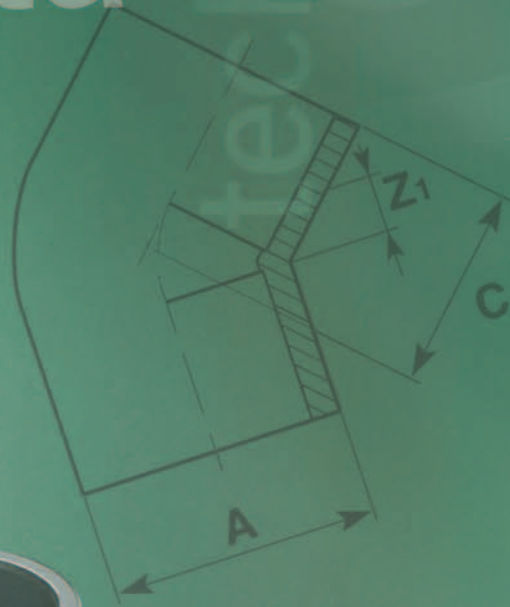




technical data

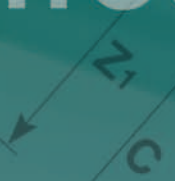


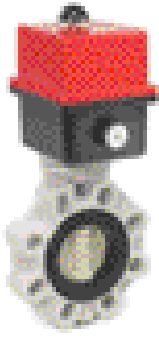
TECHNICAL DATA

 **Durapipe**
abs

Pipes and Fittings
Imperial and Metric Systems

technical data





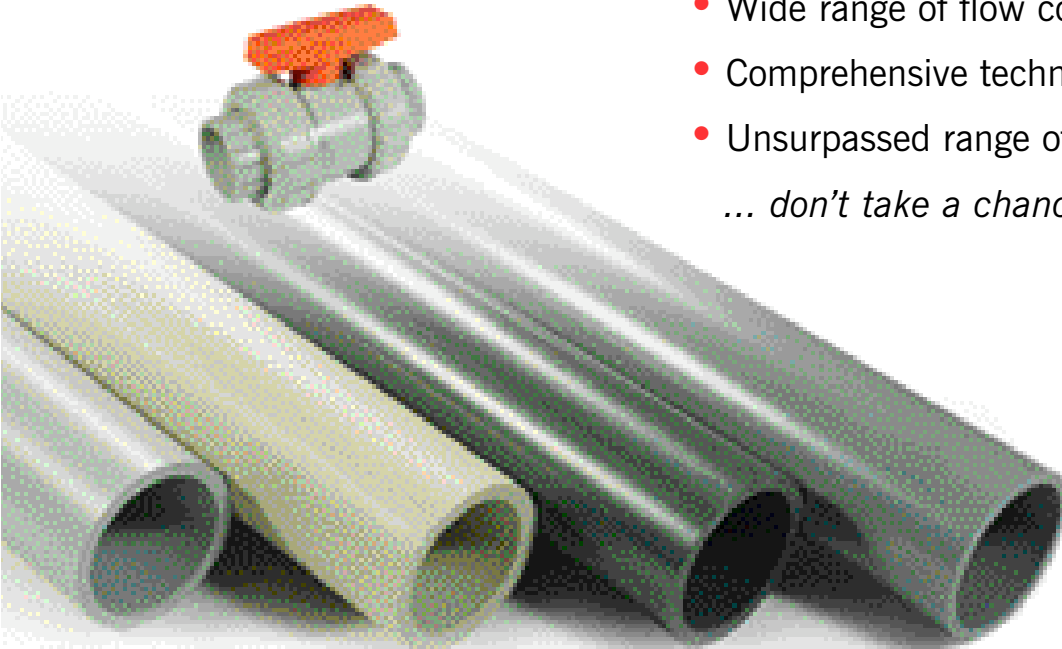
Durapipe

Complete system solutions

At the forefront of development and manufacture of thermoplastic pipework for over half a century, Durapipe pipe systems are widely used in industries around the world.

- Fully matched systems
- Wide range of flow controls
- Comprehensive technical support
- Unsurpassed range of approvals

... don't take a chance with any other brand



Durapipe abs

ideal for chilled, condensate and cold water systems

Durapipe pvc-u

Versatile general purpose pipework - the established material for handling of chemicals and water up to 60°C.

Durapipe corzan

Excellent resistance to acids, at temperatures up to 95°C.

Durapipe polypropylene

handles a wide range of aggressive chemicals at high temperature

NEW Flow X3 series

Ask for details of the new high performance Durapipe Flow X3 series. We offer a range of products typically used for flow sensing, batch control and blending and pump protection.



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Durapipe ABS The market leader in pipe systems for environmental control

Durapipe ABS - the proven industrial pipework system combining corrosion resistance, toughness and economy

Durapipe ABS offers tremendous advantages for low temperature fluid transportation:

- Fully integrated range of pipes, fittings and valves (manual and actuated)
- 50 year service life
- Installed costs reduced
- Non corrosible
- Low maintenance
- Robust and reliable
- Lightweight
- Tough and durable
- Ductile down to minus 40°C
- Exceptionally smooth bore
- No scaling
- Reduced noise compared to metal
- Fast and reliable jointing
- Low thermal conductivity

When considering environment control systems, cooling medium distribution pipework is of prime importance. The reliable containment and efficient movement of fluid in pipes is essential to every air conditioning system, from a self contained packaged unit to a full scale central plant scheme.

Installation cost

As well as influencing system performance, pipework accounts for a large proportion of the total installation cost making the right choice of pipes and pipe fittings vital. Durapipe ABS can help reduce installation costs.

Growing environmental concerns have led to the adoption of 'indirect cooling' practices by the environment control industry as well as manufacturers and installers of packaged air conditioning equipment.

Corrosion resistance

The inherent susceptibility to corrosion and thermal properties of metal piping materials such as copper and steel are often not suited to these arduous applications.

The corrosion resistance of the piping material is as important since the aqueous solutions used by such systems may be of a corrosive nature. These have highlighted the benefit of the corrosion resistance of Durapipe ABS piping systems. Growing economical and environmental pressures have also made Durapipe ABS piping the right choice.

Environment and Conservation

ABS can also be re-worked to avoid scrap. Additionally, the thermal properties of ABS, compared with those of metals, may result in cost savings in lagging.

Durapipe UK operates an environmental management system that has been successfully assessed against the BS EN ISO 14001 environmental management standard.



Applications

- Chilled water/air conditioning
- Water treatment
- Sewage treatment
- Process cooling water
- High purity water
- Effluent and chemical processing
- Film processing
- Electrolytic metal refining
- Food processing and soft drinks
- Pharmaceutical products
- Medical preparations
- Condensate discharge
- Cooling mediums
 - glycol solution
 - ice slurries
 - organic salt solutions



Major Users

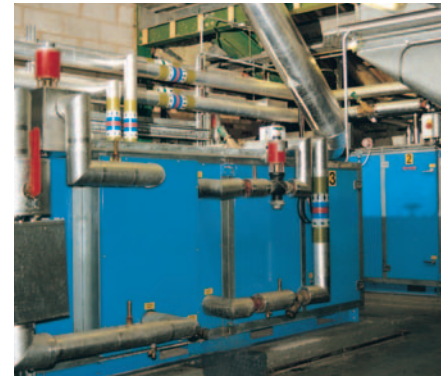
- Alstom
- Anglian Water
- Bank of Zambia
- Boots
- BP
- British Avionics
- British Embassy, Muscat
- British Energy
- BT
- Coca Cola
- DEFRA
- Deluxe Laboratories Limited
- DML
- Dunlop
- Elga/US Filter
- Ferranti
- Fisons
- Ford Motor Company
- General Motors
- Harrods
- Hilton Hotels
- Hyatt Regency Hotels
- ICI
- Kodak
- Manchester airport
- Marks & Spencer
- McDonalds
- National Air Traffic Control
- National Power
- Orange
- Palace of Justice (The Hague)
- Pedigree Pet Foods
- Pfizer
- Rank Organisation
- Rolls Royce
- J. Sainsbury plc
- Schipol Airport
- Science Research Centre
- Severn Trent Water
- Sony UK Limited
- Technicolor Limited
- Transco
- United Kingdom Atomic Energy Authority
- Wellcome



Supplementary Services

We offer the following supplementary services:

- Advice regarding use of all Durapipe products.
- Installed cost comparison.
- Product and application training seminars.



Technical Support

Our experience and expertise is at your disposal. Our Technical Support team will be pleased to offer you design and installation advice.

Availability

Durapipe ABS pipework is available from an extensive international network of distributors and stockists. Please ask for details of your nearest outlet.



Durapipe ABS

The material with many qualities

The large diversity of end uses makes Durapipe ABS one of the most successful thermoplastics available. ABS is a copolymer of Acrylonitrile, Butadiene and Styrene, blended to give unrivalled properties, and offering benefits over traditional materials for significant water pipework.

Acrylonitrile imparts chemical resistance ensuring the pipework does not corrode or scale. The Butadiene content endows the material with impact strength and toughness particularly at low temperatures, while the Styrene content contributes to lustre, hence extremely smooth bores, and also ensures the strength of the material.

Durapipe UK is the most experienced and successful ABS pipework systems manufacturer in the world.

The outstanding advantages of Durapipe ABS make it the market leader.

BSRIA Findings

- **Simplified installation technique**
- **Installation cost reduction of 43% over traditional methods**
- **Installation labour reduction of 60% over traditional methods**
- **Free product training by manufacturer**
- **Health and Safety risk reduced by:**
 - No hot works or threading machinery required
 - Lightweight
- **50 year service life - no corrosion**
- **Reduced hydraulic system resistance**
- **Reduced insulation thickness requirement**

Quality

Approvals

Durapipe ABS has a wide range of International approvals, see page 67 for further details.



Quality control

Our commitment to quality is reflected by our operation of an independently assessed quality management system registered under BS EN ISO 9001.



Certificate No. FM 34819

Durapipe ABS offers consistency, reliability and complete reassurance to designer, installer and end-user.

Design life

Durapipe ABS systems have a 50 year design life with a residual safety factor of 2:1

Tough and durable

The Butadiene constituent of ABS affords exceptional resistance to accidental damage, a benefit which it retains, even at sub-zero temperatures.

Abrasion resistance

Durapipe ABS offers good resistance to abrasion and erosion from aggressive slurries.

Non toxic

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

No metallic stabilisers

Durapipe ABS does not contain any harmful metallic stabilisers, and is widely used to convey high purity de-ionised water in semi-conductor and pharmaceutical applications.

Fracture mode

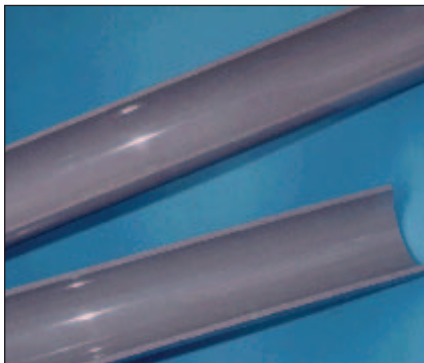
Durapipe ABS is a ductile material, and remains ductile down to minus 40°C. Impact damage is usually confined to scuffs or dents. In severe cases there may be ductile tearing of the material.

In contrast, PVC-U and PVC-C are much less ductile, particularly at temperatures below +5°C. A sufficiently hard impact can cause them to fragment.



ABS

PVC-U



Smooth bore, unhibited flow

Superior flow

Low fluid friction allows higher flow velocities than metal pipes, and also inhibits the formation of scale, with consequent savings in pump energy consumption, and reduced pressure drops.



Durapipe ABS resists the limescale build-up common in most metal pipe materials as shown in the picture above.

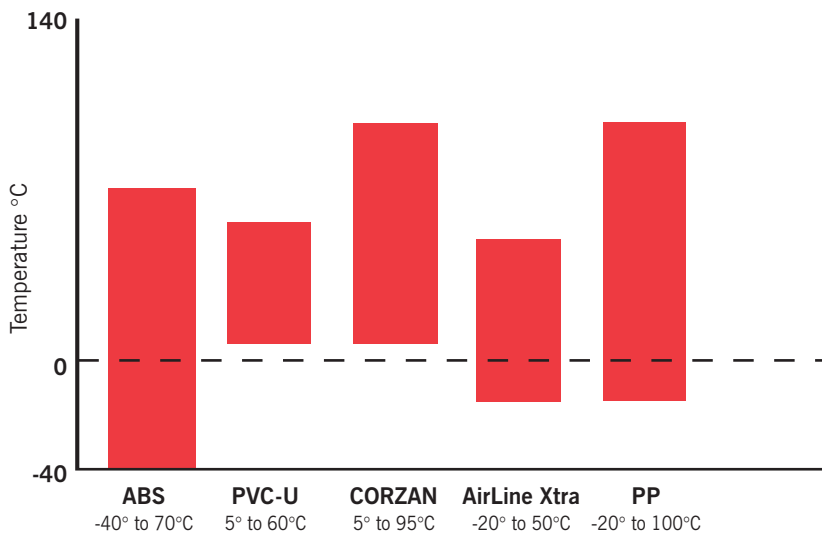


Durapipe ABS, unlike copper or steel, is free from corrosion.

Corrosion free

Durapipe ABS pipework is designed to handle a wide range of chemicals including moderately strong mineral acids and caustic solutions. Please refer to brochure D0238 Durapipe Chemical Resistance Data for further details.

Comparative temperature ranges



Wide temperature range

A major advantage of Durapipe ABS over other plastic systems is its ability to perform over a wide temperature range from -40°C to +70°C. (Note: usual precautions must be taken to prevent contents freezing.)

Low installed costs

The ease of handling and speed of jointing of Durapipe ABS will generally result in the total installed cost being lower than for threaded, welded, or soldered metal systems.

Extensive product range

The Durapipe ABS range comprises an extensive selection of Imperial and Metric pipes in various pressure ratings, plus a wide selection of fittings.

Fast, simple, 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 or equipment, or hot works permits, are required.

- No electricity required
- No flame or combustible gas bottles required on site
- No site down-time due to electricity shut down
- No hot works permits or need for site segregation
- Permanent, secure jointing
- No special tools needed
- Easy transition to other systems
- Reduced installation time
- Reduced installation costs
- Light and easy to handle

Lightweight

At one-sixth the weight of steel pipes, Durapipe ABS is much easier to handle, especially during installation at site.



Flow Control

Durapipe FIP expertise and experience

- System design and sizing advice
- Product selection advice
- Full quality assurance to BS EN ISO 9001
- Complete actuation traceability - each item carries an individual serial number

Durapipe FIP service

- Most valves are available within 48 hours of ordering

Fully complies with PED

The European Parliament Pressure Equipment Directive 97/23/EC requires that pressure equipment should meet essential safety requirements (including design, manufacture and testing) and must satisfy an appropriate conformity procedure.

Durapipe FIP fully complies with these requirements and operates within a full Quality Assurance system to ISO 9001.

For full technical details about Durapipe FIP valves and actuation please ask for a copy of our manual and actuated valve technical guide D0894.

Wide range of valves and actuation

The Durapipe valve range is comprehensive, including many commonly required flow control products. This includes ball, butterfly, diaphragm, non-return, solenoid and air release types and is complemented by pneumatic or electrical actuation. Importantly, we have a department dedicated to valves and actuation, able to provide expert advice about product selection and system design.

Flow control

Durapipe UK offers a wide range of flow control equipment for incorporation into matched Durapipe systems.

Comprehensive details are contained in our two product range CDs - Modern Pipework Solutions for Building Services and Complete System Solutions (for industrial applications).



Index to ABS Imperial Fittings

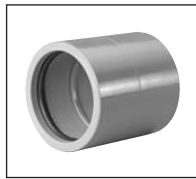
Note: Two-dimensional Auto-CAD drawings are available on www.durapipe.co.uk



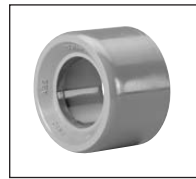
Pipe (plain)
page 10



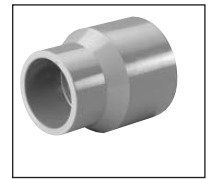
Sockets (plain)
page 11



'O' ring sockets (plain)
page 11



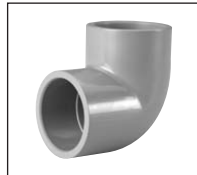
Reducing bushes
(plain)
page 11



Reducing sockets
(plain)
page 12



Elbows 45° (plain)
page 12



Elbows 90° (plain)
page 12



Tees 45° (plain)
page 12



Tees 90° (plain)
page 13



Tees 90° (swept plain)
page 13



Tees 90° (reducing)
page 13



Bends 22½°
long radius (plain)
page 13



Bends 45°
page 14



Bends 90°
long radius (plain)
page 14



Bends 90°
short radius (plain)
page 14



Saddles (plain)
page 15



Caps (plain)
page 15



Socket unions (plain)
page 15



Imperial/Metric socket
adaptors (plain)
page 16



Sockets
(plain/threaded)
page 16



Reducing bushes
(plain/threaded)
page 16



Elbows 90°
(plain/threaded)
page 17



Adaptors female
(plain/threaded)
page 17



Hexagon nipples male
(plain/threaded)
page 17



Adaptors male
(plain/threaded)
page 18



Barrel nipples
(plain/threaded)
page 18



Hose adaptors
(threaded)
page 18



Tank connectors
(plain/threaded)
page 19



Composite unions
female brass
page 19



Composite unions
male brass
page 19



Sockets (threaded)
page 19



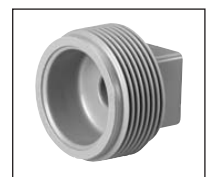
Reducing bushes
(threaded)
page 20



Elbows 90° (threaded)
page 20



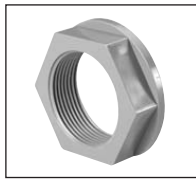
End caps (threaded)
page 20



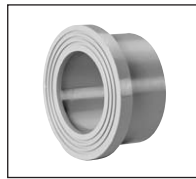
Plugs (threaded)
page 20



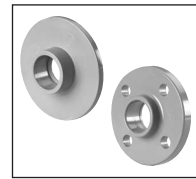
Hexagon nipples (threaded)
page 21



Back nuts (threaded)
page 21



Flanges stub serrated
page 21



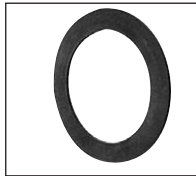
Flanges full face (plain/drilled)
pages 22



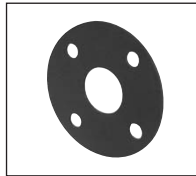
Flanges blanking (drilled and undrilled)
pages 23



Backing rings
page 24



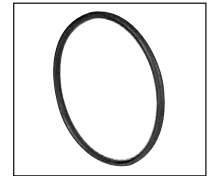
Gaskets flat
page 25



Gaskets full face
page 25



Valve support plates
page 26



'O' rings
page 26

VALVES



VK Double union ball valves (manual)
page 27



VKD Double union ball valves (manual)
page 27



EV Double union ball valves (manual)
page 27



ML/MT/MC Multiport ball valves
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SR Single union ball check valves
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VA Air release valves
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RV Y Type strainers
page 29



VM Diaphragm valves
page 29



PR Pressure relief valves
page 30



FK Butterfly valves
page 30

For details of our full range of manual and actuated valves please ask for a copy of Valves Technical Catalogue D0894



One-step solvent cement and Eco-cleaner
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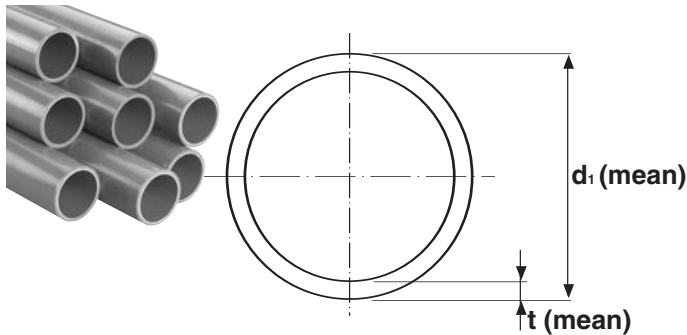


Cobra clips
page 31



Saddle clips
page 31

ABS Pipe Imperial System plain



Class B 87psig (6 bar)

| Size | Mean OD d_1 | Thickness t (mm) | Length (m) | Weight kg/m | Code |
|------|------------------|--------------------------|---------------|----------------|------------|
| 10 | 273.1 | 11.1 | 6 | 9.50 | 01 510 114 |
| 12 | 323.9 | 13.1 | 6 | 13.30 | 01 510 115 |

Class C 130psig (9 bar)

| Size | Mean OD d_1 | Thickness t (mm) | Length (m) | Weight kg/m | Code |
|------|------------------|--------------------------|---------------|----------------|------------|
| 1 | 33.6 | 2.0 | 6 | 0.21 | 01 511 104 |
| 1¼ | 42.2 | 2.5 | 6 | 0.32 | 01 511 105 |
| 1½ | 48.3 | 2.8 | 6 | 0.42 | 01 511 106 |
| 2 | 60.3 | 3.6 | 6 | 0.67 | 01 511 107 |
| 2½ | 75.2 | 5.0 | 5 | 1.14 | 11 555 312 |
| 3 | 88.9 | 5.2 | 6 | 1.40 | 01 511 109 |
| 4 | 114.3 | 6.6 | 6 | 2.32 | 01 511 110 |
| 5 | 140.2 | 9.3 | 5 | 3.97 | 11 555 316 |
| 6 | 168.3 | 9.9 | 6 | 5.12 | 01 511 112 |
| 8 | 219.1 | 12.7 | 6 | 8.57 | 01 511 113 |

* Note - 2½" & 5" pipes dimensionally compatible with 75mm and 140mm PN10 Metric series and are manufactured in accordance with the general requirements of DIN 8061/8062.

Class D 173psig (12 bar)

| Size | Mean OD d_1 | Thickness t (mm) | Length (m) | Weight kg/m | Code |
|------|------------------|--------------------------|---------------|----------------|------------|
| 6 | 168.3 | 12.8 | 6 | 6.50 | 01 512 112 |

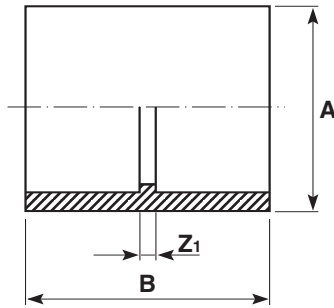
Class E 217psig (15 bar)

| Size | Mean OD d_1 | Thickness t (mm) | Length (m) | Weight kg/m | Code |
|------|------------------|--------------------------|---------------|----------------|------------|
| ¾ | 17.1 | 1.7 | 6 | 0.09 | 01 513 101 |
| ½ | 21.4 | 2.0 | 6 | 0.13 | 01 513 102 |
| ¾ | 26.7 | 2.5 | 6 | 0.20 | 01 513 103 |
| 1 | 33.6 | 3.1 | 6 | 0.31 | 01 513 104 |
| 1¼ | 42.2 | 3.9 | 6 | 0.49 | 01 513 105 |
| 1½ | 48.3 | 4.5 | 6 | 0.64 | 01 513 106 |
| 2 | 60.3 | 5.6 | 6 | 1.00 | 01 513 107 |
| 3 | 88.9 | 8.3 | 6 | 2.16 | 01 513 109 |
| 4 | 114.3 | 10.6 | 6 | 3.59 | 01 513 110 |

Class T 173 psig (12 bar after threading)

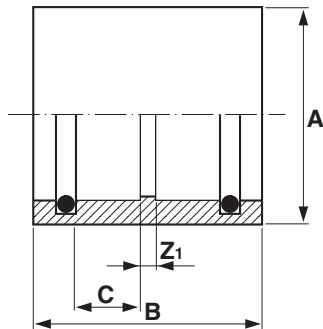
| Size | Mean OD d_1 | Thickness t (mm) | Length (m) | Weight kg/m | Code |
|------|------------------|--------------------------|---------------|----------------|------------|
| ¾ | 17.1 | 3.5 | 6 | 0.16 | 01 514 101 |
| ½ | 21.4 | 3.6 | 6 | 0.22 | 01 514 102 |
| ¾ | 26.7 | 3.6 | 6 | 0.28 | 01 514 103 |
| 1 | 33.6 | 4.3 | 6 | 0.43 | 01 514 104 |
| 1¼ | 42.2 | 5.3 | 6 | 0.65 | 01 514 105 |
| 1½ | 48.3 | 6.0 | 6 | 0.85 | 01 514 106 |
| 2 | 60.3 | 7.2 | 6 | 1.28 | 01 514 107 |

Sockets plain



| Size | PN | A | B | Z ₁ | gms | Code |
|-------|----|-----|-----|----------------|------|------------|
| 3/8 | 15 | 21 | 32 | 2 | 4 | 01 100 101 |
| 1/2 | 15 | 26 | 38 | 2 | 6 | 01 100 102 |
| 3/4 | 15 | 32 | 43 | 3 | 12 | 01 100 103 |
| 1 | 15 | 41 | 50 | 3 | 24 | 01 100 104 |
| 1 1/4 | 15 | 52 | 60 | 4 | 41 | 01 100 105 |
| 1 1/2 | 15 | 60 | 66 | 2 | 62 | 01 100 106 |
| 2 | 15 | 74 | 78 | 4 | 114 | 01 100 107 |
| 2 1/2 | 10 | 88 | 94 | 4 | 230 | 11 100 312 |
| 3 | 15 | 108 | 104 | 4 | 355 | 01 100 109 |
| 4 | 15 | 136 | 135 | 5 | 595 | 01 100 110 |
| 5 | 10 | 171 | 163 | 7 | 1390 | 11 100 316 |
| 6 | 12 | 201 | 191 | 9 | 2269 | 01 100 112 |
| 8 | 9 | 257 | 249 | 11 | 3668 | 01 100 113 |

'O' ring sockets



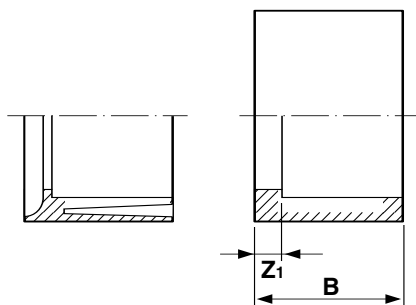
| Size | PN | A | B | C | Z ₁ | Pressure | | gms | Code |
|------|----|-----|-----|----|----------------|----------|--|------|------------|
| | | | | | | Class | | | |
| 2 | 12 | 74 | 78 | 27 | 4 | D | | 111 | 01 305 107 |
| 3 | 12 | 108 | 104 | 37 | 4 | D | | 359 | 01 305 109 |
| 4 | 12 | 136 | 132 | 49 | 6 | D | | 616 | 01 305 110 |
| 6 | 9 | 201 | 191 | 74 | 8 | C | | 2353 | 01 305 112 |
| 8 | 6 | 255 | 248 | 94 | 14 | B | | 3229 | 01 305 113 |

'O' rings EPDM

Not end-load resistant

For buried use as temporary repair only

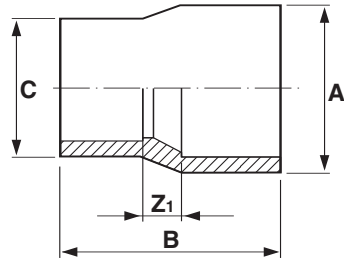
Reducing bushes plain



| Size | PN | B | Z ₁ | gms | Code |
|---------------|----|-----|----------------|------|------------|
| 1/2 x 3/8 | 15 | 17 | 2 | 7 | 01 109 121 |
| 3/4 x 1/2 | 15 | 20 | 3 | 8 | 01 109 122 |
| 1 x 1/2 | 15 | 23 | 6 | 23 | 01 109 123 |
| 1 x 3/4 | 15 | 24 | 4 | 15 | 01 109 124 |
| *1 1/4 x 1/2 | 15 | 28 | 12 | 21 | 01 109 116 |
| *1 1/4 x 3/4 | 15 | 28 | 8 | 24 | 01 109 117 |
| 1 1/4 x 1 | 15 | 28 | 5 | 20 | 01 109 125 |
| *1 1/2 x 1/2 | 15 | 30 | 13 | 26 | 01 109 118 |
| *1 1/2 x 3/4 | 15 | 30 | 10 | 37 | 01 109 119 |
| *1 1/2 x 1 | 15 | 30 | 7 | 40 | 01 109 126 |
| 1 1/2 x 1 1/4 | 15 | 31 | 4 | 19 | 01 109 127 |
| *2 x 3/4 | 15 | 38 | 15 | 45 | 01 109 120 |
| *2 x 1 | 15 | 38 | 15 | 45 | 01 109 128 |
| *2 x 1 1/4 | 15 | 38 | 11 | 57 | 01 109 129 |
| 2 x 1 1/2 | 15 | 37 | 7 | 42 | 01 109 130 |
| 2 1/2 x 2 | 15 | 44 | 8 | 75 | 01 109 131 |
| *3 x 1 1/2 | 15 | 51 | 21 | 130 | 01 109 134 |
| *3 x 2 | 15 | 51 | 15 | 178 | 01 109 135 |
| 3 x 2 1/2 | 15 | 50 | 6 | 126 | 01 109 136 |
| *4 x 3 | 15 | 65 | 12 | 277 | 01 109 141 |
| 5 x 4 | 15 | 78 | 15 | 413 | 01 329 142 |
| *6 x 4 | 12 | 93 | 27 | 666 | 01 109 147 |
| 6 x 5 | 15 | 90 | 13 | 641 | 01 329 148 |
| *8 x 6 | 9 | 110 | 23 | 1185 | 01 109 152 |

