	95	98	30	54	280	33 151 347
90 x 75 x 3	16	95	100	34	56	300	33 151 357
110 x 90 x 3	16	110	113	34	62	390	33 151 348
90 x 110 x 4	16	128	128	39	77	420	33 151 358
125 x 110 x 4	16	128	126	39	65	500	33 151 349

*Thread size designation.

Female threaded adaptors BSP female thread reinforced

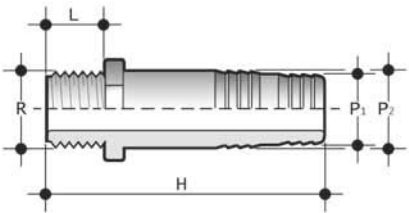
DIMV



Size d2 x d1 x Tx	PN	H	L _m	L _f	L ₁	K	gms	Code
20 x 16 x 1/2	16	39	16	14	15	30	18	33 153 333
25 x 20 x 3/4	16	45	16	16	16.3	36	28	33 153 335
32 x 25 x 1	16	51	22	19	19.1	46	49	33 153 337
40 x 32 x 1 1/4	16	62	26	22	21.4	54	74	33 153 339
50 x 40 x 1 1/2	16	77	31	26	21.4	65	127	33 153 341
63 x 50 x 2	16	86	38	31	25.7	80	190	33 153 343
75 x 63 x 2 1/2	16	99	44	38	30.2	95	280	33 153 108
90 x 75 x 3	16	114	51	44	33.3	110	470	33 153 109
110 x 90 x 4	16	134	61	51	39.3	130	670	33 153 110

Hose adaptors BSP male thread

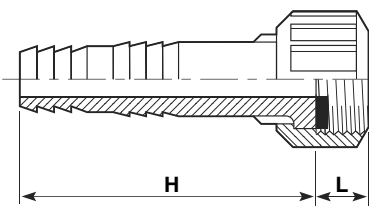
AFV



Size R x P ₁ x P ₂	PN	L	H	gms	Code
1/4 x 12 x 14	16	11	56	7	02 157 600
3/8 x 16 x 18	16	11	58	14	02 157 602
1/2 x 20 x 22	16	15	66	19	02 157 605
3/4 x 25 x 27	16	16	81	30	02 157 608
1 x 30 x 32	16	19	97	45	02 157 612
1 1/4 x 40 x 42	16	21	104	85	02 157 616
1 1/2 x 50 x 52	16	21	111	120	02 157 623
2 x 60 x 64	16	26	123	180	02 157 630

Hose adaptors BSP female thread – loose nut with EPDM gasket

ADV

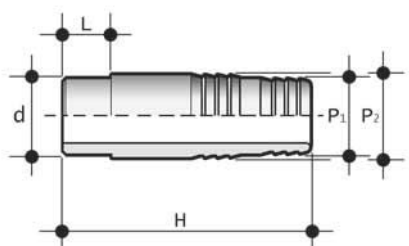


Size	PN	L	H	gms	Code
*1/2 x 12 x 14	16	14	56	15	02 156 601
*3/4 x 16 x 18	16	12	60	24	02 156 603
*1 x 20 x 22	16	11	67	35	02 156 606
*1 1/4 x 25 x 27	16	14	81	55	02 156 609
*1 1/2 x 30 x 32	16	16	97	80	02 156 613
*2 x 40 x 42	16	18	104	140	02 156 616
*2 1/4 x 50 x 52	16	18	111	200	02 156 623
*2 1/2 x 60 x 64	16	19	123	290	02 156 312
*2 3/4 x 60 x 64	16	20	123	300	02 156 630

*Thread size designation.

Hose adaptors Spigot end

AIV

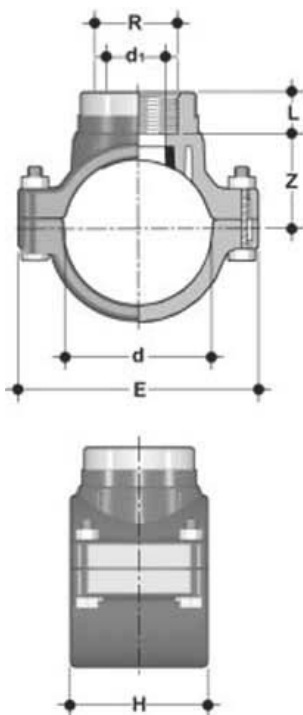


Size d x P ₂ x P ₁	PN	L	H	gms	Code
12 x 14 x 12	16	12	56	6	33 158 304
16 x 18 x 16	16	14	60	12	33 158 305
20 x 22 x 20	16	16	67	17	33 158 306
25 x 27 x 25	16	19	81	26	33 158 307
32 x 32 x 30	16	22	97	40	33 158 308
40 x 42 x 40	16	26	104	78	33 158 309
50 x 52 x 50	16	31	111	113	33 158 310
63 x 64 x 60	16	38	123	170	33 158 311

Metric Fittings

Saddle clamps BSP female threaded branch with metal reinforcing ring

UIFV

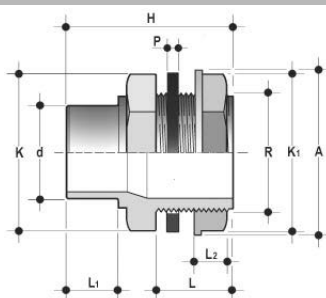


d (mm) x R (inch)	PN	d ₁	L	E	H	Z	Weight gms	Code
32 x 1/2	16	18	18	82	68	28	228	33 436 201
32 x 3/4	16	22	19	82	68	28	242	33 436 202
40 x 3/4	16	22	19	94	78	33	339	33 436 204
40 x 1	16	25	22	94	78	33	348	33 436 205
50 x 1/2	16	18	18	104	80	38	328	33 436 206
50 x 3/4	16	22	19	104	80	38	342	33 436 207
50 x 1	16	28	22	104	80	38	379	33 436 208
63 x 1/2	16	18	18	116	105	48	562	33 436 209
63 x 3/4	16	22	19	116	105	48	571	33 436 210
63 x 1	16	28	22	116	105	48	582	33 436 211
63 x 1 1/2	16	30	25	116	105	48	615	33 436 212
75 x 3/4	16	22	19	134	105	54	683	33 436 213
75 x 1	16	30	22	134	105	54	692	33 436 214
90 x 3/4	16	22	19	152	105	61	764	33 436 216
90 x 1	16	28	22	152	105	61	778	33 436 217
90 x 1 1/2	16	40	25	152	105	61	805	33 436 219
90 x 2	16	40	30	152	105	61	877	33 436 220
110 x 3/4	16	22	19	176	105	72	982	33 436 221
110 x 1	16	28	22	176	105	72	993	33 436 222
110 x 1 1/2	16	40	25	176	105	72	1017	33 436 224
110 x 2	16	40	30	176	105	72	1081	33 436 225
125 x 1	16	25	22	190	112	80	1260	33 436 226
125 x 1 1/2	16	40	25	190	112	80	1319	33 436 228
125 x 2	16	50	30	190	112	80	1412	33 436 229
140 x 1	16	25	22	214	114	87	1471	33 436 230
140 x 1 1/2	16	40	25	214	114	87	1526	33 436 232
140 x 2	16	50	30	214	114	87	1607	33 436 233
160 x 1	16	28	22	238	120	98	1453	33 436 234
160 x 1 1/2	16	40	25	238	120	98	1481	33 436 236
160 x 2	16	50	30	238	120	98	1523	33 436 237
200 x 2	16	52	30	300	133	118	2119	33 436 238
225 x 1 1/2	16	40	25	333	125	132	2610	33 436 239
225 x 2	16	50	30	333	125	132	2650	33 436 240
225 x 3	16	74	36	333	125	132	2735	33 436 241

Note: Saddle clamps are fitted with NBR gaskets so are only suitable for water applications. For more information contact our technical support team.

Tank connectors

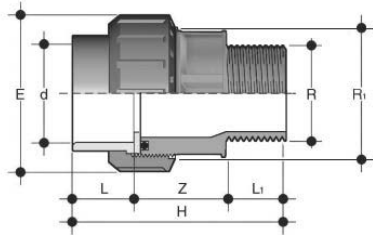
LIFV



Size	PN	A	H	L	L ₁	L ₂	K	K ₁	P	gms	Code
25 x 1	16	58	60	26	19	16	46	46	2	58	33 235 307
32 x 1 1/4	16	62	66	28	22	18	55	50	2	90	33 235 308

Male composite unions PVC-U/Brass, BSP taper male thread

BIROV

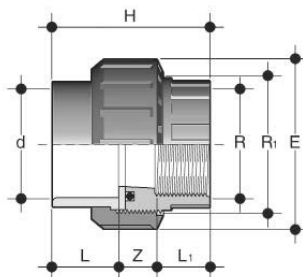


Size	PN	L ₁	Z	L	H	K	Code
16	16	10.5	34	14	58.5	33	33 217 305
20	16	13.5	35.5	16	65	41	33 217 306
25	16	15	38.5	19	72.5	50	33 217 307
32	16	17.5	40.5	22	80	58	33 217 308
40	16	19.5	45.5	26	91	72	33 217 309
50	16	19.5	50.5	31	101	79	33 217 310
63	16	24	60.5	38	122.5	98	33 217 311

Fitted with brass retaining nut and EPDM rubber seal.
Stainless steel options also available on request.

Female composite unions PVC-U/Brass, BSP parallel female thread

BIFOV

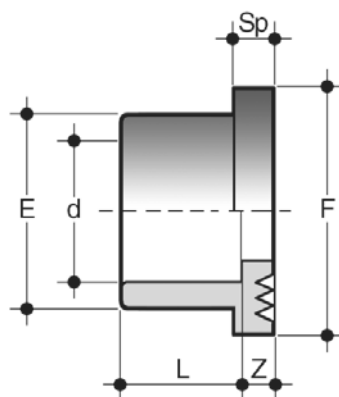


Size	PN	L ₁	Z	L	H	K	Code
16	16	13.5	14	14	42.5	20	33 216 305
20	16	16.5	16	16	48.5	25	33 216 306
25	16	18.5	17	19	54.5	32	33 216 307
32	16	19.5	18	22	59.5	38	33 216 308
40	16	21.5	21	26	68.5	48	33 216 309
50	16	23	24.5	31	84.5	55	33 216 310
63	16	27	29.5	38	94.5	69	33 216 311

Fitted with brass retaining nut and EPDM rubber seal.
Stainless steel options also available on request.

Flanges stub serrated

QRV



d	PN	L	Z	Sp	E	F	gms	Code
*20	16	19	3	7	33	41	16	33 135 306
*25	16	22	3	7	41	50	25	33 135 307
*32	16	26	3	8	50	61	40	33 135 308
40	16	26	3	8	50	61	40	33 135 309
50	16	31	3	8	61	73	62	33 135 310
63	16	38	3	9	76	90	105	33 135 311
75	16	44	3	10	90	105	160	33 135 312
90	16	51	5	10	108	125	275	33 135 313
110	16	61	4	12	131	150	445	33 135 314
125	16	69	5	13	147	168	750	33 135 315
140	16	76	5	14	165	188	790	33 135 316
160	16	86	4.5	16	188	212	1140	33 135 317
200	16	106	5.5	18	230	254	1840	33 135 318
225	16	109	5.5	25	245	273	1750	33 135 319
250	16	131	8.5	20	270	306	2140	33 135 320
280	10	147	14.5	32	307	327	3650	33 135 321
315	10	165	16	32	346	377	4950	33 135 323

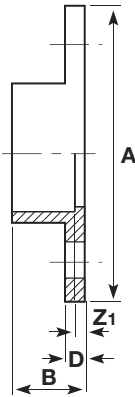
*Flat Faced

*The 200mm (NW175) stub flange supplied by Durapipe UK when used in conjunction with backing ring; code number 421 318 and 420 318 has a bolt circle diameter which matches 225mm (NW200) valves and fittings (295mm)

Metric Fittings

Flanges full face Plain/drilled

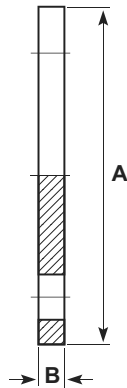
FDV



Drilled to DIN2501 (BS4504) PN10

Size	PN	A	B	D	Z ₁	gms	Code
32	10	115	27	14	5	150	33 319 308
40	10	140	31	15	5	230	33 319 309
50	10	150	36	16	5	280	33 319 310
63	10	163	43	18	5	390	33 319 311
75	10	185	49	19	5	525	33 319 312
90	10	200	58	20	7	710	33 319 313
110	10	220	69	22	8	955	33 319 314

