Radix Plastic Industries LLC

We are an international leading UPVC pipe system manufacturer.

Our sole aim and goal is to globally provide superior value, healthy, reliable and cost efficient solutions. We use the most advanced production techniques and advanced manufacturing skills to provide pipes and fittings systems with elite standards.

SOLUTIONS FOR ANY CHALLENGE SYSTEM.

CEMENTED
SYSTEM

PUSH FIT
SYSTEM

VALVES
SYSTEM

SOLUTIONS FOR ANY CHALLENGE SYSTEM.

CEMENTED SYSTEM

For safe, reliable and cost effective treatment and distribution of water and chemicals, DP Piping Systems has a comprehensive cemented system portfolio, which includes corresponding jointing technologies, fittings, valves, sensors, pipes and related tools as well as services.

The PVC-U range of DP Piping Systems, which has been leading the industry for decades through continous innovation and proven benefits on safety, efficiency and reliability, covers all aspects required to build, maintain and operate industrial piping systems.

Main benefits

SAFETY
System lifetime warranty

SIMPLICITY
Simple installation with low costs for tools

EFFICIENCY
Excellent price-performance ratio

ENVIRONMENT
Low carbon & water footprint

SOLUTIONS FOR ANY CHALLENGE SYSTEM.

PVC-U METRIC SYSTEMS

Scope
This specification covers requirements for the DP PVC-U Piping System intended for a wide range of applications including water, wastewater and effluent treatment as well as a wide range of chemical applications.

The components of the PVC-U systems are in accordance with the following standards.

Basic System Data
PVC-U pipes, fittings and valves from DP Piping Systems shall be manufactured from unplasticized polyvinylchloride the operation with water as medium (20°C). PVC-U has also an optimal chemical resistance against many mineral acids, bases and salt solutions.

For detailed information, please refer to the list of chemical resistance provided by DP Piping Systems.

The raw material used shall be material designed for use with pressure bearing piping systems with long term hydrostatic properties in accordance with DIN 8063 – EN1422.

Characteristic	Value
Density	1.38 g/cm3
Tensile E-modules	>2400 N/mm2
Charpy notched impact strength at 23° C	>8 kJ/m2
Charpy notched impact strength at 0° C	>3 kJ/m2
Vicat heat distortion temp. B/50N	≥76° C
Chemical resistance	DIBT agreement
Thermal expansion coefficient	0.07 - 0.08 mm/mK
Temperature range in °C	0°C - 60°C
Colour	dark grey

PVC-U IMPERIAL (INCH) SYSTEMS

Scope
This specification covers requirements for the DP PVC-U Piping System intended for a wide range of applications including water, wastewater and effluent treatment as well as a wide range of chemical applications.

The components of the PVC-U Imperial (inch)-sized piping systems are in accordance with the following standards.

Basic System Data
PVC-U pipes, fittings and valves from DP Piping Systems shall be manufactured from unplasticized polyvinylchloride, the operation with water as medium (20°C). PVC-U has also an optimal chemical resistance against many mineral acids, bases & salt solutions.

For detailed information, please refer to the list of chemical resistance provided by DP Piping Systems.

The raw material used shall be material designed for use with pressure bearing piping systems with long term hydrostatic properties in accordance with ASTM-D2467, D2464 and British standards BSEN 1452-2 which supercedes BS3505.

Characteristic	Value
Density	1.38 g/cm3
Tensile E-modules	>2400 N/mm2
Charpy notched impact strength at 23 °C	≥8 kJ/m2
Charpy notched impact strength at 0°C	≥3 kJ/m2
Vicat heat distortion temp. B/50N	≥76 °C
Chemical resistance	DIBT agreement
Thermal expansion coefficient	0.07 - 0.08 mm/mK
Temperature range in °C	0°C - 60°C
Colour	dark grey

SOLUTIONS FOR ANY CHALLENGE SYSTEM.

PUSH-FIT SYSTEM

Easy to install.

Due to the rubber ring push-fit system.

Controlled Expansion

This product is vailable in PN10 and PN 16.

CONTENTS

INTRODUCTION

Introduction 12
Manufacturing 14

“Reliabilty, Quality and Value”

INTRODUCTION

PVC PIPE - WORLD LEADER

PVC pipe is the world's most widely used medium for conveyance of fluids. After centuries of use of ancient materials such as clay, lead, iron and more recently steel, Ductile Iron and asbestos cement, PVC has, in a comparatively short 50 years, invaded all of the traditional applications of these materials to become the premier pipe material, measured by length or value, in the world today.

The product has well recognized advantages of immunity to corrosion, chemical and micro-/macro-biological resistance, hydraulic capacity, ease of handling and installation together with toughness and flexibility to withstand abuse. Its widespread applications are largely attributable to these features.

Pipe applications fall into two broad categories primarily determined by the dominance of either internal pressure or external loading over design. They are referred to as ‘pressure’ or ‘non-pressure’ applications.

This manual covers pressure applications with particular emphasis on general water supply. Other applications include irrigation, industrial, and pumped sewerage mains. It provides state of the art information on material characteristics and performance, pipe selection and system design procedures, installation recommendations and detailed product specification data for both pipe and fittings.

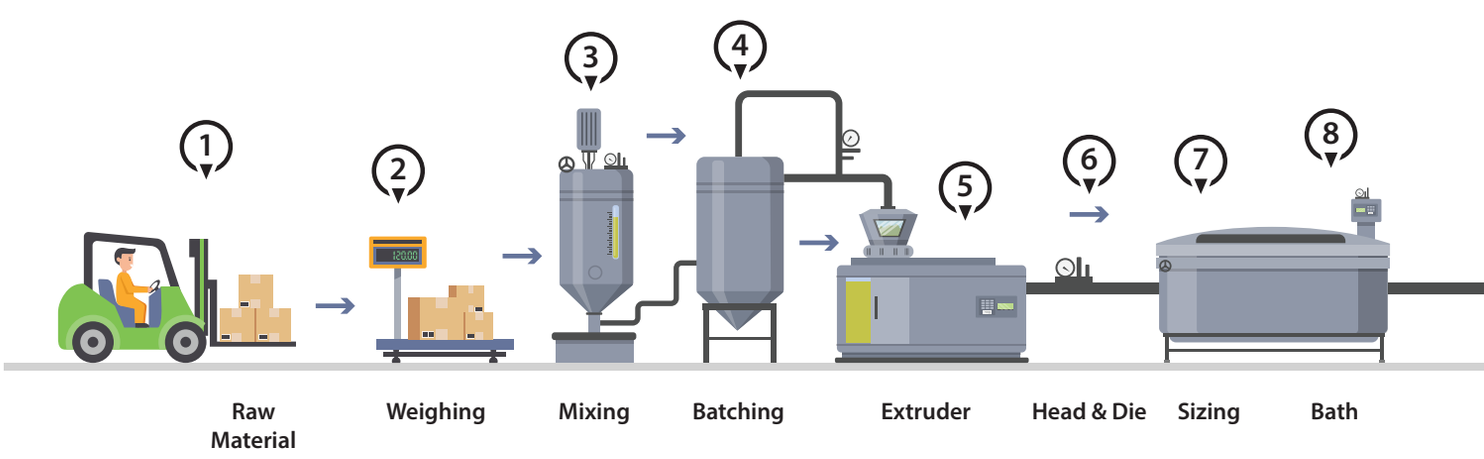
INTRODUCTION

MANUFACTURING

Basically, PVC products are formed from raw PVC powder by a process of heat and pressure. The two major processes used in manufacture are extrusion for pipe and injection moulding for fittings.

Modern PVC processing involves highly developed scientific methods requiring precise control over process variables. The polymer material is a free flowing powder, which requires the addition of stabilizers and processing aids.

Formulation and blending are critical stages of the process and tight specifications are maintained for incoming raw materials, batching and mixing. Feed to the extrusion or molding machines may be direct, in the form of “dry blend”, or pre-processed into a granular “compound”.



EXTRUSION

Polymer and additives (1) are accurately weighed (2) and processed through the high speed mixing (3) to blend the raw materials into a uniformly distributed dry blend mixture. A mixing temperature of around 120 °C is achieved by frictional heat.

At various stages of the mixing process, the additives melt and progressively coat the PVC polymer granules.

After reaching the required temperature, the blend is automatically discharged into a cooling chamber which rapidly reduces the temperature to around 50 °C, thereby allowing the blend to be conveyed to intermediate storage (4) where even temperature and density consistency are achieved. The heat of the process, the extruder (5), has a temperature controlled, zoned barrel in which rotate precision “screws”. Modern extruder screws are complex devices, carefully designed with varying flights to control the compression and shear, developed in the material, during all stages of the process. The twin counter-rotating screw configuration used by all major manufacturers offers improved processing.

The PVC dry blend is metered into the barrel and screws, which then convert the dry blend into the required “melt” state, by heat, pressure and shear.

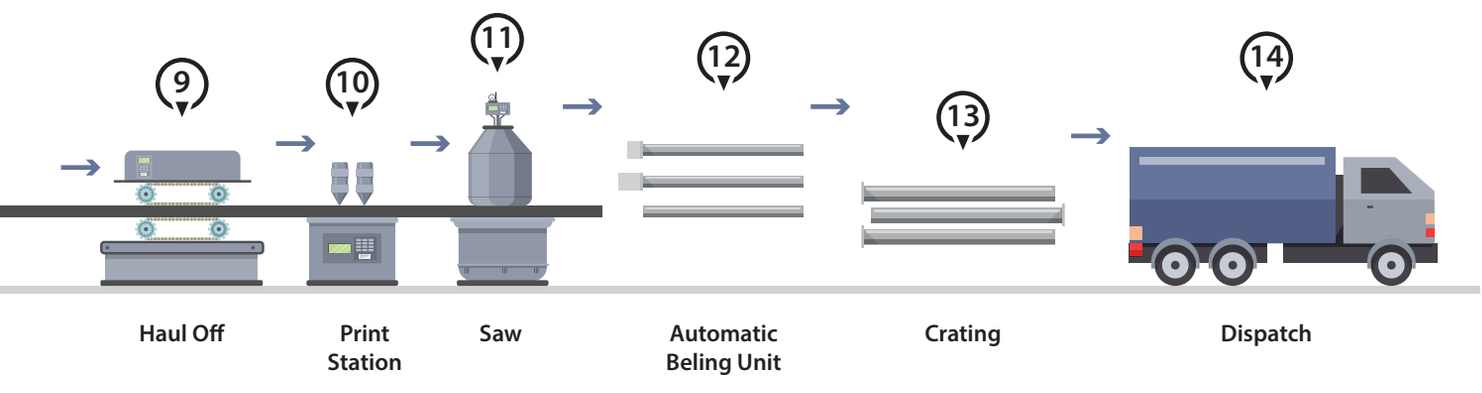
During its passage along the screws, the PVC passes through a number of zones that compress, homogenise and vent the melt stream. The final zone increases the pressure to extrude the melt through the head and die set (6) which is shaped according to the size of the pipe required and flow characteristics of the melt stream. Once the pipe leaves the extrusion die, (7) it is sized by passing through a precision sizing sleeve with external vacuum.

This is sufficient to harden the exterior layer of PVC and hold the pipe diameter during final cooling in a controlled water cooling chambers (8).

The pipe is pulled through the sizing and cooling operations by the puller or haul-off (9) at a constant speed. Speed control is very important when this equipment is used because the speed at which the pipe is pulled will affect the wall thickness of the finished product. In the case of rubber ring jointed pipe the haul-off is slowed down at appropriate intervals to thicken the pipe in the area of the socket.

An in-line printer (10) marks the pipes at regular intervals, with identification according to size, class, type, date, Standard number, and extruder number.

An automatic cut-off saw (11) cuts the pipe to the required length. A belling machine forms a socket on the end of each length of pipe (12). There are two general forms of socket. For rubber-ring jointed pipe, a collapsible mandrel is used, whereas a plain mandrel is used for solvent jointed sockets. Rubber ring pipe requires a chamfer on the spigot, which is executed either at the saw station or belling unit. The finished product is stored.