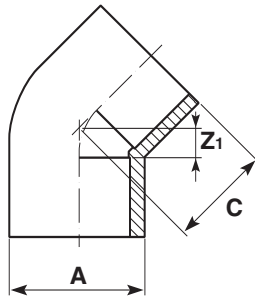
*Relief configuration (see drawing insert)

Reducing sockets



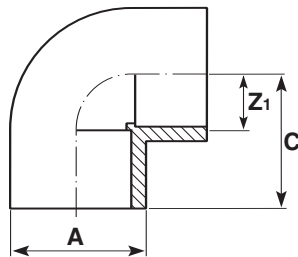
| Size | PN | A | B | C | Z ₁ | gms | Code |
|---------------|----|-----|-----|-----|----------------|------|------------|
| 3/4 x 1/2 | 15 | 32 | 44 | 26 | 7 | 11 | 01 114 122 |
| 1 x 3/4 | 15 | 41 | 53 | 33 | 9 | 19 | 01 114 124 |
| 1 1/4 x 1 | 15 | 52 | 63 | 41 | 10 | 39 | 01 114 125 |
| 1 1/2 x 1 1/4 | 15 | 59 | 68 | 51 | 8 | 58 | 01 114 127 |
| 2 x 1 1/2 | 15 | 74 | 82 | 59 | 12 | 100 | 01 114 130 |
| 3 x 2 | 15 | 108 | 114 | 75 | 26 | 320 | 01 114 135 |
| 4 x 3 | 15 | 136 | 136 | 108 | 20 | 558 | 01 114 141 |
| 6 x 4 | 12 | 205 | 213 | 140 | 55 | 1975 | 01 114 147 |
| 8 x 6 | 9 | 256 | 263 | 198 | 50 | 3410 | 01 114 152 |

Elbows 45° plain



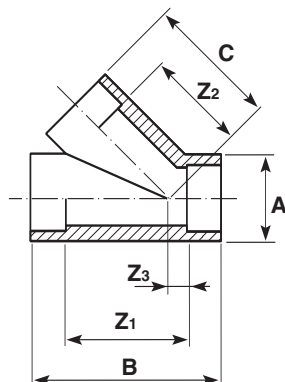
| Size | PN | A | C | Z ₁ | gms | Code |
|-------|----|-----|-----|----------------|------|------------|
| 3/8 | 15 | 21 | 20 | 6 | 8 | 01 119 101 |
| 1/2 | 15 | 27 | 26 | 8 | 9 | 01 119 102 |
| 3/4 | 15 | 33 | 33 | 12 | 15 | 01 119 103 |
| 1 | 15 | 41 | 37 | 13 | 25 | 01 119 104 |
| 1 1/4 | 15 | 52 | 44 | 15 | 59 | 01 119 105 |
| 1 1/2 | 15 | 60 | 50 | 18 | 86 | 01 119 106 |
| 2 | 15 | 82 | 66 | 27 | 160 | 01 119 107 |
| 2 1/2 | 10 | 90 | 63 | 17 | 300 | 11 119 312 |
| 3 | 15 | 112 | 94 | 40 | 750 | 01 119 109 |
| 4 | 15 | 139 | 115 | 50 | 1300 | 01 119 110 |
| 5 | 10 | 173 | 115 | 37 | 1980 | 11 119 316 |
| 6 | 12 | 198 | 134 | 41 | 2390 | 01 119 112 |
| 8 | 9 | 259 | 182 | 65 | 5620 | 01 119 113 |

Elbows 90° plain



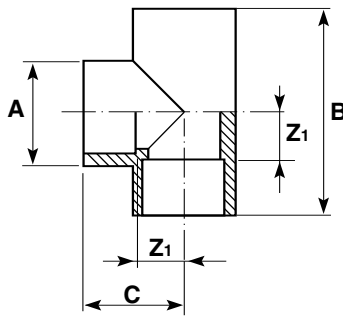
| Size | PN | A | C | Z ₁ | gms | Code |
|-------|----|-----|-----|----------------|------|------------|
| 3/8 | 15 | 21 | 24 | 9 | 6 | 01 115 101 |
| 1/2 | 15 | 26 | 29 | 12 | 11 | 01 115 102 |
| 3/4 | 15 | 32 | 34 | 14 | 19 | 01 115 103 |
| 1 | 15 | 41 | 41 | 17 | 35 | 01 115 104 |
| 1 1/4 | 15 | 52 | 49 | 21 | 70 | 01 115 105 |
| 1 1/2 | 15 | 60 | 56 | 26 | 101 | 01 115 106 |
| 2 | 15 | 74 | 68 | 31 | 191 | 01 115 107 |
| 2 1/2 | 10 | 90 | 83 | 38 | 385 | 11 115 312 |
| 3 | 15 | 111 | 104 | 52 | 720 | 01 115 109 |
| 4 | 15 | 141 | 130 | 65 | 1505 | 01 115 110 |
| 5 | 10 | 173 | 153 | 76 | 2390 | 11 115 316 |
| 6 | 12 | 203 | 175 | 85 | 4075 | 01 115 112 |
| 8 | 9 | 256 | 251 | 112 | 6900 | 01 115 113 |

Tees 45° plain



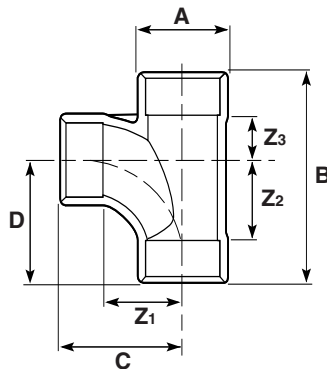
| Size | PN | A | B | C | Z ₁ | Z ₂ | Z ₃ | gms | Code |
|-------|----|----|-----|-----|----------------|----------------|----------------|-----|------------|
| 1/2 | 9 | 28 | 68 | 44 | 34 | 27 | 7 | 30 | 01 128 102 |
| 3/4 | 9 | 33 | 81 | 52 | 41 | 32 | 8 | 45 | 01 128 103 |
| 1 | 9 | 41 | 97 | 63 | 49 | 39 | 9 | 80 | 01 128 104 |
| 1 1/4 | 9 | 50 | 117 | 80 | 61 | 52 | 10 | 194 | 01 128 105 |
| 1 1/2 | 9 | 60 | 140 | 97 | 80 | 67 | 12 | 298 | 01 128 106 |
| 2 | 9 | 74 | 170 | 113 | 90 | 73 | 15 | 546 | 01 128 107 |

Tees 90° plain



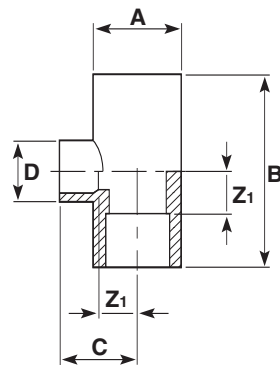
| Size | PN | A | B | C | Z ₁ | gms | Code |
|-------|----|-----|-----|-----|----------------|------|------------|
| 3/8 | 15 | 21 | 49 | 25 | 10 | 7 | 01 122 101 |
| 1/2 | 15 | 26 | 58 | 29 | 11 | 13 | 01 122 102 |
| 3/4 | 15 | 32 | 69 | 34 | 15 | 23 | 01 122 103 |
| 1 | 15 | 41 | 83 | 42 | 19 | 43 | 01 122 104 |
| 1 1/4 | 15 | 52 | 101 | 50 | 23 | 92 | 01 122 105 |
| 1 1/2 | 15 | 59 | 113 | 53 | 25 | 133 | 01 122 106 |
| 2 | 15 | 74 | 137 | 70 | 31 | 249 | 01 122 107 |
| 2 1/2 | 10 | 90 | 172 | 87 | 36 | 510 | 11 122 312 |
| 3 | 15 | 113 | 204 | 105 | 44 | 926 | 01 122 109 |
| 4 | 15 | 143 | 244 | 121 | 54 | 1960 | 01 122 110 |
| 5 | 10 | 172 | 307 | 153 | 72 | 3200 | 11 122 316 |
| 6 | 12 | 205 | 355 | 175 | 88 | 4449 | 01 122 112 |
| 8 | 9 | 257 | 468 | 240 | 100 | 9600 | 01 122 113 |

Tees 90° swept plain



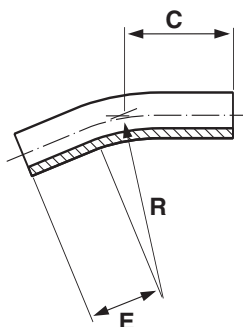
| Size | PN | A | B | C | D | Z ₁ | Z ₂ | Z ₃ | gms | Code |
|-------|----|-----|-----|-----|-----|----------------|----------------|----------------|------|------------|
| 1 | 9 | 41 | 115 | 79 | 79 | 57 | 57 | 14 | 85 | 01 148 104 |
| 1 1/2 | 9 | 62 | 160 | 105 | 105 | 74 | 74 | 24 | 285 | 01 148 106 |
| 2 | 9 | 78 | 195 | 125 | 125 | 87 | 87 | 32 | 515 | 01 148 107 |
| 2 1/2 | 9 | 92 | 210 | 125 | 125 | 81 | 81 | 41 | 601 | 11 148 312 |
| 4 | 9 | 139 | 315 | 190 | 190 | 127 | 127 | 62 | 2080 | 01 148 110 |

Tees 90° reducing



| Size | PN | A | B | C | D | Z ₁ | gms | Code |
|-----------|----|----|----|----|----|----------------|-----|------------|
| 3/4 x 1/2 | 15 | 32 | 64 | 32 | 26 | 17 | 22 | 01 124 122 |
| 1 x 1/2 | 15 | 40 | 70 | 36 | 26 | 17 | 40 | 01 124 123 |
| 1 x 3/4 | 15 | 40 | 76 | 38 | 32 | 20 | 41 | 01 124 124 |

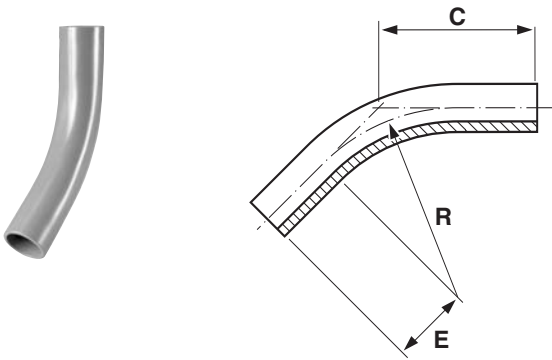
Bends 22 1/2° long radius



| Size | PN | C | E | R | gms | Code |
|-------|----|-----|-----|------|-------|------------|
| 1 | 15 | 76 | 38 | 102 | 46 | 01 311 104 |
| 1 1/2 | 15 | 110 | 57 | 152 | 143 | 01 311 106 |
| 2 | 15 | 113 | 73 | 203 | 274 | 01 311 107 |
| 2 1/2 | 15 | 172 | 112 | 300 | 319 | 11 311 312 |
| 3 | 15 | 202 | 114 | 305 | 857 | 01 311 109 |
| 4 | 15 | 262 | 152 | 407 | 1886 | 01 311 110 |
| 5 | 10 | 322 | 210 | 560 | 2513 | 11 311 316 |
| 6 | 12 | 385 | 229 | 610 | 5154 | 01 311 112 |
| 8 | 9 | 503 | 305 | 812 | 8962 | 01 311 113 |
| 10 | 6 | 711 | 508 | 1016 | 15607 | 01 311 114 |
| 12 | 6 | 750 | 508 | 1220 | 19702 | 01 311 115 |

Tolerance on angle ±3°

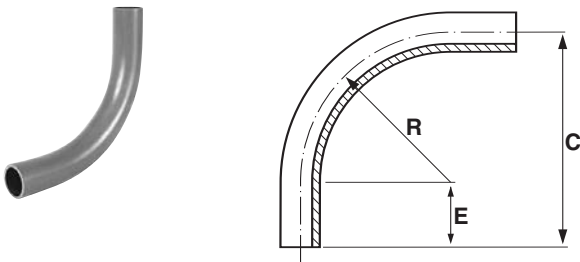
Bends 45° long radius plain



| Size | PN | C | E | R | gms | Code |
|------|----|------|-----|------|-------|------------|
| 1 | 15 | 75 | 37 | 102 | 51 | 01 310 104 |
| 1½ | 15 | 113 | 55 | 152 | 156 | 01 310 106 |
| 2 | 15 | 152 | 73 | 203 | 322 | 01 310 107 |
| 2½ | 15 | 300 | 113 | 300 | 429 | 11 310 312 |
| 3 | 15 | 238 | 121 | 305 | 1100 | 01 310 109 |
| 4 | 15 | 300 | 145 | 407 | 2290 | 01 310 110 |
| 5 | 10 | 512 | 280 | 560 | 5315 | 11 310 316 |
| 6 | 12 | 440 | 218 | 610 | 6290 | 01 310 112 |
| 8 | 9 | 592 | 280 | 812 | 11440 | 01 310 113 |
| 10 | 6 | 940 | 520 | 1016 | 20289 | 01 310 114 |
| 12 | 6 | 1030 | 520 | 1220 | 26348 | 01 310 115 |

Tolerance on angle $\pm 3^\circ$

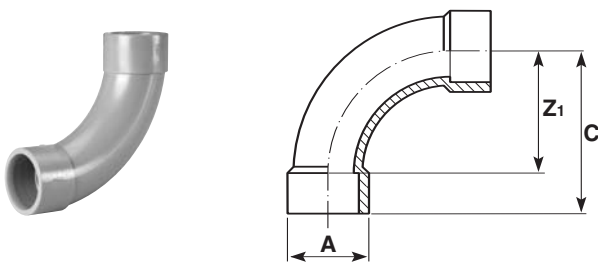
Bends 90° long radius plain



| Size | PN | C | E | R | gms | Code |
|------|----|------|-----|------|-------|------------|
| 3 | 15 | 403 | 98 | 305 | 1535 | 01 309 109 |
| 4 | 15 | 545 | 138 | 407 | 3440 | 01 309 110 |
| 5 | 10 | 840 | 280 | 560 | 6696 | 11 309 316 |
| 6 | 12 | 817 | 207 | 610 | 9430 | 01 309 112 |
| 8 | 9 | 1174 | 362 | 812 | 19070 | 01 309 113 |
| 10 | 6 | 1550 | 534 | 1016 | 29372 | 01 309 114 |
| 12 | 6 | 1754 | 534 | 1220 | 39305 | 01 309 115 |

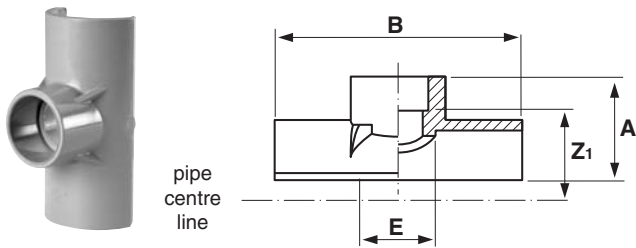
Tolerance on angle $\pm 3^\circ$

Bends 90° short radius plain



| Size | PN | A | C | Z ₁ | gms | Code |
|------|----|-----|-----|----------------|------|------------|
| ½ | 15 | 26 | 56 | 43 | 20 | 01 118 102 |
| ¾ | 15 | 33 | 65 | 45 | 45 | 01 118 103 |
| 1 | 15 | 40 | 85 | 63 | 65 | 01 118 104 |
| 1¼ | 15 | 51 | 108 | 81 | 130 | 01 118 105 |
| 1½ | 15 | 62 | 134 | 102 | 290 | 01 118 106 |
| 2 | 15 | 73 | 165 | 126 | 560 | 01 118 107 |
| 2½ | 10 | 93 | 195 | 150 | 810 | 11 118 312 |
| 3 | 15 | 111 | 226 | 172 | 1445 | 01 118 109 |
| 4 | 15 | 140 | 280 | 216 | 2400 | 01 118 110 |

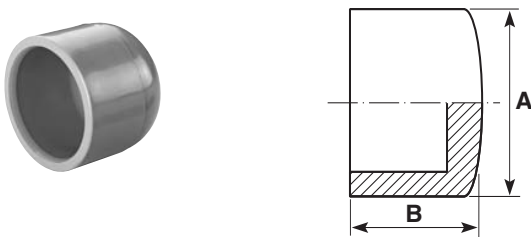
Saddles plain



| Size | PN | A | B | E | Z ₁ | gms | Code |
|--------|----|----|-----|----|----------------|-----|------------|
| 2 x 1¼ | 15 | 60 | 136 | 48 | 33 | 90 | 01 126 129 |
| 3 x 1½ | 15 | 76 | 140 | 60 | 46 | 158 | 01 126 134 |
| 4 x 2 | 15 | 95 | 140 | 74 | 58 | 230 | 01 126 140 |
| 6 x 2 | 15 | 71 | 154 | 73 | 86 | 225 | 01 126 146 |

Two saddles can be mounted diametrically opposite

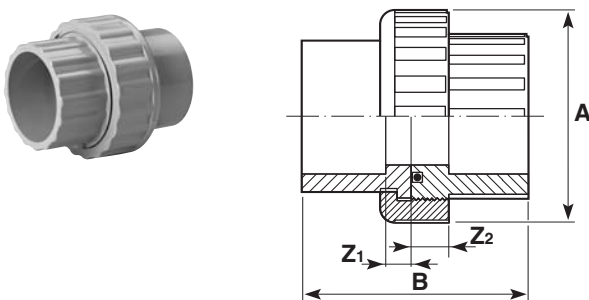
Caps plain



| Size | PN | A | B | gms | Code |
|------|----|-----|----|-----|------------|
| ¾ | 15 | 21 | 17 | 3 | 01 140 101 |
| ½ | 15 | 26 | 22 | 5 | 01 140 102 |
| ¾ | 15 | 32 | 25 | 9 | 01 140 103 |
| 1 | 15 | 40 | 30 | 20 | 01 140 104 |
| 1¼ | 15 | 52 | 35 | 33 | 01 140 105 |
| 1½ | 15 | 59 | 39 | 48 | 01 140 106 |
| 2 | 15 | 74 | 47 | 90 | 01 140 107 |
| *2½ | 10 | 94 | 59 | 180 | 11 149 312 |
| 3 | 15 | 109 | 65 | 268 | 01 140 109 |
| 4 | 15 | 136 | 84 | 465 | 01 140 110 |

Design changes to domed end are in progress.
Please check for up-to-date details.

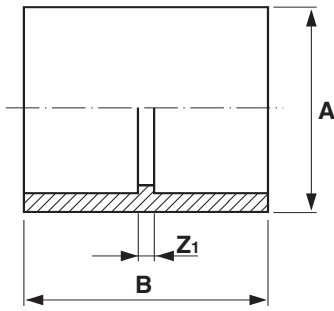
Socket unions plain



| Size | PN | A | B | Z ₁ | Z ₂ | gms | Code |
|------|----|-----|-----|----------------|----------------|------|------------|
| ¾ | 15 | 39 | 44 | 5 | 10 | 25 | 01 205 101 |
| ½ | 15 | 43 | 49 | 5 | 10 | 36 | 01 205 102 |
| ¾ | 15 | 51 | 55 | 5 | 10 | 51 | 01 205 103 |
| 1 | 15 | 64 | 65 | 7 | 12 | 86 | 01 205 104 |
| 1¼ | 15 | 72 | 77 | 10 | 14 | 122 | 01 205 105 |
| 1½ | 15 | 79 | 92 | 13 | 16 | 160 | 01 205 106 |
| 2 | 15 | 102 | 112 | 15 | 19 | 297 | 01 205 107 |
| *2½ | 10 | 135 | 107 | 8 | 13 | 610 | 11 205 312 |
| 3 | 9 | 155 | 113 | 6 | 4 | 750 | 01 205 109 |
| 4 | 9 | 180 | 138 | 7 | 6 | 1155 | 01 205 110 |

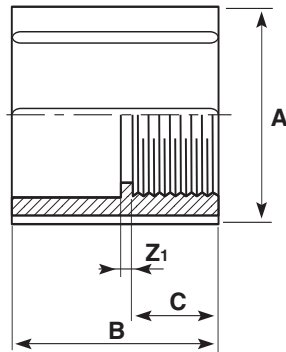
EPDM seal as standard
For FPM seal order by type 204

Imperial/metric socket adaptors plain



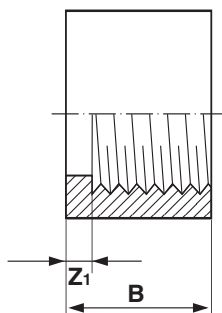
| Size | PN | A | B | Z ₁ | gms | Code |
|------------|----|-----|-----|----------------|------|------------|
| 1/2 x 20 | 10 | 26 | 37 | 3 | 7 | 11 345 102 |
| 3/4 x 25 | 10 | 31 | 41 | 3 | 12 | 11 345 103 |
| 1 x 32 | 10 | 40 | 49 | 3 | 25 | 11 345 104 |
| 1 1/4 x 40 | 10 | 50 | 58 | 2 | 45 | 11 345 105 |
| 1 1/2 x 50 | 10 | 59 | 67 | 3 | 62 | 11 345 106 |
| 2 x 63 | 10 | 74 | 78 | 2 | 114 | 11 345 107 |
| 3 x 90 | 10 | 107 | 105 | 3 | 355 | 11 345 109 |
| 4 x 110 | 10 | 134 | 130 | 6 | 690 | 11 345 110 |
| 6 x 160 | 10 | 195 | 183 | 8 | 1660 | 11 345 112 |

Sockets plain/BSP taper threaded



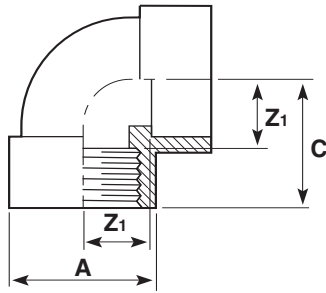
| Size | PN | A | B | C | Z ₁ | gms | Code |
|-------|----|-----|-----|----|----------------|-----|------------|
| 1/2 | 12 | 27 | 38 | 17 | 4 | 8 | 01 101 102 |
| 3/4 | 12 | 33 | 44 | 20 | 2 | 14 | 01 101 103 |
| 1 | 12 | 42 | 51 | 23 | 5 | 30 | 01 101 104 |
| 1 1/4 | 12 | 52 | 55 | 22 | 4 | 46 | 01 101 105 |
| 1 1/2 | 12 | 60 | 61 | 26 | 2 | 65 | 01 101 106 |
| 2 | 12 | 75 | 70 | 29 | 2 | 114 | 01 101 107 |
| 3 | 12 | 110 | 107 | 52 | 3 | 378 | 01 101 109 |

Reducing bushes plain/BSP taper threaded



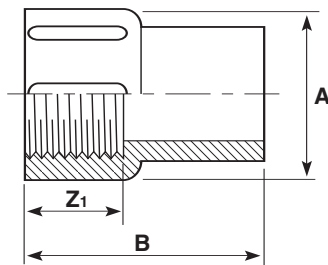
| Size | PN | B | Z ₁ | gms | Code |
|-----------|----|----|----------------|-----|------------|
| 1/2 x 3/8 | 12 | 17 | 6 | 4 | 01 111 121 |
| 3/4 x 1/2 | 12 | 20 | 5 | 7 | 01 111 122 |
| 1 x 3/4 | 12 | 23 | 6 | 12 | 01 111 124 |

Elbows 90° plain/BSP taper threaded



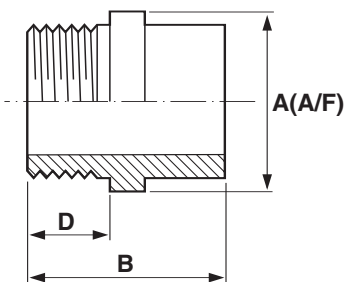
| Size | PN | A | C | Z ₁ | gms | Code |
|-------|----|----|----|----------------|-----|------------|
| 1/2 | 12 | 26 | 34 | 17 | 26 | 01 116 102 |
| 3/4 | 12 | 32 | 36 | 20 | 34 | 01 116 103 |
| 1 | 12 | 40 | 41 | 23 | 63 | 01 116 104 |
| 1 1/2 | 12 | 62 | 57 | 30 | 136 | 01 116 106 |
| 2 | 12 | 75 | 66 | 35 | 203 | 01 116 107 |

Adaptors female plain/BSP taper threaded



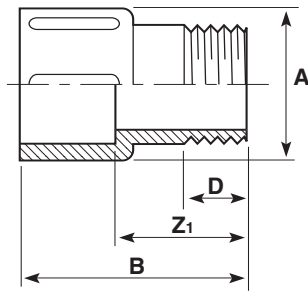
| Size | PN | A | B | Z ₁ | gms | Code |
|-------|----|----|----|----------------|-----|------------|
| 1/2 | 12 | 27 | 38 | 16 | 8 | 01 153 102 |
| 3/4 | 12 | 36 | 44 | 18 | 14 | 01 153 103 |
| 1 | 12 | 43 | 50 | 21 | 24 | 01 153 104 |
| 1 1/4 | 12 | 55 | 60 | 22 | 49 | 01 153 105 |
| 1 1/2 | 12 | 63 | 66 | 25 | 68 | 01 153 106 |
| 2 | 12 | 78 | 78 | 29 | 129 | 01 153 107 |

Hexagon nipples male plain/BSP taper threaded

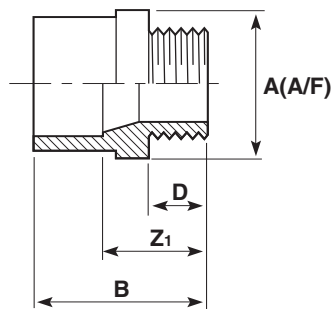


| Size | PN | A | B | D | gms | Code |
|-------|----|----|----|----|-----|------------|
| 3/8 | 12 | 24 | 36 | 11 | 7 | 01 107 101 |
| 1/2 | 12 | 30 | 42 | 15 | 12 | 01 107 102 |
| 3/4 | 12 | 36 | 48 | 16 | 30 | 01 107 103 |
| 1 | 12 | 46 | 56 | 20 | 40 | 01 107 104 |
| 1 1/4 | 12 | 46 | 60 | 21 | 50 | 01 107 105 |
| 1 1/2 | 12 | 55 | 63 | 22 | 58 | 01 107 106 |
| 2 | 12 | 72 | 74 | 26 | 91 | 01 107 107 |

Adaptors male threaded plain/BSP taper threaded

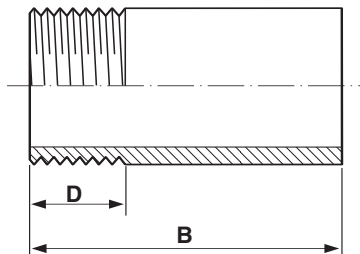


| Size | PN | A | B | D | Z ₁ | gms | Code |
|------|----|----|----|----|----------------|-----|------------|
| 3/8 | 12 | 22 | 35 | 10 | 20 | 5 | 01 151 101 |
| 1/2 | 12 | 27 | 45 | 12 | 28 | 9 | 01 151 102 |
| 3/4 | 12 | 35 | 48 | 14 | 28 | 14 | 01 151 103 |



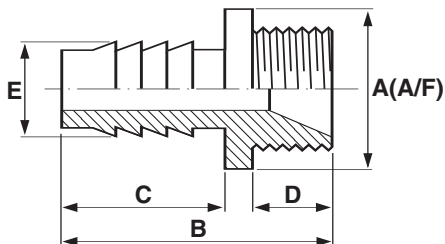
| Size | PN | A | B | D | Z ₁ | gms | Code |
|-------|----|----|----|----|----------------|-----|------------|
| 1 | 12 | 46 | 58 | 19 | 35 | 36 | 01 151 104 |
| 1 1/4 | 12 | 56 | 66 | 22 | 38 | 70 | 01 151 105 |
| 1 1/2 | 12 | 72 | 75 | 22 | 43 | 115 | 01 151 106 |
| 2 | 12 | 80 | 85 | 26 | 46 | 150 | 01 151 107 |

Barrel nipples plain/BSP taper threaded



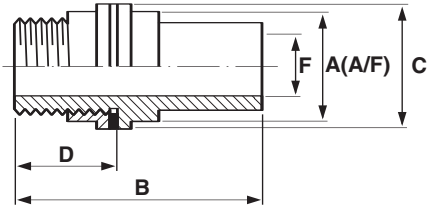
| Size | PN | B | D | gms | Code |
|------|----|-----|----|-----|------------|
| 3 | 12 | 128 | 30 | 252 | 01 316 109 |
| 4 | 12 | 153 | 36 | 525 | 01 316 110 |

Hose adaptors BSP threaded



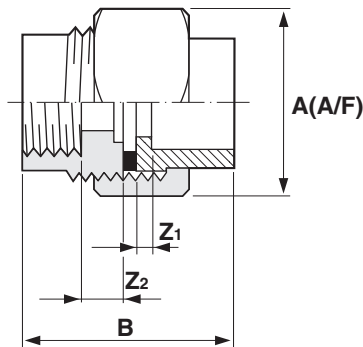
| Size | PN | A | B | C | D | E | gms | Code |
|------|----|----|----|----|----|----|-----|------------|
| 1/2 | 12 | 26 | 60 | 41 | 13 | 14 | 8 | 01 157 102 |
| 3/4 | 12 | 28 | 66 | 41 | 16 | 20 | 15 | 01 157 103 |
| 1 | 12 | 40 | 73 | 46 | 19 | 27 | 28 | 01 157 104 |