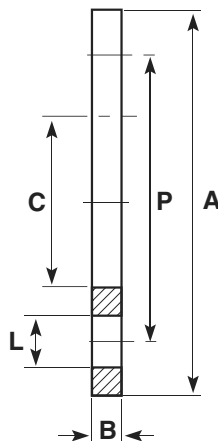
Flanges blanking Plain/drilled



Drilled to BS4504:Table 16/3 & 10/3 (20 to 160mm)

Size	PN	A	B	P.C.D.	No. Holes	Hole Dia.	gms	Code
20	15	95	11	65	4	14	99	02 323 102
25	15	105	12	75	4	14	106	02 323 103
32	15	115	14	85	4	14	206	02 323 104
40	15	150	16	110	4	18	327	02 323 106
63	15	165	13	125	4	18	300	02 323 107
90	15	197	19	160	8	18	690	02 323 109
110	15	214	19	180	8	18	950	02 323 110
160	15	286	26	240	8	22	2100	02 323 112

Backing rings Galvanised mild steel



Drilled to DIN8063 (BS4504) PN10/PN16

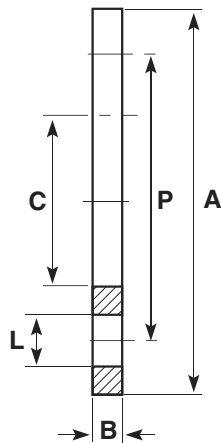
Size	A	B	C	P	L	No. Holes	Weight gms	Code
1/2" - 20mm	95	6	28	65	14	4	330	13 421 306
3/4" - 25mm	105	6	34	75	14	4	380	13 421 307
1" - 32mm	115	6	42	85	14	4	440	13 421 308
1 1/4" - 40mm	140	6	51	100	18	4	660	13 421 309
1 1/2" - 50mm	150	6	62	110	18	4	730	13 421 310
2" - 63mm	165	8	78	125	18	4	1100	13 421 311
2 1/2" - 75mm	185	8	92	145	18	4	1340	13 421 312
3" - 90mm	200	8	110	160	18	8	1500	13 421 313
4" - 110mm	220	8	133	180	18	8	1630	13 421 314
125mm	250	8	150	210	18	8	2090	13 421 315
5" - 140mm	250	10	167	210	18	8	2290	13 421 316
6" - 160mm	285	10	190	240	22	8	3050	13 421 317

Drilled to DIN8063 (BS4504) PN10

Size	A	B	C	P	L	No. Holes	Weight gms	Code
200mm*	340	10	235	295	22	8	3200	13 421 318
8" - 225mm**	340	12	250	295	22	8	3000	13 421 319
250mm	395	20	274	350	22	12	9900	13 421 320
10" - 280mm	395	16	303	350	22	12	9900	13 421 321
12" - 315mm	445	20	355	400	22	12	9300	13 421 323

Continued >>

Backing rings Galvanised mild steel



Drilled to DIN8063 (BS4504) PN16

Size	A	B	C	P	L	No. Holes	Weight gms	Code
200mm*	340	11	235	295	22	12	3200	13 420 318
8" - 225mm**	340	11	249	295	22	12	3000	13 420 319
250mm	405	20	278	355	26	12	9900	13 420 320
10" - 280mm	395	20	303	355	26	12	9900	13 420 321
12" - 315mm	460	20	355	410	26	12	9300	13 420 323

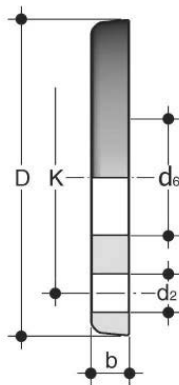
† Not for use with FK Butterfly valve, use 8 hole backing ring code 04 996 131.

Drilled to ANSI Class 150

Size	A	B	C	P	L	No. Holes	Weight gms	Code
1/2" - 20mm	90	8	28	61	16	4	350	13 448 306
3/4" - 25mm	100	8	34	70	16	4	390	13 448 307
1" - 32mm	110	9	42	79	16	4	470	13 448 308
1 1/4" - 40mm	118	8	51	90	16	4	590	13 448 309
1 1/2" - 50mm	129	8	62	99	16	4	650	13 448 310
2" - 63mm	154	10	78	121	19	4	1133	13 448 311
3" - 90mm	192	11	110	153	19	4	1570	13 448 313
4" - 110mm	230	11	133	190	19	8	2310	13 448 314

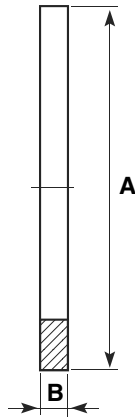
*The 200mm (NW175) stub flange supplied by Durapipe UK when used in conjunction with backing ring; code number 421 318 and 420 318 has a bolt circle diameter which matches 225mm (NW200) valves and fittings (295mm).

Backing rings Pre-drilled – Manufactured in PVC-U



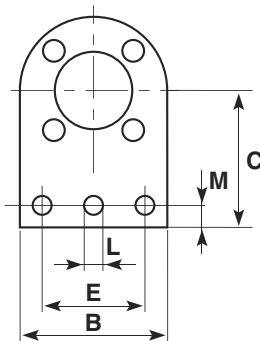
Size	PN	E	d ₁	a	Sp	f	u	b	gms	Code
25	10	107	34	75	12	14	4	M12x70	85	33 180 307
32	10	117	42	85	14	14	4	M12x70	120	33 180 308
40	10	143	51	100	15	14	4	M16x85	190	33 180 309
50	10	153	62	110	16	18	4	M16x85	225	33 180 310
63	10	168	78	125	18	18	4	M16x95	280	33 180 311
75	10	188	92	145	19	18	8	M16x95	390	33 180 312
90	10	203	109	160	20	18	8	M16x105	460	33 180 313
110	10	222	132	180	22	18	8	M16x105	515	33 180 314
125	10	230	149	190	24	18	8	M16x115	530	33 180 315
140	10	251	166	210	26	18	8	M16x120	715	33 180 316
160	10	290	189	240	29	22	8	M20x135	915	33 180 317
200	10	340	235	295	30	22	8	M20x140	1210	33 180 318
225	10	340	252	295	30	22	8	M20x140	1090	33 180 319
250	10	396	278	350	34	22	12	M20x150	1790	33 180 320
280	10	396	309	350	35	22	12	M20x160	1880	33 180 321
315	10	465	349	400	40	22	12	M20x180	3050	33 180 322

Gaskets flat Stub flange



Size	A	B	Weight gms	EPDM Code
20	34	4	2	13 411 306
25	41	4	3	13 411 307
32	50	3	4	13 411 308
40	60	3	4	13 411 309
50	72	3	5	13 411 310
63	90	4	10	13 411 311
75	106	3	20	13 411 312
90	125	3	30	13 411 313
110	150	4	40	13 411 314
125	166	4	50	13 411 315
140	180	4	60	13 411 316
160	205	4	70	13 411 317
200	253	4	120	13 411 318
225	274	4	165	13 411 319
250	306	4	170	13 431 320
280	330	4	195	13 411 321
315	379	4	250	13 411 323

Valve support plates Galvanised mild steel



Drilled to DIN8063 (BS4504) PN10/PN16

No. Size	B	C	E	L	M	N	No. Holes	Weight gms	Code
1/2" - 20mm	97	86	49	14	16	2	4	640	31 459 306
3/4" - 25mm	105	89	76	14	16	2	4	750	31 459 307
1" - 32mm	114	96	77	14	12	2	4	860	31 459 308
1 1/2" - 50mm	150	125	100	14	22	2	4	1480	31 459 310
2" - 63mm	160	134	100	14	24	2	4	2100	31 459 311
2 1/2" - 75mm	185	144	125	14	22	2	4	2500	31 459 312
3" - 90mm	203	150	127	14	23	2	8	2660	31 459 313
4" - 110mm	214	160	150	14	22	3	8	2960	31 459 314

N = No. of holes in base.

For details of flange drillings see the corresponding backing ring.

Flange assemblies



PVC Stub Flange – PN16 Drilling

Size	Description	Code
20	PVC S FLG 16/3 KIT 20	33 364 306
25	PVC S FLG 16/3 KIT 25	33 364 307
32	PVC S FLG 16/3 KIT 32	33 364 308
40	PVC S FLG 16/3 KIT 40	33 364 309
50	PVC S FLG 16/3 KIT 50	33 364 310
63	PVC S FLG 16/3 KIT 63	33 364 311
75	PVC S FLG 16/3 KIT 75	33 364 312
90	PVC S FLG 16/3 KIT 90	33 364 313
110	PVC S FLG 16/3 KIT 110	33 364 314
125	PVC S FLG 16/3 KIT 125	33 364 315
140	PVC S FLG 16/3 KIT 140	33 364 316
160	PVC S FLG 16/3 KIT 160	33 364 317
200	PVC S FLG 16/3 KIT 200	33 364 318
225	PVC S FLG 16/3 KIT 225	33 364 319
250	PVC S FLG 16/3 KIT 250	33 364 320
315	PVC S FLG 16/3 KIT 315	33 364 323

PVC Stub Flange – PN10 Drilling

Size	Description	Code
200	PVC S FLG 10/3 KIT 200	33 365 318
225	PVC S FLG 10/3 KIT 225	33 365 319
250	PVC S FLG 10/3 KIT 250	33 365 320
315	PVC S FLG 10/3 KIT 315	33 365 323

PVC Stub Flange – PN16 ASA 150 Drilling

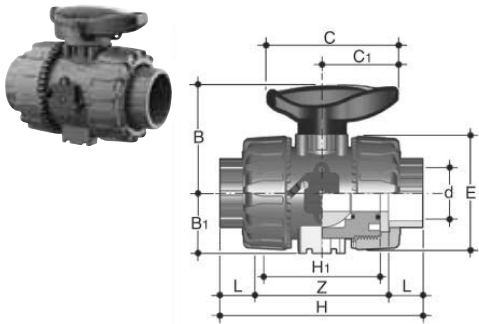
Size	Description	Code
20	PVC S FLG ASA 150 KIT 20	33 366 306
25	PVC S FLG ASA 150 KIT 25	33 366 307
32	PVC S FLG ASA 150 KIT 32	33 366 308
40	PVC S FLG ASA 150 KIT 40	33 366 309
50	PVC S FLG ASA 150 KIT 50	33 366 310
63	PVC S FLG ASA 150 KIT 63	33 366 311
75	PVC S FLG ASA 150 KIT 75	33 366 312
90	PVC S FLG ASA 150 KIT 90	33 366 313
110	PVC S FLG ASA 150 KIT 110	33 366 314
125	PVC S FLG ASA 150 KIT 125	33 366 315
140	PVC S FLG ASA 150 KIT 140	33 366 316
160	PVC S FLG ASA 150 KIT 160	33 366 317
200	PVC S FLG ASA 150 KIT 200	33 366 318
225	PVC S FLG ASA 150 KIT 225	33 366 319

Pre-packed flange assemblies are also available and consist of a PVC flange, galvanised mild steel backing ring and gasket on one code. Ordering these products guarantees a correct fit between the components.