INTRODUCTION

INJECTION MOLDING

PVC fittings are manufactured by high-pressure injection molding. In contrast to continuous extrusion, molding is a repetitive cyclic process, where a “shot” of material is delivered to a mold in each cycle.

PVC material, either in dry blend powder form or granular compound form, is gravity fed from a hopper situated above the injection unit, into the barrel housing a reciprocating screw.

The barrel is charged with the required amount of plastic by the screw rotating and conveying the material to the front of the barrel. The position of the screw is set to a predetermined “shot size”. During this action, pressure and heat “plasticize” the material, which now in its melted state, awaits injection into the mold.

All this takes place during the cooling cycle of the previous shot. After a preset time the mold will open and the finished molded fitting will be ejected from the mold. The mold then closes and the melted plastic in the front of the barrel is injected under high pressure by the screw now acting as a plunger. The plastic enters the mold to form the next fitting.

After injection, recharge commences while the molded fitting goes through its cooling cycle.

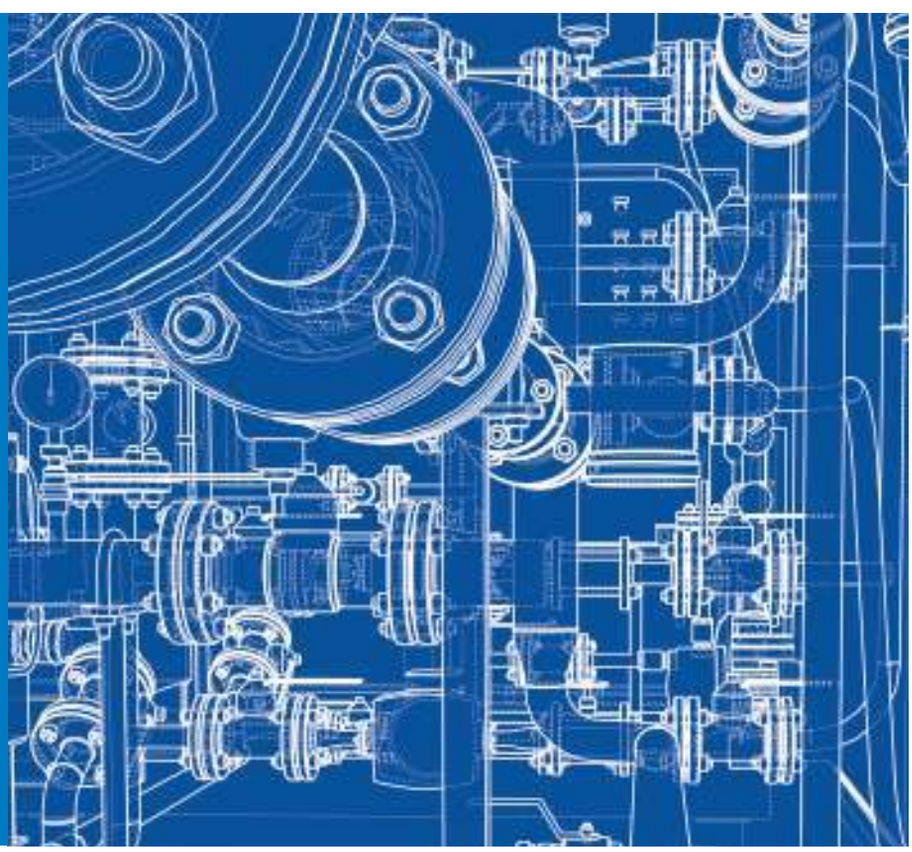
INTRODUCTION

RAW MATERIAL

All raw materials for Radix Plastic Industries LLC products must meet detailed specifications and suppliers are required to conform to strict quality assurance standards.

PRODUCTION PROCESS CONTROL

Production processes are enumerated, closely specified and continuously monitored and recorded. Inspection and control are exercised by properly trained personnel using calibrated equipment.



PRODUCT TESTING

Products are examined and tested to ensure compliance with the relevant Standard. Pipe production is fully traceable and test results are recorded for all extrusion and molded products.

- **Effect on water** - This is a series of type tests carried out in order to demonstrate that the pipe or fitting does not have a detrimental effect on the quality of drinking water. It assesses the effect of the pipe or fittings on the taste, odor and appearance of water as well as the health aspects due to growth of microorganisms and leaching of toxic substances.

- **Vinyl chloride monomer test** - This requirement is to ensure that the residual VCM in PVC material does not exceed safe limits.

- **Light transmission tests** - This test is conducted to ensure that PVC pipes have sufficient opacity to prevent growth of algae in the water conveyed. It is a type test for a given formulation and pipe wall thickness.

- **Joint pressure and infiltration tests** - Elastomeric ring joints are subjected to both an internal hydrostatic pressure test and an external pressure or internal vacuum test in order to ensure a satisfactory joint design.

- **Processing tests** - A number of tests are conducted in accordance with Standards to ensure the manufacturing process is consistent and repeated.

CONTENTS

MATERIAL

POLYVINYL CHLORIDE (PVC) 22
- Different Types of Polyvinyl Chloride 23
- Comparison Between OPVC, MPVC and Standard PVC 24

PROPERTIES OF PVC 25
- Typical Properties 26
- Mechanical Properties 28
- Elevated Temperatures 29
- The Chemical Performance of PVC 30
- Other material performance aspects 32

“Reliabilty, Quality and Value”

MATERIAL

POLYVINYL CHLORIDE (PVC)

Polyvinyl chloride is a thermoplastics material which consists of PVC resin compounded with varying proportions of stabilizers, lubricants, fillers, pigments, plasticizers and processing aids. Different compounds of these ingredients have been developed to obtain specific groups of properties for different applications. However, the major part of each compound is PVC resin.

The technical terminology for PVC in organic chemistry is poly (vinyl chloride): a polymer, i.e. chained molecules, of vinyl chloride. The brackets are not used in common literature and the name is commonly abbreviated to PVC. The common terminology is used throughout this publication. Where the discussion refers to a specific type of PVC pipe, that type will be explicitly identified as detailed below. Where the discussion is general, the term “PVC pipes” will be used to cover the range of PVC pipe materials in this manual.

DIFFERENT TYPES OF POLYVINYL CHLORIDE

The PVC compounds with the greatest short-term and long-term strengths are those that contain no plasticizers and the minimum of compounding ingredients. This type of PVC is known as UPVC or PVC-U.

Other resins or modifiers (such as ABS, CPE or acrylics) may be added to UPVC to produce compounds with improved impact resistance. These compounds are known as modified PVC (PVC-M). Flexible or plasticizers PVC compounds, with a wide range of properties, can also be produced by the addition of plasticizers. Other types of PVC are called CPVC (PVC-C) (chlorinated PVC), which has a higher chlorine content and oriented PVC (PVC-O) which is PVC-U where the molecules are preferentially aligned in a particular direction.

PVC-U (unplasticized) is hard and rigid with an ultimate tensile stress of approximately 52 MPa at 20°C and is resistant to most chemicals. Generally PVC-U can be used at temperatures up to 60°C, although the actual temperature limit is dependent on stress and environmental conditions.

PVC-M (modified) is rigid and has improved toughness, particularly in impact. The elastic modulus, yield stress and ultimate tensile strength are generally lower than PVC-U. These properties depend on the type and amount of modifier used.

PVC (plasticised) is less rigid has high impact strength is easier to extrude or mold has lower temperature resistance; is less resistant to chemicals, and usually has lower ultimate tensile strength. The variability from compound to compound in plasticized PVC is greater than that in PVC-U.

PVC-C (chlorinated) is similar to PVC-U in most of its properties but it has a higher temperature resistance, being able to function up to 95°C. It has a similar ultimate stress at 20°C and an ultimate tensile stress of about 15 MPa at 80°C.

PVC-O (Oriented PVC) is sometimes called HSPVC (high strength PVC). PVC-O pipes represent a major advancement in the technology of the PVC pipe industry.

PVC-O is manufactured by a process which results in a preferential orientation of the long chain PVC molecules in the circumferential or hoop direction. This provides a marked enhancement of properties in this direction. In addition to other benefits, ultimate tensile strength up to double that of PVC-U can be obtained for PVC-O. In applications such as pressure pipes, where well defined stress directionality is present, very significant gains in strength and/or savings in materials can be made.

Typical properties of PVC-O are:
Tensile Strength of PVC-O - 90 MPa
Elastic Modulus of PVC-O - 4000 MPa

Property enhancement by molecular orientation is well known and some industrial examples have been produced for over thirty years. In more recent times, it has been applied to consumer products such as films, high strength garbage bags, carbonated beverage bottles and the like.

MATERIAL

COMPARISON BETWEEN OPVC, MPVC AND STANDARD PVC

PVC-O is identical in composition to PVC-U and their general properties are correspondingly similar. The major difference lies in the mechanical properties in the direction of orientation. The composition of PVC-M differs by the addition of an impact modifier and the properties deviate from standard PVC-U depending on the type and amount of modifier used. The following comparison is general in nature and serves to highlight typical differences between pipe grade materials.

Tensile Strength. The tensile strength of PVC-O is up to twice that of normal PVC-U. The tensile strength of PVC-M is slightly lower than standard PVC-U.

Toughness. Both PVC-O and PVC-M behave in a consistently ductile manner under all practical circumstances. Under some adverse conditions, in the presence of a notch or flaw, standard PVC-U can exhibit brittle characteristics.

Safety Factors. The Design of PVC pipes for pressure applications involves prediction of long-term properties and application of a safety factor. As in all engineering design, the magnitude of the safety factor reflects the level of confidence in the prediction of performance. The greater confidence in predictable behaviour for the new generation materials PVC-M and PVC-O has the benefit of allowing a lower factor of safety to be used in design.

Design Stress. PVC-O and PVC-M pipes operate at a higher design stress than standard PVC-U pipes as a result of their reduced safety factor and in the case of PVC-O, higher strength in the hoop direction.

Elasticity and Creep. PVC-O has a modulus of elasticity up to 24% higher than normal PVC-U in the oriented direction and a similar modulus to standard PVC-U in other directions. The elastic modulus of PVC-M is marginally lower than standard PVC-U.

Impact Characteristics. PVC-O exceeds standard PVC-U by a factor of at least 2 and up to 5. PVC-M also has greater impact resistance than standard PVC-U. Impact performance tests for PVC-M pipes focus on obtaining a ductile failure characteristic.

Weathering. There are no significant differences in the weathering characteristics of PVC-U, PVC-M and PVC-O.

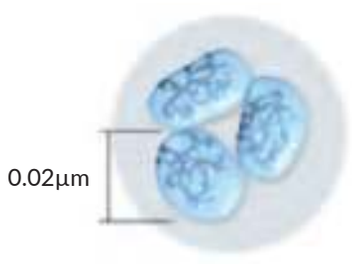
Jointing. PVC-U and PVC-M pipes can be jointed by either rubber ring or solvent cement joints. PVC-O is available in rubber-ring jointed pipes only.

PVC-O cannot be solvent-cement jointed.

PROPERTIES OF PVC

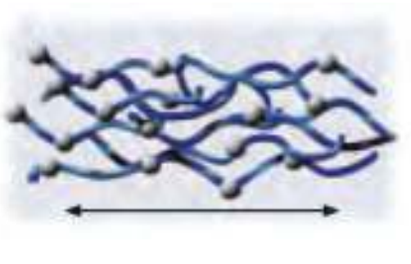
General properties of PVC compounds used in pipe manufacture are given in page 29 & 30. Unless otherwise noted, the values given are for standard unmodified formulations using K67 PVC resin. Some comparative values are shown for other pipe materials. Properties of thermoplastics are subject to significant changes with temperature, and the applicable range is noted where appropriate.

Mechanical properties are subject to duration of stress application, and are more properly defined by creep functions. More detailed data pertinent to pipe applications are given in the design section of this manual. For data outside of the range of conditions listed, users are advised to contact our Technical Department.