Tank connectors plain/BSP threaded



| Size | A | B | C | D | F | gms | Code |
|------|----|----|----|----|----|-----|------------|
| 1/2 | 28 | 70 | 38 | 28 | 15 | 26 | 01 235 102 |
| 3/4 | 33 | 77 | 38 | 38 | 21 | 30 | 01 235 103 |

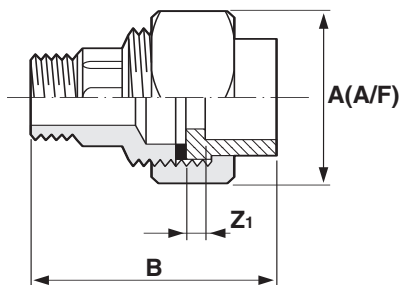
Composite unions plain/BSP parallel threaded female brass



| Size | PN | A | B | Z ₁ | Z ₂ | gms | Code |
|-------|----|----|----|----------------|----------------|-----|------------|
| 1/2 | 15 | 40 | 42 | 3 | 7 | 165 | 01 212 102 |
| 3/4 | 15 | 48 | 49 | 3 | 9 | 290 | 01 212 103 |
| 1 | 15 | 55 | 59 | 11 | 12 | 310 | 01 212 104 |
| 1 1/4 | 15 | 65 | 68 | 9 | 10 | 450 | 01 212 105 |
| 1 1/2 | 15 | 79 | 75 | 12 | 14 | 800 | 01 212 106 |
| 2 | 15 | 88 | 90 | 14 | 14 | 950 | 01 212 107 |

Fitted with brass retaining nut
Brass material to BS2872, WRAS approved

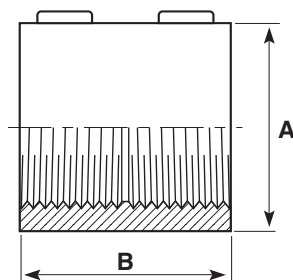
Composite unions plain/BSP taper threaded male brass



| Size | PN | A | B | Z ₁ | gms | Code |
|-------|----|----|-----|----------------|------|------------|
| 1/2 | 15 | 40 | 54 | 3 | 175 | 01 217 102 |
| 3/4 | 15 | 48 | 74 | 3 | 320 | 01 217 103 |
| 1 | 15 | 55 | 86 | 8 | 420 | 01 217 104 |
| 1 1/4 | 15 | 65 | 94 | 10 | 620 | 01 217 105 |
| 1 1/2 | 15 | 78 | 108 | 13 | 1000 | 01 217 106 |
| 2 | 15 | 88 | 129 | 15 | 1200 | 01 217 107 |

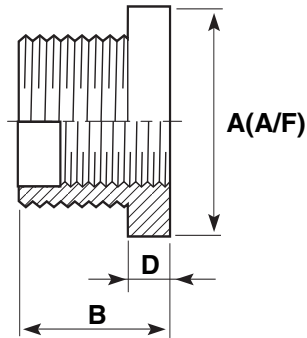
Fitted with brass retaining nut.
Brass material to BS2872, WRAS approved

Sockets BSP taper threaded



| Size | PN | A | B | gms | Code |
|-------|----|-----|-----|-----|------------|
| 1/2 | 12 | 26 | 38 | 12 | 01 102 102 |
| 3/4 | 12 | 33 | 43 | 22 | 01 102 103 |
| 1 | 12 | 41 | 51 | 34 | 01 102 104 |
| 1 1/4 | 12 | 51 | 54 | 60 | 01 102 105 |
| 1 1/2 | 12 | 62 | 63 | 87 | 01 102 106 |
| 2 | 12 | 75 | 72 | 132 | 01 102 107 |
| 3 | 12 | 110 | 107 | 437 | 01 102 109 |

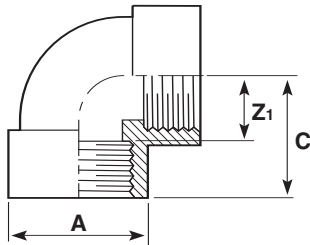
Reducing bushes BSP threaded



| Size | PN | A | B | D | gms | Code |
|-----------|----|----|----|----|-----|------------|
| 1/2 x 3/8 | 12 | 24 | 25 | 10 | 5 | 01 113 121 |
| 3/4 x 1/2 | 12 | 30 | 27 | 11 | 10 | 01 113 122 |
| 1 x 3/4 | 12 | 36 | 31 | 12 | 13 | 01 113 124 |

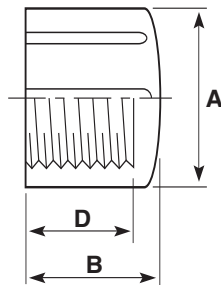
Male thread taper
Female thread parallel

Elbows 90° BSP taper threaded



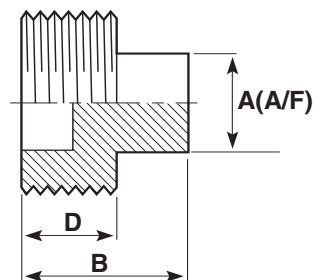
| Size | PN | A | C | Z ₁ | gms | Code |
|-------|----|----|----|----------------|-----|------------|
| 1/2 | 12 | 26 | 29 | 17 | 27 | 01 117 102 |
| 3/4 | 12 | 32 | 33 | 19 | 39 | 01 117 103 |
| 1 | 12 | 41 | 41 | 23 | 65 | 01 117 104 |
| 1 1/2 | 12 | 63 | 57 | 30 | 141 | 01 117 106 |
| 2 | 12 | 75 | 67 | 35 | 212 | 01 117 107 |

End Caps BSP taper threaded



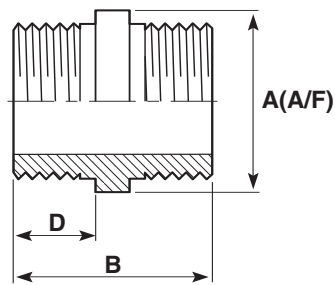
| Size | PN | A | B | D | gms | Code |
|-------|----|-----|----|----|-----|------------|
| 3/8 | 12 | 26 | 20 | 16 | 5 | 01 141 101 |
| 1/2 | 12 | 27 | 20 | 16 | 6 | 01 141 102 |
| 3/4 | 12 | 36 | 23 | 17 | 10 | 01 141 103 |
| 1 | 12 | 44 | 28 | 21 | 18 | 01 141 104 |
| 1 1/4 | 12 | 55 | 31 | 22 | 33 | 01 141 105 |
| 1 1/2 | 12 | 63 | 35 | 25 | 50 | 01 141 106 |
| 2 | 12 | 78 | 40 | 28 | 90 | 01 141 107 |
| 3 | 12 | 111 | 65 | 53 | 262 | 01 141 109 |

Plugs BSP taper threaded



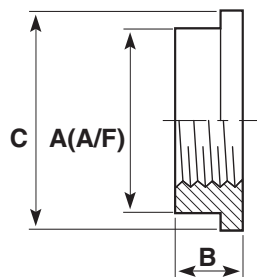
| Size | PN | A | B | D | gms | Code |
|-------|----|----|----|----|-----|------------|
| 3/8 | 12 | 11 | 19 | 10 | 3 | 01 155 101 |
| 1/2 | 12 | 13 | 23 | 14 | 5 | 01 155 102 |
| 3/4 | 12 | 14 | 28 | 15 | 8 | 01 155 103 |
| 1 | 12 | 17 | 30 | 17 | 12 | 01 155 104 |
| 1 1/4 | 12 | 22 | 35 | 22 | 30 | 01 155 105 |
| 1 1/2 | 12 | 27 | 38 | 22 | 36 | 01 155 106 |
| 2 | 12 | 37 | 45 | 26 | 50 | 01 155 107 |

Hexagon nipples BSP taper threaded



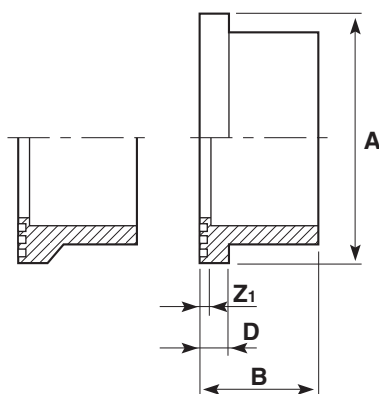
| Size | PN | A | B | D | gms | Code |
|-------|----|----|----|----|-----|------------|
| 3/8 | 12 | 24 | 38 | 14 | 6 | 01 106 101 |
| 1/2 | 12 | 30 | 46 | 18 | 12 | 01 106 102 |
| 3/4 | 12 | 36 | 50 | 19 | 30 | 01 106 103 |
| 1 | 12 | 46 | 59 | 13 | 40 | 01 106 104 |
| 1 1/4 | 12 | 46 | 67 | 27 | 55 | 01 106 105 |
| 1 1/2 | 12 | 55 | 73 | 29 | 75 | 01 106 106 |
| 2 | 12 | 72 | 81 | 33 | 125 | 01 106 107 |

Back nuts BSP threaded



| Size | PN | A | B | C | gms | Code |
|-------|----|----|----|----|-----|------------|
| 3/8 | 12 | 25 | 11 | 29 | 5 | 01 159 101 |
| 1/2 | 12 | 28 | 13 | 38 | 8 | 01 159 102 |
| 3/4 | 12 | 33 | 13 | 38 | 15 | 01 159 103 |
| 1 | 12 | 45 | 16 | 54 | 18 | 01 159 104 |
| 1 1/4 | 12 | 50 | 18 | 58 | 19 | 01 159 105 |
| 1 1/2 | 12 | 60 | 19 | 69 | 31 | 01 159 106 |
| 2 | 12 | 79 | 21 | 91 | 65 | 01 159 107 |

Flanges stub serrated

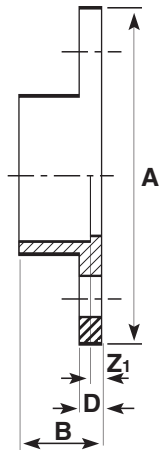


| Size | PN | A | B | D | Z ₁ | gms | Code |
|-------|----|-----|-----|----|----------------|------|------------|
| 2 | 15 | 96 | 40 | 14 | 3 | 90 | 01 135 107 |
| 2 1/2 | 10 | 106 | 49 | 10 | 4 | 150 | 11 135 312 |
| 3 | 15 | 127 | 57 | 18 | 6 | 200 | 01 135 109 |
| 4 | 15 | 159 | 69 | 20 | 6 | 350 | 01 135 110 |
| 5 | 15 | 180 | 83 | 14 | 7 | 680 | 11 135 316 |
| 6 | 12 | 213 | 104 | 24 | 11 | 805 | 01 135 112 |
| 8 | 9 | 269 | 132 | 26 | 14 | 2075 | 01 135 113 |
| *10 | 6 | 326 | 155 | 29 | 8 | 2650 | 01 139 114 |
| *12 | 6 | 378 | 178 | 33 | 9 | 3900 | 01 139 115 |

*Taper back flange (see drawing insert)

All Durapipe flanges are designed for use with Durapipe backing rings. Guarantees are null and void if used with incorrect backing ring.

Flanges full face plain/drilled



BS10 Table D/E

| Size | A | B | D | Z ₁ | P.C.D. | No. of Holes | Hole Diameter | gms | Code |
|-------|-----|----|----|----------------|--------|--------------|---------------|------|------------|
| 1/2 | 96 | 21 | 10 | 4 | 67 | 4 | 14 | 68 | 01 130 102 |
| 3/4 | 105 | 24 | 10 | 4 | 73 | 4 | 14 | 78 | 01 130 103 |
| 1 | 115 | 27 | 10 | 4 | 83 | 4 | 14 | 107 | 01 130 104 |
| 1 1/4 | 140 | 33 | 10 | 5 | 87 | 4 | 14 | 122 | 01 130 105 |
| 1 1/2 | 150 | 37 | 10 | 5 | 98 | 4 | 14 | 154 | 01 130 106 |
| 2 | 166 | 45 | 10 | 6 | 115 | 4 | 18 | 223 | 01 130 107 |
| 3 | 199 | 60 | 11 | 8 | 145 | 4 | 18 | 398 | 01 130 109 |
| *4 | 220 | 72 | 14 | 6 | 178 | 8 | 18 | 638 | 01 130 110 |
| 6 | 284 | 98 | 22 | 8 | 235 | 8 | 22 | 1340 | 01 130 112 |

*4" BS10 Table D has 4 holes and should be ordered as 01 317 110

BS4504 Table 16/3-10/3

| Size | A | B | D | Z ₁ | P.C.D. | No. of Holes | Hole Diameter | gms | Code |
|-------|-----|----|----|----------------|--------|--------------|---------------|------|------------|
| 1/2 | 96 | 21 | 10 | 4 | 65 | 4 | 14 | 68 | 01 319 102 |
| 3/4 | 105 | 24 | 10 | 4 | 75 | 4 | 14 | 78 | 01 319 103 |
| 1 | 115 | 27 | 10 | 4 | 85 | 4 | 14 | 107 | 01 319 104 |
| 1 1/4 | 140 | 33 | 10 | 5 | 100 | 4 | 18 | 122 | 01 319 105 |
| 1 1/2 | 150 | 37 | 10 | 5 | 110 | 4 | 18 | 154 | 01 319 106 |
| 2 | 166 | 45 | 10 | 6 | 125 | 4 | 18 | 223 | 01 319 107 |
| 3 | 199 | 60 | 11 | 8 | 160 | 8 | 18 | 398 | 01 319 109 |
| 4 | 220 | 72 | 14 | 6 | 180 | 8 | 18 | 638 | 01 319 110 |
| 6 | 284 | 98 | 22 | 8 | 240 | 8 | 22 | 1340 | 01 319 112 |

ANSI Class 150

| Size | A | B | D | Z ₁ | P.C.D. | No. of Holes | Hole Diameter | gms | Code |
|-------|-----|----|----|----------------|--------|--------------|---------------|------|------------|
| 1/2 | 96 | 21 | 10 | 4 | 60 | 4 | 14 | 68 | 01 322 102 |
| 3/4 | 105 | 24 | 10 | 4 | 70 | 4 | 14 | 78 | 01 322 103 |
| 1 | 115 | 27 | 10 | 4 | 80 | 4 | 14 | 107 | 01 322 104 |
| 1 1/2 | 150 | 37 | 10 | 5 | 98 | 4 | 14 | 154 | 01 322 106 |
| 2 | 166 | 45 | 10 | 6 | 121 | 4 | 18 | 223 | 01 322 107 |
| 3 | 199 | 60 | 11 | 8 | 152 | 4 | 18 | 398 | 01 322 109 |
| 4 | 220 | 72 | 14 | 6 | 190 | 8 | 18 | 638 | 01 322 110 |
| 6 | 284 | 98 | 22 | 8 | 241 | 8 | 22 | 1340 | 01 322 112 |

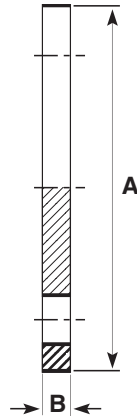
Undrilled

| Size | PN | A | B | D | Z ₁ | gms | Code |
|-------|----|-----|----|----|----------------|------|------------|
| 1/2 | 15 | 96 | 21 | 10 | 4 | 75 | 01 129 102 |
| 3/4 | 15 | 105 | 24 | 10 | 4 | 85 | 01 129 103 |
| 1 | 15 | 115 | 27 | 10 | 4 | 111 | 01 129 104 |
| 1 1/4 | 15 | 140 | 32 | 10 | 4 | 130 | 01 129 105 |
| 1 1/2 | 15 | 150 | 36 | 10 | 5 | 160 | 01 129 106 |
| 2 | 15 | 165 | 45 | 11 | 6 | 233 | 01 129 107 |
| 3 | 15 | 199 | 60 | 11 | 8 | 414 | 01 129 109 |
| 4 | 15 | 220 | 73 | 14 | 6 | 657 | 01 129 110 |
| 6 | 12 | 284 | 99 | 22 | 8 | 1417 | 01 129 112 |

Note: Durapipe backing rings must be used in conjunction with full face flanges

All Durapipe flanges are designed for use with Durapipe backing rings. Guarantees are null and void if used with incorrect backing ring.

Flanges blanking plain/drilled



BS10 Table D/E

| Size | A | B | P.C.D. | No. of Holes | Hole Diameter | gms | Code |
|------|-----|----|--------|--------------|---------------|------|------------|
| 2 | 165 | 13 | 115 | 4 | 18 | 235 | 01 313 107 |
| 3 | 197 | 19 | 145 | 4 | 18 | 520 | 01 313 109 |
| *4 | 214 | 19 | 178 | 8 | 18 | 720 | 01 313 110 |
| 6 | 286 | 26 | 235 | 8 | 22 | 1575 | 01 313 112 |
| 8 | 337 | 26 | 292 | 8 | 22 | 2300 | 01 313 113 |

*4" BS10 Table D has 4 holes and should be ordered as 01 326 110

BS4504 Table 16/3 (1/2" to 8") 10/3 (1/2" to 6")

| Size | A | B | P.C.D. | No. of Holes | Hole Diameter | gms | Code |
|------|-----|----|--------|--------------|---------------|------|------------|
| 2 | 165 | 13 | 125 | 4 | 18 | 235 | 01 323 107 |
| 2½ | 186 | 19 | 145 | 4 | 18 | 568 | 11 323 312 |
| 3 | 197 | 19 | 160 | 8 | 18 | 520 | 01 323 109 |
| 4 | 214 | 19 | 180 | 8 | 18 | 720 | 01 323 110 |
| 5 | 251 | 26 | 210 | 8 | 18 | 1338 | 11 323 316 |
| 6 | 286 | 26 | 240 | 8 | 22 | 1575 | 01 323 112 |
| 8 | 337 | 26 | 295 | 12 | 22 | 2300 | 01 323 113 |

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| Size | A | B | P.C.D. | No. of Holes | Hole Diameter | gms | Code |
|------|-----|----|--------|--------------|---------------|------|------------|
| 2 | 165 | 13 | 121 | 4 | 18 | 235 | 01 325 107 |
| 3 | 197 | 19 | 152 | 4 | 18 | 520 | 01 325 109 |
| 4 | 214 | 19 | 190 | 8 | 18 | 720 | 01 325 110 |
| 6 | 286 | 26 | 241 | 8 | 22 | 1575 | 01 325 112 |
| 8 | 337 | 26 | 298 | 8 | 22 | 2300 | 01 325 113 |

Undrilled

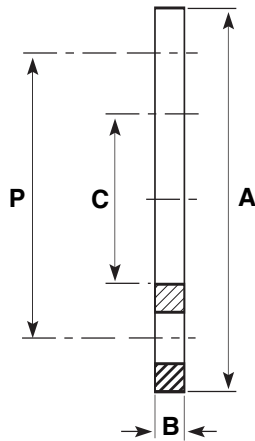
| Size | PN | A | B | gms | Code |
|------|----|-----|----|------|------------|
| 1 | 15 | 116 | 13 | 140 | 01 131 104 |
| 1½ | 15 | 150 | 13 | 185 | 01 131 106 |
| 2 | 15 | 166 | 13 | 235 | 01 131 107 |
| 3 | 15 | 197 | 19 | 520 | 01 131 109 |
| 4 | 15 | 214 | 19 | 720 | 01 131 110 |
| 6 | 12 | 286 | 26 | 1575 | 01 131 112 |
| 8 | 9 | 337 | 26 | 2300 | 01 131 113 |

Note: Durapipe backing rings must be used in conjunction with blank flanges



All Durapipe flanges are designed for use with Durapipe backing rings. Guarantees are null and void if used with incorrect backing ring.

Backing rings galvanised mild steel drilled



BS10 Table D/E

| Size | A | B | C | P | No. of Holes | Hole Dia. | Bolt Size | Weight gms | Code |
|-------|-----|----|-----|-----|--------------|-----------|-----------|------------|------------|
| 1/2 | 89 | 6 | 35 | 67 | 4 | 14 | M12x50 | 270 | 03 416 102 |
| 3/4 | 103 | 7 | 45 | 73 | 4 | 14 | M12x50 | 300 | 03 416 103 |
| 1 | 114 | 6 | 49 | 83 | 4 | 14 | M12x50 | 380 | 03 416 104 |
| 1 1/4 | 120 | 7 | 60 | 87 | 4 | 14 | M12x50 | 380 | 03 416 105 |
| 1 1/2 | 135 | 7 | 68 | 98 | 4 | 14 | M12x50 | 480 | 03 416 106 |
| 2 | 151 | 8 | 78 | 115 | 4 | 18 | M16x65 | 880 | 03 416 107 |
| 3 | 187 | 9 | 110 | 145 | 4 | 18 | M16x70 | 1040 | 03 416 109 |
| *4 | 216 | 9 | 140 | 178 | 8 | 18 | M16x80 | 1330 | 03 416 110 |
| 6 | 282 | 11 | 195 | 235 | 8 | 22 | M20x90 | 2340 | 03 416 112 |
| 8 | 337 | 10 | 255 | 292 | 8 | 22 | M20x100 | 2870 | 03 416 113 |
| †10 | 405 | 15 | 308 | 356 | 12 | 22 | M20x130 | 5870 | 03 407 114 |
| 12 | 458 | 21 | 364 | 406 | 12 | 26 | M24x150 | 8990 | 03 407 115 |

*4" BS10 Table D has 4 holes and should be ordered as 03 415 110
 †10" only available in BS10 Table E drilling. The bore of the 10" and 12" backing rings is machined to mate with the taper of the stub flanges

BS4504 Table 16/3 (1/2" to 12") 10/3 (1/2" to 6")

| Size | A | B | C | P | No. of Holes | Hole Dia. | Bolt Size | Weight gms | Code |
|-------|-----|----|-----|-----|--------------|-----------|-----------|------------|------------|
| 1/2 | 96 | 6 | 35 | 65 | 4 | 14 | M12x50 | 310 | 03 421 102 |
| 3/4 | 106 | 6 | 45 | 75 | 4 | 14 | M12x50 | 330 | 03 421 103 |
| 1 | 114 | 6 | 49 | 85 | 4 | 14 | M12x50 | 390 | 03 421 104 |
| 1 1/4 | 141 | 6 | 60 | 100 | 4 | 18 | M16x50 | 580 | 03 421 105 |
| 1 1/2 | 150 | 6 | 68 | 110 | 4 | 18 | M16x50 | 880 | 03 421 106 |
| 2 | 165 | 8 | 78 | 125 | 4 | 18 | M16x65 | 1020 | 03 421 107 |
| 2 1/2 | 186 | 9 | 92 | 145 | 4 | 18 | M16x65 | 1280 | 13 421 312 |
| 3 | 200 | 8 | 110 | 160 | 8 | 18 | M16x70 | 1310 | 03 421 109 |
| 4 | 221 | 8 | 140 | 180 | 8 | 18 | M16x80 | 1370 | 03 421 110 |
| 5 | 251 | 11 | 167 | 210 | 8 | 18 | M16x90 | 2060 | 13 421 316 |
| 6 | 286 | 11 | 195 | 240 | 8 | 22 | M20x90 | 2460 | 03 421 112 |
| 8 | 339 | 11 | 255 | 295 | 12 | 22 | M20x100 | 2780 | 03 421 113 |
| 10 | 405 | 15 | 308 | 355 | 12 | 26 | M24x130 | 5850 | 03 403 114 |
| 12 | 458 | 21 | 364 | 410 | 12 | 26 | M24x150 | 8990 | 03 407 115 |

BS4504 Table 10/3 (8")

| Size | A | B | C | P | No. of Holes | Hole Dia. | Bolt Size | Weight gms | Code |
|------|-----|----|-----|-----|--------------|-----------|-----------|------------|------------|
| 8 | 339 | 11 | 255 | 295 | 8 | 22 | M20x100 | 2870 | 04 996 131 |

Note: The 8" backing ring drilled 10/3 is intended for use in conjunction with the 8" FK Butterfly valve.

ANSI Class 150

| Size | A | B | C | P | No. of Holes | Hole Dia. | Bolt Size | Weight gms | Code |
|-------|-----|----|-----|-----|--------------|-----------|-----------|------------|------------|
| 1/2 | 89 | 6 | 35 | 60 | 4 | 14 | M12x50 | 240 | 03 425 102 |
| 3/4 | 98 | 6 | 45 | 70 | 4 | 14 | M12x50 | 270 | 03 425 103 |
| 1 | 108 | 6 | 49 | 80 | 4 | 14 | M12x50 | 330 | 03 425 104 |
| 1 1/4 | 118 | 6 | 60 | 90 | 4 | 14 | M12x50 | 400 | 03 425 105 |
| 1 1/2 | 128 | 6 | 68 | 98 | 4 | 14 | M12x50 | 420 | 03 425 106 |
| 2 | 153 | 8 | 78 | 121 | 4 | 18 | M16x65 | 790 | 03 425 107 |
| 3 | 191 | 8 | 110 | 152 | 4 | 18 | M16x65 | 1200 | 03 425 109 |
| 4 | 230 | 9 | 140 | 190 | 8 | 18 | M16x70 | 1580 | 03 425 110 |
| 6 | 280 | 11 | 195 | 241 | 8 | 22 | M20x90 | 2230 | 03 425 112 |
| 8 | 340 | 12 | 255 | 298 | 8 | 22 | M20x100 | 3060 | 03 425 113 |

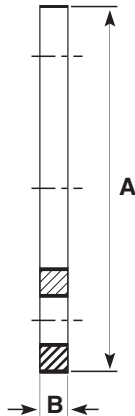
* Bolt lengths shown are for flange/flange assemblies only.