Valves

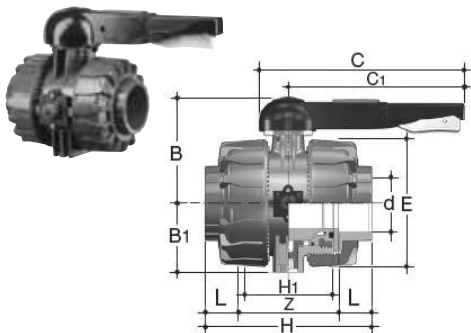
**Premium Quality
Valve for Demanding
Environments**

VKD Double union ball valves Manual – EPDM seals



with metric series plain female ends for solvent welding

d	DN	PN	L	Z	H	H ₁	E	B	B ₁	C	C ₁	gms	Code
16	10	16	14	75	103	65	54	54	29	67	40	195	HO DKE 305
20	15	16	16	71	103	65	54	54	29	67	40	205	HO DKE 306
25	20	16	19	77	115	70	65	65	35	85	49	315	HO DKE 307
32	25	16	22	84	128	78	73	70	39	85	49	435	HO DKE 308
40	32	16	26	94	146	88	86	83	46	108	64	655	HO DKE 309
50	40	16	31	102	164	91	98	89	52	108	64	880	HO DKE 310
63	50	16	38	123	199	111	122	108	62	134	76	1560	HO DKE 311



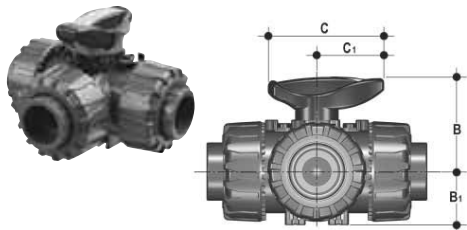
d	DN	PN	Z	L	H	H ₁	E	B	B ₁	C	C ₁	gms	Code
75	65	16	147	44	235	133	164	164	87	225	175	4380	HO DKE 312
90	80	16	168	51	270	149	203	177	105	327	272	7260	HO DKE 313
110	100	16	182	61	308	167	238	195	129	385	330	11300	HO DKE 314

Options:

FPM seals (plain ends) order HO DKF ***

**Premium Quality
Valve for Demanding
Environments**

TKD 3-way ball valves Plain EPDM T-Port



T-Port design

d	DN	PN	H	H ₁	Z	C	C ₁	B	B ₁	L	gms	Code
20	15	16	144	80	86	67	40	54	35	16	305	HO TTE 306
25	20	16	145	100	107	85	49	65	35	19	535	HO TTE 307
32	25	16	160	110	116	85	49	70	39	22	725	HO TTE 308
40	32	16	189	131	137	108	64	83	46	26	1170	HO TTE 309
50	40	16	219	148	157	108	64	89	52	31	1600	HO TTE 310
63	50	16	267	179	191	134	76	108	62	38	2845	HO TTE 311

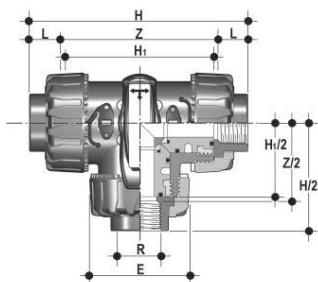
Options:

EPDM seals (threaded ends) order HO TTE B**

FPM seals (plain ends) order HO TTF ***

FPM seals (threaded ends) order HO TTF B**

Manual valves can be supplied with locking kits - further information is available from our Valve Department.



L-Port design

d	DN	PN	H	H ₁	Z	C	C ₁	B	B ₁	L	gms	Code
20	15	16	144	80	86	67	40	54	35	16	305	HO LTE 306
25	20	16	145	100	107	85	49	65	35	19	535	HO LTE 307
32	25	16	160	110	116	85	49	66	39	22	725	HO LTE 308
40	32	16	189	131	137	108	64	83	46	26	1170	HO LTE 309
50	40	16	219	148	157	108	64	89	52	31	1600	HO LTE 310
63	50	16	267	179	191	134	76	108	62	38	2845	HO LTE 311

Options:

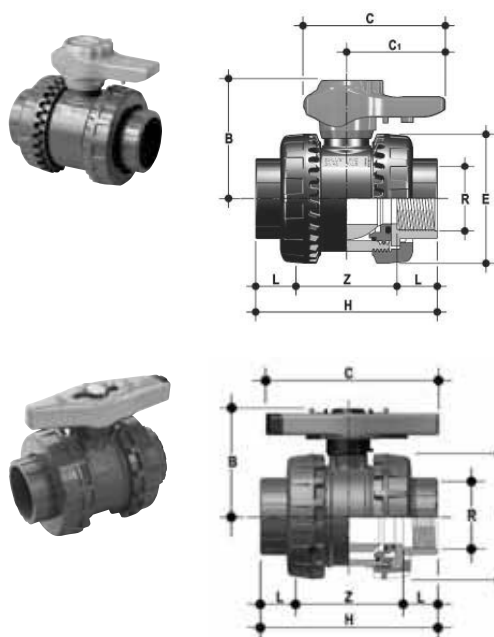
EPDM seals (threaded ends) order HO LTE B**

FPM seals (plain ends) order HO LTB ***

FDM seals (threaded ends) order HO LTF B**

VKD and TKD ball valves can be supplied electrically or pneumatically actuated.

VXE Easyfit ball valves Manual – EPDM seals

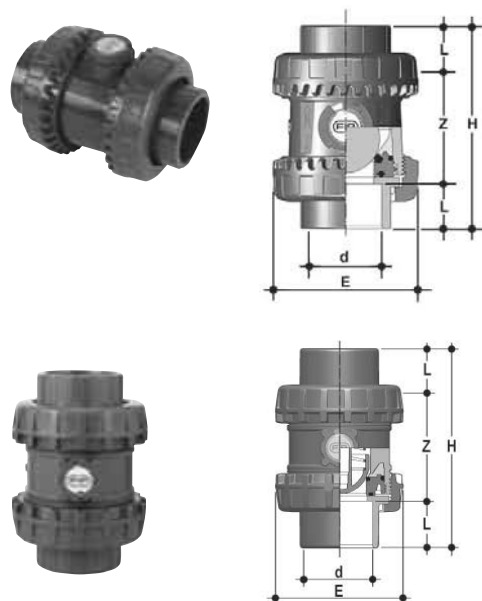


with metric series plain female ends for solvent welding

d	DN	PN	L	Z	H	E	B	C	C1	gms	Code
16	10	16	14	54	82	54	49	64	20	180	HO XEE 305
20	15	16	16	50	82	54	49	64	20	175	HO XEE 306
25	20	16	19	53	91	63	62	78	23	260	HO XEE 307
32	25	16	22	59	103	72	71	87	27	365	HO XEE 308
40	32	16	26	68	120	85	82	102	30	565	HO XEE 309
50	40	16	31	77	139	100	92	109	33	795	HO XEE 310
63	50	16	38	98	174	118	110	133	39	1325	HO XEE 311

d	DN	PN	L	Z	H	E	B	C	C1	gms	Code
75	65	16	44	123	211	157	142	214	115	2750	HO XEE 312
90	80	16	51	146	248	174	151	239	125	3432	HO XEE 313
110	100	16	63	161	283	212	174.5	270	145	5814	HO XEE 314

SXE Easyfit ball check valves Plain ends – EPDM seals



with metric series plain female ends for solvent welding

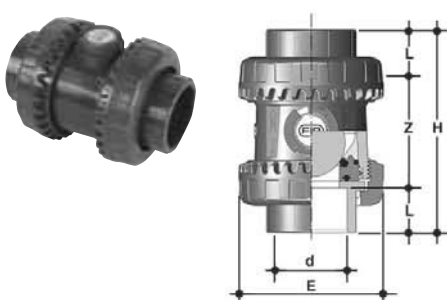
d	L	Z	C	E	gms	Code
20	17	48	82	50	96	HO SXE 306
25	19	55	93	59	99	HO SXE 307
32	22	62	106	68	145	HO SXE 308
40	26	75	127	80	234	HO SXE 309
50	31	84	146	96	357	HO SXE 310
63	38	99	175	116	937	HO SXE 311

Options:

FPM seals (plain ends) order HO SXF ***

d	DN	PN	L	Z	H	E	gms	EPDM Code
75	65	16	44	123	211	157	2605	HO SXE 312
90	80	16	51	146	248	174	3300	HO SXE 313
110	100	16	63	157	283	212	5570	HO SXE 314

SXA Easyfit air release valves Plain ends – EPDM seals



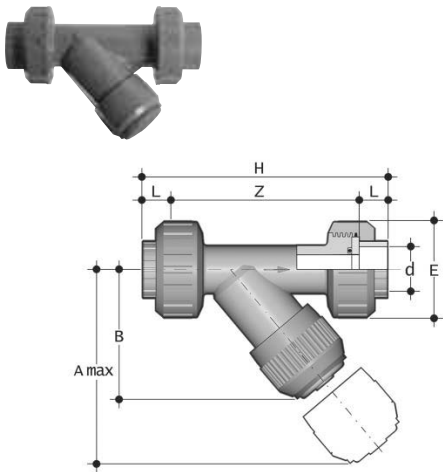
with metric series plain male end for solvent welding

d	DN	PN	L	Z	H	E	gms	Code
20	15	16	16	50	82	54	133	HO SAE 306
25	20	16	19	53	91	63	171	HO SAE 307
32	25	16	22	59	103	72	270	HO SAE 308
40	32	16	26	68	120	85	414	HO SAE 309
50	40	16	31	77	139	100	608	HO SAE 310
63	50	16	38	98	174	118	972	HO SAE 311

Options:

FPM seals (plain ends) order HO SAF ***

RV Y-Type strainers Socket union ends – EPDM seals

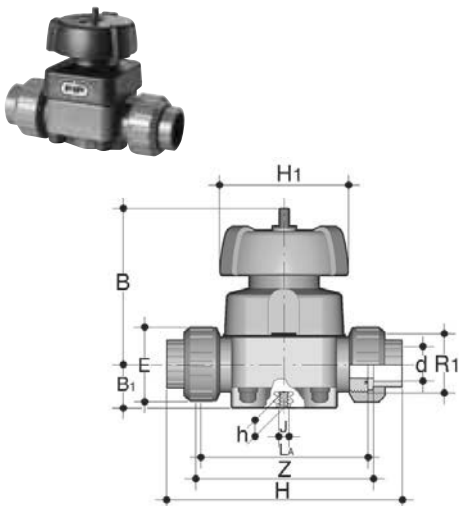


d	DN	PN	A	B	E	L	Z	H	K	Fig.	gms	Code
Grey Trans. max												
20	15	16 16	125	72	55	16	103	135	-	A	203	HO UVE 306
25	20	16 16	145	84	66	19	120	158	-	A	358	HO UVE 307
32	25	16 16	165	95	75	22	132	176	-	A	526	HO UVE 308
40	32	16 10	190	111	87	26	155	207	-	A	733	HO UVE 309
50	40	16 10	210	120	100	31	181	243	-	A	1095	HO UVE 310
63	50	16 10	240	139	120	38	222	298	-	A	1843	HO UVE 311

Grey (HO UV* ***) or Transparent (HO UT* ***)
with unionised metric series plain female ends for solvent welding

Options:
FPM seals (plain ends) order HO UVF ***

VM Diaphragm valves Manual – plain union ends EPDM



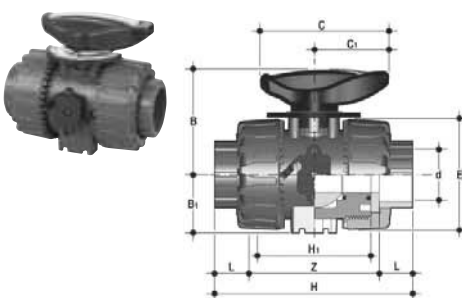
d	DN	PN	B	B ₁	H	h	H ₁	I	J	L	gms	Code
20	15	10	95	26	147	12	90	25	M6	16	830	HO UME 406
25	20	10	95	26	154	12	90	25	M6	19	860	HO UME 407
32	25	10	95	26	168	12	90	25	M6	23	895	HO UME 408
40	32	10	126	40	192	18	115	45	M8	27	1650	HO UME 409
50	40	10	126	40	222	18	115	45	M8	32	1730	HO UME 410
63	50	10	148	40	266	18	140	45	M8	39	2800	HO UME 411
75*	65	10**	225	55	284	23	215	100	M12	44	7000	HO VME 412
90*	80	10**	225	55	300	23	215	100	M12	51	7000	HO VME 413
110*	100	10**	295	69	350	23	250	120	M12	-	10500	HO VME 414

with metric series plain female ends for solvent welding

*75mm, 90mm & 110mm product is spigot ended.
** PN6 for PTFE version.