Clusters of PVC Molecules

Molecular Entanglements of PVC Pipe



Direction of Orientation

MATERIAL

TYPICAL PROPERTIES

Properties of PVC

Property	Value	Conditions and Remarks
Physical properties		
Molecular weight (resin)	140,000	cf: K57 PVC 70,000
Relative density	1.42 - 1.48	cf: PE 0.95 - 0.96, GRP 1.4 - 2.1, CI 7.20, Clay 1.8 - 2.6
Water absorption	0.12%	23°C, 24 hours cf: AC 18 - 20% AS1711
Hardness	80	Shore D Durometer, Brinell 15, Rockwell R 114, cf: PE Shore D 60
Impact strength - 20°C	20 kJ/m2	Charpy 250 µm notch tip radius
Impact strength - 0°C	8 kJ/m2	Charpy 250 µm notch tip radius
Coefficient of friction	0.4	PVC to PVC cf: PE 0.25, PA 0.3
Mechanical properties		
Ultimate tensile strength	52 MPa	AS 1175 Tensometer at constant strain rate cf: PE 30
Elongation at break	50 - 80%	AS 1175 Tensometer at constant strain rate cf: PE 600-900
Short term creep rupture	44 MPa	Constant load 1 hour value cf: PE 14, ABS 25
Long term creep rupture	28 MPa	Constant load extrapolated 50 year value cf: PE 8-12
Elastic tensile modulus	3.0 - 3.3 GPa	1% strain at 100 seconds cf: PE 0.9-1.2
Elastic flexural modulus	2.7 - 3.0 GPa	1% strain at 100 seconds cf: PE 0.7-0.9
Long term creep modulus	0.9 - 1.2 GPa	Constant load extrapolated 50 year secant value cf: PE 0.2 - 0.3
Shear modulus	1.0 GPa	1% strain at 100 seconds G=E/2/(1+µ) cf: PE 0.2
Bulk modulus	4.7 GPa	1% strain at 100 seconds K=E/3/(1-2µ) cf: PE 2.0
Poisson's ratio	0.4	Increases marginally with time under load. cf: PE 0.45
Electrical properties		
Dielectric strength (breakdown)	14 - 20 kV/mm	Short term, 3 mm specimen PE 70-85
Volume resistivity	2 x 1014Ω.m	AS 1255.1 PE > 1016
Surface resistivity	1013 - 1014 Ω	AS 1255.1 PE > 1013
Dielectric constant (permittivity)	3.9 (3.3)	50 Hz (106 Hz) AS 1255.4
Dissipation factor (power factor)	0.01 (0.02)	50 Hz (106 Hz) AS 1255.4

Thermal properties		
Softening point	80 - 84°C	Vicat method AS 1462.5 (min. 75°C for pipes)
Max. continuous service temp.	60°C	cf: PE 80*, PP 110*
Coefficient of thermal expansion	7 x 10-5/K	7 mm per 10 m per 10°C cf: PE 18 - 20 x 10-5, DI 1.2 x 10-5
Thermal conductivity	0.16 W/[m.K]	0 - 50°C PE 0.4
Specific heat	1,000 J/[kg.K]	0 - 50°C
Thermal diffusivity	1.1 x 10-7 m2/s	0 - 50°C
Fire performance		
Flammability (oxygen index)	45%	ASTM D2863 Fennimore Martin test, cf: PE 17.5, PP 17.5
Ignitability index	10 - 12 (/20)	cf: 9 - 10 when tested as pipe AS 1530 Early Fire Hazard Test
Smoke produced index	6 - 8 (/l0)	cf: 4 - 6 when tested as pipe AS 1530 Early Fire Hazard Test
Heat evolved index	0	
Spread of flame index	0	Will not support combustion. AS 1530 Early Fire Hazard Test

Abbreviations

PE Polyethylene
PP Polypropylene
PA Polyamide (nylon)
CI Cast Iron
AC Asbestos Cement
GRP Glass Reinforced Pipe

Conversion of Units

1 MPa = 10 bar = 9.81 kg/cm2 = 145 lbf/in2

MATERIAL

MECHANICAL PROPERTIES

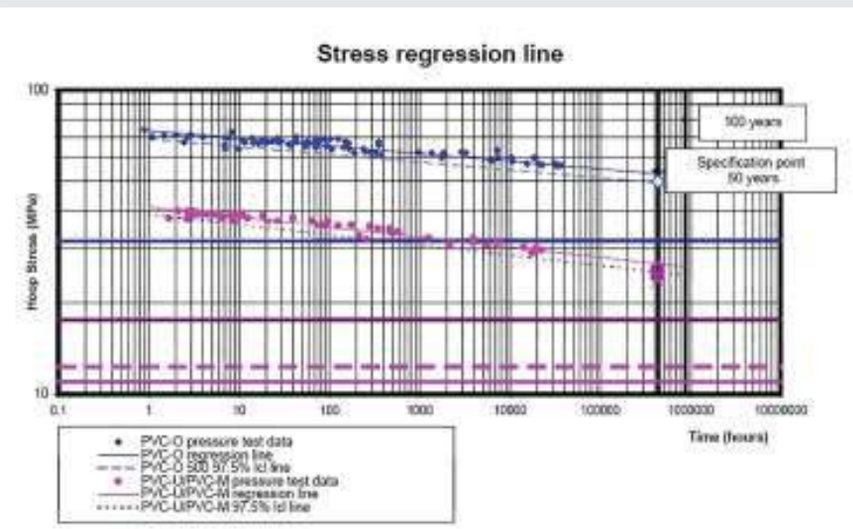
For PVC, like other thermoplastics materials, the stress /strain response is dependent on both time and temperature. When a constant static load is applied to a plastics material, the resultant strain behavior is rather complex. There is an immediate elastic response, which is fully recovered as soon as the load is removed. In addition there is a slower deformation, which continues indefinitely while the load is applied until rupture occurs. This is known as creep. If the load is removed before failure, the recovery of the original dimensions occurs gradually over time. The rate of creep and recovery is also influenced by temperature. At higher temperatures, creep rates tend to increase. Because of this type of response, plastics are known as viscoelastic materials.

THE STRESS REGRESSION LINE

The consequence of creep is that pipes subjected to higher stresses will fail in a shorter time than those subjected to lower stresses. For pressure pipe applications, long life is an essential requirement. Therefore, it is important that pipes are designed to operate at wall stresses which will ensure that long service lives can be achieved. To establish the long-term properties, a large number of test specimens, in pipe form, are tested until rupture. All of these separate data points are then plotted on a graph and a regression analysis performed. The linear regression analysis is extrapolated to obtain the 97.5% lower prediction limit failure stress at the design point which must exceed a minimum required stress (MRS).

A safety factor is then applied to the MRS to obtain a maximum operating stress for the pipe material which is used to dimension pipes for a range of pressure ratings.

TYPICAL STRESS REGRESSION CURVES



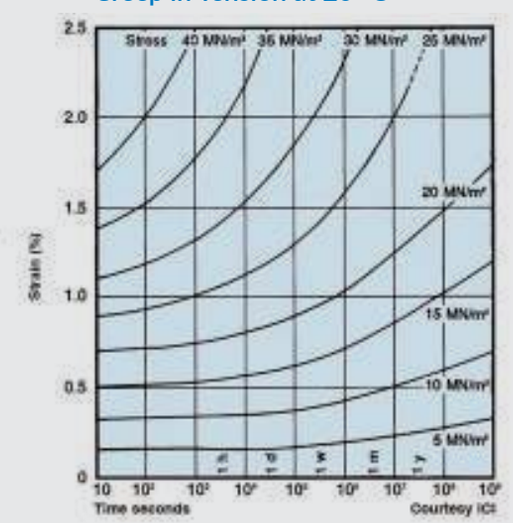
CREEP MODULUS

For PVC, the modulus or stress/strain relationship must be considered in the context of the rate or duration of loading and the temperature.

A universal method of data presentation is a curve of strain versus time at constant stress. At a given temperature, a series of curves is required at different stress levels to represent the complete picture. A modulus can be computed for any stress/strain/ time combination, and this is normally referred to as the creep modulus.

Such curves are useful, for example, in designing for short and long term transverse loadings of pipes.

Creep in Tension at 20 °C



ELEVATED TEMPERATURES

Pressure Ratings at Elevated Temperatures

The mechanical properties of PVC are referenced at 20°C. Thermoplastics generally decrease in strength and increase in ductility as the temperature rises and design stresses must be adjusted accordingly.

See Section on Design for the design ratings for pipes at temperatures other than 20°C.

Reversion

The term “reversion” refers to dimensional change in plastics products as a consequence of “material memory”. Plastics products “memorise” their original formed shape and if they are subsequently distorted, they will return to their original shape under heat.

In reality, reversion proceeds at all temperatures, but with high quality extrusion it is of no practical significance in plain pipe at temperatures below 60°C and in PVC-O pipe at temperatures below 50°C.

MATERIAL

The Chemical Performance of PVC

PVC is resistant to many alcohols, fats, oils and aromatic free petrol. It is also resistant to most common corroding agents including inorganic acids, alkalis and salts. However, PVC should not be used with esters, ketones, ethers and aromatic or chlorinated hydrocarbons. PVC will absorb these substances and this will lead to swelling and a reduction in tensile strength.

Chemical Attack

Chemicals that attack plastics do so at differing rates and in differing ways. There are two general types of chemical attack on plastic:

1. Swelling of the plastic occurs but the plastic returns to its original condition if the chemical is removed. However, if the plastic has a compounding ingredient that is soluble in the chemical, the plastic may be changed because of the removal of this ingredient and the chemical itself will be contaminated.

2. The base resin or polymer molecules are changed by crosslinking, oxidation, substitution reactions or chain scission. In these situations the plastic can not be restored by the removal of the chemical. Examples of this type of attack on PVC are aqua regia at 20°C and wet chlorine gas.

Factors Affecting Chemical Resistance

A number of factors can affect the rate and type of chemical attack that may occur. These are:

Concentration. In general, the rate of attack increases with concentration, but in many cases there are threshold levels below which no significant chemical effect will be noted.

Temperature. As with all processes, the rate of attack increases as the temperature rises. Again, threshold temperatures may exist.

Period of Contact. In many cases rates of attack are slow and of significance only with sustained contact.

Stress. Some plastics under stress can undergo higher rates of attack. In general PVC is considered relatively insensitive to “stress corrosion”.

Considerations for PVC Pipe

For normal water supply work, PVC pipes are totally unaffected by soil and water chemicals. The question of chemical resistance is likely to arise only if they are used in unusual environments or if they are used to convey chemical substances.

For applications characterized as food conveyance or storage, health regulations should be observed. Specific advice should be obtained on the use of PVC pipes.

Although PVC-O is chemically identical to standard PVC-U, rates of attack may vary and this material is not recommended for use in chemical environments or for chemical conveyance.

In most environments, the chemical performance of PVC-M is expected to be similar to standard PVC-U. However, where concentrated chemicals are to be in prolonged contact with PVC-M or elevated temperatures are likely, it is recommended that some preliminary testing should be carried out to determine the suitability of the material.

Sewage Discharges

PVC will not be affected by anything that can be normally found in sewerage effluent.

However, if some illegal discharge is made then most chemicals are more likely to attack the rubber ring (common to all modern pipe systems) than the PVC pipe.

Because of modern pollution controls on sewage discharges PVC can be safely used in any municipal sewerage network including areas accepting industrial effluent.

Chemical Resistance of Joints

When considering the performance of pipe materials in contact with chemical environments, it is important not to overlook the effect of the environment on the jointing materials. In general, solvent cement joints may be used in any environment where PVC pipe is acceptable. However, separate consideration may need to be given to the rubber ring.

Chemical attack on rubbers can occur in two ways. Swelling can occur as a result of absorption of a chemical. This can make it weaker and more susceptible to mechanical damage. On the other hand, it may assist in retaining the sealing force.

Alternatively, the chemical attack may result in a degradation or change in the chemical structure of the rubber. Both types of attack are affected by a number of factors such as chemical concentration, temperature, rubber compounding and component dimensions. The surface area exposed to the environment may also influence the severity of the attack.