Gaskets flat stub flange EPDM



| Size | A | B | gms | Code |
|------|-----|-----|-----|------------|
| 2 | 97 | 3.0 | 21 | 03 431 107 |
| 2½ | 106 | 3.0 | 22 | 13 411 312 |
| 3 | 128 | 3.0 | 23 | 03 431 109 |
| 4 | 160 | 3.9 | 36 | 03 431 110 |
| 5 | 180 | 4.0 | 60 | 13 411 316 |
| 6 | 214 | 3.9 | 74 | 03 431 112 |
| 8 | 269 | 4.0 | 92 | 03 431 113 |
| 10 | 327 | 4.1 | 186 | 03 411 114 |
| 12 | 378 | 3.9 | 218 | 03 411 115 |

Gaskets full face drilled EPDM



BS10 Table D/E

| Size | A | B | P.C.D. | No. of Holes | Hole Diameter | gms | Code |
|------|-----|-----|--------|--------------|---------------|-----|------------|
| ½ | 95 | 3.0 | 67 | 4 | 14 | 31 | 03 410 102 |
| ¾ | 112 | 3.0 | 73 | 4 | 14 | 37 | 03 410 103 |
| 1 | 115 | 3.0 | 83 | 4 | 14 | 37 | 03 410 104 |
| 1¼ | 121 | 3.0 | 87 | 4 | 14 | 41 | 03 410 105 |
| 1½ | 133 | 3.0 | 98 | 4 | 14 | 55 | 03 410 106 |
| 2 | 153 | 3.0 | 115 | 4 | 18 | 56 | 03 410 107 |
| 3 | 184 | 3.0 | 145 | 4 | 18 | 98 | 03 410 109 |
| *4 | 216 | 3.2 | 178 | 8 | 18 | 112 | 03 410 110 |
| 6 | 250 | 3.1 | 235 | 8 | 22 | 160 | 03 410 112 |

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

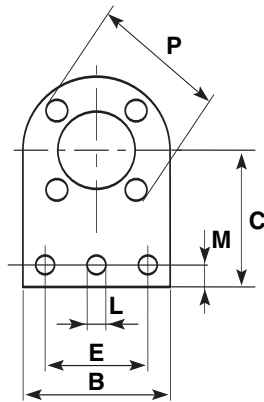
BS4504 Table 16/3-10/3

| Size | A | B | P.C.D. | No. of Holes | Hole Diameter | gms | Code |
|------|-----|-----|--------|--------------|---------------|-----|------------|
| ½ | 95 | 3.0 | 65 | 4 | 14 | 31 | 03 408 102 |
| ¾ | 112 | 3.0 | 75 | 4 | 14 | 37 | 03 408 103 |
| 1 | 115 | 3.0 | 85 | 4 | 14 | 37 | 03 408 104 |
| 1¼ | 121 | 3.0 | 100 | 4 | 18 | 41 | 03 408 105 |
| 1½ | 133 | 3.0 | 110 | 4 | 18 | 55 | 03 408 106 |
| 2 | 153 | 3.0 | 125 | 4 | 18 | 56 | 03 408 107 |
| 3 | 184 | 3.0 | 160 | 8 | 18 | 98 | 03 408 109 |
| 4 | 216 | 3.2 | 180 | 8 | 18 | 112 | 03 408 110 |
| 6 | 280 | 3.1 | 240 | 8 | 22 | 160 | 03 408 112 |

ANSI Class 150

| Size | A | B | P.C.D. | No. of Holes | Hole Diameter | gms | Code |
|------|-----|-----|--------|--------------|---------------|-----|------------|
| ½ | 95 | 3.0 | 60 | 4 | 14 | 31 | 03 426 102 |
| ¾ | 112 | 3.0 | 70 | 4 | 14 | 37 | 03 426 103 |
| 1 | 115 | 3.0 | 80 | 4 | 14 | 37 | 03 426 104 |
| 1½ | 133 | 3.0 | 98 | 4 | 14 | 55 | 03 426 106 |
| 2 | 153 | 3.0 | 121 | 4 | 18 | 56 | 03 426 107 |
| 3 | 184 | 3.0 | 152 | 4 | 18 | 98 | 03 426 109 |
| 4 | 216 | 3.2 | 190 | 8 | 18 | 112 | 03 426 110 |
| 6 | 280 | 3.1 | 241 | 8 | 22 | 160 | 03 426 112 |

Valve support plates galvanised mild steel drilled

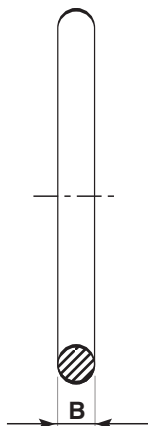


BS4504 Table 16/3 (½" to 8") **10/3** (½" to 6")

| Size | B | C | E | L | M | N | P | Weight gms | Code |
|------|-----|-----|-----|----|----|---|-----|------------|------------|
| ½ | 95 | 86 | 50 | 14 | 16 | 2 | 65 | 370 | 03 458 102 |
| ¾ | 106 | 89 | 75 | 14 | 16 | 2 | 75 | 450 | 03 458 103 |
| 1 | 143 | 99 | 75 | 14 | 16 | 2 | 85 | 560 | 03 458 104 |
| 1¼ | 152 | 105 | 75 | 14 | 16 | 2 | 100 | 950 | 03 458 105 |
| 1½ | 151 | 105 | 74 | 14 | 16 | 2 | 110 | 1150 | 03 458 106 |
| 2 | 166 | 127 | 101 | 14 | 17 | 2 | 125 | 1380 | 03 458 107 |
| 2½ | 185 | 144 | 125 | 14 | 22 | 2 | 145 | 2500 | 31 459 312 |
| 3 | 201 | 143 | 127 | 14 | 22 | 2 | 160 | 1650 | 03 458 109 |
| 4 | 222 | 161 | 151 | 14 | 24 | 3 | 180 | 2550 | 03 458 110 |
| 6 | 286 | 217 | 228 | 14 | 33 | 3 | 240 | 4100 | 03 458 112 |
| 8 | 340 | 242 | 280 | 14 | 31 | 3 | 295 | 6250 | 03 458 113 |

N = No. of holes in base

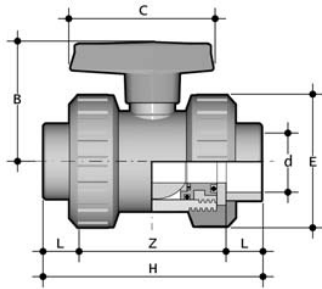
'O' ring for socket union



| Size | B | gms | EPDM Code | Viton (FPM) Code |
|------|-----|-----|------------|------------------|
| ¾ | 3.5 | 0.5 | 03 209 101 | 03 211 101 |
| 1 | 3.5 | 1 | 03 209 102 | 03 211 102 |
| 1¼ | 3.5 | 2 | 03 209 103 | 03 211 103 |
| 1½ | 3.5 | 3 | 03 209 104 | 03 211 104 |
| 2 | 5.2 | 5 | 03 209 105 | 03 211 105 |
| 2½ | 5.2 | 6 | 03 209 106 | 03 211 106 |
| 3 | 5.3 | 7 | 03 209 107 | 03 211 107 |
| 4 | 5.3 | 3 | 13 209 312 | 13 211 312 |
| 6 | 5.0 | 5 | 03 209 109 | 03 211 109 |
| 8 | 4.9 | 6 | 03 209 110 | 03 211 110 |

VALVES

VK Double union ball valves Manual – EPDM seals



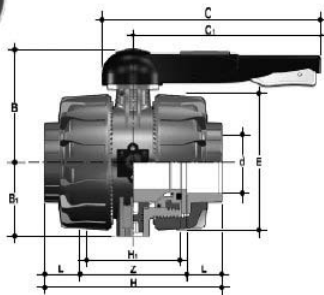
| d | DN | PN | L | Z | H | E | B | C | gms | Code | |
|-------|----|----|------|-----|-----|-----|-----|-----|------|------------|------------|
| | | | | | | | | | | Plain | Threaded |
| 3/8 | 10 | 16 | 14.5 | 74 | 103 | 55 | 49 | 66 | 195 | HO VKA 101 | - |
| 1/2 | 15 | 16 | 16.5 | 70 | 103 | 55 | 49 | 66 | 195 | HO VKA 102 | HO VKA B02 |
| 3/4 | 20 | 16 | 19 | 77 | 115 | 66 | 59 | 75 | 315 | HO VKA 103 | HO VKA B03 |
| 1 | 25 | 16 | 22.5 | 83 | 128 | 75 | 66 | 85 | 435 | HO VKA 104 | HO VKA B04 |
| 1 1/4 | 32 | 16 | 26 | 94 | 146 | 87 | 75 | 97 | 655 | HO VKA 105 | HO VKA B05 |
| 1 1/2 | 40 | 16 | 30 | 104 | 164 | 100 | 87 | 110 | 880 | HO VKA 106 | HO VKA B06 |
| 2 | 50 | 16 | 36 | 127 | 199 | 122 | 101 | 134 | 1560 | HO VKA 107 | HO VKA B07 |

Options:

FPM seals (plain ends) order HO VKB ***
 FPM seals (threaded ends) order HO VKB ***

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

VKD Double union ball valves Manual – EPDM seals

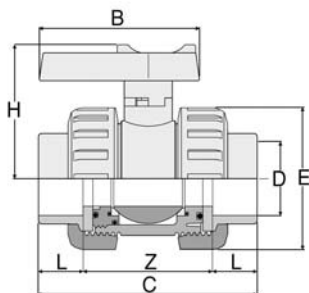


| d | DN | PN | Z | L | H | H ₁ | E | B | B ₁ | C | C ₁ | gms | Code |
|-------|-----|----|-----|----|-----|----------------|-----|-----|----------------|-----|----------------|-------|------------|
| 2 1/2 | 65 | 16 | 147 | 44 | 235 | 133 | 164 | 164 | 87 | 225 | 175 | 4380 | HO VKD 312 |
| 3 | 80 |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

Options:

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

EV Double union ball valves Manual – EPDM seals

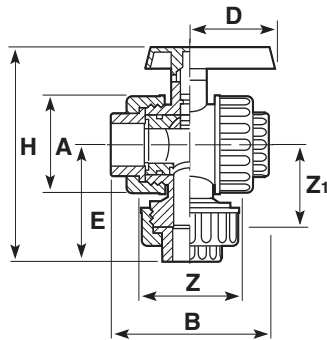


| d | DN | PN | L | Z | C | E | H | B | gms | Code | |
|-------|----|----|----|----|-----|-----|------|-----|-----|------------|------------|
| | | | | | | | | | | Plain | Threaded |
| 1/2 | 15 | 10 | 17 | 47 | 81 | 50 | 50 | 57 | 95 | HO EVA 102 | HO EVA B02 |
| 3/4 | 20 | 10 | 19 | 51 | 95 | 59 | 55 | 66 | 156 | HO EVA 103 | HO EVA B03 |
| 1 | 25 | 10 | 22 | 61 | 105 | 68 | 66.5 | 75 | 228 | HO EVA 104 | HO EVA B04 |
| 1 1/4 | 32 | 10 | 31 | 84 | 146 | 96 | 93 | 103 | 540 | HO EVA 105 | HO EVA B05 |
| 1 1/2 | 40 | 10 | 31 | 84 | 146 | 96 | 93 | 103 | 540 | HO EVA 106 | HO EVA B06 |
| 2 | 50 | 10 | 38 | 96 | 172 | 116 | 107 | 121 | 844 | HO EVA 107 | HO EVA B07 |

Valves can be supplied as electrically or pneumatically actuated.

Further details are available in our full Valves Technical Catalogue D0894 or interactive CD. Please ask for copies.

ML/MT/MC Multiport ball valves Plain FPM – L port



| Size | PN | Z | Z ₁ | A | B | D | E | H | gms | Code |
|-------|----|-----|----------------|-----|-----|----|-----|-----|------|------------|
| 3/8 | 10 | 68 | 49 | 48 | 101 | 58 | 65 | 117 | 236 | H0 MLB 101 |
| 1/2 | 10 | 68 | 49 | 48 | 101 | 58 | 65 | 117 | 221 | H0 MLB 102 |
| 3/4 | 10 | 79 | 66 | 59 | 118 | 66 | 85 | 148 | 375 | H0 MLB 103 |
| 1 | 10 | 89 | 74 | 69 | 134 | 67 | 97 | 163 | 554 | H0 MLB 104 |
| 1 1/4 | 10 | 104 | 82 | 81 | 158 | 78 | 109 | 185 | 809 | H0 MLB 105 |
| 1 1/2 | 10 | 107 | 98 | 96 | 167 | 88 | 128 | 228 | 1180 | H0 MLB 106 |
| 2 | 10 | 125 | 109 | 113 | 197 | 88 | 145 | 248 | 1828 | H0 MLB 107 |

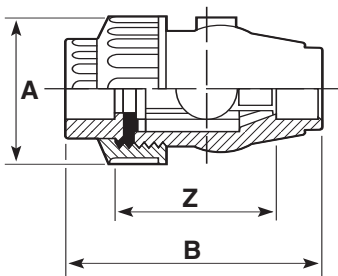
Options: L Port T Port C Port
 Plain FPM HO MLB *** HO MTB *** HO MCB ***
 Threaded FPM HO MLB B** HO MTB B** HO MCB B**

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

| | Position 1 0° | Position 2 90° | Position 3 180° | Operation |
|---|------------------|-------------------|--------------------|--|
| L | | | | Diverting and isolating |
| T | | | | Diverting or mixing |
| C | | | | Diverting and mixing (has transflow position 10° to 80°) |

◀ = flow

SR Single union ball check valves Plain ends – EPDM seals



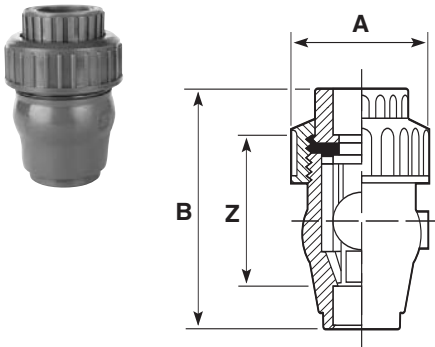
| Size | PN | Z | A | B | gms | Code |
|-------|----|-----|-----|-----|------|------------|
| 3/8 | 10 | 62 | 48 | 95 | 109 | H0 SRA 101 |
| 1/2 | 10 | 62 | 48 | 95 | 100 | H0 SRA 102 |
| 3/4 | 10 | 73 | 59 | 112 | 165 | H0 SRA 103 |
| 1 | 10 | 79 | 69 | 124 | 250 | H0 SRA 104 |
| 1 1/4 | 10 | 94 | 96 | 148 | 610 | H0 SRA 105 |
| 1 1/2 | 10 | 88 | 96 | 148 | 575 | H0 SRA 106 |
| 2 | 10 | 105 | 103 | 177 | 798 | H0 SRA 107 |
| 3 | 10 | 114 | 178 | 215 | 2757 | H0 SRA 109 |

Options:
 EPDM seals (threaded ends) order HO SRA B**
 FPM seals (plain ends) order HO SRB ***
 FPM seals (threaded ends) order HO SRB B**

Note: Threaded version incorporates threaded union adaptor only - socket end to body of valve plain.

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

VA Air release valves Plain ends – FPM seals



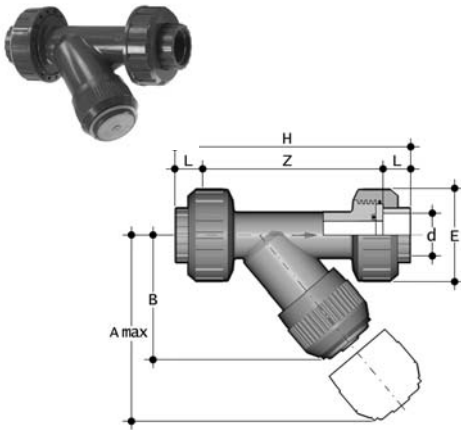
| Size | PN | Z | A | B | gms | Code |
|-------|----|-----|-----|-----|-----|------------|
| 3/8 | 10 | 62 | 48 | 95 | 109 | HO VAB 101 |
| 1/2 | 10 | 62 | 48 | 95 | 100 | HO VAB 102 |
| 3/4 | 10 | 73 | 59 | 112 | 165 | HO VAB 103 |
| 1 | 10 | 79 | 69 | 124 | 250 | HO VAB 104 |
| 1 1/4 | 10 | 94 | 96 | 148 | 610 | HO VAB 105 |
| 1 1/2 | 10 | 88 | 96 | 148 | 575 | HO VAB 106 |
| 2 | 10 | 105 | 103 | 177 | 798 | HO VAB 107 |

Options:

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

Note: Threaded version incorporates threaded union adaptor only - socket end to body of valve plain.

RV Y Type strainer Plain ends – EPDM seals



| d | DN | PN | A | B | E | L | Z | H | Fig. | gms | Code | |
|------------------|----|----|----|-----|-----|-----|----|-----|------|-----|------|------------|
| Grey Trans. maxa | | | | | | | | | | | | |
| 1/2 | 15 | 16 | 16 | 125 | 72 | 55 | 16 | 103 | 135 | A | 162 | HO UVA 102 |
| 3/4 | 20 | 16 | 16 | 145 | 84 | 66 | 19 | 120 | 158 | A | 274 | HO UVA 103 |
| 1 | 25 | 16 | 16 | 165 | 95 | 75 | 22 | 132 | 176 | A | 403 | HO UVA 104 |
| 1 1/4 | 32 | 16 | 10 | 190 | 111 | 87 | 26 | 155 | 207 | A | 562 | HO UVA 105 |
| 1 1/2 | 40 | 16 | 10 | 210 | 120 | 100 | 31 | 181 | 243 | A | 839 | HO UVA 106 |
| 2 | 50 | 16 | 10 | 240 | 139 | 120 | 38 | 222 | 298 | A | 1413 | HO UVA 107 |

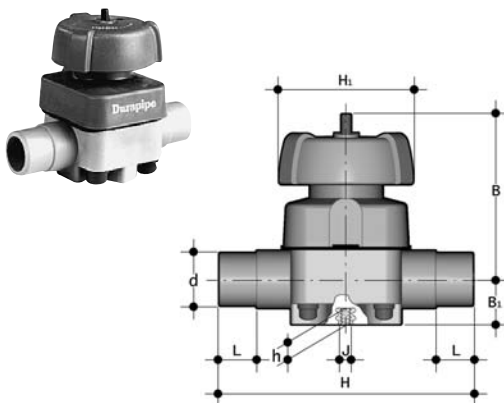
Options:

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

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

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

VM Diaphragm valves Manual – plain spigot ends EPDM



| d | DN | PN | B | B ₁ | H | h | H ₁ | J | L | gms | Code |
|-------|-----|----|-----|----------------|-----|----|----------------|-----|----|-------|------------|
| 1/2 | 15 | 10 | 95 | 26 | 124 | 12 | 90 | M6 | 16 | 700 | HO VMA 202 |
| 3/4 | 20 | 10 | 95 | 26 | 144 | 12 | 90 | M6 | 19 | 700 | HO VMA 203 |
| 1 | 25 | 10 | 95 | 26 | 154 | 12 | 90 | M6 | 23 | 700 | HO VMA 204 |
| 1 1/4 | 32 | 10 | 126 | 40 | 174 | 18 | 115 | M8 | 27 | 1500 | HO VMA 205 |
| 1 1/2 | 40 | 10 | 126 | 40 | 194 | 18 | 115 | M8 | 32 | 1500 | HO VMA 206 |
| 2 | 50 | 10 | 148 | 40 | 224 | 18 | 140 | M8 | 39 | 2400 | HO VMA 207 |
| 2 1/2 | 65 | 10 | 225 | 55 | 284 | 23 | 215 | M12 | 44 | 7000 | HO VMA 208 |
| 3 | 80 | 10 | 225 | 55 | 300 | 23 | 215 | M12 | 51 | 7000 | HO VMA 209 |
| 4 | 100 | 10 | 295 | 69 | 350 | 23 | 250 | M12 | - | 10500 | HO VMA 210 |

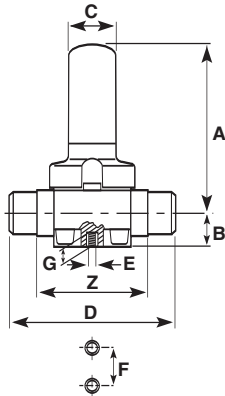
Options:

FPM diaphragm order HO VMB ***

PTFE diaphragm order HO VMC ***

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

PR Pressure relief valves EPDM seals

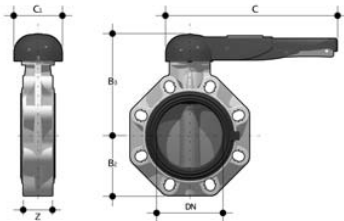


| Size | PN | Z | A | B | C | D | E | F | G | gms | Code |
|-------|----|-----|-----|------|----|-----|----|------|----|------|------------|
| 1/2 | 10 | 92 | 143 | 20.5 | 35 | 124 | M6 | 25 | 12 | 700 | HO PRA 202 |
| 3/4 | 10 | 106 | 143 | 20.5 | 35 | 144 | M6 | 25 | 12 | 700 | HO PRA 203 |
| 1 | 10 | 108 | 143 | 25.0 | 35 | 154 | M6 | 25 | 12 | 700 | HO PRA 204 |
| 1 1/4 | 10 | 120 | 204 | 36.0 | 50 | 174 | M8 | 44.5 | 16 | 1500 | HO PRA 205 |
| 1 1/2 | 10 | 130 | 204 | 39.5 | 50 | 194 | M8 | 44.5 | 16 | 1500 | HO PRA 206 |
| 2 | 10 | 146 | 219 | 49.0 | 50 | 224 | M8 | 44.5 | 16 | 2400 | HO PRA 207 |

Options:

FPM seals order HO PRB ***

FK Butterfly valves Glass reinforced polypropylene with ABS disc



lever operated

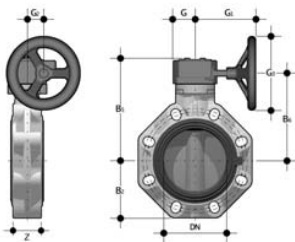
| Size | DN | PN | B ₂ | B ₃ | C | C ₁ | Z | gms | U | Code |
|-------|-----|----|----------------|----------------|-----|----------------|----|------|---|------------|
| 1 1/2 | 40 | 16 | 60 | 137 | 175 | 100 | 33 | 900 | 4 | HO FKA 106 |
| 2 | 50 | 16 | 70 | 143 | 175 | 100 | 43 | 1080 | 4 | HO FKA 107 |
| 2 1/2 | 65 | 10 | 80 | 164 | 272 | 110 | 46 | 1470 | 4 | HO FKA 108 |
| 3 | 80 | 10 | 93 | 178 | 272 | 110 | 49 | 1870 | 8 | HO FKA 109 |
| 4 | 100 | 10 | 107 | 192 | 272 | 110 | 56 | 2220 | 8 | HO FKA 110 |
| 5 | 125 | 10 | 120 | 212 | 330 | 110 | 64 | 3100 | 8 | HO FKA 111 |
| 6 | 150 | 10 | 134 | 225 | 330 | 110 | 70 | 3850 | 8 | HO FKA 112 |
| 8 | 200 | 10 | 161 | 272 | 420 | 122 | 71 | 6750 | 8 | HO FKA 113 |

Options:

FPM seals order HO FKB ***

U = No of holes

with gear box



| Size | DN | PN | B ₁ | B ₂ | B ₃ | G | G ₁ | G ₂ | G ₃ | Z | gms | U | Code |
|-------|-----|----|----------------|----------------|----------------|----|----------------|----------------|----------------|-----|-------|----|------------|
| 2 1/2 | 65 | 10 | 80 | 174 | 146 | 48 | 135 | 39 | 125 | 46 | 2400 | 4 | HV FKA 108 |
| 3 | 80 | 10 | 93 | 188 | 160 | 48 | 135 | 39 | 125 | 49 | 2800 | 8 | HV FKA 109 |
| 4 | 100 | 10 | 107 | 202 | 174 | 48 | 135 | 39 | 125 | 56 | 3150 | 8 | HV FKA 110 |
| 5 | 125 | 10 | 120 | 222 | 194 | 48 | 144 | 39 | 200 | 64 | 4450 | 8 | HV FKA 111 |
| 6 | 150 | 10 | 134 | 235 | 207 | 48 | 144 | 39 | 200 | 70 | 5200 | 8 | HV FKA 112 |
| 8 | 200 | 10 | 161 | 287 | 256 | 65 | 204 | 60 | 200 | 71 | 9300 | 8 | HV FKA 113 |
| 10 | 250 | 10 | 210 | 317 | 281 | 88 | 236 | 76 | 250 | 114 | 18600 | 12 | HV FKA 114 |
| 12 | 300 | 8 | 245 | 374 | 338 | 88 | 236 | 76 | 250 | 114 | 25600 | 12 | HV FKA 115 |

Options:

FPM seals order HV FKB ***

U = No of holes

Note: Lugged versions available to special order. Please refer to our Valve Department for further details.

Valves can be supplied as electrically or pneumatically actuated.

Further details are available in our full Valves Technical Catalogue D0894 or interactive CD. Please ask for copies.

One-step solvent cement and Eco-cleaner

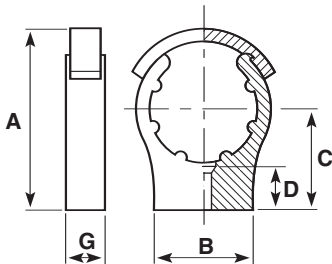


| Litres | gms | | Code | |
|--------|------------|-------------|------------|-------------|
| | ABS cement | Eco-cleaner | ABS cement | Eco-cleaner |
| 125ml* | | | 03 461 394 | |
| 0.5 | 550 | 500 | 03 461 395 | 03 457 395 |
| 1.0 | 1100 | - | 03 461 396 | - |

* 125ml size with roller-applicator

Only Durapipe ABS solvent cement and Durapipe Eco-cleaner should be used for jointing of Durapipe ABS pipework systems

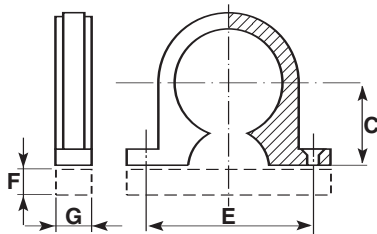
Cobra pipe clips Polypropylene



| 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.6/0BA/No 10 | 30 | 13 434 310 |
| 2 | 102 | 60 | 60 | 19 | 21 | M.6/0BA/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 | 330 | 13 434 317 |

Clips of size 1 1/4" and above are fitted with 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.10/3/8UNC | 45 | 03 455 109 |
| 4 | 65 | 156 | 13 | 38 | M.10/3/8UNC | 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

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Note: Two-dimensional Auto-CAD drawings are available on www.durapipe.co.uk



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Reducers
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Elbows 45°
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Elbows 90°
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Tees 45°, plain
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Tees 90° equal
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Tees 90°, swept plain
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Tees 90° reducing
page 38



Bends 90°
page 38



Fabricated bends 90°
page 38



Caps, plain
page 39



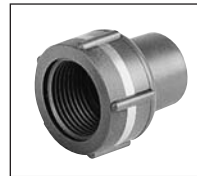
Socket unions
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Imperial/metric socket
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Male threaded adaptors
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Female threaded
adaptors
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Hose adaptors
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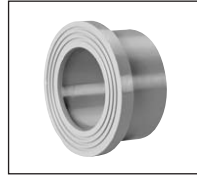
Female composite
unions page 41



Male composite unions
page 41



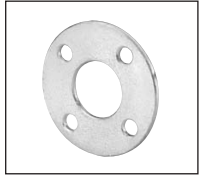
Wall brackets
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Stub flanges serrated
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Blank flanges
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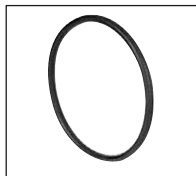
Backing rings
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Valve support plates
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VALVES



VK Double union ball valves (manual)
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VKD Double union ball valves (manual)
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EV Double union ball valves (manual)
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ML/MT/MC Multiport ball valves
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FK Butterfly valves (manual)
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One-step solvent cement and Eco-cleaner
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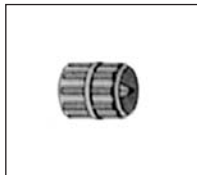
Cobra pipe clips
page 49

For details of our full range of manual and actuated valves please ask for a copy of Valves Technical Catalogue D0894.

ACCESSORIES



Pipe trays
page 49

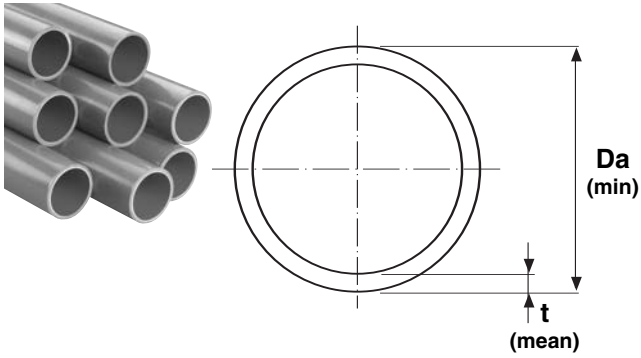


Chamfering and De-burring tools
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Wheel cutters
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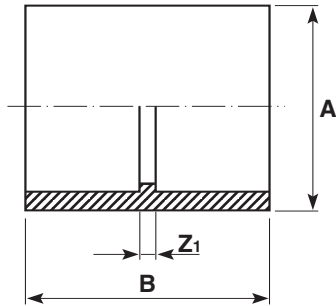
ABS Pipe Metric System plain



| PN10 | | | | |
|------|----------------|--------|--------|------------|
| Size | Thickness t | Weight | Length | Code |
| Da | mm | kg/m | m | |
| 16 | 1.5 | 0.07 | 5 | 11 555 305 |
| 20 | 1.6 | 0.10 | 5 | 11 555 306 |
| 25 | 1.9 | 0.14 | 5 | 11 555 307 |
| 32 | 2.1 | 0.21 | 5 | 11 555 308 |
| 40 | 2.7 | 0.33 | 5 | 11 555 309 |
| 50 | 3.4 | 0.52 | 5 | 11 555 310 |
| 63 | 4.2 | 0.81 | 5 | 11 555 311 |
| 75 | 5.0 | 1.14 | 5 | 11 555 312 |
| 90 | 6.0 | 1.65 | 5 | 11 555 313 |
| 110 | 7.3 | 2.45 | 5 | 11 555 314 |
| 125 | 8.2 | 3.13 | 5 | 11 555 315 |
| 140 | 9.3 | 3.97 | 5 | 11 555 316 |
| 160 | 10.5 | 5.13 | 5 | 11 555 317 |
| 200 | 13.2 | 8.06 | 5 | 11 555 318 |
| 225 | 14.8 | 10.17 | 5 | 11 555 319 |
| 250 | 16.1 | 12.31 | 5 | 11 555 320 |
| *315 | 20.8 | 20.00 | 5 | 11 555 323 |

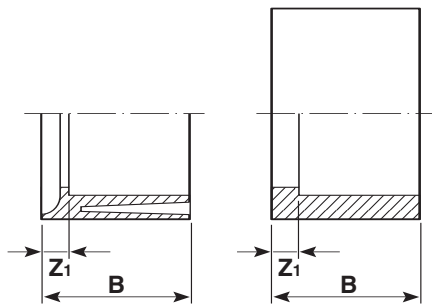
* 315mm is PN8 rated

Sockets



| Size | PN | A | B | Z ₁ | gms | Code |
|------|----|-----|-----|----------------|------|------------|
| 16 | 10 | 21 | 31 | 3 | 5 | 11 100 305 |
| 20 | 10 | 25 | 37 | 3 | 7 | 11 100 306 |
| 25 | 10 | 31 | 42 | 2 | 12 | 11 100 307 |
| 32 | 10 | 41 | 49 | 3 | 25 | 11 100 308 |
| 40 | 10 | 50 | 58 | 4 | 45 | 11 100 309 |
| 50 | 10 | 62 | 68 | 4 | 77 | 11 100 310 |
| 63 | 10 | 78 | 81 | 4 | 154 | 11 100 311 |
| 75 | 10 | 88 | 93 | 3 | 230 | 11 100 312 |
| 90 | 10 | 107 | 108 | 4 | 380 | 11 100 313 |
| 110 | 10 | 126 | 131 | 7 | 690 | 11 100 314 |
| 125 | 10 | 146 | 149 | 7 | 1040 | 11 100 315 |
| 140 | 10 | 171 | 163 | 7 | 1390 | 11 100 316 |
| 160 | 10 | 182 | 184 | 8 | 1660 | 11 100 317 |
| 200 | 10 | 223 | 220 | 8 | 2390 | 11 100 318 |
| 225 | 10 | 260 | 250 | 11 | 3470 | 11 100 319 |
| 250 | 10 | 286 | 272 | 10 | 5760 | 11 100 320 |
| 315 | 8 | 355 | 339 | 11 | 9780 | 11 100 323 |