Options:
FPM diaphragm (plain ends) order HO UMF ***
PTFE diaphragm (plain ends) order HO UMG ***

VKR Metering ball valve



d	DN	PN	L	Z	H	H ₁	E	B	B ₁	C	C ₁	gms	Code
16	15	16	16	71	103	65	54	54	29	67	40	215	HO MBE 305
20	15	16	16	71	103	65	54	54	29	67	40	215	HO MBE 306
25	20	16	19	77	115	70	65	65	34.5	85	49	330	HO MBE 307
32	25	16	22	84	128	78	73	70	39	85	49	438	HO MBE 308
40	32	16	26	94	146	88	86	83	46	108	64	493	HO MBE 309
50	40	16	31	102	164	91	98	89	52	108	64	925	HO MBE 310
63	50	16	38	123	199	111	122	108	62	134	76	1577	HO MBE 311

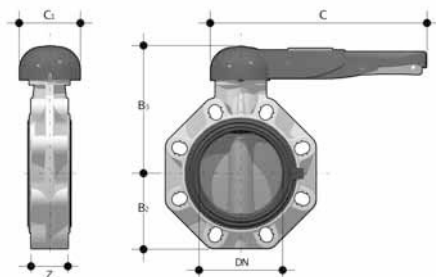
Options:
FPM seals (plain ends) order HO MBF ***

FK Butterfly valves Manual – EPDM seals



lever operated

d	DN	PN	B ₂	B ₃	C	C ₁	gms	U	Code
50	40	16	60	137	175	100	900	4	HO FKE 106
63	50	16	70	143	175	100	1080	4	HO FKE 107
75	65	10	80	164	272	110	1470	4	HO FKE 108
90	80	10	93	178	272	110	1870	8	HO FKE 109
110	100	10	107	192	272	110	2220	8	HO FKE 110
140	125	10	120	212	330	110	3100	8	HO FKE 111
160	150	10	134	225	330	110	3850	8	HO FKE 112
225	200	10	161	272	420	122	6750	8	HO FKE 113



Options:

FPM seals order HO FKF ***

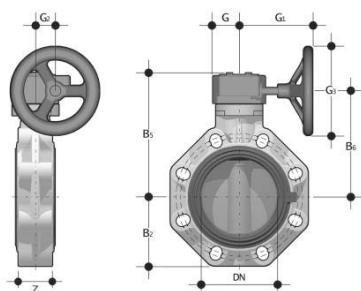


with gearbox

d	DN	PN	B ₂	B ₅	B ₆	G	G ₁	G ₂	G ₃	gms	U	Code
250	250	10	210	317	281	88	236	76	250	18600	12	HO FKE 114
315	300	8	245	374	338	88	236	76	250	25600	12	HO FKE 115

250 & 315mm FK Butterfly valves come with gearbox as standard.

Sizes 160mm to 225mm are available with gearbox operation on request.



Product is supplied with DIN 8063 PN10 drillings but ANSI drillings are available on request.

Set of transparent service plugs & white PVC tag holders

For insertion in handle for (VXE) Easyfit valve customisation



Size mm/inch	Standard pack quantity in units	Product Code
16-20 / 1/2	20	LCE020
25 / 3/4	20	LCE025
32 / 1	20	LCE032
40 / 1 1/4	20	LCE040
50 / 1 1/2	20	LCE050
63 / 2	20	LCE063

Die cut labels plus software White waterproof A4 sheets and freeware editing software to be used with inkjet printers for easyfit valve customisation.



Size mm/inch	No. of sheets	Total labels	Product Code
16-20 / 1/2	10	500	LSE020
25 / 3/4	10	500	LSE025
32 / 1	10	500	LSE032
40 / 1 1/4	10	500	LSE040
50 / 1 1/2	10	400	LSE050
63 / 2	10	400	LSE060

Accessories

One-step solvent cement



Litres	gms	Code
0.5	500	03 462 395

Durapipe PVC-U solvent cement must be used for jointing of Durapipe PVC-U pipework systems.

Eco-cleaner



Litres	gms	Code
0.5	500	03 457 395

Durapipe ECO cleaner must be used for jointing of Durapipe PVC-U pipework systems.

HCR-36 Chemically resistant PVC cement



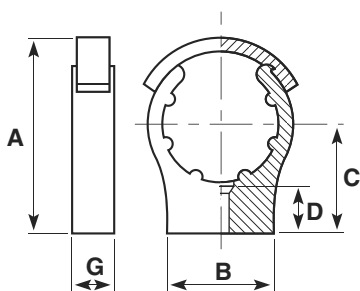
Description	Code
1 litre	03 468 396

Cleaner for use with HCR-36 Chemically resistant PVC cement



Description	Code
1/2 litre	03 467 395

Cobra pipe clips



Size	A	B	C	D	G	Bolt/Screw	gms	Code
*12	-	24	25	15	16	M4/3BA/No 8	5	13 434 304
*16	-	35	25	17	16	M4/3BA/No 8	7	13 434 305
*20	-	35	30	14	16	M5/1BA/No 10	8	13 434 306
*25	-	35	35	16	17	M5/1BA/No 10	11	13 434 307
32	65	45	40	17	17	M5/1BA/No 10	14	13 434 308
40	75	65	45	20	20	M5/1BA/No 10	21	13 434 309
50	85	50	50	22	21	M6/0BA/No 10	30	13 434 310
63	102	60	60	19	21	M6/0BA/No 10	42	13 434 311
75	122	70	70	27	31	M8	94	13 434 312
90	148	80	90	39	31	M8	121	13 434 313
110	171	90	96	36	35	M8	184	13 434 314
125	185	161	96	9	17	M8	237	13 424 315
140	188	176	112	13	19	M8	252	13 424 316
160	238	219	150	10	40	M8	330	13 424 317

*Clips 32mm and above are fitted with a pipe retaining strap. Bolts/screws not supplied. When using 32mm clip on 1" pipe strap is not needed.

Chamfering and de-burring tools



Description	Code
E 16-63mm pipe outer milling cutter tool	FT 55 65 12
32-160mm chamfering tool	FT 55 05 10

Durapipe PVC-U solvent cement must be used for jointing of Durapipe PVC-U pipework systems.

Pipe cutters

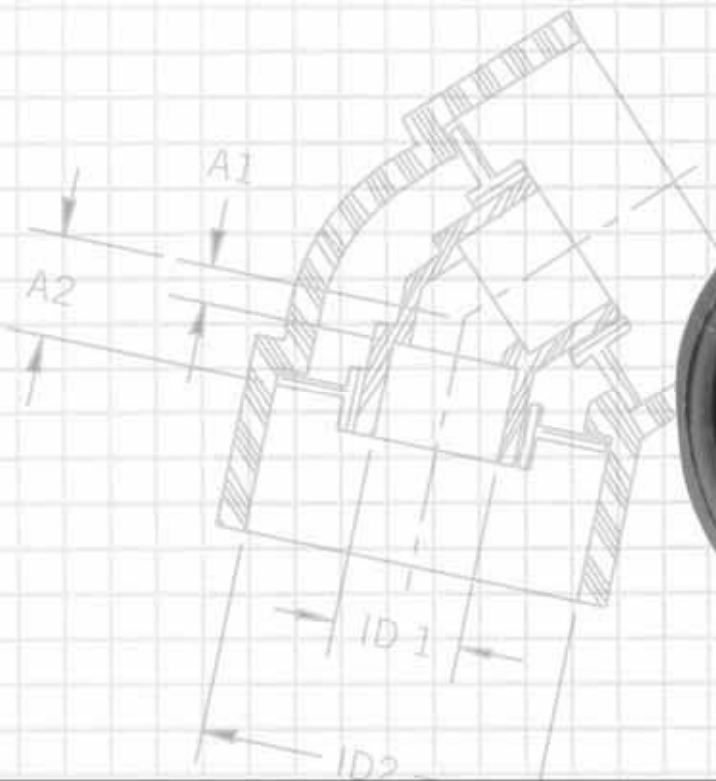


Description	Code
16-63mm pipe cutter	FT 80 00 01
50-125mm pipe cutter	FT 80 00 03
16-63mm spare cutter wheel	FT 80 00 02
50-125mm spare cutter wheel	FT 80 00 04



Pipes, Fittings & Valves

Imperial PVC-U # PVC-U system



**Guardian Dual
Contained Pipework**

Technical Data

Durapipe
Guardian
Dual Containment

DURAPIPE GUARDIAN

Durapipe Guardian is a completely new Dual Contained pipework system made from PVC-U material.

Guardian is a unique system that incorporates a patented Centra-Lok™ system, which provides a solid fixed fitting, offering a true point of difference from other dual contained systems on the market.

Manufactured in PVC-U material, Durapipe Guardian is ideal for water and waste treatment applications as it allows the safe transportation of different fluids and some chemical concentrates without fear of corrosion and environmental pollution.

Key Product Information

- Size Range: ½"#2" up to 8"#12"
- Pressure Rating: Class E 15 bar
- Temperature Rating: +5 to 60°C

Key Product Features

- Patented Centra-Lok™ system holds fitting in the correct place prior to installation
- Extremely easy to install - Solvent Weld jointing for both inner and outer
- Visual or automated leak detection system available

Typical Applications

- Water and waste water treatment
- Chemical process
- Pharmaceutical
- Industrial process
- Food and beverage
- Marine
- Potable water



Guardian

Guardian Introduction

Dual contained pipework for when leaks are not an option...

Durapipe Guardian – Your dual contained specialist

Creating a safe working environment, offering strong environmental control is imperative in many industrial applications, particularly within the water treatment, chemical processing and process application sectors. Pressures are increasing for businesses to provide extra reliability not only to their workforce, but also to the environment they are operating within, driving demand for extra reliability provided with a dual contained pipework system.

Durapipe Guardian dual contained pipework system utilises state-of-the-art technology, using pre-assembled components that guarantee reliability, ease of installation and fewer joints than many other competitor systems on the market, providing a perfect solution to applications **when leaks are NOT an option!**



What is Guardian?

Overview

- Dual contained pipework system
- Full range of pipe, fittings, valves and terminations
- Easy to install
- Fully imperial sized system

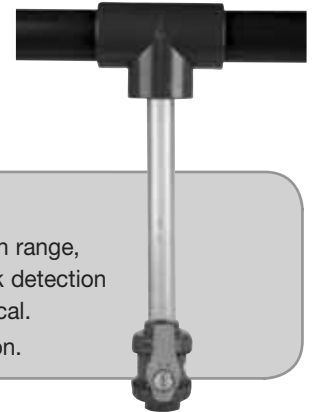
Material Selection

Durapipe Guardian is manufactured from PVC-U material which makes the system ideal for conveying industrial fluids in demanding environments.

Design

The Guardian system offers a complete selection of pretested modular components which are extremely easy to install.

Our Centra-Lok™ patented design means the Guardian system averages up to 60% fewer overall joints than other systems on the market. Since joints are always the most common source of premature failures and leaks, it is easy to realise the immense impact the patented Centra-Lok™ design has on maintenance, repair and installation costs.

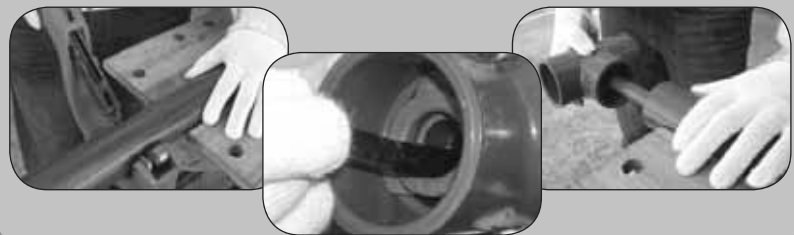


Leak Detection

As part of the Durapipe Guardian range, we can also offer a range of leak detection systems, both physical and optical. See Page 93 for more information.

Easy to install

Guardian is the easiest system of its kind (dual contained) to install. Following the same simple solvent cement jointing process as single-wall PVC-U, there are no special tools, equipment or hot works permits required. Please see page 83 for full jointing instructions.



Where is Guardian used?

- Water and Waste Treatment
- Chemical Waste
- Process Applications
- Chemical Manufacturing/ Pharmaceutical
- Electronics/Data Storage

What is it commonly used for?

- Chemical Treatment
- Unknown/Hazardous Waste
- Aggressive Chemicals
- High Value Contents
- Water Damage Prevention



Leak Prevention



Booster Pump Station, Audenshaw

The station delivers drinking water into North West water company United Utilities' Manchester ring main from the Thirlmere Aqueduct. Following a review, it became apparent that the phosphate dosing operation at the site was in need of attention, in particular, the existing pipework carrying the aqueous solution of sodium orthophosphate from the glass reinforced plastic storage tanks to the dosing rig.

Byzak Limited installed the Guardian pipework system to transfer the sodium orthophosphate from the storage tanks to the dosing rig, using 1" carrier pipe in 3" containment pipe.

Contamination Prevention



Water Treatment Works, Rivington

Durapipe Guardian installed at Rivington Water Treatment Works, specified to transport sodium hypochlorite safely from the bulk storage tanks to each of the seven new pumps installed within the plant.

The pipework is installed within the ceiling voids of the plant, therefore due to the nature of the chemicals planned for transportation, it was vital that the system is dual contained to prevent any potential leakages spilling out into the plant and endangering unprotected workers.

Durapipe Guardian Case Study Examples

Factory Installation



Armstrong World Industries, Gateshead

Durapipe Guardian installed at Armstrong World Industries, a global manufacturer of ceiling and floor products and commissioned ProMinent.

The system was specified as a dual contained pipework system to carry 2000ppm Carbon Dioxide from manufacturing through to settle tanks ready for discharge.

Chemical Transportation



Water Treatment Works, Egham

Durapipe Guardian installed at Egham Water Treatment Works during a period of pipework regeneration.