MATERIAL

OTHER MATERIAL PERFORMANCE ASPECTS

Permeation

The effect on water quality due to the transport of contaminants from the surrounding soil through the pipe wall or rubber ring must be considered where gross pollution of the soil has occurred in the immediate vicinity of the pipe.

For permeation to occur through the pipe wall, the chemical must be a strong solvent or swelling agent for PVC such as aromatic or chlorinated hydrocarbons, ketones, anilines and nitrobenzenes. Permeation through PVC is insignificant for alcohols, aliphatic hydrocarbons, and organic acids.

The mechanism of permeation depends on the effective concentration (activity) of the chemical contaminant. At lower concentrations, permeation rates are so slow that permeation may be considered insignificant. Thus, in the majority of cases, PVC pipe is an effective barrier against permeation of soil contaminants.

At high chemical concentrations (activity >0.25) a different mechanism applies and both the PVC pipe and water quality may be adversely affected in a short time. This corresponds to a gross spill or leak of the chemical in close proximity to the pipe.

It should be noted that rubber rings are generally considered more susceptible to permeation than PVC and should be considered separately.

Weathering and Solar Degradation

The effect of “weathering” or surface degradation by radiant energy, in conjunction with the elements, on plastics has been well researched and documented.

Solar radiation causes changes in the molecular structure of polymeric materials, including PVC. Inhibitors and reflectants are normally incorporated in the material which limits the process to a surface effect. Loss of gloss and discolouration under severe weathering will be observed.

The processes require input of energy and cannot proceed if the material is shielded, e.g. underground pipes.

From a practical point of view, the bulk material is unaffected and performance under primary tests will show no change, i.e. tensile strength and modulus.

However, microscopic disruptions on a weathered surface can initiate fracture under conditions of extreme local stress, e.g. impact on the outside surface. Impact strength will therefore show a decrease under test.

Material Ageing

All PVC pipes and fittings manufactured by Radix Plastic Industries LLC contain protective systems that will ensure against detrimental effects for normal periods of storage and installation.

For periods of storage longer than one year, and to the extent that impact resistance is important to the particular installation, additional protection may be considered advisable.

This may be provided by under-cover storage, or by covering pipe stacks with an appropriate material such as hessian. Heat entrapment should be avoided and ventilation provided. Black plastic sheeting should not be used.

Above-ground systems may be protected by a coat of white or pastel-shade PVA paint. Good adhesion will be achieved with simply a detergent wash to remove any grease and dirt.

Protection against Solar Degradation

The ultimate strength of PVC does not alter markedly with age. Its short-term ultimate tensile strength generally shows a slight increase.

It is important to appreciate that the stress regression line does not represent a weakening of the material with time, i.e. a pipe held under continuous pressure for many years will still show the same short-term ultimate burst pressure as a new pipe.

The material does, however, undergo a change in morphology with time, in that the "free volume" in the matrix reduces, with an increasing number of cross-links between molecules. This results in some changes in mechanical properties:

- A marginal increase in ultimate tensile strength.
- A significant increase in yield stress.
- An increase in modulus at high strain levels.

In general, these changes would appear to be beneficial. However, the response of the material at high stress levels is altered in that local yielding at stress concentrators is inhibited, and strain capability of the article is decreased. Brittle-type fracture is more likely to occur, and a general reduction in impact resistance may be observed.

These changes occur exponentially with time, rapidly immediately following forming, and more and more slowly as time proceeds. By the time the article is put into service, they are barely measurable, except in the very long term.

Artificial ageing can be achieved by heat treatment at 60°C for 18 hours. PVC-O undergoes such ageing in the orientation process and its characteristics are similar to a fully aged material, but with greatly enhanced ultimate strength.

MATERIAL

OTHER MATERIAL PERFORMANCE ASPECTS

Microbiological Effects

PVC is immune to attack by microbiological organisms normally encountered in under-ground water supply and sewerage systems.

Macrobiological Attack

PVC does not constitute a food source and is highly resistant to damage by termites and rodents.

Effect of Soil Sulphides

Grey discolouration of under-ground PVC pipes may be observed in the presence of sulphides commonly found in soils containing organic materials. This is due to a reaction with the stabilizer systems used in processing. It is a surface effect, and in no way impairs performance.

Important Information

The listed data are based on results of immersion tests on specimens, in the absence of any applied stress. In certain circumstances, where the preliminary classification indicates high or limited resistance, it may be necessary to conduct further tests to assess the behavior of pipes and fittings under internal pressure or other stresses.

Variations in the analysis of the chemical compounds as well as in the operating conditions (pressure and temperature) can significantly modify the actual chemical resistance of the materials in comparison with this chart's indicated value.

It should be stressed that these ratings are intended only as a guide to be used for initial information on the material to be selected. They may not cover the particular application under consideration and the effects of altered temperatures or concentrations may need to be evaluated by testing under specific conditions. No guarantee can be given in respect of the listed data.

Chemical	Formula	Conc. (%)	Temp. (°C)	uPVC	PE	PP	PVDF	PVC/C	NBR	EPM	FPM
ACETALDEHYDE	CH_3CHO	100	25	3	1	2	3	3	3	1	2
			60	3	2			3			
			100					3			
- AQUEOUS SOLUTION		40	25	3	1	1	1	1	3	1	1
			60	3	2	2	1		3		
			100				1				2
ACETIC ACID	CH_3COOH	≤25	25	1	1	1	1	1	3	1	1
			60	2	1	1	1	1	3	3	
			100			1	1	1			
		30	25	1	1	1	1	1	2	1	1
			60	2	1	1	1		2	3	
			100			1	1	2			
		60	25	1	1	1	1	1	2		1
			60	2	1	1	1		3		
			100			2	2	2		3	
		80	25	1	2	1	1	1	3	2	1
			60	2	3	3	1		3	3	
			100			3	2	2	3	3	2
- GLACIAL		100	25	2	1	1	1	2	3	3	2
			60	3	2	2	2	3	2	1	3
			100			3	3	3		3	3
ACETIC ANHYDRIDE	$(CH_3CO)_2O$	100	25	3	2	1	3		3	2	1
			60	3	2	2	3	3			
			100			3	3				3
ACETONE	CH_3COCH_3	10	25	3	1	1	1	3	3	1	3
			60	3		3	1	3		3	3
			100			3	1	3		3	3
		100	25	3	2	1	2	3	3	1	3
			60	3	2	3	3	3	3	3	3
			100			3	3	3		3	3
ACETOPHENONE	$CH_3COC_6H_5$	nd	25			1	1		3	1	
			60			3	1				
			100								
ACRYLONITRILE	CH_2CHCN	technically pure	25		1	1	2		3	2	
			60	3	1	1	3				2
			100				3				
ADIPIC ACID	$(CH_2CH_2CO_2H)_2$	sat.	25	1	1	1		1	1	1	1
- AQUEOUS SOLUTION			60	2	1	1			1		
			100								
ALLYL ALCOHOL	CH_2CHCH_2OH	96	25	2	1	1	1	1			2
			60	3	2	1					
			100			1					3
ALUM	$Al_2(SO_4)_3.K_2SO.nH_2O$	dil	25	1	1	1			1		1
- AQUEOUS SOLUTION			60	2	1	1					
			100								
	$Al_2(SO_4)_3.K_2SO_4.nH_2O$	sat	25		1	1	1		1		
			60	2	1	1					
			100								
ALUMINIUM	$AlCl_3$	all	25	1	1		1	1	1	1	1
- CHLORIDE			60	1	1		1	1	2		
			100								
- FLUORIDE	AlF_3	100	25	1	1		1	1	1		
			60	1	1		1				
			100								
- HYDROXIDE	$Al(OH_4)_3$	all	25	1			1	1		1	1
			60	1			1				
			100								
- NITRATE	$Al(NO_2)_3$	nd	25	1			1	1		1	1
			60	1			1				
			100								
- SULPHATE	$Al(SO_4)_3$	deb	25	1	1	1	1	1	1	1	1
			60	1	1	1	1		1		
			100								
		sat	25	1	1	1	1	1	1	1	1
			60	1	1	1	1	1	1		1
			100			2	1	1			1

MATERIAL

Chemical	Formula	Conc. (%)	Temp. (°C)	uPVC	PE	PP	PVDF	PVC/C	NBR	EPM	FPM
AMMONIA	NH_3	deb	25	1	1	1	1	1		1	1
- AQUEOUS SOLUTION			60	2	1		1				
			100								
		sat	25	1		1	1	1		1	
			60	2			1				
			100								
- DRY GAS		100	25	1	1	1	1	1	1	1	1
			60	1	1	1	1	1	2	2	
			100								
- LIQUID		100	25	2	1	1	1		1	1	3
			60	3	1	1	1				3
			100								
AMMONIUM	CH_3COONH_4	sat	25		1	1	1		1	1	1
- ACETATE			60	2	1	1	1		2		1
			100				1				1
- CARBONATE	$(NH_4)_2CO_3$	all	25	1	1	1	1	1	3	1	1
			60	2	1	1	1				
			100								
- CHLORIDE	NH_4Cl	sat	25	1	1	1	1	1	1	1	1
			60	1	1	1	1	1	1		1
			100			2	1	1			1
- FLUORIDE	NH_4F	25	25	1	1	1	1	1			1
			60	2	1	1	1	1			
			100				3				3
- HYDROXIDE	NH_4OH	28	25		1	1	1		1	1	1
			60	2	1	1	1				
			100								
- NITRATE	NH_4NO_3	sat	25	1	1	1	1	1	1		1
			60	1	1	1	1	1	2		1
			100			1	1	1			1
- PHOSPHATE DIBASIC	$NH_4(HPO_4)_2$	all	25	1	1	1	1	1	1		1
			60	1	1	1	1		2		
			100				1	2			
- PHOSPHATE META	$(NH_4)_4P_4O_{12}$	all	25	1		1	1	1		1	1
			60	1		1	1				
			100								
- PHOSPHATE TRI	$(NH_4)_2HPO_4$	all	25	1		1	1	1	1	1	1
			60	1		1	1		2		
			100								
- PERSULPHATE	$(NH_4)_2S_2O_8$	all	25	1		1	1	1		1	1
			60	1			1				
			100								
- SULPHIDE	$(NH_4)_2S$	deb	25	1	1	1	1	1	1	1	1
			60	2	1	1	1		1		
			100								
		sat	25	1	1	1	1	1	1	1	
			60	1	1	1	1		1		
			100								
- SULPHYDRATE	NH_4OHSO_4	dil	25	1	1	1	1	1			1
			60	2	1	1	1				1
			100								
		sat	25	1	1	1	1	1			1
			60	1	1	1	1				1
			100								
AMYLACETATE	$CH_3CO_2CH_2(CH_2)_3CH_3$	100	25	3	1	2	1	3	3	3	3
			60	3	2		2	3		3	3
			100				2	3		3	3
AMYLALCOHOL	$CH_3(CH_2)_3CH_2OH$	nd	25	1	1	1	1	1	1	1	1
			60	2	1	1	1	1	2		1
			100			1	1	1			1
ANILINE	$C_6H_5NH_2$	all	25	3	2	1	1	3	3	1	1
			60	3	2	1	2	3	3		
			100				3	3			1
- CHLORHYDRATE	$C_6H_5NH_2HCl$	nd	25	2	2	2	1	3			1
			60	3	2	2		3			
			100			3	2	3			2