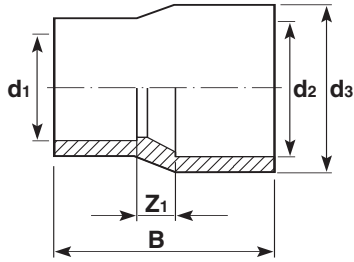
Reducing bushes



| Size | PN | B | Z ₁ | gms | Code |
|------------|----|-----|----------------|------|------------|
| 20 x 16 | 10 | 17 | 3 | 2 | 11 109 412 |
| 25 x 20 | 10 | 19 | 3 | 4 | 11 109 415 |
| 32 x 16 | 10 | 23 | 9 | 5 | 11 109 417 |
| 32 x 25 | 10 | 23 | 8 | 6 | 11 109 419 |
| 40 x 32 | 10 | 28 | 6 | 13 | 11 109 423 |
| 50 x 20* | 10 | 33 | 17 | 32 | 11 109 424 |
| 50 x 25* | 10 | 33 | 13 | 29 | 11 109 425 |
| 50 x 32* | 10 | 32 | 11 | 19 | 11 109 426 |
| 50 x 40 | 10 | 32 | 5 | 25 | 11 109 427 |
| 63 x 25* | 10 | 39 | 20 | 60 | 11 109 429 |
| 63 x 32* | 10 | 39 | 16 | 36 | 11 109 430 |
| 63 x 50 | 10 | 39 | 7 | 47 | 11 109 432 |
| 75 x 63 | 10 | 46 | 7 | 65 | 11 109 438 |
| 90 x 50* | 10 | 54 | 23 | 200 | 11 109 442 |
| 90 x 63* | 10 | 54 | 15 | 224 | 11 109 443 |
| 90 x 75 | 10 | 55 | 9 | 110 | 11 109 444 |
| 110 x 63* | 10 | 64 | 25 | 252 | 11 109 449 |
| 110 x 90 | 10 | 64 | 10 | 200 | 11 109 451 |
| 125 x 110 | 10 | 72 | 9 | 220 | 11 109 459 |
| 140 x 125 | 10 | 79 | 8 | 260 | 11 109 467 |
| 160 x 90 | 10 | 89 | 35 | 320 | 11 109 473 |
| 160 x 110* | 10 | 89 | 27 | 405 | 11 109 474 |
| 160 x 140 | 10 | 89 | 10 | 460 | 11 109 476 |
| 200 x 160 | 10 | 110 | 21 | 109 | 11 109 487 |
| 225 x 160* | 10 | 122 | 33 | 1600 | 11 109 495 |
| 225 x 200* | 10 | 122 | 13 | 1250 | 11 109 496 |
| 250 x 225* | 10 | 132 | 12 | 2230 | 11 109 499 |
| 315 x 250* | 8 | 165 | 33 | 5080 | 11 109 503 |

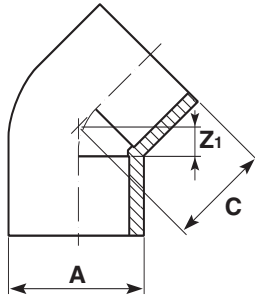
*Configuration shown in inset

Reducers



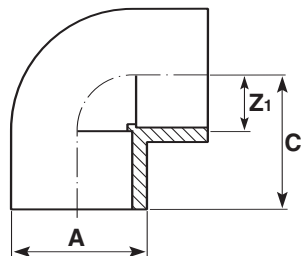
| PN | d ₃ | d ₂ | d ₁ | B | Z ₁ | gms | Code |
|----|----------------|----------------|----------------|-----|----------------|------|------------|
| 10 | 25 | 20 | 16 | 37 | 6 | 6 | 11 114 412 |
| 10 | 32 | 25 | 20 | 42 | 6 | 12 | 11 114 415 |
| 10 | 40 | 32 | 25 | 50 | 8 | 22 | 11 114 419 |
| 10 | 50 | 40 | 32 | 60 | 11 | 39 | 11 114 423 |
| 10 | 63 | 50 | 40 | 71 | 11 | 80 | 11 114 427 |
| 10 | 75 | 63 | 50 | 85 | 14 | 108 | 11 114 432 |
| 10 | 90 | 75 | 63 | 98 | 13 | 190 | 11 114 438 |
| 10 | 110 | 90 | 75 | 115 | 16 | 350 | 11 114 444 |
| 10 | 125 | 110 | 90 | 140 | 21 | 480 | 11 114 451 |
| 10 | 140 | 125 | 110 | 156 | 20 | 690 | 11 114 459 |
| 10 | 160 | 140 | 125 | 170 | 20 | 1000 | 11 114 467 |
| 10 | 200 | 160 | 140 | 193 | 23 | 2180 | 11 114 476 |
| 10 | 225 | 200 | 160 | 237 | 41 | 2530 | 11 114 487 |

Elbows 45°



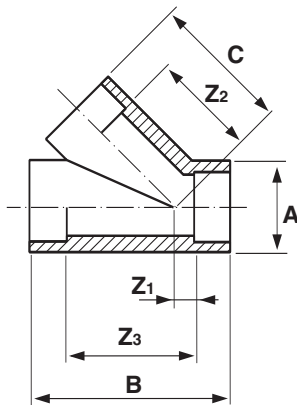
| Size | PN | A | C | Z ₁ | gms | Code |
|------|----|-----|-----|----------------|-------|------------|
| 16 | 10 | 21 | 20 | 5 | 5 | 11 119 305 |
| 20 | 10 | 25 | 22 | 5 | 7 | 11 119 306 |
| 25 | 10 | 31 | 26 | 7 | 14 | 11 119 307 |
| 32 | 10 | 40 | 31 | 8 | 27 | 11 119 308 |
| 40 | 10 | 50 | 37 | 10 | 54 | 11 119 309 |
| 50 | 10 | 62 | 45 | 13 | 100 | 11 119 310 |
| 63 | 10 | 82 | 54 | 16 | 180 | 11 119 311 |
| 75 | 10 | 90 | 63 | 17 | 300 | 11 119 312 |
| 90 | 10 | 112 | 70 | 18 | 550 | 11 119 313 |
| 110 | 10 | 137 | 90 | 27 | 950 | 11 119 314 |
| 125 | 10 | 155 | 103 | 31 | 1350 | 11 119 315 |
| 140 | 10 | 173 | 115 | 37 | 1980 | 11 119 316 |
| 160 | 10 | 190 | 125 | 35 | 2920 | 11 119 317 |
| 200 | 10 | 230 | 152 | 44 | 3460 | 11 119 318 |
| 225 | 10 | 260 | 174 | 51 | 4920 | 11 119 319 |
| 250 | 10 | 286 | 189 | 58 | 5900 | 11 119 320 |
| 315 | 8 | 359 | 230 | 66 | 11880 | 11 119 323 |

Elbows 90°



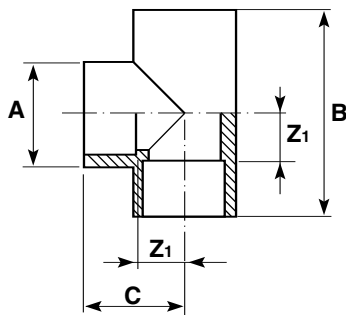
| Size | PN | A | C | Z ₁ | gms | Code |
|------|----|-----|-----|----------------|-------|------------|
| 16 | 10 | 20 | 24 | 10 | 6 | 11 115 305 |
| 20 | 10 | 25 | 28 | 11 | 10 | 11 115 306 |
| 25 | 10 | 31 | 34 | 15 | 17 | 11 115 307 |
| 32 | 10 | 40 | 41 | 18 | 35 | 11 115 308 |
| 40 | 10 | 50 | 47 | 20 | 68 | 11 115 309 |
| 50 | 10 | 62 | 59 | 26 | 129 | 11 115 310 |
| 63 | 10 | 78 | 71 | 31 | 230 | 11 115 311 |
| 75 | 10 | 90 | 83 | 38 | 385 | 11 115 312 |
| 90 | 10 | 112 | 100 | 49 | 690 | 11 115 313 |
| 110 | 10 | 136 | 125 | 63 | 1220 | 11 115 314 |
| 125 | 10 | 155 | 140 | 63 | 1720 | 11 115 315 |
| 140 | 10 | 173 | 153 | 76 | 2390 | 11 115 316 |
| 160 | 10 | 190 | 172 | 79 | 3600 | 11 115 317 |
| 200 | 10 | 231 | 219 | 110 | 4300 | 11 115 318 |
| 225 | 10 | 260 | 240 | 119 | 6550 | 11 115 319 |
| 250 | 10 | 286 | 319 | 188 | 9560 | 11 115 320 |
| 315 | 8 | 359 | 400 | 236 | 17910 | 11 115 323 |

Tees 45° plain



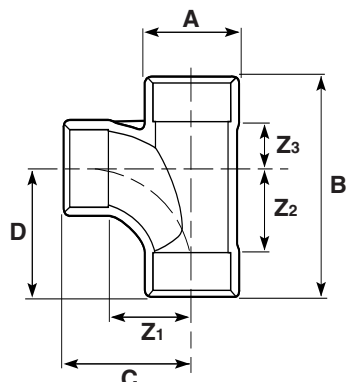
| Size | PN | A | B | C | Z ₁ | Z ₂ | Z ₃ | gms | Code |
|------|----|----|-----|-----|----------------|----------------|----------------|-----|------------|
| 20 | 10 | 28 | 68 | 43 | 6 | 26 | 34 | 30 | 11 418 306 |
| 25 | 10 | 33 | 81 | 52 | 7 | 29 | 55 | 45 | 11 418 307 |
| 32 | 10 | 41 | 98 | 65 | 9 | 42 | 52 | 80 | 11 418 308 |
| 40 | 10 | 50 | 117 | 77 | 11 | 51 | 65 | 135 | 11 418 309 |
| 50 | 10 | 60 | 140 | 95 | 12 | 63 | 78 | 195 | 11 418 310 |
| 63 | 10 | 74 | 169 | 114 | 13 | 76 | 93 | 410 | 11 418 311 |

Tees 90° equal



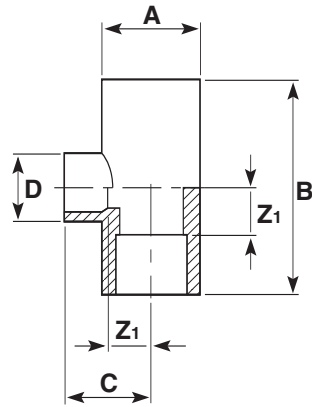
| Size | PN | A | B | C | Z ₁ | gms | Code |
|------|----|-----|-----|-----|----------------|-------|------------|
| 16 | 10 | 21 | 47 | 25 | 10 | 7 | 11 122 305 |
| 20 | 10 | 25 | 57 | 30 | 12 | 12 | 11 122 306 |
| 25 | 10 | 31 | 67 | 34 | 15 | 24 | 11 122 307 |
| 32 | 10 | 40 | 81 | 43 | 18 | 48 | 11 122 308 |
| 40 | 10 | 50 | 99 | 50 | 23 | 87 | 11 122 309 |
| 50 | 10 | 62 | 119 | 62 | 28 | 160 | 11 122 310 |
| 63 | 10 | 78 | 146 | 70 | 34 | 300 | 11 122 311 |
| 75 | 10 | 90 | 172 | 87 | 36 | 510 | 11 122 312 |
| 90 | 10 | 112 | 205 | 104 | 46 | 900 | 11 122 313 |
| 110 | 10 | 132 | 248 | 128 | 60 | 1650 | 11 122 314 |
| 125 | 10 | 154 | 276 | 143 | 67 | 2300 | 11 122 315 |
| 140 | 10 | 172 | 307 | 153 | 72 | 3200 | 11 122 316 |
| 160 | 10 | 190 | 350 | 176 | 87 | 4800 | 11 122 317 |
| 200 | 10 | 231 | 430 | 214 | 106 | 5800 | 11 122 318 |
| 225 | 10 | 259 | 480 | 239 | 120 | 7700 | 11 122 319 |
| 250 | 10 | 286 | 518 | 259 | 128 | 10160 | 11 122 320 |
| 315 | 8 | 360 | 652 | 326 | 162 | 19390 | 11 122 323 |

Tees 90° swept



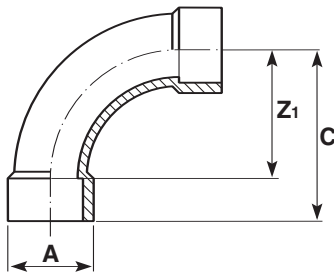
| Size | PN | A | B | C | D | Z ₁ | Z ₂ | Z ₃ | gms | Code |
|------|----|-----|-----|-----|-----|----------------|----------------|----------------|------|------------|
| 32 | 10 | 41 | 115 | 79 | 79 | 57 | 57 | 14 | 90 | 11 148 308 |
| 50 | 10 | 62 | 160 | 105 | 105 | 74 | 74 | 24 | 259 | 11 148 310 |
| 63 | 10 | 78 | 195 | 125 | 125 | 87 | 87 | 32 | 480 | 11 148 311 |
| 75 | 10 | 92 | 210 | 125 | 125 | 81 | 81 | 41 | 601 | 11 148 312 |
| 110 | 10 | 139 | 315 | 190 | 190 | 127 | 127 | 62 | 2235 | 11 148 314 |

Tees 90° reducing



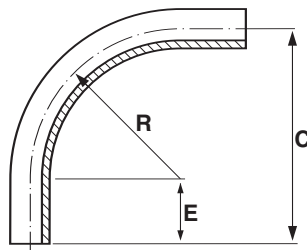
| Size | PN | A | B | C | D | Z ₁ | gms | Code |
|----------|----|-----|-----|-----|-----|----------------|------|------------|
| 25 x 20 | 10 | 31 | 67 | 31 | 25 | 14 | 22 | 11 124 415 |
| 32 x 20 | 10 | 40 | 81 | 35 | 25 | 18 | 40 | 11 124 418 |
| 32 x 25 | 10 | 40 | 81 | 37 | 31 | 18 | 41 | 11 124 419 |
| 40 x 20 | 10 | 50 | 98 | 39 | 25 | 22 | 72 | 11 124 421 |
| 40 x 25 | 10 | 50 | 98 | 41 | 31 | 22 | 72 | 11 124 422 |
| 50 x 20 | 10 | 62 | 119 | 44 | 29 | 27 | 104 | 11 124 424 |
| 50 x 25 | 10 | 62 | 119 | 46 | 31 | 27 | 140 | 11 124 425 |
| 50 x 32 | 10 | 62 | 119 | 50 | 40 | 27 | 140 | 11 124 426 |
| 63 x 25 | 10 | 78 | 146 | 53 | 31 | 34 | 250 | 11 124 429 |
| 63 x 32 | 10 | 78 | 146 | 57 | 40 | 34 | 250 | 11 124 430 |
| 75 x 32 | 10 | 91 | 168 | 62 | 41 | 40 | 391 | 11 124 435 |
| 75 x 40 | 10 | 91 | 168 | 66 | 50 | 40 | 398 | 11 124 436 |
| 75 x 50 | 10 | 91 | 168 | 71 | 61 | 40 | 406 | 11 124 437 |
| 75 x 63 | 10 | 91 | 168 | 78 | 76 | 40 | 428 | 11 124 438 |
| 90 x 40 | 10 | 109 | 198 | 74 | 50 | 48 | 642 | 11 124 441 |
| 90 x 50 | 10 | 109 | 198 | 79 | 61 | 48 | 649 | 11 124 442 |
| 90 x 63 | 10 | 109 | 198 | 86 | 76 | 48 | 664 | 11 124 443 |
| 90 x 75 | 10 | 109 | 198 | 92 | 91 | 48 | 693 | 11 124 444 |
| 110 x 50 | 10 | 133 | 244 | 92 | 61 | 61 | 1165 | 11 124 448 |
| 110 x 63 | 10 | 133 | 244 | 99 | 76 | 61 | 1173 | 11 124 449 |
| 110 x 75 | 10 | 133 | 244 | 105 | 91 | 61 | 1188 | 11 124 450 |
| 110 x 90 | 10 | 133 | 244 | 112 | 109 | 61 | 1210 | 11 124 451 |

Bends 90°



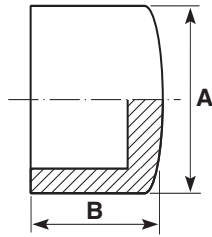
| Size | PN | A | C | Z ₁ | gms | Code |
|------|----|-----|-----|----------------|------|------------|
| 20 | 10 | 26 | 57 | 40 | 18 | 11 118 306 |
| 25 | 10 | 33 | 69 | 50 | 38 | 11 118 307 |
| 32 | 10 | 41 | 87 | 64 | 75 | 11 118 308 |
| 40 | 10 | 51 | 107 | 80 | 135 | 11 118 309 |
| 50 | 10 | 62 | 132 | 100 | 245 | 11 118 310 |
| 63 | 10 | 78 | 165 | 126 | 470 | 11 118 311 |
| 75 | 10 | 93 | 195 | 150 | 810 | 11 118 312 |
| 90 | 10 | 111 | 234 | 180 | 1350 | 11 118 313 |
| 110 | 10 | 140 | 284 | 220 | 2570 | 11 118 314 |

Fabricated bends 90°



| Size | C | E | R | gms | Code |
|------|------|-----|-----|-------|------------|
| 125 | 750 | 250 | 500 | 4790 | 11 309 315 |
| 140 | 840 | 280 | 560 | 6700 | 11 309 316 |
| 160 | 960 | 320 | 640 | 10040 | 11 309 317 |
| 200 | 1200 | 400 | 800 | 19480 | 11 309 318 |
| 225 | 1350 | 450 | 900 | 27850 | 11 309 319 |

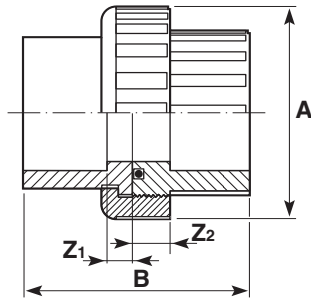
Caps plain



| Size | PN | A | B | Weight gms | Code |
|------|----|-----|----|------------|------------|
| 16 | 10 | 21 | 16 | 3 | 11 149 305 |
| 20 | 10 | 25 | 21 | 5 | 11 149 306 |
| 25 | 10 | 31 | 24 | 8 | 11 149 307 |
| 32 | 10 | 41 | 30 | 19 | 11 149 308 |
| 40 | 10 | 50 | 35 | 30 | 11 149 309 |
| 50 | 10 | 62 | 41 | 53 | 11 149 310 |
| 63 | 10 | 78 | 50 | 106 | 11 149 311 |
| 75 | 10 | 94 | 59 | 180 | 11 149 312 |
| 90 | 10 | 112 | 70 | 300 | 11 149 313 |
| 110 | 10 | 136 | 84 | 570 | 11 149 314 |

*Design changes to domed end are in progress.
Please check for up-to-date details.*

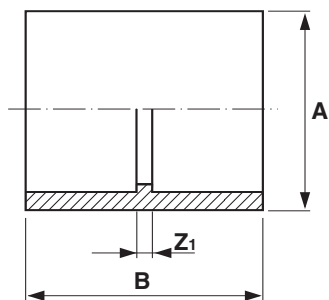
Socket unions



| Size | PN | A | B | Z ₁ | Z ₂ | Weight gms | Code |
|------|----|-----|-----|----------------|----------------|------------|------------|
| 16 | 10 | 34 | 42 | 3 | 10 | 19 | 11 205 305 |
| 20 | 10 | 40 | 47 | 3 | 10 | 29 | 11 205 306 |
| 25 | 10 | 50 | 53 | 3 | 10 | 46 | 11 205 307 |
| 32 | 10 | 57 | 64 | 8 | 11 | 70 | 11 205 308 |
| 40 | 10 | 73 | 78 | 10 | 13 | 140 | 11 205 309 |
| 50 | 10 | 80 | 92 | 13 | 15 | 154 | 11 205 310 |
| 63 | 10 | 102 | 111 | 14 | 20 | 270 | 11 205 311 |
| 75 | 10 | 135 | 107 | 8 | 13 | 720 | 11 205 312 |
| 90 | 10 | 157 | 115 | 7 | 4 | 750 | 11 205 313 |
| 110 | 10 | 183 | 138 | 8 | 7 | 1115 | 11 205 314 |

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

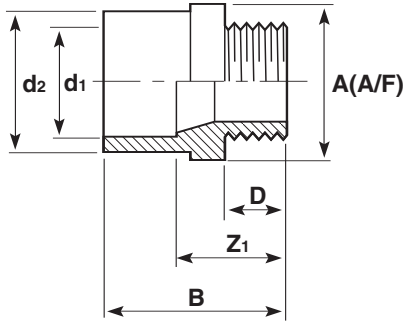
Imperial/metric socket adaptors



| Size | PN | A | B | Z ₁ | Weight gms | Code |
|-------------|----|-----|-----|----------------|------------|------------|
| *1/2 - 20 | 10 | 26 | 37 | 3 | 11 | 11 345 102 |
| *3/4 - 25 | 10 | 31 | 41 | 3 | 23 | 11 345 103 |
| *1 - 32 | 10 | 40 | 49 | 3 | 40 | 11 345 104 |
| *1 1/4 - 40 | 10 | 50 | 58 | 2 | 80 | 11 345 105 |
| *1 1/2 - 50 | 10 | 59 | 67 | 3 | 160 | 11 345 106 |
| *2 - 63 | 10 | 74 | 78 | 2 | 230 | 11 345 107 |
| *3 - 90 | 10 | 107 | 105 | 3 | 340 | 11 345 109 |
| *4 - 110 | 10 | 134 | 130 | 6 | 675 | 11 345 110 |
| *6 - 160 | 10 | 195 | 183 | 8 | 1890 | 11 345 112 |

**Sizes shown in imperial n.b. designation*

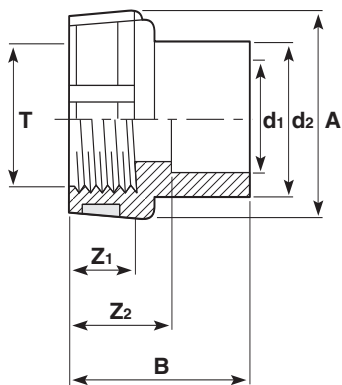
Male threaded adaptors BSP taper male thread



| Size | | PN | T* | A | B | D | Weight | | Code |
|----------------|----------------|-------|----|----|----|----|----------------|------------|------|
| d ₂ | d ₁ | | | | | | Z ₁ | gms | |
| 16- 12- | 10 | 3/8 | 19 | 35 | 11 | 22 | 7 | 11 151 331 | |
| 20- 16- | 10 | 3/8 | 24 | 38 | 12 | 24 | 7 | 11 151 332 | |
| 20- 16- | 10 | 1/2 | 24 | 42 | 15 | 28 | 7 | 11 151 333 | |
| 20- 16- | 10 | 3/4 | 30 | 46 | 16 | 28 | 8 | 11 151 327 | |
| 25- 20- | 10 | 1/2 | 30 | 46 | 15 | 28 | 13 | 11 151 334 | |
| 25- 20- | 10 | 3/4 | 30 | 48 | 16 | 31 | 14 | 11 151 335 | |
| 32- 25- | 10 | 1/2 | 36 | 51 | 15 | 32 | 23 | 11 151 352 | |
| 32- 25- | 10 | 3/4 | 36 | 52 | 16 | 33 | 23 | 11 151 336 | |
| 32- 25- | 10 | 1 | 36 | 55 | 19 | 36 | 23 | 11 151 337 | |
| 40- 32- | 10 | 1 | 46 | 58 | 20 | 36 | 36 | 11 151 338 | |
| 40- 32- | 10 | 1 1/4 | 46 | 60 | 21 | 37 | 38 | 11 151 339 | |
| 50- 40- | 10 | 1 1/4 | 55 | 66 | 22 | 39 | 70 | 11 151 340 | |
| 50- 40- | 10 | 1 1/2 | 55 | 66 | 21 | 39 | 70 | 11 151 341 | |
| 63- 50- | 10 | 1 1/2 | 72 | 73 | 22 | 41 | 115 | 11 151 342 | |
| 63- 50- | 10 | 2 | 72 | 78 | 26 | 46 | 123 | 11 151 343 | |
| 75- 63- | 10 | 2 | 80 | 84 | 26 | 46 | 150 | 11 151 345 | |

*Thread size designation

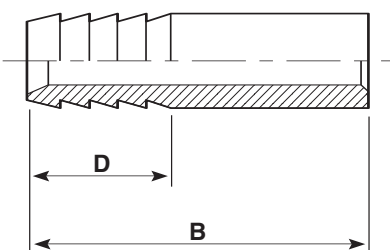
Female threaded adaptors BSP taper female threaded reinforced



| Size | | PN | T* | A | B | Z ₁ | Z ₂ | Weight | | Code |
|----------------|----------------|-------|----|----|----|----------------|----------------|------------|--|------|
| d ₂ | d ₁ | | | | | | | gms | | |
| 16- 12- | 10 | 3/8 | 24 | 28 | 11 | 16 | 7 | 11 153 331 | | |
| 20- 16- | 10 | 1/2 | 30 | 35 | 15 | 21 | 14 | 11 153 333 | | |
| 25- 20- | 10 | 3/4 | 38 | 39 | 16 | 22 | 21 | 11 153 335 | | |
| 32- 25- | 10 | 1 | 45 | 45 | 18 | 26 | 42 | 11 153 337 | | |
| 40- 32- | 10 | 1 1/4 | 56 | 54 | 21 | 31 | 69 | 11 153 339 | | |
| 50- 40- | 10 | 1 1/2 | 64 | 60 | 21 | 33 | 108 | 11 153 341 | | |
| 63- 50- | 10 | 2 | 78 | 72 | 25 | 41 | 169 | 11 153 343 | | |

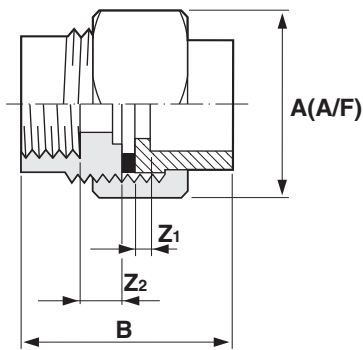
*Thread size designation

Hose adaptors spigot end



| Size | PN | B | D | Weight gms | Code |
|------|----|----|----|------------|------------|
| 16 | 10 | 60 | 25 | 8 | 11 158 305 |
| 20 | 10 | 75 | 30 | 13 | 11 158 306 |
| 25 | 10 | 80 | 35 | 20 | 11 158 307 |
| 32 | 10 | 90 | 40 | 32 | 11 158 308 |

Female composite unions ABS/Brass, BSP parallel female thread



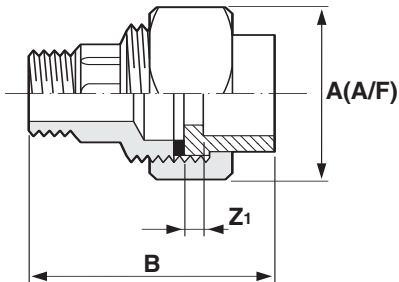
| Size | PN | A | B | Z ₁ | Z ₂ | Weight gms | Code |
|-------------|----|----|----|----------------|----------------|---------------|------------|
| 16 x 3/8* | 10 | 32 | 37 | 3 | 7 | 105 | 11 216 305 |
| 20 x 1/2* | 10 | 40 | 43 | 3 | 7 | 175 | 11 216 306 |
| 25 x 3/4* | 10 | 48 | 47 | 3 | 7 | 320 | 11 216 307 |
| 32 x 1* | 10 | 55 | 59 | 8 | 9 | 420 | 11 216 308 |
| 40 x 1 1/4* | 10 | 65 | 68 | 10 | 8 | 620 | 11 216 309 |
| 50 x 1 1/2* | 10 | 78 | 76 | 12 | 9 | 1000 | 11 216 310 |
| 63 x 2* | 10 | 88 | 89 | 12 | 11 | 1200 | 11 216 311 |

*Thread sizes designation

Fitted with brass retaining nut and EPDM rubber seal

Brass material to BS2872, WRAS approved

Male composite unions ABS/Brass, BSP taper male thread



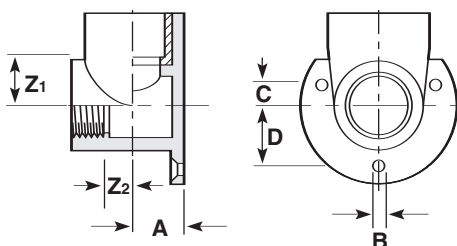
| Size | PN | A | B | Z ₁ | Z ₂ | Weight gms | Code |
|-------------|----|----|-----|----------------|----------------|---------------|------------|
| 16 x 3/8* | 10 | 32 | 48 | 3 | 9 | 100 | 11 217 305 |
| 20 x 1/2* | 10 | 40 | 54 | 3 | 9 | 165 | 11 217 306 |
| 25 x 1/4* | 10 | 48 | 74 | 3 | 10 | 250 | 11 217 307 |
| 32 x 1* | 10 | 55 | 86 | 8 | 11 | 310 | 11 217 308 |
| 40 x 1 1/4* | 10 | 65 | 94 | 10 | 11 | 450 | 11 217 309 |
| 50 x 1 1/2* | 10 | 78 | 108 | 12 | 12 | 800 | 11 217 310 |
| 63 x 2* | 10 | 88 | 126 | 12 | 14 | 950 | 11 217 311 |

*Thread sizes designation

Fitted with brass retaining nut and EPDM rubber seal

Brass material to BS2872, WRAS approved

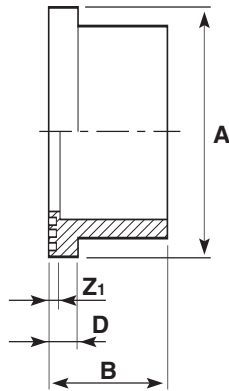
Wall brackets ABS/brass body



| Size | PN | A | B | C | D | Z ₁ | Z ₂ | Weight gms | Code |
|----------|----|------|-----|---|----|----------------|----------------|---------------|------------|
| 16- 3/8* | 10 | 15 | 4.5 | 6 | 19 | 17 | 9 | 180 | 31 422 326 |
| 20- 1/2* | 10 | 16.5 | 4.5 | 6 | 19 | 18 | 9 | 185 | 31 422 327 |
| 25- 1/2* | 10 | 20 | 4.5 | 5 | 24 | 19 | 11 | 215 | 31 422 328 |
| 25- 3/4* | 10 | 20 | 4.5 | 5 | 24 | 19 | 11 | 200 | 31 422 329 |

*Thread sizes designation

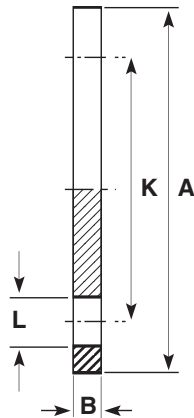
Stub flanges serrated face



| Size | PN | A | B | D | Z ₁ | gms | Code |
|------|----|-----|-----|----|----------------|------|------------|
| 16 | 10 | 29 | 17 | 6 | 3 | 5 | 11 135 305 |
| 20 | 10 | 34 | 20 | 6 | 3 | 8 | 11 135 306 |
| 25 | 10 | 41 | 22 | 7 | 3 | 13 | 11 135 307 |
| 32 | 10 | 50 | 26 | 7 | 3 | 19 | 11 135 308 |
| 40 | 10 | 61 | 30 | 8 | 3 | 36 | 11 135 309 |
| 50 | 10 | 73 | 35 | 8 | 3 | 60 | 11 135 310 |
| 63 | 10 | 90 | 42 | 9 | 4 | 100 | 11 135 311 |
| 75 | 10 | 106 | 49 | 10 | 4 | 150 | 11 135 312 |
| 90 | 10 | 125 | 59 | 11 | 6 | 240 | 11 135 313 |
| 110 | 10 | 149 | 68 | 12 | 6 | 370 | 11 135 314 |
| 125 | 10 | 165 | 76 | 13 | 5 | 520 | 11 135 315 |
| 140 | 10 | 180 | 83 | 14 | 7 | 680 | 11 135 316 |
| 160 | 10 | 205 | 93 | 16 | 5 | 930 | 11 135 317 |
| 200* | 10 | 252 | 114 | 17 | 6 | 1520 | 11 135 318 |
| 225 | 10 | 273 | 126 | 24 | 6 | 1360 | 11 135 319 |
| 250 | 10 | 306 | 140 | 20 | 9 | 2140 | 11 135 320 |
| 315 | 10 | 375 | 180 | 32 | 14 | 5000 | 11 135 323 |

*The 200mm stub flange when used in conjunction with backing ring code number 421 318 has a bolt circle diameter which matches 225 (DN 200) valves and fittings.