Contractors IDS required a dual contained system in order to transport orthophosphoric acid and polyaluminium chloride around the plant safely.

Guardian Installation

Solvent Cement Jointing (Individual)

PVC

1. The pipe must be cut clean and square. A suitable wheel cutter will eliminate swarf. As an alternative (and on larger sizes) a carpenter's saw should be used, however this may create dust and swarf which can enter the system. Remove all burrs from both the inside and outside edge of the pipe with a knife, file or reamer and chamfer the end of the pipe using a coarse file or suitable chamfering tool. The chamfer should be approximately 45° by 3mm to 5mm depending on the pipe size. Remove any dirt, grease or moisture. A thorough wipe with a clean, dry rag is usually sufficient. Check dry fit. Pipe should insert easily into socket, approximately 1/4 to 3/4 of the total socket depth.

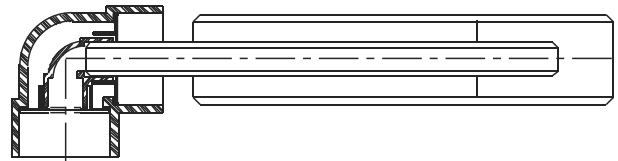


2. Clean surfaces thoroughly with Durapipe Eco-cleaner using lint free cloth/paper towel.



3. Using a clean brush, apply Durapipe PVC One-step cement to the carrier pipe and inner fitting. HCR-36 cement and cleaner should be used for aggressive chemicals, for more information please see page 18.

The joint surfaces should be completely covered by cement. Cement should be applied using an appropriate size brush and tin of cement. It is important to apply cement quickly to enable assembly without excessive force being required. When applying cement with a brush, the size of the brush should be approximately half the size of the pipe to be jointed - brush size up to 2 1/2" for 0.5 litre tins.



4. Without delay assemble while cement is still wet, push the pipe fully home into the fitting using sufficient force to ensure that pipe bottoms in socket. Hold together for about thirty seconds to make sure joint does not separate. With a rag, wipe off excess cement. Avoid disturbing the joint.



5. Repeat step 3, but this time for the containment pipe and outer fittings.



6. Without delay assemble the outer joint as described in step 4. This process (points 3-6), can be repeated using standard PVC sockets to extend the pipe lengths, until there is a change of direction needed.



Solvent Cement Jointing (Simultaneous)

There will be circumstances where it will not be possible to joint the carrier pipework and the containment pipework separately. At this point a simultaneous joint will be required.

- 7a. Determine proper carrier pipe lengths to achieve desired centre-to-centre dimension. Cut to size and prep ends as detailed in steps 1 & 2.



- 7b. Generally containment pipe needs to be shorter than the carrier pipe. This distance can be worked out from the data on pages 90-91. $A2 - A1 =$ Additional length of carrier pipe eg. for $1/2"$ # 2" (90° Elbow) this equates to $35.1 - 12.7 = 22.4\text{mm}$

Hence the carrier pipe needs to be 22.4mm longer than the containment pipe, for simultaneous jointing. Measure and cut both the carrier and containment pipes to the required distance and chamfer and clean the pipe and fittings as described in steps 1 & 2.



8. Install Centra-guide support at pipe's end. Distance between the fitting and support should not exceed $1\frac{1}{2}$ metres. Install additional supports if required.
9. Clean surfaces thoroughly with Durapipe Eco-cleaner and apply solvent cement to carrier and containment sockets and pipe ends. Push the fitting fully home so that it is against the pipe stop.



10. Wipe off excess cement from the outside of the joint.
11. Do not disturb the joint for at least 15 minutes. On larger sizes do not subject the joint to bending or twisting forces for at least 4 hours. When making subsequent joints, which can be done without waiting, take care not to transmit forces to freshly made joints in the system.

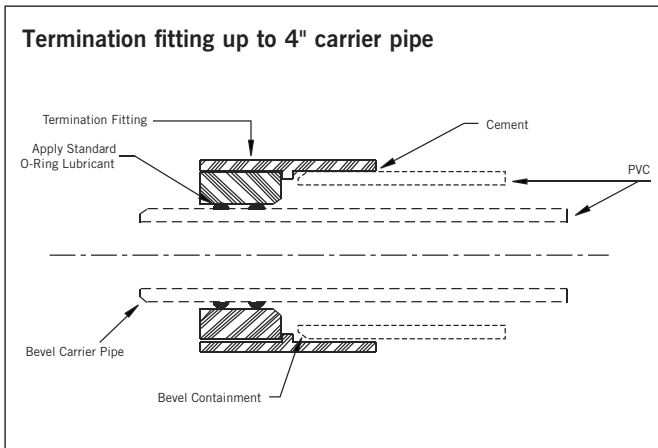
Depending upon the chemical being used HCR cement may be required. Please refer to Page 18.

IMPORTANT: Always apply Eco-cleaner and cement liberally. Do not take shortcuts. Follow Guardian instructions explicitly.

Termination Fittings

Guardian PVC termination fittings (up to 4" carrier pipe) are supplied as one-piece components, complete with carrier pipe O-Rings. Always bevel carrier pipe end or damage to the O-Rings will occur. Clean surfaces of both the containment pipe and the socket of the termination fitting thoroughly with Durapipe Eco-cleaner. Apply cement to both containment pipe and termination socket and slide into position. Allow 24 hours cure time prior to testing. The fitting is supplied as standard with taps to allow for venting, draining, leak detection etc. If this plug is not needed it can be plugged with a standard 1/2" BSP PVC plug (Durapipe code 02 155 102)

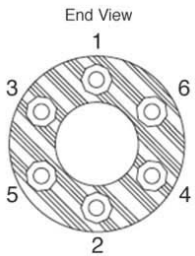
Do not apply Eco-cleaner or solvent cement to O-Rings.



All C-style termination fittings (for carrier pipe larger than 4") are shipped completely assembled and ready for field installation.

Slide the termination fitting over the carrier pipe and into the end of the containment pipe, recessing it approximately one inch from the containment pipe end. As the bolts are tightened, the end plates compress the elastomeric material creating a seal between the carrier and containment pipe. Tighten all bolts following the torque sequence (as below).

NOTE: I.D. and O.D. of termination fitting are sized per specified carrier and containment pipe.



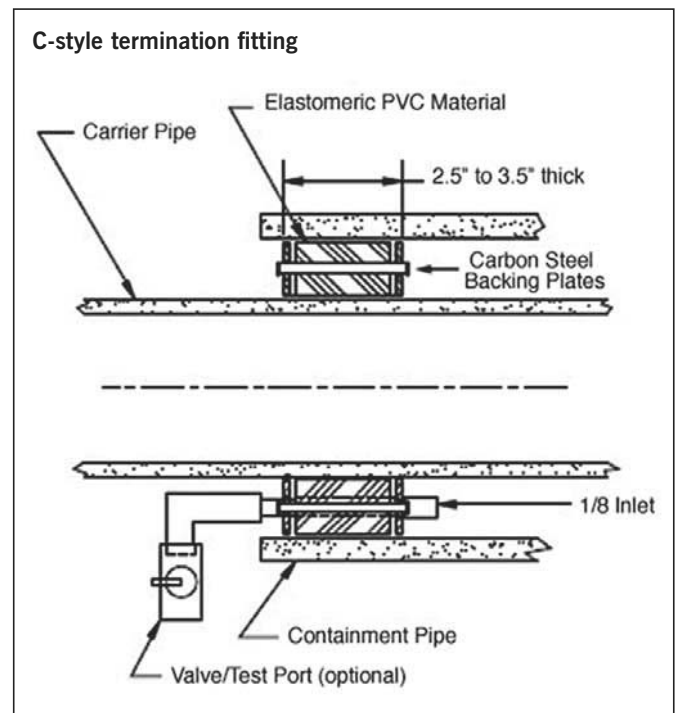
Pipe Size	No. of Bolts	Bolts Size	Max Torque (Nm)
1 x 3	3	1/4 NC	10.85
1 x 4	4	1/4 NC	10.85
1 1/2 x 4	4	1/4 NC	10.85
2 x 4	4	1/4 NC	10.85
3 x 6	6	1/4 NC	10.85
4 x 8	6	5/16 NC	13.56
6 x 10	6	5/16 NC	13.56
8 x 12	6	5/16 NC	13.56

Using a C-style termination to pressure test installed pipework.

To properly test the containment pipe joints, first seal the interstitial space located at both ends of the pipe run.

Second, provide a port to pressurise and depressurise the section of pipe to be tested. A C-style termination fitting can be used to seal the interstitial space and provide a pressurisation port for testing purposes. When permanently installed, it acts as a termination fitting with a drain valve. It is also used temporarily to test containment joints in subassemblies before joining to your next subassembly.

Once a successful pressure test is completed, the fitting can be removed and used again.



Cleaning and Installation

Following installation, the installer shall check the operation of all valves, leak detection, devices and ancillary items. The annular space should be purged of moisture containing air, by replacing the volume of air with clean, dry nitrogen.

Common Mistakes

- Insufficient amount of cement
 - Incorrect or outdated cement
 - Eco-cleaner not being used
 - Pipe ends not chamfered
 - Pipes not fully inserted (Inner pipe too short)
 - Pipes misaligned
 - Contamination (dirt) on cementing area
 - Improper positioning of closure coupling on containment pipe
 - Movement of pipe sections before cement is fully cured
 - Wrong size brush
1. Always use containment pipe dimensions as the basis for determining piping layout, centre-to-centre dimensions and expansion loop size.
 2. Termination fittings are usually required at the beginning, end and at any branch line of double containment systems, except when draining back to a collection sump, pit or tank.
 3. Systems with long runs or extreme temperature changes may require expansion loops or elbows, TEDs or changes in direction.
 4. Durapipe UK technical support team should be consulted for correct determination of suitability of chemicals.
 5. For above-ground and outdoor applications, UV protection may be required on certain materials.

Care should be taken to avoid exposure to UV light, eg. sunlight, particularly during storage.

This will cause discolouration and deterioration of the PVC-U material.

Whilst this is a surface effect only, it is recommended that precautions be taken to prevent this happening.

If stored outdoors pipe should be covered with opaque sheeting.

If installed outdoors it can be protected from the effects of UV by insulating or painting.

NOTE: Always allow 24 hours or more, depending on environmental conditions, before testing carrier/containment pipe. Please allow 48 hours for sizes above 8".



External Support

Support and spacing requirements for double containment pipe systems should be equal to standard above-ground PVC-U piping. It is important to place hangers near interstitial supports. Additional external support considerations should be given to components such as valves, in-line pumps or other heavy items.

Horizontal piping systems should be supported on uniform centers, which are determined by maximum containment pipe temperatures (see support chart for recommendations). Values apply to uninsulated lines either in a building or exposed to the environment.

Regardless of the type of hanger selected, it is important to note that a wide surface is recommended, free from burrs and sharp edges. Do not anchor by means of a U-bolt directly to the containment pipe.

When pipe clips are used, they should not force the pipe fittings into position. Each pipe section should be laid out and jointed to its mating section. Once the joints have been completed, the final support is in place. When correctly installed, a clip or anchor can be loosened or removed without the pipe shifting.

Pipe Size Inner#Outer (Inch)	Minimum Support Spacing at 20°C (m)
1/2#2	1.80
3/4#3	2.25
1#3	2.15
1 1/4#4	2.40
2#4	2.20
3#6	2.75
4#8	3.10
6#10	3.30
8#12	3.50

Pressure Testing Guardian PVC-U Dual Contained Pipework

Test Method: Carrier (inner) Pipework

After the joints have been allowed to cure for the appropriate minimum drying time (at least 24 hours @ 20°C).

- The system should be divided into sections (if appropriate) for testing. Fill with cold water ensuring no air pockets remain. **Do not** pressurise at this stage.
- Check the pipework for any obvious leaks, if none are apparent, check for and remove any remaining air.
- Increase the pressure up to 3 bar. **Do not** pressurise further at this stage.
- Leave pressurised for 10 minutes, if pressure decays, inspect for leaks and rectify as necessary. If pressure remains constant, slowly increase the hydrostatic pressure to 1½ times the nominal operating pressure (max 22.5 bar).
- Leave pressurised for a period not exceeding 1 hour. During this time the pressure should not change.
- If extended times are required to achieve hydrostatic pressure, either leakage has occurred or air remains in the line, inspect for leaks and if none are apparent, reduce the pressure and check for trapped air. This must be removed prior to further pressurisation.