Chemical	Formula	Conc. (%)	Temp. (°C)	uPVC	PE	PP	PVDF	PVC/C	NBR	EPM	FPM
CARBON	CO_2		25	1	1	1	1	1	1	1	1
- DIOXIDE			60	2	1	1	1		1		1
AQUEOUS SOLUTION			100								
- GAS		100	25	1	1	1	1	1	1	1	1
			60	1	1	1	1		1		
			100								
- DISULPHIDE	CS_2	100	25	2	2	1	1	3	3	3	1
			60	3		3	1	3	3	3	
			100			3	1	3	3	3	
- MONOXIDE	CO	100	25	1	1	1	1	1		1	1
			60	1	1	1	1				
			100								
- TETRACHLORIDE	CCl_4	100	25	2	2	3	1	1	2	3	1
			60	3	3	3	1				
			100								
CARBONIC ACID	H_2CO_3	sat	25	1			1	1			
- AQUEOUS SOLUTION			60	1			1				
			100								
- DRY		100	25	1			1	1			
			60	1			1	1			
			100								
- WET		all	25	1			1	1			
			60	2			1				
			100								
CARBON OIL		comm	25	1		3	1	1	2	1	1
			60	1		1	1				
			100								
CHLORAMINE		dil	25	1	1	1	1	1		1	1
			60								
			100								
CHLORIC ACID	$HClO_3$	20	25	1	1	1	1	1	3	1	1
			60	2	3	3	1			1	
			100			3	1			1	3
CHLORINE	Cl_2	sat	25	2			1	2		3	1
			60	3			1				
			100								
- DRY GAS		10	25	1		3	1	1	3		1
			60	2		3	1				1
			100								
		100	25	2		3	1	1	3		1
			60	3		3	1	1			1
			100								
- WET GAS		5g/m³	25	1		3			3		
			60	3		3					
			100								
		10g/m³	25	2		3	1		3		
			60	2		3	1				
			100								
		66g/m³	25	2		3	1		3		
			60	2		3	1				
			100								
- LIQUID		100	25	3	3	3	1		3	3	1
			60			3	1				
			100								
CHLOROACETIC ACID	$ClCH_2COH$	85	25	1	2	1	1		3	2	1
			60	2	3	3	1		3		
			100			3	1			3	3
		100	25	1	3		1	3	3		
			60	2	3	3	3	3			
			100			3	3	3		3	3
CHLOROBENZENE	C_6H_5Cl	all	25	3		3	1	3	3	3	1
			60	3		3	2	3	3	3	
			100								
CHLOROFORM	$CHCl_3$	all	25	3	2	2	1	3	3	3	2
			60	3		3	1	3		3	
			100	3		1		3		3	

MATERIAL

Chemical	Formula	Conc. (%)	Temp. (°C)	uPVC	PE	PP	PVDF	PVC/C	NBR	EPM	FPM
CHLOROSULPHONIC	$ClHSO_3$	100	25	2	3	3	2	1	3	3	2
ACID			60	3	3	3	3			3	
			100			3	3			3	
CHROME ALUM	$KCr(SO_4)_2$	nd	25	1	1	1		1		1	1
			60	2	1	1		1			1
			100			2		1			1
CHROMIC ACID	CrO_3+H_2O	10	25	1	2	1	1	1		1	1
			60	2	3	2	1	1			
			100			3	3	1			
		30	25	1	2	2	1	1	3	1	1
			60	2	3	3	1	1	3	3	
			100			3	2	1	3	3	
		50	25	1	2	2	1	1	3	2	1
			60	2	3	3	1				
			100			3	2	2			
CHROMIC SOLUTION	$CrO_3+H_2O+H_2SO_4$	50/35/15	25	1	3	3					1
			60	2	3	3					1
			100								
CITRIC ACID	$C_3H_4(OH)(CO_2H)_3$	50	25	1	1	1	1	1	1	1	1
AQ. SOL. min			60	1	1	1	1				
			100			1	1	2			
COPPER	$CuCl_2$	sat	25	1	1	1	1	1		1	1
- CHLORIDE			60	1	1	1	1	1			
			100				1	1			
- CYANIDE	$CuCN_2$	all	25	3		1	1	1			
			60	3		1	1				
			100								
- FLUORIDE	CuF_2	all	25	1	1	3	1	1			1
			60	1	1	3	1				
			100								
- NITRATE	$Cu(NO_3)_2$	nd	25	1	1	1	1	1		1	1
			60	2	1	1	1				1
			100								
- SULPHATE	$CuSO_4$	dil	25	1	1	3	1	1	2	1	1
			60	1	1	3	1				
			100								
		sat	25	1	1	1	1	1	2	1	1
			60	1	1	1	1				1
			100								
COTTONSEED OIL		comm	25	1		1	1	1	1	2	1
			60	1		1	1				1
			100								
CRESOL	$CH_3C_6H_4OH$	£90	25	2	1	1	1	2	3	3	1
			60	3			1	3		3	
			100								
		>90	25	3		2	1	3	3	3	2
			60	3			1	3		3	
			100								
CRESYLIC ACID	$CH_3C_6H_4COOH$	50	25	2			1	1			1
			60	3			2		3	2	1
			100								
CYCLOHEXANE	C_6H_{12}	all	25	3	1	1	1	3	1	3	1
			60	3		2	1	3		3	
			100				2				
CYCLOHEXANONE	$C_6H_{10}O$	all	25	3	1		1	3	2	3	
			60	3		3	2	3		3	
			100			3	3	3		3	
DECAHYDRONAFTALENE	$C_{10}H_{18}$	nd	25	1	1	3	1			3	1
			60	1	2	3	1			3	
			100								
DEMINERALIZED WATER		100	25	1	1	1	1	1		1	1
			60	1	1	1	1	1		1	1
			100			1	1	1		1	1
DEXTRINE	$C_6H_{12}OCH_2O$	nd	25	1	1	1	1	1	1		1
			60	2	1	1	1		1		
			100								

Chemical	Formula	Conc. (%)	Temp. (°C)	uPVC	PE	PP	PVDF	PVC/C	NBR	EPM	FPM
DIBUTYLPHTALATE	$C_6H_4(CO_2C_4H_9)_2$	100	25	3	3	3	1	3	3	1	2
			60	3		3		3			
			100								
DICHLOROACETIC	$Cl_2CHCOOH$	100	25	1	1	1				1	2
ACID			60	2	2	2					3
			100								
DICHLOROETHANE	CH_2ClCH_2Cl	100	25	3	3	1	1	3			3
			60	3	3		1				
			100								
DICHLOROETHYLENE	$ClCH_2Cl$	100	25	3	3	2	1		3	1	1
			60	3	3		1				
			100								
DIETHYL ETHER	$C_2H_5OC_2H_5$	100	25	3	3	1	1	3	2		3
			60	3	3	1	3	3			3
			100								
DIGLYCOLIC ACID	$(CH_2)_2O(CO_2H)_2$	18	25	1	1	1				1	1
			60	2	1	1					1
			100								
DIMETHYLAMINE	$(CH_3)_2NH$	100	25	2		1	2		2	3	2
			60	3	2	2	3		3		
			100								
DIOCTYLPHTHALATE		all	25	3	1	2	1	3	2	2	3
			60	3	2	2		3			3
			100								
DISTILLED WATER		100	25	1	1	1	1	1	1	1	1
			60	1	1	1	1	1	1	1	1
			100			1	1	1	1	1	1
DRINKING WATER		100	25	1	1	1	1	1	1	1	1
			60	1	1	1	1	1		1	1
			100			1	1	1		1	1
ETHERS		all	25	3		3		3	2	2	
			60	3		3		3		3	
			100								
ETHYL	$CH_3CO_2C_2H_5$	100	25	3	1	2	2	3	3	1	3
- ACETATE			60	3	3	3	2	3		3	3
			100			3	3	3		3	3
- ALCOHOL	CH_3CH_2OH	nd	25	1	1	1	1	1	1	1	1
			60	2	2	1	1		2		1
			100			1	1				1
- CHLORIDE	CH_3CH_2Cl	all	25	3	2	3	1	3	2	1	2
			60	3		3	1	3			
			100								
- ETHER	$CH_3CH_2OCH_2CH_3$	all	25	3		3	1	3	2	2	3
			60	3		3		3		3	3
			100								
ETHYLENE	$ClCH_2CH_2OH$	100	25	3			1	3	3	3	
- CHLOROHYDRIN			60	3			2	3		3	
			100				3				
- GLYCOL	$HOCH_2CH_2OH$	comm	25	1	1	1	1	1	1	1	1
			60	2	3	1	1		2		1
			100								
FATTY	ACIDS	nd	25	1			1	1			1
			60	1			1	1			
			100								
FERRIC	$FeCl_3$	10	25	1		1	1	1	1	1	1
- CHLORIDE			60	2		1	1			1	
			100								
		sat	25	1	1	1	1	1	1	1	1
			60	1	1	1	1	1		1	
			100			1	1	1		1	
- NITRATE	$Fe(NO_3)_3$	nd	25	1	1		1	1			1
			60	1	1		1	1			
			100								
- SULPHATE	$Fe(SO_4)_3$	nd	25	1	1	1	1	1	1	1	1
			60	1	1		1				
			100								

MATERIAL

Chemical	Formula	Conc. (%)	Temp. (°C)	uPVC	PE	PP	PVDF	PVC/C	NBR	EPM	FPM
FERROUS	$FeCl_2$	sat	25	1	1	1	1	1	1	1	
- CHLORIDE			60	1	1		1	1			
			100								
- SULPHATE	$FeSO_4$	nd	25	1	1	1	1	1	1	1	
			60	1	1		1				
			100								
FERTILIZER		≤10	25	1	1	1		1		1	1
			60	1	1	1					
			100								
		sat	25	1	1	1		1		1	1
			60	1	1	1					
			100								
FLUORINE GAS - DRY	F_2	100	25	2	2	3	1		3		
			60	3	3	3					
			100								
FLUOROSILICIC ACID	H_2SiF_6	32	25	1	1	1	1	1	2	2	1
			60	1	1	1	1	1	3		
			100				1	1			
FORMALDEHYDE	HCOH		25	1	1	1	1	1	3	1	1
			60	2	1	1	1		3		
			100				1	2			3
FORMIC ACID	HCOOH	50	25	1	1	1	1	1	3	1	1
			60	2	1	1	1		3	2	
			100				1	2			3
		100	25	1	1	1	1	1	2	2	3
			60	3	1	1	1		2	2	3
			100				1	3			3
FRUIT PULP AND JUICE		comm	25	1	1	1	1	1		1	1
			60	1		1	1				
			100								
FUEL OIL		100	25	1		1	1	1	1	3	1
			60	1		2	1	1			
			100								
		comm	25	1		1	1	1	1	3	1
			60	1	2	2	1	1			
			100								
FURFUROLE ALCOHOL	$C_5H_3OCH_2OH$	nd	25	3	2	2			3		1
			60	3	2	2					
			100								
GAS EXHAUST		all	25	1			1	1		1	
- ACID			60	1			1				
			100								
- WITH NITROUS VAPOURS		traces	25	1	1	1	1	1	1		1
			60	1	1	1	1				
			100								
GAS PHOSGENE	ClCOCl	100	25	1	2	2		1			1
			60	2	2	2		3			
			100								
GELATINE		100	25	1	1	1	1	1	1	1	1
			60	1		1	1				
			100								
GLUCOSE	$C_6H_{12}O_6$	all	25	1	1	1	1	1	1	1	1
			60	2	1	1	1		1		1
			100								
GLYCERINE	$HOCH_2CHOHCH_2OH$	all	25	1	1	1	1	1	1	1	1
AQ.SOL			60	1	1	1	1	1	1		1
			100			1	1	1			1
GLYCOGLUE		10	25	1	1	1	1	1	1	1	1
AQUEOUS			60	1	1	1	1	1	1		
			100			1	1	1			
GLYCOLIC ACID	$HOCH_2COOH$	37	25	1	1	1	1	1			1
			60	1	1		1				
			100								
HEPTANE	C_7H_{16}	100	25	1	1	3	1	1		1	1
			60	2	3	3	3	1		1	
			100								