Blank flanges

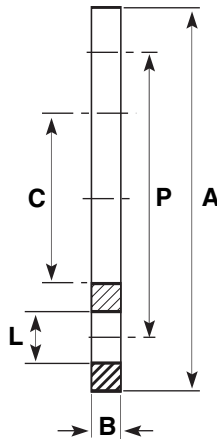


DIN 2501 16 bar/PN16

| Size | PN | A | B | K | L | No. Holes | Weight gms | Code |
|------|----|-----|----|-----|------|-----------|------------|------------|
| 32 | 10 | 116 | 13 | 85 | 14 | 4 | 139 | 11 323 308 |
| 40 | 10 | 141 | 13 | 100 | 18 | 4 | 204 | 11 323 309 |
| 50 | 10 | 153 | 13 | 110 | 18.5 | 4 | 237 | 11 323 310 |
| 63 | 10 | 166 | 19 | 124 | 18 | 4 | 447 | 11 323 311 |
| 75 | 10 | 186 | 19 | 145 | 18.5 | 4 | 568 | 11 323 312 |
| 90 | 10 | 201 | 19 | 159 | 18 | 8 | 645 | 11 323 313 |
| 110 | 10 | 221 | 26 | 180 | 18 | 8 | 715 | 11 323 314 |
| 125 | 10 | 251 | 26 | 210 | 18 | 8 | 1338 | 11 323 315 |
| 140 | 10 | 251 | 26 | 210 | 18 | 8 | 1338 | 11 323 316 |
| 160 | 10 | 286 | 27 | 240 | 23 | 8 | 1720 | 11 323 317 |

Note: Durapipe backing rings must be used in conjunction with blank flanges

Backing rings galvanised mild steel



Drilled to DIN 2501 (BS4504) PN10/PN16

| Size | A | B | C | P | L | No. Holes | Weight gms | Code |
|------|-----|----|-----|-----|----|-----------|------------|------------|
| 16 | 90 | 7 | 23 | 61 | 14 | 4 | 240 | 13 421 305 |
| 20 | 96 | 6 | 28 | 65 | 14 | 4 | 300 | 13 421 306 |
| 25 | 106 | 7 | 34 | 75 | 14 | 4 | 320 | 13 421 307 |
| 32 | 116 | 7 | 42 | 85 | 14 | 4 | 350 | 13 421 308 |
| 40 | 142 | 7 | 51 | 100 | 18 | 4 | 420 | 13 421 309 |
| 50 | 152 | 7 | 62 | 110 | 18 | 4 | 710 | 13 421 310 |
| 63 | 165 | 8 | 78 | 125 | 18 | 4 | 1010 | 13 421 311 |
| 75 | 186 | 9 | 92 | 145 | 18 | 4 | 1280 | 13 421 312 |
| 90 | 201 | 9 | 110 | 160 | 18 | 8 | 1380 | 13 421 313 |
| 110 | 220 | 9 | 133 | 180 | 18 | 8 | 1430 | 13 421 314 |
| 125 | 253 | 8 | 150 | 210 | 18 | 8 | 1960 | 13 421 315 |
| 140 | 251 | 11 | 167 | 210 | 18 | 8 | 2060 | 13 421 316 |
| 160 | 286 | 11 | 190 | 240 | 22 | 8 | 2700 | 13 421 317 |
| 200 | 340 | 11 | 235 | 295 | 22 | 12 | 3830 | 13 420 318 |
| 225 | 340 | 11 | 249 | 295 | 22 | 12 | 3190 | 13 420 319 |
| 250 | 405 | 20 | 278 | 355 | 26 | 12 | 9450 | 13 420 320 |
| 315 | 460 | 20 | 349 | 410 | 26 | 12 | 8400 | 13 420 323 |

Drilled to DIN 2501 (BS4504) PN16

| Size | A | B | C | P | L | No. Holes | Weight gms | Code |
|------|-----|----|-----|-----|----|-----------|------------|------------|
| 200 | 340 | 11 | 235 | 295 | 22 | 8 | 3830 | 13 421 318 |
| 225 | 340 | 11 | 249 | 295 | 22 | 8 | 3190 | 13 421 319 |
| 250 | 396 | 20 | 278 | 350 | 22 | 12 | 9450 | 13 421 320 |
| 315 | 448 | 20 | 349 | 402 | 22 | 12 | 8400 | 13 421 323 |

Drilled to ANSI CLASS 150

| Size | A | B | C | P | L | No. Holes | Weight gms | Code |
|------|-----|----|-----|-----|----|-----------|------------|------------|
| 20 | 90 | 8 | 28 | 61 | 16 | 4 | 300 | 13 448 306 |
| 25 | 100 | 8 | 34 | 70 | 16 | 4 | 380 | 13 448 307 |
| 32 | 110 | 9 | 42 | 79 | 16 | 4 | 480 | 13 448 308 |
| 40 | 118 | 8 | 51 | 90 | 16 | 4 | 530 | 13 448 309 |
| 50 | 129 | 8 | 63 | 99 | 16 | 4 | 590 | 13 448 310 |
| 63 | 154 | 10 | 78 | 121 | 19 | 4 | 1050 | 13 448 311 |
| 90 | 192 | 11 | 110 | 153 | 19 | 4 | 1470 | 13 448 313 |
| 110 | 230 | 11 | 133 | 190 | 19 | 8 | 2080 | 13 448 314 |

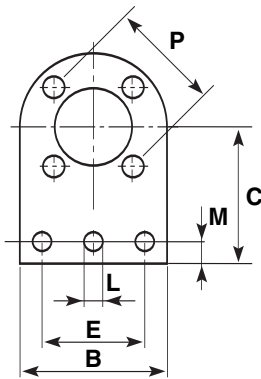
*The 200mm (NW175) stub flange supplied by Durapipe when used in conjunction with backing ring; code number 421 318 has a bolt circle diameter which matches 225mm (NW200) valves and fittings (295mm)

Flat gaskets/stub flanges



| Size | A | B | Weight gms | EPDM Code |
|------|-----|-----|---------------|--------------|
| 16 | 29 | 3.0 | 2 | 13 411 305 |
| 20 | 34 | 3.5 | 2 | 13 411 306 |
| 25 | 41 | 3.5 | 3 | 13 411 307 |
| 32 | 50 | 3.0 | 4 | 13 411 308 |
| 40 | 60 | 3.0 | 4 | 13 411 309 |
| 50 | 72 | 3.3 | 5 | 13 411 310 |
| 63 | 90 | 4.0 | 10 | 13 411 311 |
| 75 | 106 | 3.0 | 20 | 13 411 312 |
| 90 | 125 | 3.1 | 30 | 13 411 313 |
| 110 | 150 | 4.0 | 40 | 13 411 314 |
| 125 | 166 | 4.0 | 50 | 13 411 315 |
| 140 | 180 | 4.0 | 60 | 13 411 316 |
| 160 | 205 | 4.0 | 70 | 13 411 317 |
| 200 | 253 | 4.0 | 120 | 13 411 318 |
| 225 | 274 | 3.8 | 165 | 13 411 319 |
| 250 | 306 | 4.0 | 170 | 13 411 320 |
| 280 | 330 | 4.0 | 190 | 13 411 321 |
| 315 | 379 | 4.2 | 220 | 13 411 323 |

Valve support plates galvanised iron

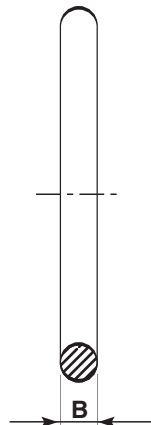


DIN 2501 16 bar/PN16

| Size | B | C | E | L | M | N | P | No. Holes | Weight gms | Code |
|------|-----|-----|-----|----|----|---|-----|--------------|---------------|------------|
| 16 | 91 | 84 | 50 | 14 | 16 | 2 | 61 | 4 | 370 | 31 459 305 |
| 20 | 97 | 86 | 49 | 14 | 16 | 2 | 65 | 4 | 640 | 31 459 306 |
| 25 | 105 | 89 | 76 | 14 | 16 | 2 | 75 | 4 | 750 | 31 459 307 |
| 32 | 114 | 96 | 77 | 14 | 12 | 2 | 85 | 4 | 860 | 31 459 308 |
| 50 | 150 | 125 | 100 | 14 | 22 | 2 | 110 | 4 | 1480 | 31 459 310 |
| 63 | 160 | 134 | 100 | 14 | 24 | 2 | 125 | 4 | 2100 | 31 459 311 |
| 75 | 185 | 144 | 125 | 14 | 22 | 2 | 145 | 4 | 2500 | 31 459 312 |
| 90 | 203 | 150 | 127 | 14 | 23 | 2 | 160 | 8 | 2660 | 31 459 313 |
| 110 | 214 | 160 | 150 | 14 | 22 | 3 | 179 | 8 | 2960 | 31 459 314 |

N = No. of holes in base

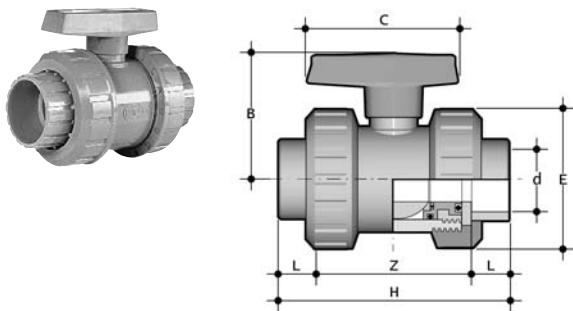
'O' ring for socket unions



| Size | B | gms | EPDM Code | Viton (FPM) Code |
|------|-----|-----|--------------|---------------------|
| 12 | 2.7 | 0.4 | 13 209 304 | 13 211 304 |
| 16 | 2.5 | 0.5 | 13 209 305 | 13 211 305 |
| 20 | 3.4 | 1 | 13 209 306 | 13 211 306 |
| 25 | 3.4 | 2 | 13 209 307 | 13 211 307 |
| 32 | 3.4 | 3 | 13 209 308 | 13 211 308 |
| 40 | 5.3 | 5 | 13 209 309 | 13 211 309 |
| 50 | 5.3 | 6 | 13 209 310 | 13 211 310 |
| 63 | 5.3 | 7 | 13 209 311 | 13 211 311 |
| 75 | 5.3 | 8 | 13 209 312 | 13 211 312 |
| 90 | 5.0 | 11 | 13 209 313 | 03 211 109 |
| 110 | 4.9 | 24 | 13 209 314 | 03 211 110 |

VALVES

VK Double union ball valves Manual – EPDM seals



| d | DN | PN | L | Z | H | E | B | C | gms | Code |
|----|----|----|----|-----|-----|-----|-----|-----|------|------------|
| 16 | 10 | 16 | 14 | 75 | 103 | 55 | 49 | 66 | 200 | HO VKA 305 |
| 20 | 15 | 16 | 16 | 71 | 103 | 55 | 49 | 66 | 195 | HO VKA 306 |
| 25 | 20 | 16 | 19 | 77 | 115 | 66 | 59 | 75 | 310 | HO VKA 307 |
| 32 | 25 | 16 | 22 | 84 | 128 | 75 | 66 | 85 | 440 | HO VKA 308 |
| 40 | 32 | 16 | 26 | 94 | 146 | 87 | 75 | 97 | 645 | HO VKA 309 |
| 50 | 40 | 16 | 31 | 102 | 164 | 100 | 87 | 110 | 880 | HO VKA 310 |
| 63 | 50 | 16 | 38 | 123 | 199 | 122 | 101 | 134 | 1490 | HO VKA 311 |

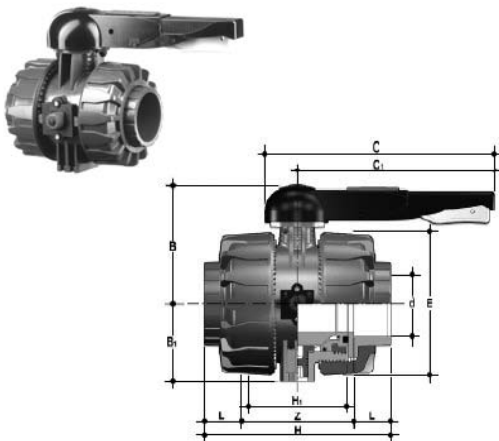
Options:

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

For threaded versions refer to Imperial Valves section

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

VKD Double union ball valves Manual – EPDM seals

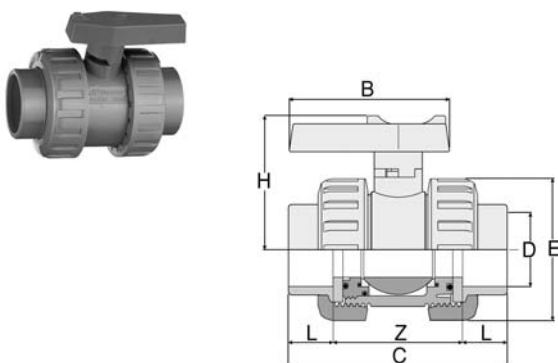


| d | DN | PN | Z | L | H | H ₁ | E | B | B ₁ | C | C ₁ | gms | Code |
|-----|-----|----|-----|----|-----|----------------|-----|-----|----------------|-----|----------------|-------|------------|
| 75 | 65 | 16 | 147 | 44 | 235 | 133 | 164 | 164 | 87 | 225 | 175 | 4380 | HO DKA 312 |
| 90 | 80 | 16 | 168 | 51 | 270 | 149 | 203 | 177 | 105 | 327 | 272 | 7200 | HO DKA 313 |
| 110 | 100 | 16 | 186 | 61 | 308 | 167 | 238 | 195 | 129 | 385 | 330 | 11141 | HO DKA 314 |

Options:

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

EV Double union ball valves Manual – EPDM seals



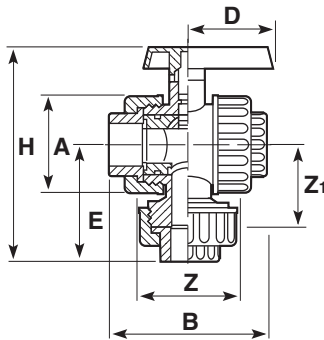
| d | DN | PN | L | Z | C | E | H | B | gms | Code |
|----|----|----|----|----|-----|-----|------|-----|-----|------------|
| 20 | 15 | 10 | 17 | 47 | 81 | 50 | 50 | 57 | 95 | HO EVA 306 |
| 25 | 20 | 10 | 19 | 51 | 95 | 59 | 55 | 66 | 156 | HO EVA 307 |
| 32 | 25 | 10 | 22 | 61 | 105 | 68 | 66.5 | 75 | 228 | HO EVA 308 |
| 40 | 32 | 10 | 31 | 84 | 146 | 96 | 93 | 103 | 540 | HO EVA 309 |
| 50 | 40 | 10 | 31 | 84 | 146 | 96 | 93 | 103 | 540 | HO EVA 310 |
| 63 | 50 | 10 | 38 | 96 | 172 | 116 | 107 | 121 | 844 | HO EVA 311 |

For threaded versions refer to Imperial Valves section

Valves can be supplied as electrically or pneumatically actuated.

Further details are available in our full Valves Technical Catalogue D0894 or interactive CD. Please ask for copies.

ML/MT/MC Multiport ball valves Plain FPM – L port



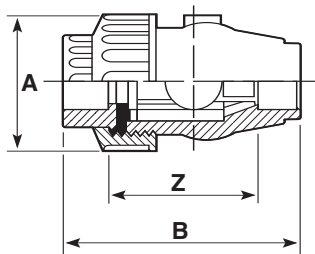
| Size | PN | Z | Z ₁ | A | B | D | E | H | gms | Code |
|------|----|-----|----------------|-----|-----|----|-----|-----|------|------------|
| 16 | 10 | 68 | 49 | 48 | 101 | 58 | 65 | 117 | 236 | HO MLB 305 |
| 20 | 10 | 68 | 49 | 48 | 101 | 58 | 65 | 117 | 221 | HO MLB 306 |
| 25 | 10 | 79 | 66 | 59 | 118 | 66 | 85 | 148 | 375 | HO MLB 307 |
| 32 | 10 | 89 | 74 | 69 | 134 | 67 | 97 | 163 | 554 | HO MLB 308 |
| 40 | 10 | 104 | 82 | 81 | 158 | 78 | 109 | 185 | 809 | HO MLB 309 |
| 50 | 10 | 107 | 98 | 96 | 167 | 88 | 128 | 228 | 1180 | HO MLB 310 |
| 63 | 10 | 125 | 109 | 113 | 197 | 88 | 145 | 248 | 1828 | HO MLB 311 |

Options: T Port C Port
 Plain FPM HO MTB *** HO MCB ***
 For threaded versions refer to Imperial Valves section

| Size | Position 1 0° | Position 2 90° | Position 3 180° | Operation |
|------|------------------|-------------------|--------------------|--|
| L | | | | Diverting and isolation |
| T | | | | Diverting or mixing |
| C | | | | Diverting and mixing (has transflow position 10° to 80°) |

◀ = flow

SR Single union ball check valves Plain ends – EPDM seals

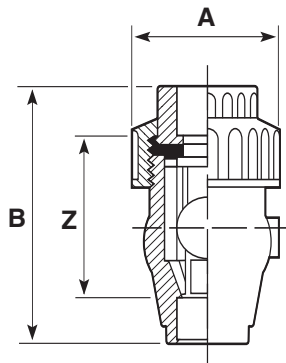


| Size | PN | Z | A | B | gms | Code |
|------|----|-----|-----|-----|------|------------|
| 16 | 10 | 62 | 48 | 95 | 109 | HO SRA 305 |
| 20 | 10 | 62 | 48 | 95 | 100 | HO SRA 306 |
| 25 | 10 | 73 | 59 | 112 | 165 | HO SRA 307 |
| 32 | 10 | 79 | 69 | 124 | 250 | HO SRA 308 |
| 40 | 10 | 94 | 96 | 148 | 610 | HO SRA 309 |
| 50 | 10 | 88 | 96 | 148 | 575 | HO SRA 310 |
| 63 | 10 | 105 | 103 | 177 | 798 | HO SRA 311 |
| 90 | 10 | 114 | 178 | 215 | 2757 | HO SRA 313 |

Options: FPM seals (plain ends) order HOSRB ***
 For threaded versions refer to Imperial Valves section

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

VA Air release valves Plain ends – FPM seals

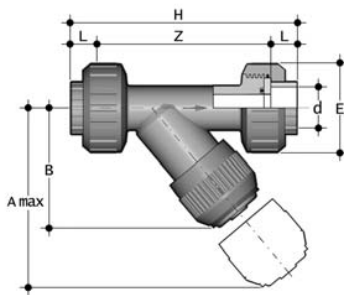


| Size | PN | Z | A | B | gms | Code |
|------|----|-----|-----|-----|-----|------------|
| 16 | 10 | 62 | 48 | 95 | 109 | HO VAB 305 |
| 20 | 10 | 62 | 48 | 95 | 100 | HO VAB 306 |
| 25 | 10 | 73 | 59 | 112 | 165 | HO VAB 307 |
| 32 | 10 | 79 | 69 | 124 | 250 | HO VAB 308 |
| 40 | 10 | 94 | 96 | 148 | 610 | HO VAB 309 |
| 50 | 10 | 88 | 96 | 148 | 575 | HO VAB 310 |
| 63 | 10 | 105 | 103 | 177 | 798 | HO VAB 311 |

Options:

For threaded versions refer to Imperial Valves section

RV Y Type strainers Plain ends – EPDM seals



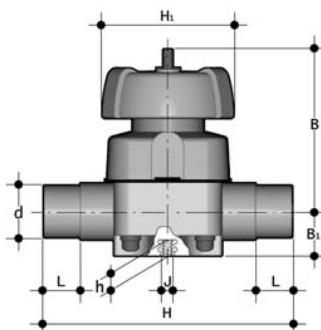
| D | DN | PN | A | B | E | L | Z | H | Fig. | gms | Code | |
|-----------------|----|----|----|-----|-----|-----|----|-----|------|-----|------|------------|
| Grey Trans. max | | | | | | | | | | | | |
| 20 | 15 | 16 | 16 | 125 | 72 | 55 | 16 | 103 | 135 | A | 211 | HO UVA 306 |
| 25 | 20 | 16 | 16 | 145 | 84 | 66 | 19 | 120 | 158 | A | 358 | HO UVA 307 |
| 32 | 25 | 16 | 16 | 165 | 95 | 75 | 22 | 132 | 176 | A | 256 | HO UVA 308 |
| 40 | 32 | 16 | 10 | 190 | 111 | 87 | 26 | 155 | 207 | A | 733 | HO UVA 309 |
| 50 | 40 | 16 | 20 | 210 | 120 | 100 | 31 | 181 | 243 | A | 1095 | HO UVA 310 |
| 63 | 50 | 16 | 10 | 240 | 139 | 120 | 38 | 222 | 298 | A | 1843 | HO UVA 311 |

Options:

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

For threaded versions refer to Imperial Valves section

VM Diaphragm valves Manual – EPDM seals



| d | DN | PN | B | B ₁ | H | h | H ₁ | J | L | gms | Code |
|-----|-----|----|-----|----------------|-----|----|----------------|-----|----|-------|------------|
| 20 | 15 | 10 | 95 | 26 | 124 | 12 | 90 | M6 | 16 | 700 | HO VMA 406 |
| 25 | 20 | 10 | 95 | 26 | 144 | 12 | 90 | M6 | 19 | 700 | HO VMA 407 |
| 32 | 25 | 10 | 95 | 26 | 154 | 12 | 90 | M6 | 23 | 700 | HO VMA 408 |
| 40 | 32 | 10 | 126 | 40 | 174 | 18 | 115 | M8 | 27 | 1500 | HO VMA 409 |
| 50 | 40 | 10 | 126 | 40 | 194 | 18 | 115 | M8 | 32 | 1500 | HO VMA 410 |
| 63 | 50 | 10 | 148 | 40 | 224 | 18 | 140 | M8 | 39 | 2400 | HO VMA 411 |
| 75 | 65 | 10 | 225 | 55 | 284 | 23 | 215 | M12 | 44 | 7000 | HO VMA 412 |
| 90 | 80 | 10 | 225 | 55 | 300 | 23 | 215 | M12 | 51 | 7000 | HO VMA 413 |
| 110 | 100 | 10 | 295 | 69 | 350 | 23 | 250 | M12 | - | 10500 | HO VMA 414 |

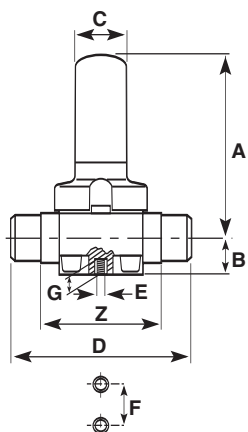
Options:

FPM diaphragm order HO VMB ***

PTFE diaphragm order HO VMC ***

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

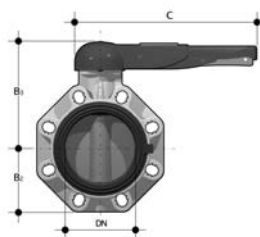
PR Pressure relief valves EPDM seals



| Size | PN | Z | A | B | C | D | E | F | G | gms | Code |
|------|----|-----|-----|------|----|-----|----|------|----|------|------------|
| 20 | 10 | 92 | 143 | 20.5 | 35 | 124 | M6 | 25 | 12 | 700 | HO PRA 406 |
| 25 | 10 | 106 | 143 | 20.5 | 35 | 144 | M6 | 25 | 12 | 700 | HO PRA 407 |
| 32 | 10 | 108 | 143 | 25.0 | 35 | 154 | M6 | 25 | 12 | 700 | HO PRA 408 |
| 40 | 10 | 120 | 204 | 36.0 | 50 | 174 | M8 | 44.5 | 16 | 1500 | HO PRA 409 |
| 50 | 10 | 130 | 204 | 39.5 | 50 | 194 | M8 | 44.5 | 16 | 1500 | HO PRA 410 |
| 63 | 10 | 146 | 219 | 49.0 | 50 | 224 | M8 | 44.5 | 16 | 2400 | HO PRA 411 |

Options:
FPM seals order HO PRB ***

FK Butterfly valves Glass reinforced polypropylene with ABS disc



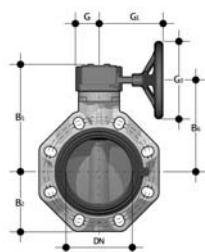
lever operated

| d | DN | PN | B ₂ | B ₃ | C | C ₁ | gms | U | Z | Code |
|-----|-----|----|----------------|----------------|-----|----------------|------|---|----|------------|
| 50 | 40 | 16 | 60 | 137 | 175 | 100 | 900 | 4 | 33 | HO FKA 106 |
| 63 | 50 | 16 | 70 | 143 | 175 | 100 | 1080 | 4 | 43 | HO FKA 107 |
| 75 | 65 | 10 | 80 | 164 | 272 | 110 | 1470 | 4 | 46 | HO FKA 108 |
| 90 | 80 | 10 | 93 | 178 | 272 | 110 | 1870 | 8 | 49 | HO FKA 109 |
| 110 | 100 | 10 | 107 | 192 | 272 | 110 | 2220 | 8 | 56 | HO FKA 110 |
| 140 | 125 | 10 | 120 | 212 | 330 | 110 | 3100 | 8 | 64 | HO FKA 111 |
| 160 | 150 | 10 | 134 | 225 | 330 | 110 | 3850 | 8 | 70 | HO FKA 112 |
| 225 | 200 | 10 | 161 | 272 | 420 | 122 | 6750 | 8 | 71 | HO FKA 113 |

Options:
FPM seals order HO FKB ***

U = No. of holes

with gear box



| Size | DN | PN | B ₁ | B ₂ | B ₃ | G | G ₁ | G ₂ | G ₃ | gms | U | Z | Code |
|------|-----|----|----------------|----------------|----------------|----|----------------|----------------|----------------|-------|----|-----|------------|
| 75 | 65 | 10 | 80 | 174 | 146 | 48 | 135 | 39 | 125 | 2400 | 4 | 46 | HV FKA 108 |
| 90 | 80 | 10 | 93 | 188 | 160 | 48 | 135 | 39 | 125 | 2800 | 8 | 49 | HV FKA 109 |
| 110 | 100 | 10 | 107 | 202 | 174 | 48 | 135 | 39 | 125 | 3150 | 8 | 56 | HV FKA 110 |
| 140 | 125 | 10 | 120 | 222 | 194 | 48 | 144 | 39 | 200 | 4450 | 8 | 64 | HV FKA 111 |
| 160 | 150 | 10 | 134 | 235 | 207 | 48 | 144 | 39 | 200 | 5200 | 8 | 70 | HV FKA 112 |
| 225 | 200 | 10 | 161 | 287 | 256 | 65 | 204 | 60 | 200 | 9300 | 8 | 71 | HV FKA 113 |
| 250 | 250 | 10 | 210 | 317 | 281 | 88 | 236 | 76 | 250 | 18600 | 12 | 114 | HV FKA 114 |
| 315 | 300 | 8 | 245 | 374 | 338 | 88 | 236 | 76 | 250 | 25600 | 12 | 114 | HV FKA 115 |

Options:
FPM seals order HV FKB ***

U = No. of holes

Note: Lugged versions available to special order. Please refer to our Valve Department for further details.