NOTE: If leaks are found at any stage, the system must be depressurised and drained. It is not possible to make a repair to leaking pipe or fittings, therefore such components must be cut out and replaced. All new joints must be fully cured prior to re-testing.

THE USE OF GAS OR COMPRESSED AIR IS NOT PERMITTED AS A TEST MEDIUM FOR CARRIER PIPE.

Test Method: Containment (outer) Pipework

A low-pressure air test is the recommended method for testing the containment pipe. However, a hydrostatic water test is possible for the containment zone.

Low-pressure air test

After the joints have been allowed to cure for the appropriate minimum drying time (at least 24 hours up to 8", sizes 10" & 12" require a minimum of 48 hours @ 20°C).

- The containment pipe can be low-pressure air tested at up to 0.5 bar regulated pressure.
- If the pipework contains 'zone fittings' each zone of the pipework will need to be tested individually.
- The system must not be directly connected to a compressed air-line, nitrogen bottle or any unregulated pressure device. It is imperative that a working pressure regulator be used during the pneumatic test to ensure over pressurisation does not occur.
- The test equipment must have a pressure limiting device, set to 0.5 bar, at the source and an air relief device, set to 0.5 bar, at the end of the system.
- Use a spray bottle containing soap and water solution to examine for leaks in the containment pipework.
- If any leaks are discovered, the system must be depressurised before components are cut out and replaced.

NOTE: Some compressor oils can contain damaging elements to PVC-U pipe, check with the manufacturer of the compressor oil for its suitability with PVC-U pipe.

Alternative hydrostatic pressure test for containment pipe

After the joints have been allowed to cure for the appropriate minimum drying time (at least 24 hours up to 8", sizes 10" & 12" require a minimum of 48 hours @ 20°C).

- The carrier pipe must be filled with water.
- The containment pipe should be divided into sections **see notes below** (if appropriate) for testing.
- Fill with cold water ensuring no air pockets remain. **Do not** pressurise at this stage.
- Check the pipework for any obvious leaks, if none are apparent, check for and remove any remaining air.

The carrier pipe must be pressurised to equal or greater than the maximum test pressure of the containment pipe.

- Increase the pressure up to 3 bar. **Do not** pressurise further at this stage.
- Leave pressurised for 10 minutes, if pressure decays, inspect for leaks and rectify as necessary. If pressure remains constant, slowly increase the hydrostatic pressure to 1½ times the nominal operating pressure (Maximum 13.5 bar).
- Leave pressurised for a period not exceeding 1 hour. During this time the pressure should not change.
- If extended times are required to achieve hydrostatic pressure, either leakage has occurred or air remains in the line, inspect for leaks and if none are apparent, reduce the pressure and check for trapped air. This must be removed prior to further pressurisation.

NOTES: The Guardian Zone fittings are not designed to hold the maximum working pressure of the system from zone to zone, if zone fittings are incorporated within the system they MUST NOT BE USED to divide the system into sections for hydrostatic testing. For testing, each side of the zone fittings must be pressurised to an equal amount at all times.

If leaks are found at any stage, the system must be depressurised and drained. It is not possible to make a repair to leaking pipe or fittings, therefore such components must be cut out and replaced. All new joints must be fully cured prior to re-testing.

When using C-style termination fittings and applying a test pressure of more than 2.5 bar, measures need to be taken to prevent slippage of the secondary containment fitting by installation of suitable anchors.

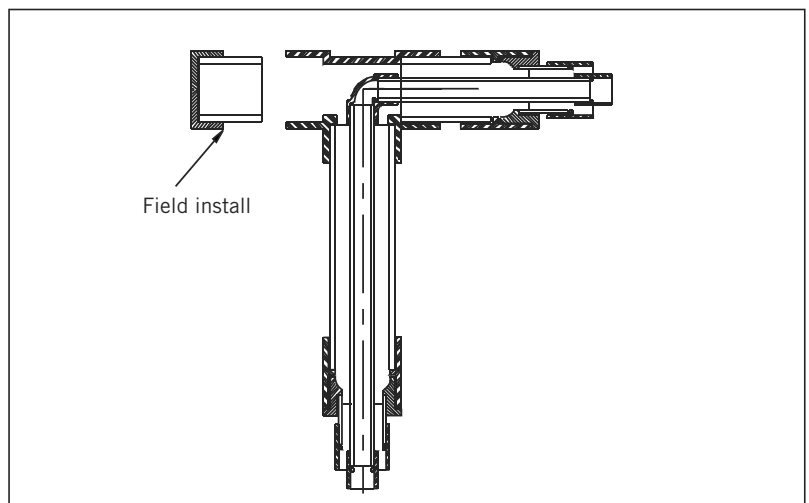
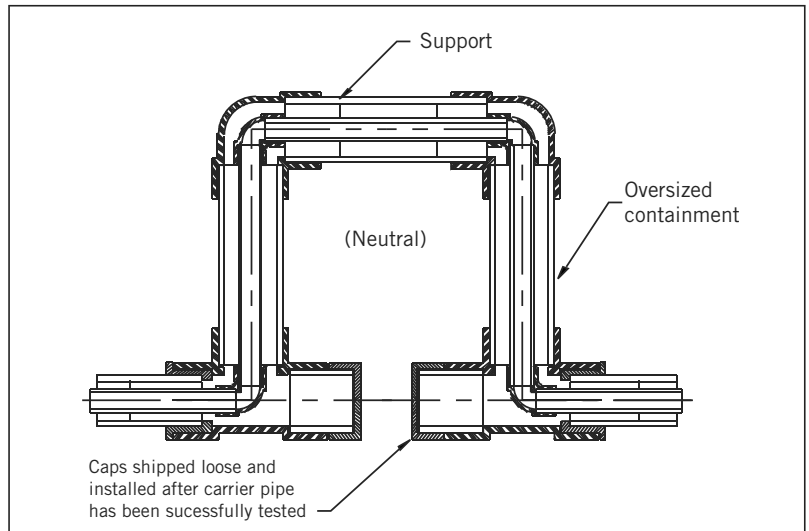
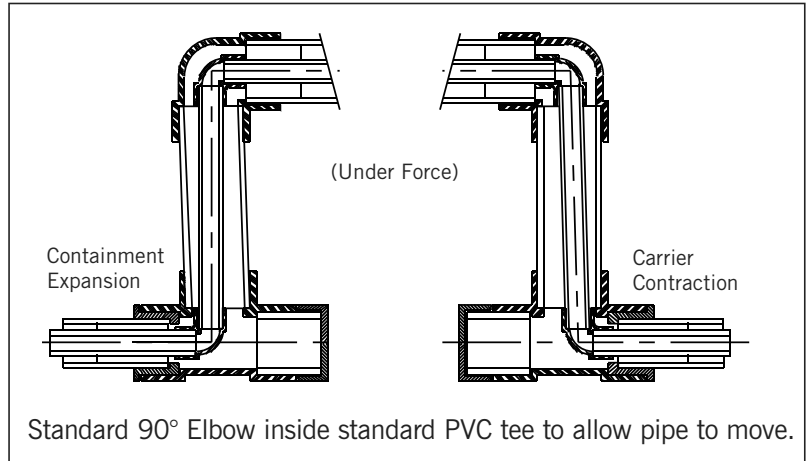
Expansion Loop and Elbows

A common method to control the effects of expansion or contraction in a piping system is to install a combination of anchors and guides with expansion loops. Anchors direct pipe to free movement area. Guides control the carrier pipe movement down the bore of the containment pipe to, and away from, the expansion loop.

A relaxed expansion loop as well as one subjected to temperature change are depicted below. As you can see, when a pipe is subjected to temperature change, some degree of movement will occur. Failure to compensate for temperature change may cause stress and ultimately failure.

The carrier and containment pipes are anchored together at every change of direction due to the way in which the unique Centra-Lok™ component connects the fittings together.

For this reason it is important to install standard tees (outer) and 90° elbows (inner) in order to allow for the carrier pipe to move independently. The open socket can then be plugged once the system has been pressure tested. See pages 11-13 for details on calculating expansion loop size.



Expansion Joints

We have introduced a new expansion joint that provides an easy to install solution for the complex expansion and contraction of a double contained piping system. This piston style expansion joint features:

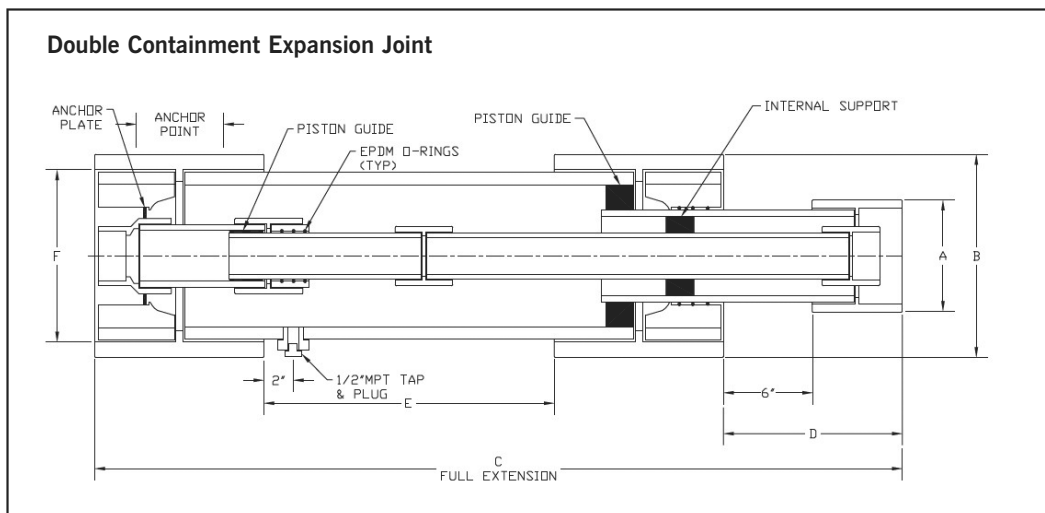
- 150mm of travel for both carrier and containment pipe
- Triple O-ring design for a reliable water tight seal
- Independent movement for both carrier and containment pipe
- Tap and plug on containment for drainage
- Piston guides to ensure smooth motion without buckling
- Pressure rated design up to 16 bar

Durapipe Guardian Double Containment Expansion Joints are engineered to accommodate the various expansion and contraction found in a contained piping system. The carrier and containment pipe are allowed to expand and contract independently of each other to ensure proper compensation regardless of ambient or process temperature differentials, pipe size, or layout differences. The expansion joint is shipped fully assembled, using factory tested joints, to eliminate the need for costly field joints that could create leak paths.

NOTE: Free space area denotes maximum movement of carrier to initial interference with containment.

Unwanted stresses resulting from thermal expansion can be minimised or eliminated by providing for flexibility in a double containment piping system. This is achieved by incorporating expansion loops or elbows.

Maximum Expansion Per Loop Size	
Size (inch)	Free Space Area (mm)
1/2#2	16.00
3/4#3	26.00
1#3	23.00
1 1/2#4	27.00
2#4	13.00
3#6	22.00
4#8	34.00
6#10	22.00
8#12	14.00

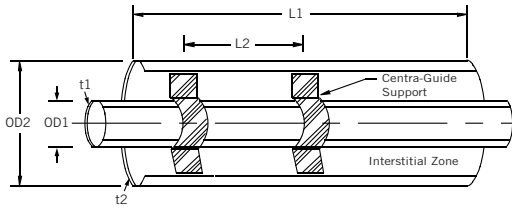


Carrier/ Containment	A	B	C	D	E	Code
1" # 3"	106.68	134.62	889.41	259.08	383.54	08 TED 104
2" # 4"	134.62	193.04	939.80	312.42	469.90	08 TED 107
3" # 6"	198.12	218.44	1295.4	304.80	438.15	08 TED 109
4" # 8"	254.00	273.05	1346.2	330.20	438.15	08 TED 110

*Optional
FPM seals available

Guardian Dimensional Information

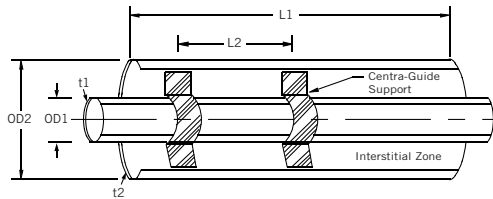
PVC Dual Contained pipe



Carrier/ Containment	Class	L ₁ m	L ₂ m	OD1 mm	t ₁ mm	OD2 mm	t ₂	Code
1/2"#2"	E/C	6	1.5	21.2	1.9	60.2	3.4	08 513 102
3/4"#3"	E/C	6	1.5	26.6	2.4	88.7	5.0	08 513 103
1"#3"	E/C	6	1.5	33.4	3.0	88.7	5.0	08 513 104
1 1/2"#4"	E/C	6	1.5	48.1	4.4	114.1	6.4	08 513 106
2"#4"	E/C	6	1.5	60.2	5.4	114.1	6.4	08 513 107
3"#6"	E/C	6	1.5	88.7	8.1	168.0	9.4	08 513 109
4"#8"	E/C	6	1.5	114.1	10.3	218.8	12.2	08 513 110
6"#10"	E/C	TBA	TBA	TBA	TBA	TBA	TBA	08 513 112
8"#12"	D/C	TBA	TBA	TBA	TBA	TBA	TBA	08 512 113

Carrier pipe is Class E or Class D. Containment pipe is Class C.