Chemical	Formula	Conc. (%)	Temp. (°C)	uPVC	PE	PP	PVDF	PVC/C	NBR	EPM	FPM
FERROUS	$FeCl_2$	sat	25	1	1	1	1	1	1	1	
- CHLORIDE			60	1	1		1	1			
			100								
- SULPHATE	$FeSO_4$	nd	25	1	1	1	1	1	1	1	
			60	1	1		1				
			100								
FERTILIZER		≤10	25	1	1	1		1		1	1
			60	1	1	1					
			100								
		sat	25	1	1	1		1		1	1
			60	1	1	1					
			100								
FLUORINE GAS - DRY	F_2	100	25	2	2	3	1		3		
			60	3	3	3					
			100								
FLUOROSILICIC ACID	H_2SiF_6	32	25	1	1	1	1	1	2	2	1
			60	1	1	1	1	1	3		
			100				1	1			
FORMALDEHYDE	HCOH		25	1	1	1	1	1	3	1	1
			60	2	1	1	1		3		
			100				1	2			3
FORMIC ACID	HCOOH	50	25	1	1	1	1	1	3	1	1
			60	2	1	1	1		3	2	
			100				1	2			3
		100	25	1	1	1	1	1	2	2	3
			60	3	1	1	1		2	2	3
			100				1	3			3
FRUIT PULP AND JUICE		comm	25	1	1	1	1	1		1	1
			60	1		1	1				
			100								
FUEL OIL		100	25	1		1	1	1	1	3	1
			60	1		2	1	1			
			100								
		comm	25	1		1	1	1	1	3	1
			60	1	2	2	1	1			
			100								
FURFUROLE ALCOHOL	$C_5H_3OCH_2OH$	nd	25	3	2	2			3		1
			60	3	2	2					
			100								
GAS EXHAUST		all	25	1			1	1		1	
- ACID			60	1			1				
			100								
- WITH NITROUS VAPOURS		traces	25	1	1	1	1	1	1		1
			60	1	1	1	1				
			100								
GAS PHOSGENE	ClCOCl	100	25	1	2	2		1			1
			60	2	2	2		3			
			100								
GELATINE		100	25	1	1	1	1	1	1	1	1
			60	1		1	1				
			100								
GLUCOSE	$C_6H_{12}O_6$	all	25	1	1	1	1	1	1	1	1
			60	2	1	1	1		1		1
			100								
GLYCERINE	$HOCH_2CHOHCH_2OH$	all	25	1	1	1	1	1	1	1	1
AQ.SOL			60	1	1	1	1	1	1		1
			100			1	1	1			1
GLYCOGLUE		10	25	1	1	1	1	1	1	1	1
AQUEOUS			60	1	1	1	1	1	1		
			100			1	1	1			
GLYCOLIC ACID	$HOCH_2COOH$	37	25	1	1	1	1	1			1
			60	1	1		1				
			100								
HEPTANE	C_7H_{16}	100	25	1	1	3	1	1		1	1
			60	2	3	3	3	1		1	
			100								

MATERIAL

Chemical	Formula	Conc. (%)	Temp. (°C)	uPVC	PE	PP	PVDF	PVC/C	NBR	EPM	FPM
HEXANE	C_6H_{14}	100	25	1	1	1	1	1		3	
			60	2	2	2	1				
			100								
HYDROBROMIC ACID	HBr	≤10	25	1	1	1	1	1	3	1	1
			60	2	1	1	1				
			100			3	1	2		3	
		48	25	1	1	1	1	1	3	1	1
			60	2	1	1	1				
			100			3	1	2		3	3
HYDROCHLORIC ACID	HCl	≤25	25	1	1	1	1	1	1	1	1
			60	2	1	1	1	1	3	1	1
			100			1	1	1	3	3	1
		≤37	25	1	1	1	2	2	1	1	1
			60	1	2	1	1	1	2	2	
			100			2	1	1		3	2
HYDROCYANIC ACID	HCN	deb	25	1	1	1	1		2	1	1
			60	1	1	1	1		3	3	
			100								
HYDROFLUORIC ACID	HF	10	25	1	1	1	1	1		1	1
			60	2	1	1	1				
			100			3	1	2			2
		60	25	2	1	1	1	1	3	2	1
			60	3		3	1		3		
			100			3	1	2			2
HYDROGEN	H_2	all	25						1		
			60						1		
			100								
HYDROGEN	H_2O_2	30	25	1	1	1	1	1	1	1	1
- PEROXIDE			60	1	1	1	1	1			
			100		1			1			
		50	25	1	2	1	1	1			1
			60	1		2		1			
			100					1			
		90	25	1	1	1	1	1	3	2	1
			60	1	2	2		1			
			100					1			3
- SULPHIDE DRY		sat	25	1	1	1	1		3	1	1
			60	2	1	1	1		3		
			100								
- SULPHIDE WET		sat	25	1	1	1	1		3	1	1
			60	2	1	1	1		3		
			100								
HYDROSULPHITE		≤10	25	1		1	1	1		1	1
			60	2		1	1				
			100								
HYDROXYLAMINE	$(H_2NOH)_2H_2SO_4$	12	25	1	1	1	1		1		
SULPHATE			60	1		1	1		2		
			100								
ILLUMINATING GAS		100	25	1	1	1		1	1	1	1
			60								
			100								
IODINE	I_2	3	25	2		1	1				
- DRY AND WET			60	3			1				
			100								
- TINCTURE		>3	25	2	2	1	1	1			1
			60	3	3	3	1				
			100								
ISOCTANE	C_8H_{18}	100	25	1	2	2	1		1		3
			60			3	1				3
			100								
ISOPROPYL	$(CH_3)_2CHOCH(CH_3)_2$	100	25	2	2	2	1		3		3
- ETHER			60	3	3	3					3
			100								
- ALCOHOL	$(CH_3)_2CHOH$	100	25			1	1				1
			60	2		1					1
			100								

Chemical	Formula	Conc. (%)	Temp. (°C)	uPVC	PE	PP	PVDF	PVC/C	NBR	EPM	FPM
LACTIC ACID	$CH_3CHOHCOOH$	≤28	25	1	1	1	1	1	1	1	1
			60	2	1	1	2				1
			100			1	2				1
LANOLINE		nd	25		1	1			1		1
			60	2	1	2			1		
			100								
LEAD ACETATE	$Pb(CH_3COO)_2$	sat	25	1	1	1	1	1	1	1	1
			60	1		2	1	1	1		1
			100			2	1	1			1
LINSEED OIL		comm	25	1		1	1	1	1	1	1
			60	2	2	1	1		1		1
			100								
LUBRICATING OILS		comm	25	1	3	1	1	1	1	3	1
			60	1		2	1				1
			100								
MAGNESIUM	$MgCO_3$	all	25	1		1	1	1		1	1
- CARBONATE			60	1		1	1				
			100								
- CHLORIDE	$MgCl_2$	sat	25	1	1	1	1	1		1	1
			60	1	1	1	1	1			
			100			2	1	1			
- HYDROXIDE	$Mg(OH)_2$	all	25	1		1	1	1	1	1	1
			60	1		1	1				
			100								
- NITRATE	$MgNO_3$	nd	25	1	1	1	1	1		1	1
			60	1	1	1	1				
			100								
- SULPHATE	$MgSO_4$	dil	25	1	1	1	1	1	1	1	1
			60	1	1	1	1	1			
			100								
		sat	25	1	1	1	1	1		1	1
			60	1	1	1	1	1			
			100								
MALEIC ACID	COOHCHCHCOOH	nd	25	1	1	1	1	1	2	2	1
			60	1	1	1	1				1
			100			1	1	2			1
MALIC ACID	$CH_2CHOH(COOH)_2$	nd	25	1	1	1	1	1	1	3	1
			60			1	1				
			100								
MERCURIC	$HgCl_2$	sat	25	1	1	1	1	1	1		
- CHLORIDE			60	1	1	1	1				
			100								
- CYANIDE	$HgCN_2$	all	25	1		1	1	1			
			60	1		1	1				
			100								
MERCUROUS NITRATE	$HgNO_3$	nd	25	1	1	1	1	1			
			60	1	1	1	1				
			100								
MERCURY	Hg	100	25	1	1	1	1	1	1	1	1
			60	2	1	1	1				
			100								
METHYL	CH_3COOCH_3	100	25			1	1		3	2	
- ACETATE			60			1				3	
			100								
- ALCOHOL	CH_3OH	nd	25	1	1	1	1	1	1	1	2
			60	1	1	2	1				2
			100			2	1				2
- BROMIDE	CH_3Br	100	25	3	3	3	1				1
			60			3	1				
			100								
- CHLORIDE	CH_3Cl	100	25	3	1	3	1	2	3	2	2
			60	3		3	1				
			100			3	1	3			
- ETHYLKETONE	$CH_3COCH_2CH_3$	all	25	3	1	1	2		3	1	3
			60	3	2	2	3		3		3
			100								

MATERIAL

Chemical	Formula	Conc. (%)	Temp. (°C)	uPVC	PE	PP	PVDF	PVC/C	NBR	EPM	FPM
METHYLAMINE	CH_3NH_2	32	25	2	1	1	2				1
			60	3	2						
			100								
METHYLENE	CH_2Cl_2	100	25	3	3	3	1	3			2
CHLORIDE			60	3		3	2	3			
			100			3	3	3			
METHYL	CH_3COOSO_4	50	25	1	2	2	1	1		1	1
SULPHORIC ACID			60	2	2	2	1				
			100			3	2			3	3
		100	25	1	3	3		1		1	2
			60	2	3	3					
			100			3				3	3
MILK		100	25	1	1	1	1	1	1	1	1
			60	1		1	1	1			
			100			1	1	1			
MINERAL ACIDOULOUS		nd	25	1	1	1	1	1	1	1	1
WATER			60	1	1	1	1	1		1	1
			100			1	1	1		1	1
MOLASSES		comm	25	1	1	1	1	1		1	1
			60	2	2	1	1				
			100			2	1	2			2
NAPHTA		100	25	2	2	1	1	1	1	3	1
			60	3	3	3	1				1
			100								
NAPHTALINE		100	25	1	1	3	1	2	3	3	1
			60		2	3	1				
			100			3	1	3			
NICKEL	$NiCl_3$	all	25	1	1	1	1	1	1	1	
- CHLORIDE			60	1	1	1	1	1			
			100			1	1	1			
- NITRATE	$Ni(NO_3)_2$	nd	25	1	1	1	1	1		1	1
			60	1	1	1	1				
			100			2	1				
- SULPHATE	$NiSO_4$	dil	25	1	1	1	1	1	1	1	1
			60	1	2	1	1				
			100								
		sat	25	1	1	1	1	1		1	1
			60	1	1	1	1			1	
			100								
NITRIC ACID	HNO_3	anhydrous	25	3		3	2	3			1
			60	3		3	3	3			
			100			3	3	3			3
		20	25	1	1	1	1	1		1	1
			60	2	2	2	1	1			1
			100			3	1	1		2	1
		40	25	1		2	1	1		1	1
			60	1	2	3	1	1			
			100			3	1	1		3	3
		60	25	1	3	2	1	1		3	2
			60	2	3	3	1	1		3	3
			100			3	1	1		3	3
		98	25	3	3	3	1	3		3	3
			60	3	3	3	1	3		3	3
			100			3	2	3		3	3
NITROBENZENE	$C_6H_5NO_2$	all	25	3		1	1	3	2	3	2
			60	3	2	2	1	3		3	3
			100								
OLEIC ACID	$C_8H_{17}CHCH(CH_2)_7CO_2H$	comm	25	1		1	1	1	1	2	1
			60	1	2	2	1				
			100								