Valves can be supplied as electrically or pneumatically actuated.

Further details are available in our full Valves Technical Catalogue D0894 or interactive CD. Please ask for copies.

One-step solvent cement and Eco-cleaner

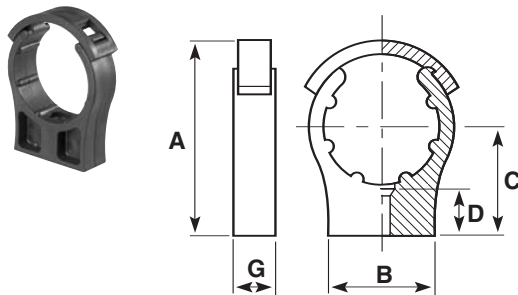


| Litres | gms | | Code | Code |
|--------|------------|-------------|------------|-------------|
| | ABS cement | Eco-cleaner | ABS cement | Eco-cleaner |
| 125ml* | | | 03 461 394 | |
| 0.5 | 550 | 500 | 03 461 395 | 03 457 395 |
| 1.0 | 1100 | - | 03 461 396 | - |

* 125ml size with roller-applicator

Only Durapipe ABS solvent cement and Durapipe Eco-cleaner should be used for jointing of Durapipe ABS pipework systems

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/OBA/No 10 | 30 | 13 434 310 |
| 63 | 102 | 60 | 60 | 19 | 21 | M6/OBA/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 | 204 | 144 | 132 | 40 | 40 | M8 | 237 | 13 434 315 |
| 140 | 211 | 156 | 132 | 40 | 40 | M8 | 252 | 13 434 316 |
| 160 | 243 | 170 | 150 | 40 | 40 | M8 | 330 | 13 434 317 |

*Without retaining clips. Bolts/screws not supplied

ACCESSORIES

Pipe trays



| Pipe diameter mm | Standard length in metres | Standard pack quantity in metres | Product code |
|------------------|---------------------------|----------------------------------|--------------|
| 16 | 3 | 90 | FT 55 50 04 |
| 20 | 3 | 60 | FT 55 50 06 |
| 25 | 3 | 36 | FT 55 50 08 |
| 32 | 3 | 27 | FT 55 50 11 |

Chamfering and De-burring tools



| Description | Product code |
|--|--------------|
| E 16-25mm pipe inner and outer milling cutter tool | FT 55 72 90 |
| E 16-63mm pipe inner and outer milling cutter tool | FT 55 65 12 |
| 32-160mm chamfering tool | FT 55 05 10 |

Wheel cutters

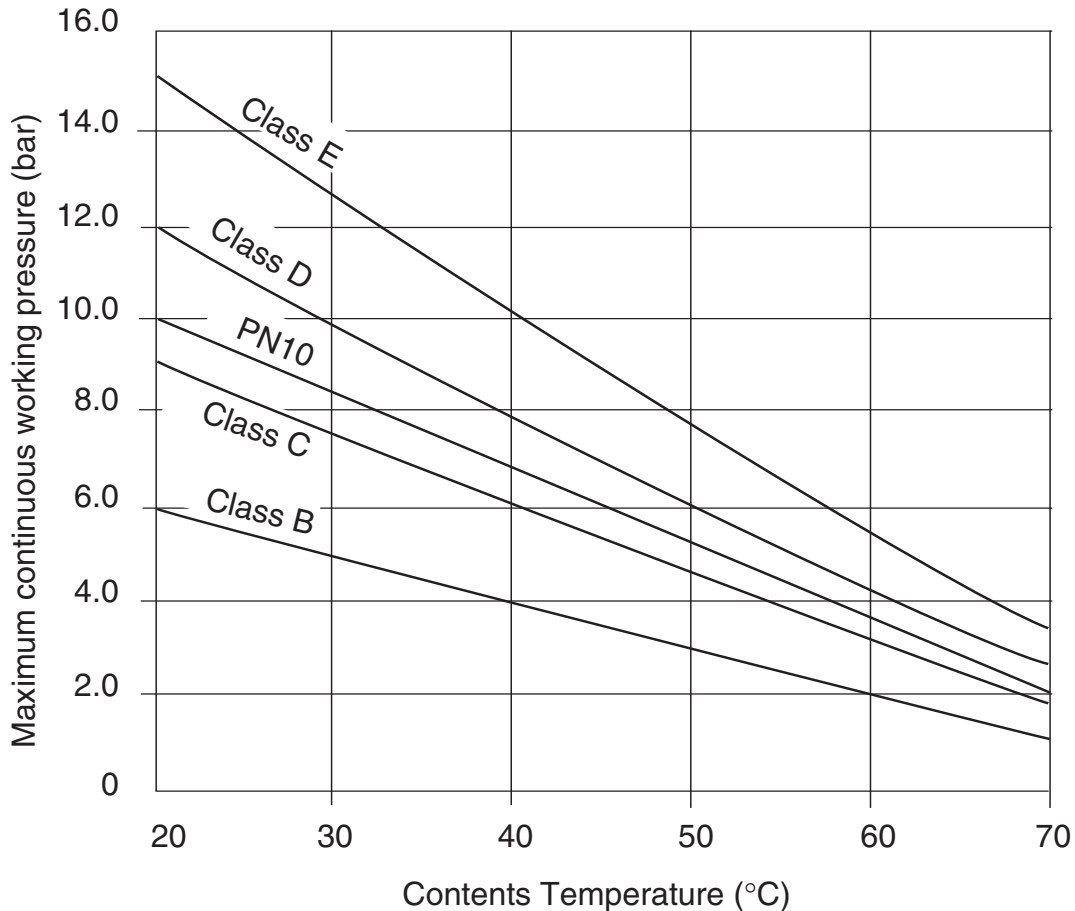


| Description | Product code |
|-----------------------------|--------------|
| 16-63mm pipe cutter | FT 80 00 01 |
| 50-125mm pipe cutter | FT 80 00 03 |
| 16-63mm spare cutter wheel | FT 80 00 02 |
| 50-125mm spare cutter wheel | FT 80 00 04 |

Technical Information

Maximum Pressure/Temperature Relationship

When temperature of contents exceeds 20°C the working pressure of the system must be reduced accordingly (see table below).



Flow Calculations

Pressure drop due to friction in pipes conveying water can be determined using the Flow Nomogram on page 51.

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

Classes C to E in accordance with BS 5391 Part 1

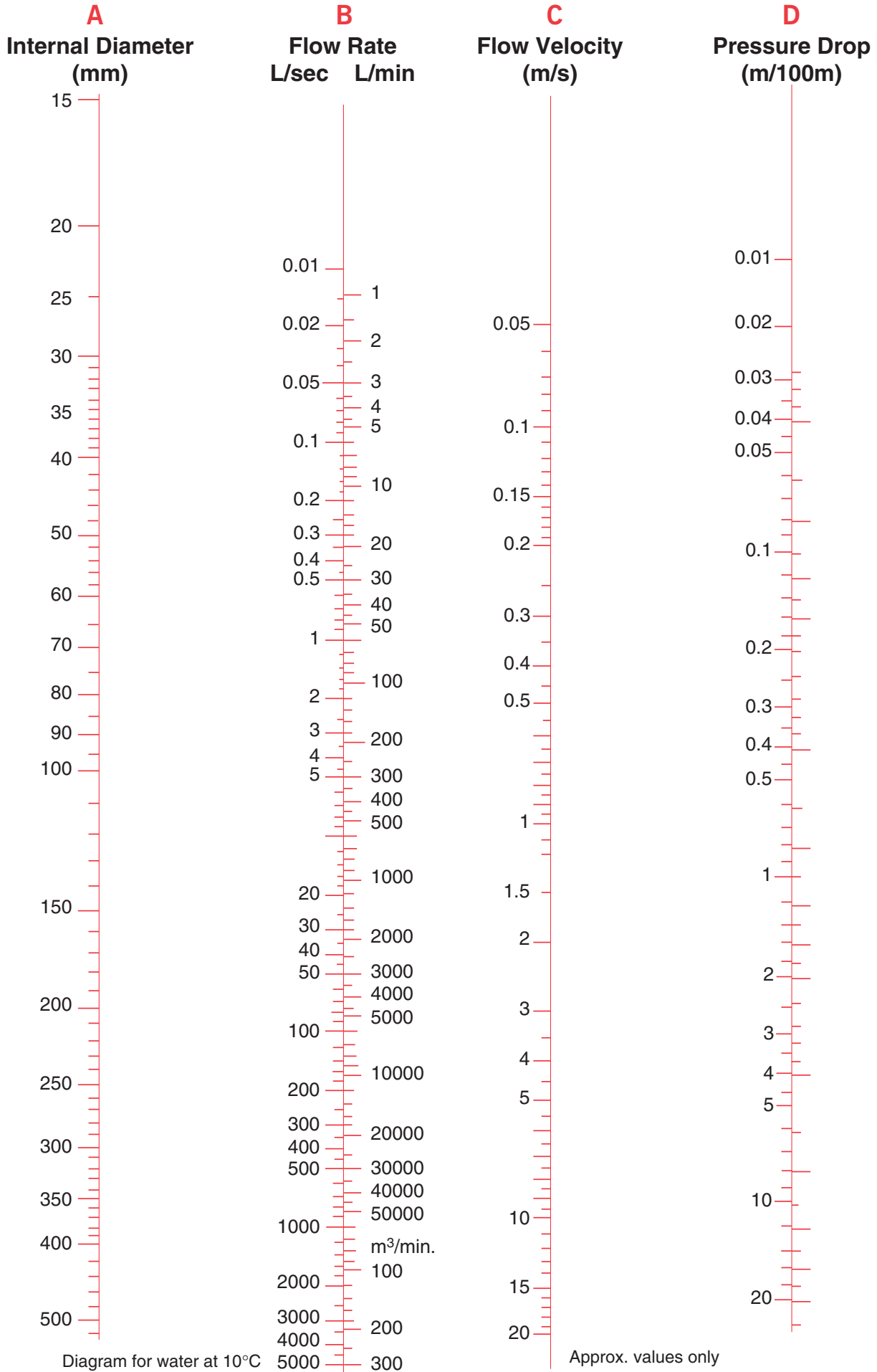
In accordance with ISO 161

| Imperial | Class B | Class C | Class D | Class E | Class T | Metric | 10bar |
|----------|---------|---------|---------|---------|---------|--------|-------|
| 3/8" | | | | 13.7 | 9.9 | 16 | 13.0 |
| 1/2" | | | | 17.6 | 13.8 | 20 | 17.0 |
| 3/4" | | | | 22.3 | 19.1 | 25 | 21.2 |
| 1" | | 29.6 | | 28.6 | 24.6 | 32 | 27.2 |
| 1 1/4" | | | 37.2 | 36.2 | 31.4 | 40 | 34.0 |
| 1 1/2" | | | 42.7 | 41.5 | 35.9 | 50 | 42.6 |
| 2" | | 54.7 | 53.5 | 51.9 | 45.5 | 63 | 53.6 |
| 2 1/2" | | 65.0 | | | | 75 | 65.0 |
| 3" | | 81.3 | 78.9 | 76.5 | | 90 | 78.0 |
| 4" | | 104.5 | 101.3 | 98.5 | | 110 | 95.4 |
| - | | | | | | 125 | 108.6 |
| 5" | | 121.4 | | | | 140 | 121.4 |
| 6" | | 154.1 | 149.3 | 144.9 | | 160 | 139.0 |
| 8" | | 193.7 | | | | 200 | 173.6 |
| - | | | | | | 225 | 195.4 |
| 10" | 250.9 | | | | | 250 | 217.8 |
| 12" | 297.7 | | | | | 315* | 273.4 |

Note: Dimensions are given for guidance only, please contact our Technical Support Department for accurate information

315mm is PN8 rated

Flow Nomogram



Approx. values only

Technical Information

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= equivalent pipe length (metres)

F= fittings constant (see table below)

D= fitting internal diameter (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

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

Supports/Brackets

The hanger type of support does not normally provide lateral restraint to the pipe and can encourage snaking. If hanger rods are used they should be made as rigid as possible and must allow free axial pipe movement.

All steel brackets in contact with the plastic system should be free of sharp edges to avoid damage to the pipe.

Clips

Any pipe clips used in conjunction with Durapipe ABS should allow free axial pipe movement and afford lateral restraint.

The Cobra pipe clips from Durapipe meet these requirements.

A suitable alternative would be fabricated mild steel saddle clips, designed with a clearance between pipe and clip.

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.

Utilize 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 (mm)
 α = coefficient of linear expansion
 ΔT = temperature difference of the pipe ($^{\circ}\text{C}$)

The coefficient of linear expansion for ABS: 10×10^{-5} per deg C

Rule of thumb: ABS expands/contracts 1mm/metre/10 deg C temperature change:

Example:

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

Expansion:

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

$$\begin{aligned} \text{Expansion} &= 30,000 \times 10 \times 10^{-5} \times 20^{\circ}\text{C} \\ &= \underline{60\text{mm}} \end{aligned}$$

Contraction:

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

$$\begin{aligned} \text{Contraction} &= 30,000\text{mm} \times 10 \times 10^{-5} \times 10^{\circ}\text{C} \\ &= \underline{30\text{mm}} \end{aligned}$$

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 90mm with an expansion of 60mm and a contraction of 30mm.

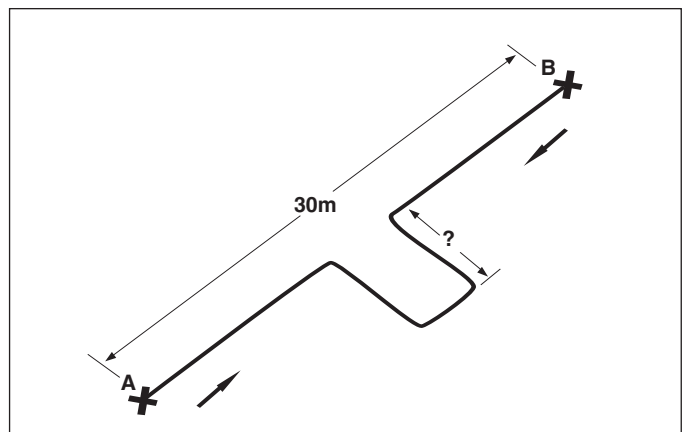
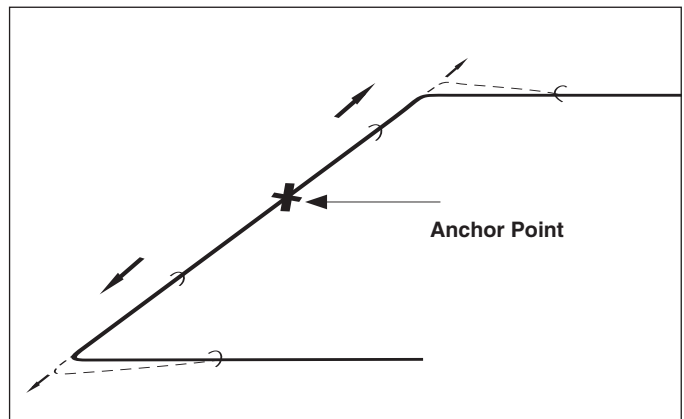
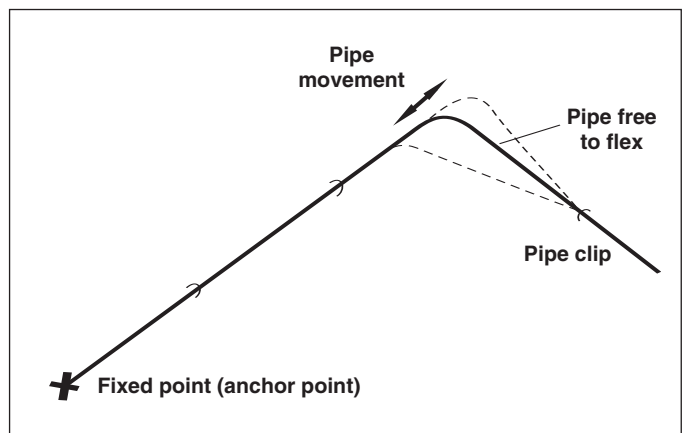
Catering for pipe movement

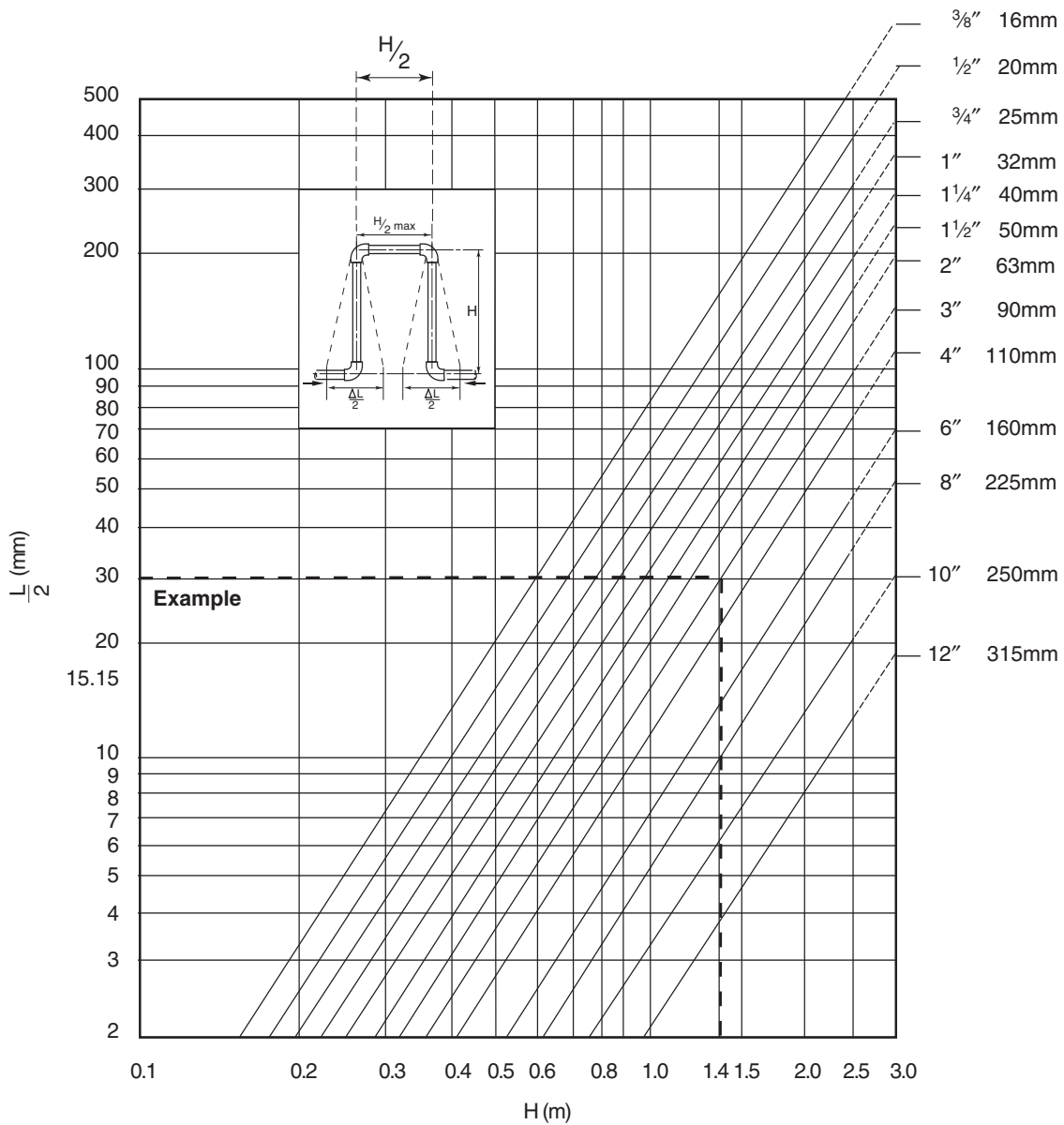
Systems installed above ground should be designed to ensure that there are sufficient changes in direction to accommodate expansion and contraction. The support method described later will ensure that the pipework can move axially without snaking.

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 60mm and contracting 30mm:

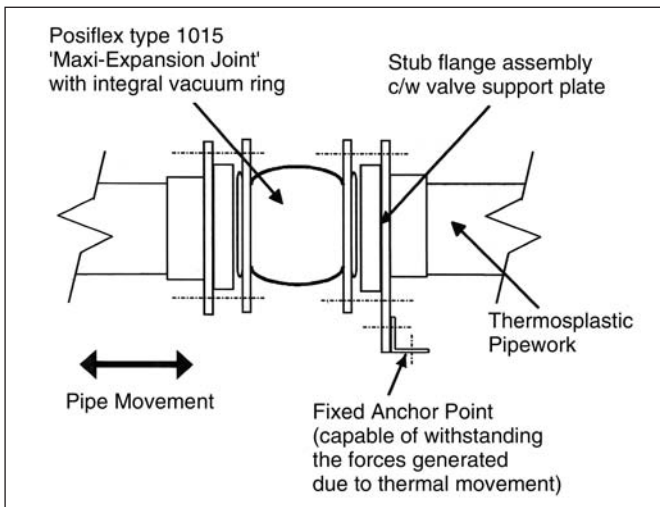
Based on the worst case ie. 60mm expansion, $\frac{\Delta L}{2} = 30\text{mm}$

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 1400mm long x 700mm wide will cater for $\pm 60\text{mm}$ movement i.e. the loop will cater for both the expansion and contraction of the pipe.

Expansion bellows

Rubber expansion bellows may also be used in place of utilising the natural flexibility of the ABS. These must be of a suitable design to ensure correct operation with ABS pipework. Bellows must be installed in accordance with manufacturers recommendations.



Design of 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 ABS 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 ABS pipes filled with water is given in the table below. This table is based on the thinnest wall pipe in each size. For sizes 1", 1 1/4", 1 1/2", 2", 3" and 4" the support distance can be increased by 10% for class E pipes. Where the contents have a specific gravity greater than 1, the distance must be decreased by dividing the recommended centre distances by the specific gravity. The details shown are for horizontal pipes. For vertical pipes, support centres may be increased by 50%.

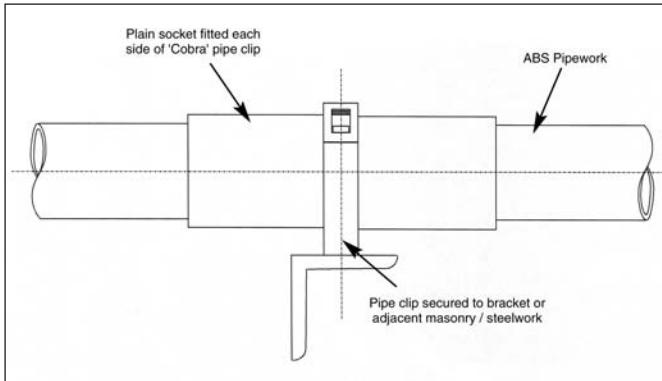
| Size mm/imperial | Support distance (m) at 20°C | Support distance (m) at 50°C | Support distance (m) at 70°C |
|---------------------|------------------------------------|------------------------------------|------------------------------------|
| 16mm / 3/8" | 0.8 | 0.5 | 0.4 |
| 20mm / 1/2" | 0.9 | 0.6 | 0.5 |
| 25mm / 3/4" | 1.0 | 0.7 | 0.6 |
| 32mm / 1" | 1.1 | 0.8 | 0.7 |
| 40mm / 1 1/4" | 1.2 | 0.9 | 0.7 |
| 50mm / 1 1/2" | 1.3 | 1.0 | 0.7 |
| 63mm / 2" | 1.4 | 1.1 | 0.8 |
| 75mm / 2 1/2" | 1.5 | 1.2 | 0.8 |
| 90mm / 3" | 1.6 | 1.2 | 0.9 |
| 110mm / 4" | 1.8 | 1.3 | 1.0 |
| 125mm | 1.9 | 1.4 | 1.0 |
| 140mm / 5" | 2.0 | 1.5 | 1.1 |
| 160mm / 6" | 2.1 | 1.6 | 1.2 |
| 200mm | 2.2 | 1.7 | 1.3 |
| 225mm / 8" | 2.3 | 1.8 | 1.5 |
| 250mm | 2.5 | 2.0 | 1.7 |
| 280mm / 10" | 2.7 | 2.2 | 1.9 |
| 315mm / 12" | 2.9 | 2.4 | 2.1 |

Pipe trays are available for sizes 16mm, 20mm, 25mm and 32mm (see page 49). These allow support distances to be increased to 2.0 metres

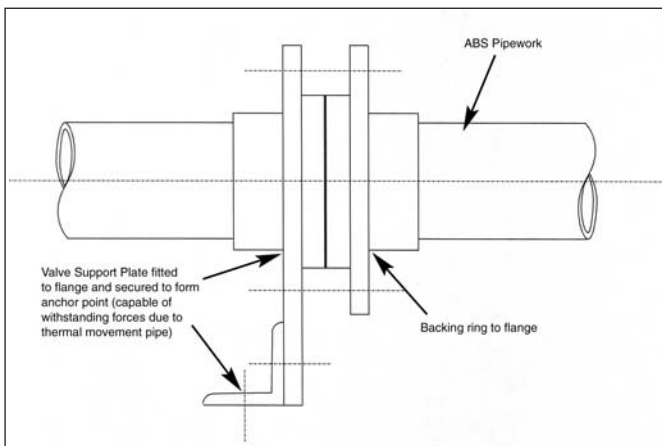
Pipe anchors

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 should not be used since damage to the pipe could occur.

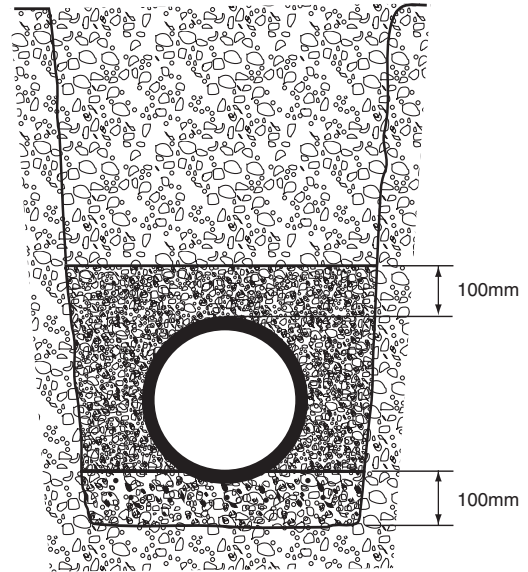
Construction of typical anchor points



1. Small Bore (up to 4" Pipework)



2. Larger pipe (above 4" Pipework)



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.

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 at all sudden 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.

Pressure surges

Durapipe ABS 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 54.

Additional Important Information

Support of heavy equipment

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



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.

Threaded connections

A range of threaded fittings is available. If it is required to cut a thread on to Durapipe ABS 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 T pipe must be used. Pipes from Durapipe ABS metric range are not suitable for threading.

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

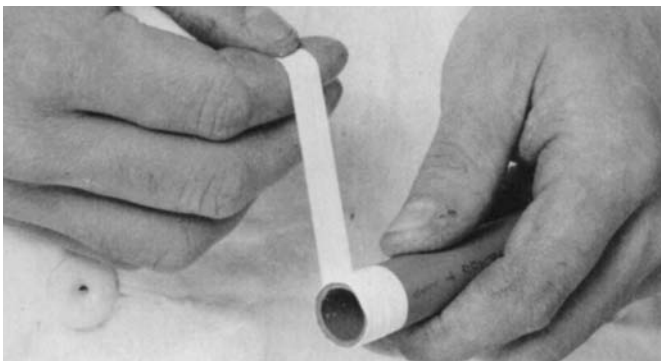
Extra care must be taken not to overtighten or damage the thread.

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 as being suitable.

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



Warning:

• Thermal insulation and trace heating

Whilst Durapipe ABS piping systems have low thermal conductivity, situations may arise when trace heating and/or thermal insulation will be required.

Some insulation products can contain substances capable of having a detrimental effect on thermoplastic pipework. It is recommended therefore that suitability be checked with Durapipe prior to use.

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

Fibre wool, such as 'Rockwool'

Armaflex Class 1 HT

Koolphen K Phenolic foam

Polystyrene

Note - the above list is not exclusive – please contact our Technical Support Department if further assistance is required.

Certain types of foam rubber insulations can cause pipes to fracture where the ABS is conveying liquids at temperatures above 30°C. Some adhesives can also be detrimental. Do not bond insulation to ABS. (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.

• Intumescent mastic and mastic sealants

Certain mastic sealants are formulated with phthalates.

Phthalates are known to be extremely aggressive toward ABS materials, and therefore confirmation of the suitability of any mastic sealant should be determined before being used in conjunction with ABS 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 ABS pipe. Please check for suitability before use.

We strongly recommend the use of Durapipe Cobra clips for pipe sizes up to and including 160mm OD / 6"NB, wherever circumstances allow.