PVC Dual Contained pipe clear out

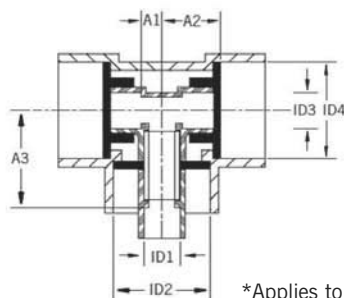
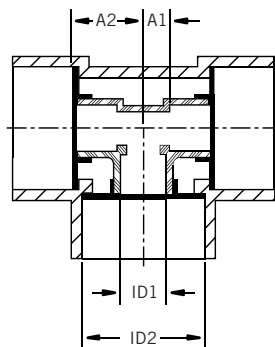


Carrier/ Containment	Class	L ₁ m	L ₂ m	OD1 mm	t ₁ mm	OD2 mm	t ₂	Code
1/2"#2"	E/C	6	1.2	21.2	1.9	60.3	5.19	08 514 102
3/4"#3"	E/C	6	1.2	26.6	2.4	88.9	7.27	08 514 103
1"#3"	E/C	6	1.2	33.4	3.0	88.9	7.27	08 514 104
1 1/2"#4"	E/C	6	1.2	48.1	4.4	114.3	10.15	08 514 106
2"#4"	E/C	6	1.2	60.2	5.4	114.3	10.15	08 514 107
3"#6"	E/C	6	1.2	88.7	8.1	168.3	15.32	08 514 109
4"#8"	D/C	6	1.2	114.1	10.3	218.8	20.17	08 514 110

This product is supplied as:

- 1 x 6m length of grey inner pipe
- 2 x 3m lengths of clear outer pipe
- 1 x socket (loose)
- 6 x Centra-guide spacers

Centra-Lok™ 90° Tees Equal plain

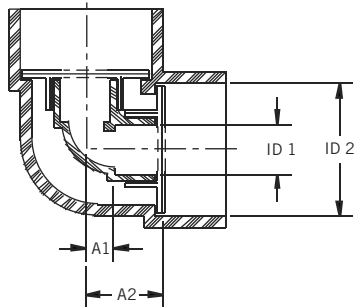


*Applies to 6#10" & 8#12"

Carrier/ Containment	A1	A2	ID1	ID2	Code
1/2"#2"	12.7	35.1	21.3	60.5	08 122 102
3/4"#3"	17.3	49.8	26.7	88.9	08 122 103
1"#3"	19.1	49.8	33.5	88.9	08 122 104
1 1/2"#4"	26.9	65.8	48.3	114.3	08 122 106
2"#4"	31.8	65.8	60.5	114.3	08 122 107
3"#6"	46.7	95.0	88.9	168.1	08 122 109
4"#8"	59.4	122.2	114.3	218.9	08 122 110
6"#10"	155.4	238.3	168.1	273.1	08 122 112
8"#12"	180.8	301.5	218.9	323.9	08 122 113

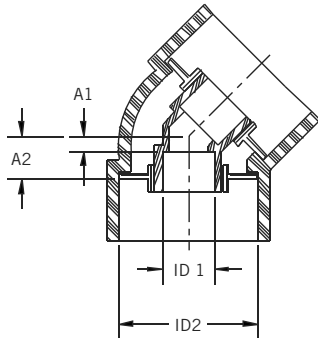
CAUTION: Do not use or test the products in this manual with compressed air or other gases.

Centra-Lok™ 90° Elbows Plain



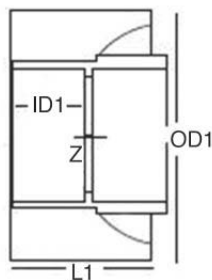
Carrier/Containment	A1	A2	ID1	ID2	Code
1/2"#2"	12.7	35.1	21.3	60.5	08 115 102
3/4"#3"	17.3	49.8	26.7	88.9	08 115 103
1"#3"	19.1	49.8	33.5	88.9	08 115 104
1 1/2"#4"	26.9	65.8	48.3	114.3	08 115 106
2"#4"	31.8	65.8	60.5	114.3	08 115 107
3"#6"	46.7	95.0	88.9	168.1	08 115 109
4"#8"	59.4	122.2	114.3	218.9	08 115 110
6"#10"	88.9	150.6	168.1	273.1	08 115 112
8"#12"	115.8	176.0	218.9	323.9	08 115 113

Centra-Lok™ 45° Elbows Plain



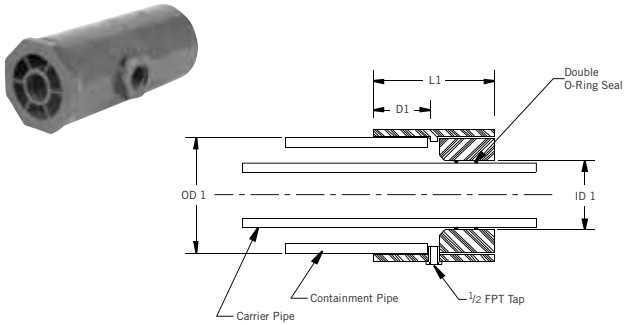
Carrier/Containment	A1	A2	ID1	ID2	Code
1/2"#2"	6.4	22.1	21.3	60.5	08 119 102
3/4"#3"	8.6	25.4	26.7	88.9	08 119 103
1"#3"	9.7	25.4	33.5	88.9	08 119 104
1 1/2"#4"	12.7	31.8	48.3	114.3	08 119 106
2"#4"	15.7	31.8	60.5	114.3	08 119 107
3"#6"	19.1	50.8	88.9	168.1	08 119 109
4"#8"	25.4	57.2	114.3	218.9	08 119 110
6"#10"	44.5	120.7	168.1	273.1	08 119 112
8"#12"	50.8	173.0	218.9	323.9	08 119 113

Guardian Zone fitting Plain



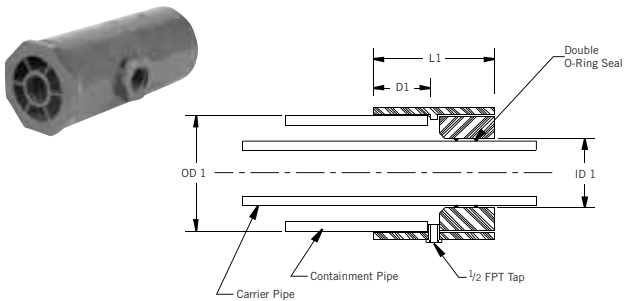
Carrier/Containment	ID1	OD1	L1	Z	Code
1/2"#2"	25	36	135	11	08 496 102
3/4"#3"	29	44	140	15	08 496 103
1"#3"	36	60	140	24	08 496 104
1 1/2"#4"	49	78	196	29	08 496 106
2"#4"	56	95	196	39	08 496 107
3"#6"	64	101	220	37	08 496 109
4"#8"	78	120	235	42	08 496 110

PVC/PVC Termination fitting EPDM Plain/O-Ring seal



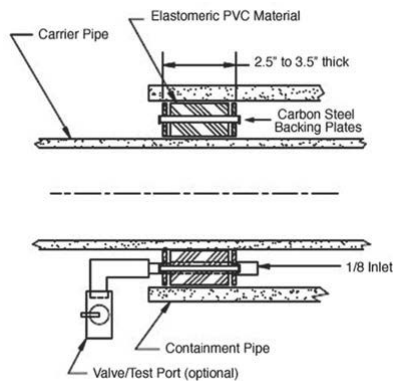
Carrier/Containment	L1	D1	ID1	OD1	Code
1/2"#2"	61.2	38.1	21.3	60.5	08 143 102
3/4"#3"	100.8	47.8	26.7	88.9	08 143 103
1"#3"	100.8	47.8	33.5	88.9	08 143 104
1 1/2"#4"	119.1	57.2	48.3	114.3	08 143 106
2"#4"	119.1	57.2	60.2	114.3	08 143 107
3"#6"	158.8	76.2	88.9	168.4	08 143 109
4"#8"	215.9	101.6	114.3	219.2	08 143 110

PVC/PVC Termination fitting FPM Plain/O-Ring seal



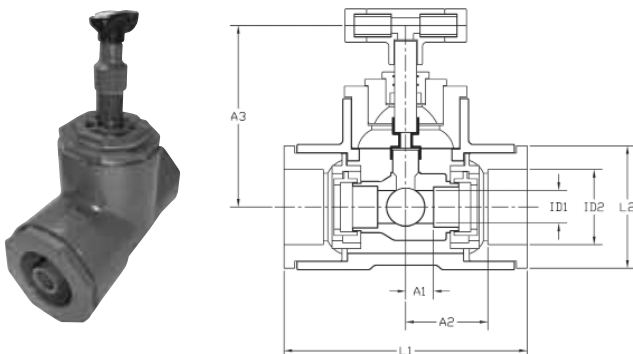
Carrier/Containment	L1	D1	ID1	OD1	Code
1/2"#2"	61.2	38.1	21.3	60.5	08 144 102
3/4"#3"	100.8	47.8	26.7	88.9	08 144 103
1"#3"	100.8	47.8	33.5	88.9	08 144 104
1 1/2"#4"	119.1	57.2	48.3	114.3	08 144 106
2"#4"	119.1	57.2	60.2	114.3	08 144 107
3"#6"	158.8	76.2	88.9	168.4	08 144 109
4"#8"	215.9	101.6	114.3	219.2	08 144 110

C-Style Termination fitting



Size	No of Bolts	Bolt Size	Max Torque	Code
6#10	6	5/16NC	10ft lbs	08 143 112
8#12	6	5/16NC	10ft lbs	08 143 113

PVC/PVC VKD valve Plain



Carrier/Containment	L1	L2	A3	ID1	ID2	Code
1/2"#2"	192	104	186	21.3	60.5	08 DKE 102
3/4"#3"	196	106	213	26.7	88.9	08 DKE 103
1"#3"	260	135	242	33.5	88.9	08 DKE 104
1 1/2"#4"	310	200	269	48.3	114.3	08 DKE 106
2"#4"	370	200	299	60.5	114.3	08 DKE 107
3"#6"	460	270	370	88.9	168.1	08 DKE 109
4"#8"	620	310	480	114.3	218.9	08 DKE 110

Option:

Available with FPM seals. To order use 08 DKF ***

CAUTION: Do not use or test the products in this manual with compressed air or other gases.

Guardian Leak Detection Kits

Standard leak detection kit Consisting of equal tee, bush, 1m clear PVC pipe and VXE Easyfit PVC ball valve



Description	Code
Leak detection tee kit to fit 2" OD containment pipe	08 191 107
Leak detection tee kit to fit 3" OD containment pipe	08 191 109
Leak detection tee kit to fit 4" OD containment pipe	08 191 110
Leak detection tee kit to fit 6" OD containment pipe	08 191 112
Leak detection tee kit to fit 8" OD containment pipe	08 191 113

Retrofit leak detection kit Consisting of clamp saddle, threaded socket, threaded adaptor, 1m clear PVC pipe and VXE Easyfit PVC ball valve

Description	Code
Leak detection saddle kit to fit 2" OD containment pipe	08 192 107
Leak detection saddle kit to fit 3" OD containment pipe	08 192 109
Leak detection saddle kit to fit 4" OD containment pipe	08 192 110
Leak detection saddle kit to fit 6" OD containment pipe	08 192 112
Leak detection saddle kit to fit 8" OD containment pipe	08 192 113

Leak Detection System

Durapipe Guardian dual contained pipework accepts many forms of leak detection equipment. Our technical support team can advise on your leak detection options. For all leak detection queries, please contact our technical support on +44(0)1543 272445.

Accessories

One-step solvent cement



Litres	gms	Code
0.5	500	03 462 395

Durapipe PVC-U solvent cement must be used for jointing of Durapipe PVC-U pipework systems.