Chemical	Formula	Conc. (%)	Temp. (°C)	uPVC	PE	PP	PVDF	PVC/C	NBR	EPM	FPM
OLEUM		nd	25	3	3	3	3	3	3	3	1
			60	3	3	3	3	3		3	
			100								
- VAPOURS		low	25	3		3	3	3	3	3	1
			60	3		3	3	3		3	
			100								
		hight	25	3		3	3	3	3	3	1
			60	3		3	3	3		3	
			100								
OLIVE OIL		comm	25			1	1		1	2	1
			60	2	3	1	1		1		
			100								
OXALIC ACID	HO_2CCO_2H	10	25	1	1	1	1	1	2	1	1
			60	2	1	2	1			1	1
			100			2	2			1	1
		sat	25	1	1	1	1	1	2	1	1
			60	1	1	2	1	1			1
			100			3	3	1			1
OXYGEN	O_2	all	25	1	1	3	1	1	1	1	1
			60	1	2	3	1	1			
			100								
OZONE	O_3	nd	25	1	2	3	1	1	3	1	1
			60	2	3	3	2		3		
			100								
PALMITIC ACID	$CH_3(CH_2)_{14}COOH$	10	25	1			1	1	1	2	1
			60	1		3	1				1
			100								
		70	25	1			1	1	2		
			60	1	3	3	1		3		1
			100								
PARAFFIN		nd	25				1		3		1
			60	2	2	1	1				
			100								
- EMULSION		comm	25	1	2	3	1	1			1
			60	1	2	3	1				
			100								
- OIL		nd	25	1		1	1				
			60	1		3	1				
			100								
PERCHLORIC ACID	$HClO_4$	100	25	1	1	1	1	1	3	2	1
			60	2	1	1	1		3		1
			100								
		70	25	1	1	1	1		3	2	1
			60	2	2		1		3		1
			100								
PETROL		100	25	1		1	1	1	2	3	1
- REFINED			60		1	3	1				
			100								
- UNREFINED		100	25	1		1	1	1	2	3	1
			60	1		3	1				
			100								
PHENOL	C_6H_5OH	1	25	1	1	1	1	1	3	1	1
- AQUEOUS SOLUTION			60			1	1				1
			100			3	1				1
		≤90	25	2	1	1	1	1	3		1
			60	3		3	1				1
			100			3	1				1
PHENYL HYDRAZINE	$C_6H_5NHNH_2$	all	25	3	2	2	1	3	3		1
			60	3	2	2	1	3			2
			100								
- CHLORHYDRATE	$C_6H_5NHNH_3Cl$	sat	25	1	1	1					1
			60	3	3	3					2
			100								

MATERIAL

Chemical	Formula	Conc. (%)	Temp. (°C)	uPVC	PE	PP	PVDF	PVC/C	NBR	EPM	FPM
PHOSPHORIC	H_3PO_4	≤25	25	1	1	1	1	1	2	1	1
- ACID			60	2	1	1	1		3	1	1
			100			1	1	2		1	1
		≤50	25	1	1	1	1	1	2	1	1
			60	1	1	1	1		3	1	1
			100			1	1	2		2	1
		≤85	25	1	1	1	1	1	3	1	1
			60	1	2	1	1				
			100			1	1				2
- ANHYDRIDE	P_2O_5	nd	25	1	1	1		1	2	1	1
			60	2	1	1			3		
			100								
PHOSPHORUS TRICHLORIDE	PCl_3	100	25	3	1	1	1	3			1
			60	3			1	3			
			100								
PHOTOGRAPHIC		comm	25	1			1	1		1	
- DEVELOPER			60	1			1	1			
			100								
- EMULSION		comm	25	1	1		1	1			
			60	1			1	1			
			100								
PHTHALIC ACID	$C_6H_4(CO_2H)_2$	50	25		1	1	1			1	1
			60	3	1	1	1			1	
			100								
PICRIC ACID	$HOC_6H_2(NO2)_3$	1	25	1	1	1	1		2	1	1
			60	1			1		3		1
			100								
		>1	25	3	1	3	1		1	1	1
			60	3	1	3	1		2	2	1
			100								
POTASSIUM - BICHROMATE	K_2CrO_7	40	25	1	1	1	1	1	1	1	1
			60	1			1		3		
			100								
- BORATE	K_3BO_3	sat	25	1		1	1				1
			60	2		1	1				
			100								
- BROMATE	$KBrO_3$	nd	25	1		1	1	1		1	1
			60	2		1	1				1
			100			2	1				1
- BROMIDE	KBr	sat	25	1	1	1	1				1
			60	1	1	1	1				
			100								
- CARBONATE	K_2CO_3	sat	25	1	1	1	1		1		1
			60	1	1		2		1		
			100								
- CHLORIDE	KCl	sat	25	1	1	1	1	1	1	2	1
			60	1	1	1	1		1		1
			100			2	1				1
- CHROMATE	$KCrO_4$	40	25	1	1	1	1	1		1	1
			60	1	1	1	1				
			100								
- CYANIDE	KCN	sat	25	1	1	1	1		1		1
			60	1	1	1	2		1		
			100								
- FERROCYANIDE	$K_4Fe(CN)_6.3H_2O$	100	25	1	1	1	1	1		1	1
			60	1	1	1	1				1
			100			2	1				1
- FLUORIDE	KF	sat	25		1	1	1				
			60		1	1	1				
			100								
- HYDROXIDE	KOH	≤60	25	1	1	1	2	1	2	1	1
			60	2	1	1	2	1	3		
			100			1	3	1			
- NITRATE	KNO_3	sat	25	1	1	1	1	1	1	1	1
			60	1	1	1	1	1	1		
			100				1	1			

Chemical	Formula	Conc. (%)	Temp. (°C)	uPVC	PE	PP	PVDF	PVC/C	NBR	EPM	FPM
- PERBORATE	KBO_3	all	25	1		1	1	1		1	1
			60	1			1				
			100								
- PERMANGANATE	$KMnO_4$	10	25	1	1	1	1	1		1	1
			60	1	1	2	1				
			100								
- PERSULPHATE	$K_2S_2O_8$	nd	25	1	1	1	1	1		1	1
			60	2	1	1	1				
			100								
- SULPHATE	K_2SO_4	sat	25			1	1		1	2	1
			60	1	1	1	1			3	
			100								
PROPANE	C_3H_8	100	25	1	1	1	1	1	1	1	1
- GAS			60				1				
			100								
- LIQUID		100	25	1	2	2	1	1	1	3	1
			60				1				
			100								
PROPYL ALCOHOL	C_3H_7OH	100	25	1	1	1	1	1	2	1	1
			60	2	1	1	1				1
			100								
PYRIDINE	$CH(CHCH)_2N$	nd	25	3	1	2	1	3	3	3	3
			60	3	2	2	3	3		3	3
			100								
RAIN WATER		100	25	1	1	1	1	1	1	1	1
			60	1	1	1	1	1	1	1	1
			100			1	1	1		1	1
SEA WATER		100	25	1	1	1	1	1	2	1	1
			60	1	1	1	1	1		1	1
			100			1	1	1		1	1
SILICIC ACID	H_2SiO_3	all	25	1	1	1	1	1		1	1
			60	1	1	1	1			1	
			100								
SILICONE OIL		nd	25	1	1	1			1	1	1
			60	3	2	1					
			100								
SILVER	AgCN	all	25	1		1	1	1	1		1
- CYANIDE			60	1		1	1				
			100								
- NITRATE	$AgNO_9$	nd	25	1	1	1	1	1		1	1
			60	2	1	1	1	1			
			100			2	1	1			2
- PLATING SOLUTION		comm	25	1			1	1		1	
			60	1							
			100								
SOAP		high	25	1		1	1	1	1	1	1
- AQUEOUS SOLUTION			60	2			1				
			100								
SODIC LYE		£60	25	1		1		1		1	1
			60	1				1			
			100								
SODIUM	CH_3COONa	100	25	1	1	1	1	1		1	
- ACETATE			60	1	1	1	1	1			
			100			1	1	1			
- BICARBONATE	$NaHCO_3$	nd	25	1	1	1	1	1	1	1	1
			60	1	1	1	1	1	1		
			100			1	1	1	1		
- BISULPHITE	$NaHSO_3$	100	25	1	1	1	1	1	2	1	1
			60	1	1	1	1	1	3		
			100			2	1	1			
- BROMIDE	NaBr	sat	25	1		1	1	1	1	1	1
			60	1		1	1		3		
			100								
- CARBONATE	Na_2CO_3	sat	25	1	1	1	1	1	1	1	1
			60	1	1	1	2				
			100				2				

MATERIAL

Chemical	Formula	Conc. (%)	Temp. (°C)	uPVC	PE	PP	PVDF	PVC/C	NBR	EPM	FPM
- CHLORATE	$NaClO_3$	nd	25	1	1	1	1	1	1	1	1
			60	2	1		1		2		1
			100								
- CHLORIDE	NaCl	dil	25	1	1	1	1	1	1	1	1
			60	2	1	1	1		1		
			100								
		sat	25	1	1	1	1	1	1	1	1
			60	1	1	1	1	1	1		
			100			3	1	1			
- CYANIDE	NaCN	all	25	1		1	1	1		1	
			60	1		1	1				
			100								
- FERROCYANIDE	$Na_4Fe(CN)_6$	sat	25	1	1			1		3	3
			60	1	1						
			100								
- FLUORIDE	NaF	all	25	1	1		1	1	1		
			60	1	1		2		2		
			100				3				
- HYDROXIDE	NaOH	60	25	1	1	1	2	1	1	1	1
			60	1	1	1	2	1	3		
			100			1	3	1			3
- HYPOCHLORITE	NaOCl	deb	25	1	1	1	1	1	2	1	1
			60	2		2	1				
			100								
- HYPOSULPHITE	$Na_2S_3O_3$	nd	25	1		1	1	1			
			60	1			1				
			100								
- NITRATE	$NaNO_3$	nd	25	1	1	1	1	1	1	1	1
			60	1	1	1	1		1		
			100								
- PERBORATE	$NaBO_3H_2O$	all	25	1		1	1	1	1	1	1
			60	1			1				
			100								
- PHOSPHATE di	Na_2HPO_4	all	25	1		1	1	1	1	1	1
			60	1		1	1	1			
			100			1	1	1			
- PHOSPHATE tri	Na_3PO_4	all	25	1	1	1	1	1	1	1	1
			60	1	1	1	1	1	1		
			100			1	1	1	1		
- SULPHATE	Na_2SO_4	dil	25	1		1	1	1	1	1	1
			60	1		1	1				
			100								
		sat	25	1	1	1	1	1	1	1	1
			60	1	1	1	1				
			100								
- SULPHIDE	Na_2S	dil	25	1	1	1	2	1		1	1
			60	2	1	1	2				
			100								
		sat	25	1	1	1	2	1		1	1
			60	1	1	1	2				1
			100								
- SULPHITE	$NaSO_3$	sat	25	1		1	1	1	1	1	1
			60	1		1	1		2		1
			100								
STANNIC CHLORIDE	$SnCl_4$	sat	25	1	1	1	1	1			
			60	1	1	1	1	1			
			100								
STANNOUS CHLORIDE	SnCl2	dil	25	1	1	1	1	1		1	1
			60	1	1	1	1				
			100								
STEARIC ACID	$CH_3(CH_2)_{16}CO_2H$	100	25	1		2	1	1	1		1
			60	1	2	2	1	1	2	2	1
			100								
SUGAR SYRUP		high	25	1	1	1	1	1		1	1
			60	2	1		1				
			100								