• Contact with synthetic oils

Some synthetic oils are unsuitable for use with thermoplastic pipe systems. The main types of synthetic oils identified as being incompatible with thermoplastic pipe systems includes Esters, Polyalkylene Glycols, and Organic Phosphates.

It should be noted that some metal coil manufacturers utilise these oils in their manufacturing process and that some residue can remain within the coil after production.

• Freezing conditions

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

Durapipe ABS Jointing Guide

Durapipe ABS pipes and fittings are designed for an interference fit. Although Durapipe ABS 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 ABS 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.



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. Stir or shake the Durapipe cement thoroughly before use.



6. Using a clean brush (0.5/1 litre tins) or integral applicator (125ml container), apply cement to the pipe and fitting. The joint surfaces should be completely covered by cement. The use of the integral applicator should be limited to pipe sizes up to and including 1/32mm. For larger pipe sizes, 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 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.



7. Immediately after applications of cement, push pipe fully home into the fitting. Do not twist. Hold the pipe and the fitting for times varying from a few seconds on sizes 3/8" or 16mm up to 1 minute on sizes 12" or 315mm 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.



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



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



10. Do not disturb a joint for least 10 minutes. On larger sizes do not subject the joint to bending or twisting forces for at least 4 hours (see below). When making subsequent joints, which can be done without waiting, take care not to transmit forces to freshly made joints in the system.

11. Replace lids on containers.

12. Clean brush(es).

CAUTION

- 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
- DO NOT dilute or decant Durapipe ABS solvent cement
- Follow safety instructions on Durapipe solvent cement and Eco-cleaner containers
- Always wear appropriate personal protective equipment

Jointing of 10"/250mm and 12"/315mm

Two people are needed to apply cement.

Each person must have a brush, minimum size 75mm/3".

Use 1 litre tins of Durapipe ABS One-step cement.

Do not handle or subject to stress for at least 4 hours from completion of joint.

Allow joints to dry for at least 48 hours before applying pressure.

Notes

- The integrity of Durapipe ABS systems may be affected if Durapipe ABS one-step Thixotropic Durapipe Solvent and Durapipe Eco-cleaner cement is not used.
Durapipe UK disclaims responsibility for any Durapipe ABS system constructed with any other cement or not fabricated in accordance with the instructions herein.
- Use the appropriate size of solvent cement tin/container and method of application for the size of pipe and fitting to be assembled.
- To achieve the correct speed of application on sizes 5"/140mm and above, cement should be applied simultaneously to pipe and fitting, by two people.

An indication of the number of joints to be made per litre of cement is as follows:

| Size | | Recommended container size | Joints per litre ABS |
|-----------|-----------|----------------------------|----------------------|
| mm | inch | | |
| 16 - 32 | 3/8 - 1 | 125 ml. | 400 |
| 40 - 63 | 1 1/4 - 2 | 0.5 Litre | 200 |
| 75 - 110 | 2 1/2 - 4 | 0.5 Litre | 70 |
| 125 - 140 | 5 | 1 Litre | 20 |
| 160 - 225 | 6 - 8 | 1 Litre | 10 |
| 250 - 315 | 10 - 12 | 1 Litre | 5 |

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. Sizes 10" and 12"/250 mm and 315mm require a minimum of 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 | Up to 2 1/2" 75mm | 3" to 4" 90mm to 125mm | 5" & 6" 140mm & 160mm | 8" 200mm & 225mm | 10" & 12" 250mm & 315mm |
|-------------|----------------------|---------------------------|--------------------------|---------------------|----------------------------|
| Drying Time | 0.5 hour / bar | 1.0 hour / bar | 1.5 hours / bar | 2.0 hours / bar | 48 hours minimum |

Note - minimum drying period should never be less than 1 hour.

Precautions

Solvent cement and cleaners are hazardous, flammable materials. Read information on labels and take appropriate measures to minimise potential hazards.
Do not use near naked flames and avoid smoking in the working area – Durapipe ABS solvent cement is highly flammable.
Do not use cements or cleaners in confined spaces.
Concentrated vapours may cause dizziness.
Use a shelter to keep jointing surfaces dry in wet weather.

Branch Connections - reduced bore

Reduced branch connections can be made as follows:

Imperial range:

Bushed equal tees or Y pieces, solvent cemented saddles.

Metric range:

Bushed equal tees or Y pieces, reduced branch tees.

Saddles permit branch connections to be made with the main pipe in situ. The following procedure must be followed carefully:

1. Drill hole in pipe wall to suit the connection. The size of hole and cutter to be used for each size of saddle is indicated below:

| Pipe size (Imperial) | Hole diameter (mm) | Cutter size (Imperial) |
|-------------------------|-----------------------|-------------------------------|
| 2 | 48 | 1 ⁷ / ₈ |
| 3 | 61 | 2 ³ / ₈ |
| 4 | 74 | 2 ⁷ / ₈ |
| 6 | 74 | 2 ⁷ / ₈ |



2. Mark out the area covered by the saddle on the pipe.



3. Clean surfaces with Eco-cleaner.



4. Feed on to pipe two worm drive (Jubilee) clips which will clamp the saddle during fitting. These should be placed either side of the socket on the saddles. Apply cement to pipe area and saddle. **It is important to apply cement quickly.**



5. Position saddle immediately, ensuring that spigot locates in hole in pipe wall. Clamp in place using worm drive clips without delay.



6. Wipe off any excess cement.



7. Replace lids on containers.
8. Clean brush with Eco-cleaner.

Important:

1. See page 65 for details of drying times. Allow 24 hours before removing straps.
2. On no account should a branch tee be constructed by drilling through the wall of a pipe and/or fitting and attempting to solvent weld a smaller fitting into the hole.

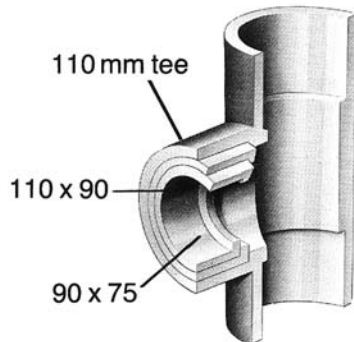
The Use of Bushes, Reducers and Threaded Adaptors

Reducing bushes

Reducing bushes offer a neat and simple method of reducing socket size in the minimum of space.

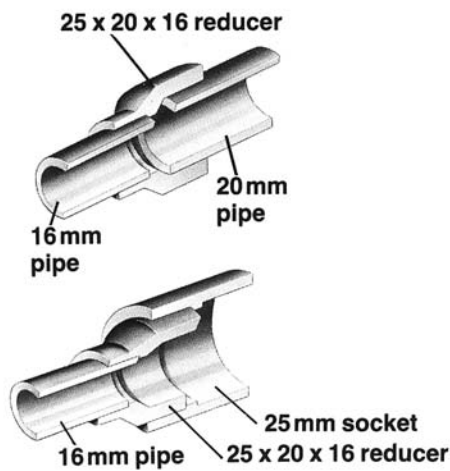
Care must be taken to properly prepare all jointing surfaces as recommended earlier, with the end of the bush being chamfered (unless a moulded chamfer is included).

Example in the use of reducing bushes



The use of reducers

All fittings have female ends, dimensionally controlled for cold fusion jointing. In addition, reducing sockets in the Metric series have controlled outside diameter at the larger end. This allows use as a male or female component, as illustrated.



Metric series threaded adaptors

Female and male threaded adaptors have controlled inside and outside diameters on the plain end. They can therefore be used as a male or female component.

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 far 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 $\pm 5^{\circ}\text{C}$, otherwise leaks may occur.

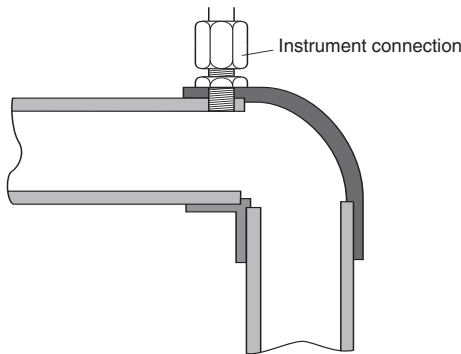
Composite unions are available with brass male or female BSP threaded adaptors.

Connection to 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 | Connection size |
|----------------------------------|---|
| 16mm-63mm/ $\frac{3}{8}$ " -2" | Use tees, reducing bushes and threaded fittings |
| 75mm-110mm/ $2\frac{1}{2}$ " -4" | Max. tapping $\frac{1}{2}$ " BSP. |
| 125mm-140mm/5" | Max. tapping $\frac{3}{4}$ " BSP. |
| 160mm & above/6" & above | Max. tapping 1" BSP. |

Such connections, if correctly drilled and tapped with full thread form will be limited to Class C /PN10 pressures.



Flanged joints

Full face flanges are available from $\frac{1}{2}$ " to 6".

Stub flanges are available from 2" to 12" and in metric sizes from 16mm to 315mm and provide a convenient means of converting from Imperial to Metric systems in sizes 8"/200mm and above.

The correct galvanised mild steel backing ring and rubber gasket must be used with both types.

Flange bolting procedure

The following procedure is recommended for installing Durapipe ABS flanges:

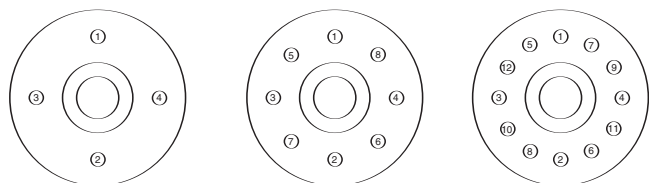
1. Inspect flange faces and ensure that they are clean and undamaged.
2. Check that the correct backing ring and rubber gaskets have been supplied. Durapipe supplies a matched system of flanges and backing rings - do not interchange Metric and Imperial components.
3. Loosely assemble flanges. Ensure 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 below) 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 tightness of all bolts is achieved.

Tightening torques for flange bolts in ABS 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 $\pm 10\%$



Comparison of ABS Imperial and Metric Sized Pipe

Tabulated below is a comparison of imperial and metric sized Durapipe ABS pipe. 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 T ABS 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 5391) | | | | | | Metric System (ISO 15493) | | | |
|--------------------------------|------------------------------------|-----------------------------|---------|---------|---------|---------------------------|----------------------------|------------------------------------|----------------------------------|
| Size (nominal bore) (imperial) | Minimum mean outside diameter (mm) | Minimum wall thickness (mm) | | | | | Size outside diameter (mm) | Minimum mean outside diameter (mm) | Minimum wall thickness (mm) PN10 |
| | | Class B | Class C | Class D | Class E | Class T | | | |
| 3/8 | 17.0 | | | | 1.6 | 3.4 | 16 | 16.0 | 1.4 |
| 1/2 | 21.2 | | | | 1.9 | 3.5 | 20 | 20.0 | 1.5 |
| 3/4 | 26.6 | | | | 2.4 | 3.5 | 25 | 25.0 | 1.8 |
| 1 | 33.4 | | 1.9 | | 3.0 | 4.2 | 32 | 32.0 | 2.0 |
| 1 1/4 | 42.1 | | 2.4 | | 3.8 | 5.1 | 40 | 40.0 | 2.5 |
| 1 1/2 | 48.1 | | 2.7 | | 4.4 | 5.8 | 50 | 50.0 | 3.2 |
| 2 | 60.2 | | 3.4 | | 5.4 | 7.0 | 63 | 63.0 | 4.0 |
| 2 1/2 | 75.0 | | 4.7 | | | | 75 | 75.0 | 4.7 |
| 3 | 88.7 | | 5.0 | | 8.06 | | 90 | 90.0 | 5.7 |
| 4 | 114.1 | | 6.4 | | 10.3 | | 110 | 110.0 | 6.9 |
| | | | | | | | 125 | 125.0 | 7.9 |
| 5 | 140.0 | | 8.8 | | | | 140 | 140.0 | 8.8 |
| 6 | 168.0 | | 9.4 | 12.3 | | | 160 | 160.0 | 10.0 |
| | | | | | | | 200 | 200.0 | 12.5 |
| 8 | 218.0 | | 12.2 | | | | 225 | 225.0 | 14.1 |
| 10 | 272.6 | 10.5 | | | | | 250 | 250.0 | 15.6 |
| 12 | 323.4 | 12.4 | | | | | 315 | 315.0 | 19.7* |

2 1/2" and 5" pipes are PN10 rated

*315mm is rated at PN8

Properties Guide

| Chemical Resistance and Performance Data | Typical Applications | Unsuitable for the Following Uses | Sizes and Jointing Information |
|---|--|--|--|
| Moderately strong mineral acids Caustic and ammoniacal solutions Most inorganic salt solutions Some detergents Temperature range -40°C to +70°C | Chilled water Low temperature brine Potable water Process water | Applications over 70°C Bleaches Solvents Domestic hot water Flammable substances | Metric; 16mm to 315mm OD Imperial: 3/8" to 12" NB Jointed by solvent cement welding Threaded fittings available |

Handling and Storage

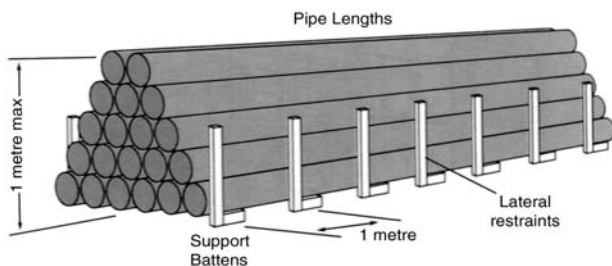
The high impact strength of Durapipe ABS systems provides some protection against damage but care should be taken at all stages of handling, transportation and storage.

Pipe must be transported by a suitable vehicle and properly loaded and unloaded, e.g., 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

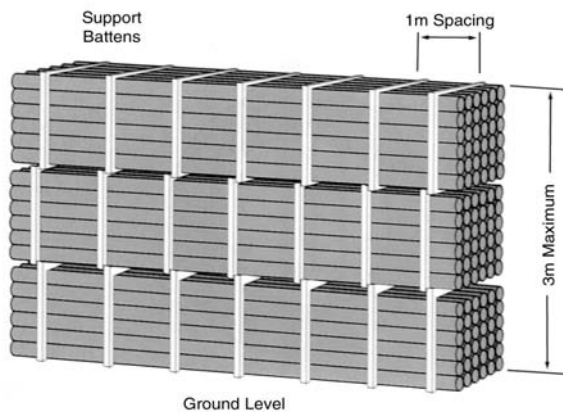
Pipe lengths stored individually should be stacked in a pyramid not more than one metre high, with the bottom layer fully restrained by wedges. Where possible, the bottom layer of pipes should be laid on timber battens at one-metre centres. On site, pipes may be laid out individually in strings. (Where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



Storage of loose pipes

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.



Storage of bundles

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.

General Information

Health and Safety at Work Act and COSHH Regulations

Attention is drawn to the requirements in the UK of this Act and to the 1988 Control of Substances Hazardous to Health (COSHH) Regulations. Durapipe 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.

Handling ABS pipes and fittings

Always adopt good storage and handling practice. Advice is available upon request.

Jointing and installation

Durapipe ABS solvent cement must be used exclusively for fabrication of the ABS system. Performance guarantees are null and void if other solvent cements are used.

Storage and installation outdoors

Care should be taken to avoid exposure to sunlight during storage. This may cause discolouration and deterioration of the ABS material. Whilst this is a surface effect only, it is recommended that precautions be taken to prevent this happening (other sources of UV light can have a similar effect).

If ABS is installed outdoors we recommend that it is protected from the effects of sunlight.

Thermal insulation and trace heating

Plastics/sealants

Pipe clips

Contact with synthetic oils

Freezing conditions

See page 57 for the above.

Filling and flushing

When purchasing chemicals for either flushing or long-term system use, suppliers should be advised that this is for ABS material. Guidance on the suitability of various system flushing or filling fluids with ABS can be found in the Durapipe Chemical Data catalogue.

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 3bar. 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 ABS products are a mid-grey colour, generally in accordance with BS5252, colour ref. 18 B 21 and RAL 7001.

Auto CAD drawings

Two dimensional drawings of Imperial products contained in this brochure are available on our website www.durapipe.co.uk Available in Fastrack format.

ABS dimensions and standards

Imperial

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

ISO 15493

KIWA 49 and 549

DIN 8062 and 8063

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

Materials

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

Durapipe ABS formulation does not contain any harmful metallic stabilizers.

Gaskets and seals

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

Interchangeability

Components in the imperial and metric ranges are not interchangeable, except for 2¹/₂"/ 75mm and 5"/140mm.

Approvals

Durapipe ABS Imperial series pipe is covered by Kitemark Licence No. KM07961 to BS 5391:Part 1 1976.

Durapipe ABS Imperial series fittings are covered by Kitemark Licence No. KM07962 to BS 5392:Part 1 1976.

Durapipe ABS Imperial series pipe and fittings are UK Water Regulations Advisory Scheme approved for cold water services.

Durapipe ABS Metric series pipe and fittings are UK Water Regulations Advisory Scheme approved for cold water services.

Durapipe ABS one-step solvent cement is UK Water Regulations Advisory Scheme approved.

Durapipe Metric pipework is approved for various non-essential services on board ships by:

Lloyds Register of Shipping

Det Norske Veritas

Bureau Veritas

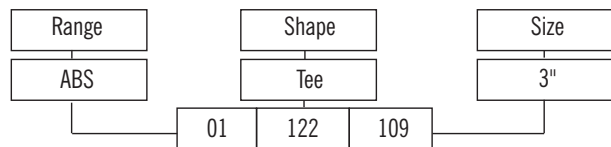
American Bureau of Shipping

Germanischer Lloyd

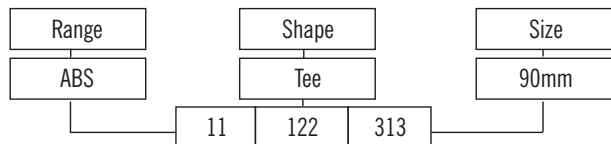
Ordering by code

Code numbers should be used when ordering products e.g.

Imperial



Metric



Abbreviations

The following list of abbreviations is used in this catalogue:

ABS - Acrylonitrile Butadiene Styrene

BS - British Standards

ISO - International Standards Organisation

DIN - Deutsche Industrie Normen (German Industrial Standards)

KIWA - Keuringsinstituut Voor Waterleidingartikelen (Netherlands)

ANSI - American National Standards Institute

BSP - British Standard Pipe Thread

EPDM - Ethylene Propylene Rubber

FPM - Fluorine Rubber (e.g. Viton®)

PTFE - Polytetrafluoroethylene (eg Teflon®)

® Dupont registered trade name.

| Mechanical, Physical, & Electrical Data | Test Method | Value |
|---|--|--|
| Mechanical | | |
| Tensile strength at yield (23°C) | ASTM D635 | 45MN/m ² |
| Tensile modulus of elasticity | ASTM D635 | 2200MN/m ² |
| Poissons ratio | - | 0.35 |
| Izod impact strength at 23°C (notched) | ASTM D256 (1/8") | 35kJ/m ² |
| Charpy impact strength at 23°C (notched) | - | 20kJ/m ² |
| Physical | | |
| Specific gravity | ASTM D792 | 1.04 |
| Softening point (BS2782:Part 1 Method120B:1976) | ISO R 306 (5kg) (heating rate unknown) | 99°C |
| Linear co-efficient of thermal expansion | - | 10.1 x 10 ⁻⁵ /°C |
| ISO75 HDT/Ae 1.8Mpa | ASTM D648 (unannealed, 1/4", 18.56 Kgf/cm ²) | 78°C |
| Thermal conductivity | - | 0.157W/m°C |
| Specific heat | - | 2.1kJ/kg.K |
| Self ignition temperature | - | 540°C |
| Electrical | | |
| Dielectric constant | - | 2.9 at 10 ³ Hz 2.8 at 10 ⁶ Hz |
| Volume resistivity IEC 93 | - | >1.E ¹⁴ ohm m |

Product Specification

IMPERIAL RANGE

DURAPIPE ABS PIPES

In accordance with the dimensional and testing requirements of BS 5391 Part 1 1976, Third Party Approved with British Standard Kitemark Licence (where applicable).

DURAPIPE ABS FITTINGS

In accordance with the dimensional and testing requirements of BS 5392 Part 1 1976, Third Party Approved with British Standard Kitemark Licence (where applicable).

MATCHED SYSTEM

The ABS products (see below) shall be from a single manufacturer 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.

The manufacturer shall offer ABS solvent cements and cleaners, specially formulated to minimise any adverse effects on the environment during installation of the ABS system.

THIRD PARTY APPROVALS

The manufacturer shall have the following Third Party Approvals:

British Standard Kitemark Licence

KM07961 for Durapipe Inch pipes to BS 5391: Part 1 1976
KM07962 for Durapipe Inch fittings to BS 5392: Part 1 1976

WRAS Water Regulations Advisory Scheme

0106052 for Durapipe Inch pipes & fittings (1100)
0009516 for Durapipe solvent cement (5560)
0205509 for Durapipe thixotropic solvent cement (5560)

Department of the Environment

M & E 100 Standard Specification for Air Conditioning

Department of Health and Social Security

Renal Dialysis Applications

APPROVAL FOR USE IN CONTACT WITH DRINKING WATER

All ABS 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.

Copies of certification of compliance with these approvals must be available for inspection.

DESIGN LIFE

Pipes, fittings and valves shall be designed to operate continuously for 50 years at their maximum rated pressure at a working temperature of 20°C. Process Control Testing must be carried out during manufacture and documented on each and every production batch.

Fittings and Pipes will be subjected to a pressure test of 3.2 x maximum recommended working pressure for 1 hour at 20°C during 1st and 2nd hours of production, then every 6 hours for fittings, and 8 hours for pipes.

Pipes are in addition to be impact tested after conditioning at 0°C for 1 hour.

Fittings are in addition to be subject to stress relief testing at 150°C.

Pipes and fittings shall undergo dimensional, marking and visual inspection at the frequency outlined above.

CHEMICAL SUITABILITY

The manufacturer shall publish detailed chemical resistance data to enable the suitability of the ABS 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 service advisory service for assessing the suitability of its ABS material, seals and gaskets.

DESIGN & 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 Design and Installation procedures.

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

DURAPIPE ABS 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 BS 5392 Part 1 1976, and DIN 3230 Part 3 Leak Rate One (Water and Air).

The following testing will have been successfully conducted:

Drop Tight and Bubble Tight test.

Hydrostatic Shell Test 1.5 x Maximum Working Pressure.

Seat Test 1.1 x Maximum Working Pressure.

PRESSURE RATING

Up to size 2" - PN15 (Class E) at 20°C (VK series), PN10 (EV series)
2 1/2" to 4" - PN15 at 20°C (VKD series)

SEATS AND SEALS

Seats: PTFE material fitted with O ring compensators.

Seals: Standard size O ring type for ease of replacement.

Available in EPDM or FPM materials.

END CONNECTIONS

Plain socket ends, or BSP threaded.

ACTUATION

Options: Electric or pneumatic.

DURAPIPE ABS MULTIPOINT BALL VALVES

True union design. Options of 'L', 'T', or 'C' 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

3/8" to 2" - PN10 at 20°C.

SEATS AND SEALS

Seats: PTFE material.

Seals: O ring type for ease of replacement. Available in FPM material.

END CONNECTIONS

Plain socket ends or BSP threaded.

DURAPIPE ABS DIAPHRAGM VALVES

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 will have been hydrostatically pressure tested to the requirements of BS 5392 Part 1 1976, 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

These may be plain spigot ends or flanged.

ACTUATION

Options - Pneumatic

DURAPIPE ABS BALL CHECK VALVES

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

PRESSURE RATING

3/8" to 3" - PN10 at 20°C.

SEALS

Available in either EPDM or FPM.

DURAPIPE ABS BUTTERFLY VALVES

Reinforced Polypropylene body, fully lined, with ABS 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 10" - PN10 at 20°C
12" - PN8 at 20°C

PRIMARY LINER

Available in EPDM, FPM, or NBR

ACTUATION

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

METRIC RANGE

DURAPIPE ABS PIPES

KIWA 49, ISO 161/1, and ISO DIS 15493 (where applicable). Pressure rating PN10 at 20°C up to 250 mm. PN8 at 20°C for 315 mm.

DURAPIPE ABS FITTINGS

KIWA 549, ISO 727 and ISO DIS 15493 (where applicable). Pressure rating PN10 at 20°C up to 250 mm. PN8 at 20°C for 315 mm.

MATCHED SYSTEM

The ABS products shall be from a single manufacturer 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.

The manufacturer shall offer ABS solvent cements and cleaners, specially formulated to minimise any adverse effects on the environment during installation of the ABS system.

THIRD PARTY APPROVALS

The manufacturer shall have the following Third Party Approvals:

WRAS Water Regulations Advisory Scheme

0012099 for Durapipe Metric pipes and fittings
0009516 for Durapipe solvent cement (5560)
0205509 for Durapipe thixotropic cement (5560)

DEPARTMENT OF HEALTH AND SOCIAL SECURITY

Renal Dialysis Applications

DET NORSKE VERITAS

BUREAU VERITAS

APPROVAL FOR USE IN CONTACT WITH DRINKING WATER

All ABS 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.

Copies of certification of compliance with these approvals must be available for inspection.

DESIGN LIFE

Pipes, fittings and valves shall be designed to operate continuously for 50 years at their maximum rated pressure at a working temperature of 20°C.

Process Control Testing must be carried out during manufacture and documented on each and every production batch.

Fittings and Pipes will be subjected to a pressure test of 3.2 x maximum recommended working pressure for 1 hour at 20°C during 1st and 2nd hours of production, then every 6 hours for fittings and 8 hours for pipes.

Pipes are in addition to be impact tested after conditioning at 0°C for 1 hour.

Fittings are in addition to be subject to stress relief testing at 150°C.

Pipes and fittings shall undergo dimensional, marking, and visual inspection at the frequency outlined above.

CHEMICAL SUITABILITY

The manufacturer shall publish detailed chemical resistance data to enable the suitability of the ABS 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 ABS material, seals, and gaskets.

DESIGN & 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 Design and Installation procedures.

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

DURAPIPE ABS 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 BS 5392 Part 1 1976, and DIN 3230 Part 3 Leak Rate One (Water and Air).

The following testing will have been successfully completed:

Drop Tight and Bubble Tight test.
Hydrostatic Shell Test 1.5 x maximum working pressure
Seat Test 1.1 x maximum working pressure.

PRESSURE RATING

16mm to 63mm – PN 16 at 20°C (VK series), PN10 (EV series)
75mm to 110mm – PN16 at 20°C (VKD series)

SEATS AND SEALS

Seats: PTFE material fitted with O ring compensators.
Seals: Standard size O ring type for ease of replacement.
Available in EPDM or FPM materials.

END CONNECTIONS

Plain socket ends or BSP threaded.

ACTUATION

Options: Electric or Pneumatic.

DURAPIPE ABS MULTI PORT BALL VALVES

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

The following testing will have been successfully completed:

Drop Tight and Bubble Tight Test.
Hydrostatic Shell Test 1.5 x maximum working pressure.
Seat test 1.1 x maximum working pressure.

PRESSURE RATING

16mm to 63mm - PN10 at 20°C

SEATS AND SEALS

Seats: PTFE material.
Seals: O ring type for ease of replacement. Available in FPM material.

END CONNECTIONS

Plain socket ends or BSP threaded

DURAPIPE ABS DIAPHRAGM VALVES

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 will have been hydrostatically pressure tested to the requirements of BS 5392 Part 1 1976, BS 5156, 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

These may be plain spigot ends or flanged.

ACTUATION

Options: Pneumatic

DURAPIPE ABS BALL CHECK VALVES

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

PRESSURE RATING

20mm to 110mm – PN10 at 20°C.

SEALS

Available in either EPDM or FPM.

DURAPIPE ABS BUTTERFLY VALVES

Reinforced Polypropylene body, fully lined, with ABS 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 250mm - PN 10 at 20°C
315mm - PN 8 at 20°C

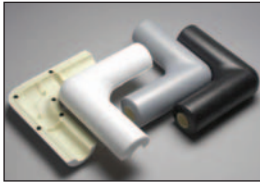
PRIMARY LINER

Available in EPDM, FPM, or NBR

ACTUATION

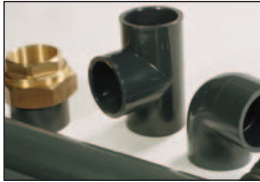
Electric, Pneumatic, or Gearbox (standard on sizes over 225mm).

Other Durapipe UK pipework systems



Duracool

- Innovative pre-insulated pipework system
- Easy-strip trimming for clean pipe ends
- Unique Thermo-click shells for pipe fittings
- No hot works
- No manual lagging



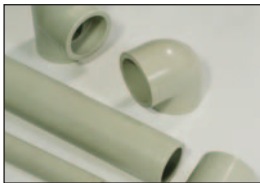
PVC-U

- 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



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



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



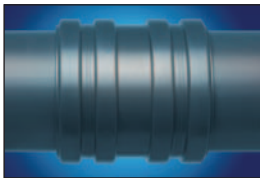
Air-Line Xtra

- High performance thermoplastic pipework system for compressed air



Friatherm

- A better way for hot and cold water offering quick, easy and efficient installations



Friaphon

- Sound attenuated drainage system
- Ideal for hospitals, hotels, office suites - wherever the invasive sounds of drainage are unwelcome



Vulcathene

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



WEFA

- PP-R plumbing system for CWS, HWS and LTHW

DURAPIPE UK CONDITIONS OF SALE

1. **DEFINITIONS:**

'Seller' shall mean Durapipe UK, 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.
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 8.0am and 4.0pm 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 had 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 -ie: 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 Buyer 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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