Cleaner for use with HCR-36 Chemically resistant PVC cement



Description	Code
1/2 litre	03 467 395

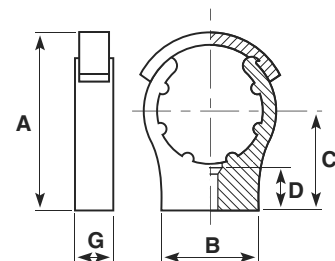
Eco-cleaner



Litres	gms	Code
0.5	500	03 457 395

Durapipe Eco-cleaner must be used for jointing of Durapipe PVC-U pipework systems.

Cobra pipe clips



HCR-36 Chemically resistant PVC cement



Description	Code
1 litre	03 468 396

Size	A	B	C	D	G	Bolt/Screw	gms	Code
2	102	60	60	19	21	M.6/0BA/ No 10	42	13 434 311
3	148	80	90	39	31	M.8	121	13 434 313
4	171	90	96	36	35	M.8	185	13 434 314
6	243	170	150	40	40	M.8	185	13 434 317

Durapipe UK Pipework Systems



ABS

- Ideal for chilled, potable and waste water
- Tough, durable, lightweight and fully approved
- Suitable for use from -40°C to +70°C
- Fully matched system of pipes, fittings and valves



Air-Line Xtra

- High performance thermoplastic pipework system for compressed air



Corzan

- Solvent weld thermoplastic pipe system for aggressive substances
- Designed specifically for use in highly corrosive conditions at temperatures up to 95°C
- Valves range available



Valves & Flow Control

- Manual and actuated flow control solutions
- For use with all Durapipe systems
- Lightweight and easy to install



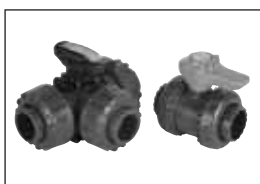
PLX

- Purpose designed for safe fuel transfer
- Suitable for pressure and vacuum applications
- Resists fuel permeation



Polypropylene

- Conveys chemicals at temperatures up to 100°C
- Excellent resistance to a wide range of substances
- Available in larger diameters up to 500mm
- Full range of valves



PVC-U

- Versatile, multi-purpose solvent weld pipework system with an extensive range of valves and fittings
- The established system for process and industrial handling of chemicals and water up to 60°C
- Guardian dual contained PVC-U pipework system



Vulcathene

- Safe chemical drainage
- Two easy jointing methods - Mechanical or Enfusion
- Ideal for schools, universities and colleges, hospitals and clinics, pharmaceutical and research organisations

DURAPIPE UK CONDITIONS OF SALE

1. **DEFINITIONS:**
'Seller' shall mean Glynwed Pipe Systems Limited, registered in England under number 1698059. 'Buyer' shall mean any company, organisation or individual to whom a quotation is offered, or whose order is accepted by the Seller.
2. **CONDITIONS:**
All offers, quotations, estimates, acceptances and contracts are subject to these Conditions of Business and any terms or conditions which any other person shall seek to impose or make part of any contract shall, so far as is inconsistent with these Conditions of Business, not apply unless expressly agreed by the Seller in writing. The headings in these conditions are for convenience only and shall not affect their interpretation.
3. **QUOTATIONS AND PRICE VARIATION:**
 - a) Any quotation given by the Seller is an invitation to the Buyer to make an offer only and no order of the Buyer placed with the Seller in pursuance of a quotation or otherwise shall be binding on the Seller unless and until it is accepted in writing by the Seller.
 - b) Unless stated otherwise, all quotations and published price lists are ex works, exclusive of VAT and shall remain valid for 30 days or such a period as may be quoted but nevertheless the Seller may amend or withdraw any quotation by written or oral notice. Quotations may be varied if the Buyer makes variations in his specifications.
 - c) Certain products are denoted 'MTO' in the Seller's published price lists. These products are Made to Order Goods and the Seller manufactures or procures these goods on a bespoke basis only. Where a Buyer has made an offer for 'MTO' products that the Seller has accepted in writing the Buyer forfeits their right to cancel their offer unless the Seller confirms in writing that it will accept cancellation by the Buyer. Where the Seller does not provide written confirmation of the Buyer's cancellation the Buyer remains liable for the full contractual value of all 'MTO' products.
4. **STATEMENTS OR REPRESENTATIONS TO THE BUYER:**
If any statement or representation has been made to the Buyer upon which the Buyer relies other than in the documents enclosed with the Seller's quotation, the Buyer must set out that statement or representation in a document to be attached to or endorsed on the order in which case the Seller may submit a new quotation.
5. **DELIVERY - TIME:**
 - a) Any period for delivery given at any time and in any manner by the Seller is an estimate only and is not binding on the Seller. Delivery periods are normally calculated from the later of:
 - i) acceptance of order; or
 - ii) where applicable, the receipt by the Seller of a detailed specification or drawings.
 - b) Time shall not be deemed to be of the essence of the contract. Failure by the Seller to meet any quoted delivery period for any part or the whole of the order shall not entitle the Buyer to rescind the contract or to claim damages of any nature.
 - c) The Seller will endeavour to comply with reasonable requests by the Buyer for postponement of delivery but shall be under no obligation to do so. Where delivery is postponed otherwise than due to default by the Seller the Buyer shall pay all costs and expenses including a reasonable charge for storage and transportation occasioned thereby and an extra charge for split delivery if applicable.
 - d) The Buyer will receive delivery of any consignment between the hours of 8.00am and 4.00pm Monday to Friday inclusive, unless otherwise agreed in writing. Cost incurred by the Seller arising from the Buyer's refusal to accept consignments within the agreed hours shall be borne by the Buyer.
6. **DELIVERY AND RISK:**
 - a) Except where stated to the contrary in the contract, delivery shall be made as follows:
 - i) where the Buyer provides the transport, delivery shall be made ex the Seller's works;
 - ii) where the Seller provides the transport, delivery shall be made to the premises of the Buyer, or the premises of the Buyer's customer or works site if the Buyer has requested delivery to be so made but where the Buyer has made such a request the Seller will make a first delivery to the Buyer's customer or works site as so much of the goods as is available for that delivery but subsequent deliveries will be made to the premises of the Buyer.
 - b) The Seller may at its discretion make partial delivery of orders and invoice the same.
 - c) Risk in the goods shall pass on delivery.
 - d) Where goods are sent FOB the Seller's responsibility shall cease when the goods are placed on board ship or aircraft without the need for the Seller to give notice to the Buyer and the provisions of Section 32(3) of the Sale of Goods Act 1979 shall not apply.
7. **OWNERSHIP OF GOODS:**
 - a) The goods shall remain the sole and absolute property of the Seller as legal and equitable owner until such time as the Buyer shall have paid to the Seller the contract price together with the full price of any other goods the subject of any contract between the Seller and the Buyer.
 - b) The Buyer acknowledges that until such time as the property in the goods passes to the Buyer he is in possession of the goods as a bailee and fiduciary agent for the Seller and the Purchaser shall store the goods in such a manner that they are clearly identifiable as the property of the Seller.
 - c) Until payment due under all contracts between the Buyer and the Seller has been made in full, in the event of sale of the goods by the Buyer:
 - i) the Seller shall be entitled to trace all proceeds of sale received by the Buyer through any bank or other account maintained by the Buyer; and
 - ii) the Buyer shall if requested by the Seller in writing to so assign its rights to recover the selling price of the goods from the third parties concerned. Such monies to be held separately by the Buyer as agent on behalf of the Seller.
 - d) The Seller may for the purpose of recovery of its goods enter upon any premises where they are stored or where they are reasonably thought to be stored and may repossess the same.
8. **TERMS OF PAYMENT:**
In the event of default in payment according to the agreed payment terms between the Seller and the Buyer – i.e. by the end of the month following the month of despatch of the goods the Seller shall be entitled without prejudice to any other right or remedy to suspend all further deliveries and to charge interest on any amount outstanding at the rate of 2% per month until payment in full is made (a part of a month being treated as a full month for the purpose of calculating interest).
9. **SHORTAGES AND DEFECTS APPARENT ON DELIVERY:**
 - a) It shall be the responsibility of the Buyer to inspect or arrange for an inspection of the goods on delivery whether the goods are delivered to the Buyer's premises or to the premises of the Buyer's customer or to a works site. If no such inspection is made the Buyer shall be deemed to have accepted the goods.
 - b) The Buyer shall have no claim for shortages or defects apparent on inspection unless:
 - i) a written complaint is made to the Seller within three days of receipt of the goods specifying the shortage or defect; and
 - ii) the Seller is within seven days of receipt of the complaint given an opportunity to inspect the goods and investigate the complaint before any use is made of the goods.
 - c) If a complaint is not made to the Seller as herein provided then in respect of such shortages or defects the goods shall be deemed to be in all respects in accordance with the contract and the Buyer shall be bound to pay for the same accordingly.
10. **CLAIMS FOR DEFECTS NOT APPARENT ON INSPECTION:**
 - a) The Buyer shall have no claim for defects not apparent on inspection unless the Seller is notified of defective workmanship or materials within twelve months from delivery of the goods. Provided that the goods have been installed and applied in accordance with any relevant recommendations made by the Seller, the Seller will at its option replace the goods or refund the net invoiced price in respect of the goods which have been shown to be defective. If the Seller does so supply substitute goods the Buyer shall be bound to accept such substituted goods in full satisfaction of the obligations of the Seller under the contract.
 - b) The Buyer shall in any event have no claim or set-off in respect of defects unless a written complaint is sent to the Seller as soon as the defect is noticed and no use is made of the goods thereafter or alteration made thereto by the Buyer before the Seller is given an opportunity to inspect the goods.
 - c) The Buyer is responsible for ensuring that the goods are fit for any particular purpose, and no warranty or condition of fitness for any particular purpose is to be implied into the contract.
11. **LIABILITY:**
Save as stated in Conditions 9 and 10 (and save in respect of death or personal injury resulting from the negligence of the Seller its servants or agents) the Seller shall not be liable for any claim or claims for direct or indirect consequential or incidental injury loss or damage made by the Buyer against the Seller whether in contract or in tort (including negligence on the part of the Seller its servants or agents) arising out of or in connection with any defect in the goods or their fitness or otherwise for any particular purpose or any act omission neglect or default of the Seller its servants or agents in the performance of the contract.
12. **FORCE MAJEURE:**
Notwithstanding anything herein contained neither the Buyer nor the Seller is to be held liable for any delay or failure to carry out the contract due wholly or in part to an act of God action by any Government whether British or foreign civil war strikes and/or lockouts wheresoever occurring fire trade disputes floods or unfavourable weather or any material becoming unavailable or irreplaceable (whether at all or at commercially acceptable prices) or any other circumstances beyond the control of the Seller.
13. **SUB-CONTRACTING:**
The Seller reserves the right to sub-contract the fulfilment of any order or any part thereof.
14. **INSOLVENCY AND BREACH OF CONTRACT:**
In the event that:
 - a) the Buyer commits any breach of the contract and fails to remedy such breach (if capable of remedy) within a period of thirty days from receipt of a notice in writing from the Seller requesting such remedy; or
 - b) any distress or execution is levied upon any of the goods or property of the Buyer; or
 - c) the Buyer offers to make any arrangements with or for the benefit of its creditors or (if an individual) becomes subject to a petition for a bankruptcy order or (being a limited company) has a receiver appointed of the whole or any part of its undertaking property or assets; or
 - d) an order is made or a resolution is passed or analogous proceedings are taken for the winding up of the Buyer (save for the purpose of reconstruction or amalgamation with insolvency and previously approved in writing by the Seller) the Seller shall thereupon be entitled without prejudice to its other rights hereunder forthwith to suspend all further deliveries until the default has been made good or to determine the contract and any unfulfilled part thereof or at the Seller's option to make partial deliveries. Notwithstanding any such termination the Buyer shall pay to the Seller at the contract rate for all the goods delivered up to and including the date of termination.
15. **INDUSTRIAL PROPERTY RIGHTS:**
If goods supplied by the Seller to the Buyer's design or specifications infringe or are alleged to infringe any patent or registered design right or copyright the Buyer will indemnify the Seller against all damages, costs and expenses incurred by the Seller as a result of the infringement or allegation. The Buyer will give the Seller all possible help in meeting any infringement claim brought against the Seller.
16. **BUYER'S ERROR IN ORDERING:**
In the event the Buyer orders incorrectly the Seller will be under no obligation to the Buyer to rectify or assist in rectifying the error.
17. **LAW AND JURISDICTION:**
The contract shall be subject in all respects to English Law and to the jurisdiction of the English Courts.

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