Chemical	Formula	Conc. (%)	Temp. (°C)	uPVC	PE	PP	PVDF	PVC/C	NBR	EPM	FPM
SULPHUR	S	100	25	1		1	1	1	3	1	
			60	2		1	1				
			100								
- DIOXIDE AQUEOUS	SO_2	sat	25	1	1	1	1	1	3	1	1
			60	2					3		
			100								
- DIOXIDE DRY		all	25	1	1	1	1	1	1	1	1
			60	1	1	1	1				1
			100			3	1				1
- DIOXIDE LIQUID		100	25	2	1				3		1
			60	3	2				3		
			100								
- TRIOXIDE	SO_3	100	25	2	3	3			1		2
			60	2	3	3					
			100								
SULPHURIC ACID	H_2SO_4	≤10	25	1	1	1	1	1	1	1	1
			60	1	1	1	1	1	1	1	1
			100			1	1	1	2	1	1
		≤75	25	1	1	1	1	1	3	1	1
			60	2	2	2	1		3		1
			100			2	1	2	3	2	1
		≤90	25	1	2	1	1	1	1	1	1
			60	2	2	2	1				1
			100			3	1	3			1
		≤96	25	2	2	3	1	1		2	1
			60	3	2	3	2	3		3	
			100			3	3	3		3	
- FUMING		all	25	2		3	3			3	1
			60	3		3	3			3	
			100			3	3			3	
- NITRIC AQUEOUS SOLUTION	H_2SO_4+HNO_3+H_20	48/49/3	25	1	3	3					1
			60	2	3	3					1
			100			3					1
		50/50/0	25	2	3	3	1				1
			60	3	3	3	1				1
			100			3					1
		10/20/70	25	1	2	2					
			60	1	2	2					
			100								
TALLOW EMULSION		comm	25	1	1	1				1	1
			60	1	2	2					
			100								
TANNIC ACID	$C_{14}H_{10}O_9$	10	25	1	1		1	1	1	1	1
			60	1	1		1	1			
			100								
TARTARIC ACID	$HOOC(CHOH)_2COOH$	all	25	1	1	1	1	1	1	1	1
			60	2	1	1	1		1	2	
			100								
TETRACHLORO	$CHCl_2CHCl_2$	nd	25	3	2	2	1		3		2
- ETHANE			60	3	3	3	2				
			100								
- ETHYLENE	CCl_2CCl_2	nd	25	3	2	2					1
			60	3	3	3					
			100								
TETRAETHYLLEAD	$Pb(C_2H_5)_4$	100	25	1	1	1		1		1	1
			60	2							
			100								
TETRAHYDROFURAN	C_4H_8O	all	25	3	2	2	1	3	3	3	2
			60	3	3	3	2	3	3		
			100			3	3	3	3		
THIONYL CHLORIDE	$SOCl_3$		25	3	3	3		3		3	1
			60								
			100								
THIOPHENE	C_4H_4S	100	25	3	2	2		3			3
			60	3	2	3		3			
			100								

MATERIAL

Chemical	Formula	Conc. (%)	Temp. (°C)	uPVC	PE	PP	PVDF	PVC/C	NBR	EPM	FPM
TOLUENE	$C_6H_5CH_3$	100	25	3	2	2	1	3	3	3	2
			60	3	3	3	1	3	3	3	
			100			3	1	3	3	3	
TRANSFORMER OIL		nd	25	1	1	1				3	1
			60	2	2	2					
			100								
TRICHLOROACETIC	CCl_3COOH	≤50	25	1	1	1	2		2	2	3
ACID			60	3	2	1	2				3
			100								
TRICHLOROETHYLENE	Cl_2CCHCl	100	25	3	2	3	1	3	3	3	1
			60	3	2	3	1	3		3	
			100								
TRIETHANOLAMINE	$N(CH_2CH_2OH)_2$	100	25	2	1	1	3	2	2	2	1
			60	3			3				
			100								
TURPENTINE		100	25	2	2	3			1		1
			60	2	3	3					
			100								
UREA	$CO(NH_2)_2$	²10	25	1	1	1	1	1			1
AQUEOUS SOLUTION			60	2	1	1	1	2			
			100								
		33	25	1	1	1	1	1			
			60	2	1	1	1				
			100								
URINE		nd	25	1	1	1	1	1		1	1
			60	2	1	1	1				
			100								
URIC ACID	$C_5H_4N_4O_3$	10	25	1				1			
			60	2				2			
			100								
VASELINE OIL		100	25	1	1	1	1			3	1
			60	3	2	2	1			3	
			100								
VINYL ACETATE	$CH_3CO_2CHCH_2$	100	25	3			1	3		2	1
			60	3				3		3	
			100					3		3	
WHISKY		comm	25	1		1	1	1	1	1	1
			60	1			1				
			100								
WINES		comm	25	1	1	1	1	1	1	1	1
			60	1		1	1	1			
			100	1							
WINE VINEGAR		comm	25	1	1	1	1	1	1	1	1
			60	2	1	1	1	1		1	
			100				1	1		1	
ZINC	$ZnCl_2$	dil	25	1	1	1	1	1	1	1	1
- CHLORIDE			60	1	1	1	1				
			100								
		sat	25	1	1	1	1	1		1	1
			60	1	1	1	1				1
			100			2	1				1
- CHROMATE	$ZnCrO_4$	nd	25	1		1	1	1		1	
			60	1		1	1				
			100								
- CYANIDE	$Zn(CN)_2$	all	25	1			1	1		1	
			60	1			1				
			100								
- NITRATE	$Zn(NO_3)_2$	nd	25	1		1	1	1		1	1
			60	1		1	1				
			100								
- SULPHATE	$ZnSO_4$	dil	25	1	1	1	1	1	1	1	1
			60	1	1	1	1				
			100								
		sat	25	1	1	1	1	1		1	1
			60	1	1	1	1				1
			100								

GENERAL GUIDE FOR CHEMICAL RESISTANCE OF VARIOUS ELASTOMERS (RUBBER RINGS)

Important Information

The listed data are based on results of immersion tests on specimens, in the absence of any applied stress. In certain circumstances, where the preliminary classification indicates high or limited resistance, it may be necessary to conduct further tests to assess the behavior of pipes and fittings under internal pressure or other stresses.

Variations in the analysis of the chemical compounds as well as in the operating conditions (pressure and temperature) can significantly modify the actual chemical resistance of the materials in comparison with this chart's indicated value.

It should be stressed that these ratings are intended only as a guide to be used for initial information on the material to be selected. They may not cover the particular application under consideration and the effects of altered temperatures or concentrations may need to be evaluated by testing under specific conditions. No guarantee can be given in respect of the listed data.

MATERIAL

Chemical	Formula	Temp. (°C)	Conc. (%)	NR	NBR	CR	SBR	EPDM
ACETALDEHYDE	CH_3CHO	20		L	U	U	U	S
ACETIC ACID	CH_3COOH	20	10	S	S	S	S	S
- glacial		20		L	L	U	L	L
ACETIC ANHYDRIDE	$(CH_3CO)_2O$	20		L	U	S	L	L
ACETONE	CH_3COCH_3	20		S	U	U	L	S
ACETONITRILE		20		S	U	S	S	S
ACETOPHENONE	$CH_3COC_6H_5$	20		U	U	U	U	S
ACETYL CHLORIDE		20		U	U	U	U	U
ACRYLIC ACID		20		L	U	L	U	S
ALUMINIUM -chloride	$AlCl_3$	20	10	S	S	S	S	S
-sulphate	$Al_2(SO_4)_3$	20		S	S	S	S	S
AMMONIUM -hydroxide	$NH_4(OH)$	20	35	S	S	S	S	S
-sulphate	$(NH_4)2SO_4$	20	50	S	S	S	S	S
AMYL ACETATE	$CH_3CO_2CH_2(CH_2)_3CH_3$	20		U	U	U	U	U
AMYL ALCOHOL	$CH_3(CH_2)_3CH_2OH$	20		L	L	S	L	L
ANILINE	$C_6H_5NH_2$	20		L	U	L	S	S
ANTIMONY TRICHLORIDE	$SbCl_3$	20	10	S	S	S	S	S
AQUA REGIA	$HCl + HNO_3$	20		U	U	U	U	U
ARSENIC ACID	H_3AsO_4	20		S	S	S	S	S
BARIUM -chloride	$BaCl_2$	20		S	S	S	S	S
-hydroxide	BaOH2	20			S	S	S	S
-sulphate	$BaSO_4$	20			S	S	S	S
BENZALDEHYDE	C_6H_5CHO	20		U	U	U	U	U
BENZENE	C_6H_6	20		U	U	U	U	U
BENZYL CHLORIDE		20		U	U	U	U	U
BENZYL ALCOHOL		20						
BORIC ACID	H_3BO_3	20		S	S	S	S	S
BROMINE	Br_3	20		U	U	U	U	U
BUTANOIS (butyl alcohols)	C_4H_9OH	20		S	S	S	S	S
BUTYL ACETATE	$CH_3CO_2CH_2CH_2CH_2CH_3$	20		U	U	U	U	L
BUTYL CHLORIDE		20		U	U	U	U	U
BUTYRIC ACID	$C_2H_5CH_2COOH$	20		U	U	L	U	U
CALCIUM -chloride	$CaCl_2$	20		S	S	S	S	S
-hydroxide	$CaOH_2$	20		S	S	S	S	S
-hypochlorite		20			U	U	U	S
-nitrate		20			S	S	S	S
CARBON DISULPHIDE	CS_2	20		U	U	U	U	U
CARBON TETRACHLORIDE	CCl_4	20		U	U	U	U	U
CASTROL OIL		20		S	S	S	S	L
CELLOSOLVE (2-ethoxyethanol)		20		L	L	L	U	L
CELLOSOLVE ACETATE		20		U	U	U	U	S
CHLORIDE -dry gas	Ci2	20		U	U	U	U	U
CHLORINE DIOXIDE		20		U	U	U	U	U
CHLORINE WATER		20		U	U	U	U	L
CHLOROBENZENE		20		U	U	U	U	U
CHLOROFORM	$CHCl_3$	20		U	U	U	U	U
CHLOROSULPHONIC ACID	$ClHSO_3$	20		U	U	U	U	U
CHROMIC ACID (plating soln)	CrO3 + H2O	20		U	U	L	U	U
CITRIC ACID	$C_3H_4(OH)CO_2H)_3$	20	10	S	S	S	S	S
COPPER -acetate		20			L	L	L	S
-chloride	$CuCl_2$	20			S	S	S	S
-cyanide		20			S	S	S	S
-sulphate	$CuSO_4$	20		S	S	S	L	S
COTTONSEED OIL		20		S	S	S	U	S
CREOSOTE		20			L	U	U	U
CRESOL	$CH_3C_6H_4OH$	20		U	U	L	U	U
CYCLOHEXANONE	$C_6H_{10}O$	20		U	U	U	U	L
CYCLOHEXANE	C_6H_{12}	20		U	L	L	U	U
CYCLOHEXANOL		20		U	L	L	U	L
DIESEL OIL		20		U	S	L	U	U
DIETHYL ETHER	$C_2H_5OC_2H_5$	20		U	U	L	U	U
DIETHYLENE GLYCOL		20		S	S	S	S	S
DIMETHYLAMINE	$(CH_3)_2NH$	20		L	S	L	U	U
DIMETHYLHYDRAZINE		20		U	U	U	U	S
DIOCTYL PHTHALATE		20		U	L	U	U	S
DIOXANE		20		U	U	U	U	L

Chemical	Formula	Temp. (°C)	Conc. (%)	NR	NBR	CR	SBR	EPDM
ETHANE		20			S	L	U	U
ETHANOL (ethyl alcohol)	CH_3CH_2OH	20		S	S	S	S	S
ETHYL -benzene		20		U	U	U	U	U
-acetate		20			U	U	U	L
-chloride	CH_3CH_2Cl	20		U	U	U	U	L
-ether		20			U	U		U
ETHYLENE -bromide		20		U	U	U	U	U
-dichloride		20		U	U	U	U	L
-glycol (ethanediol)	$HOCH_2CH_2OH$	20		S	S	S	S	S
FERRIC -chloride	$FeCl_3$	20		S	S	S	S	S
-nitrate		20		S	S	S	S	S
-sulphate		20		S	S	S	S	S
FLUOBORIC ACID		20		S	S	S	S	S
FLUORINE	F_2	20		U	U	U	U	U
FLUOSILIC ACID	$HSiF_6$	20		S	S	S	L	S
FORMALDEHYDE	HCOH	20	40	S	U	L	L	S
FORMIC ACID	HCOOH	20	90	L	L	L	S	S
FURFURALDEHYDE (furfural)		20		U	U	U	U	S
HEXANE	C_6H_{14}	20		U	S	L	L	U
HYDRAZINE		20		S	L	L	S	S
HYDROBROMIC ACID	HBr	20	50	S	U	L	U	S
HYDROCHLORIC ACID	HCl	20	10	L	S	S	S	S
		20	36	L	S	S	L	L
HYDROFLUORIC ACID	HF	20	40	L	U	S	S	S
HYDROGEN -peroxide	H_2O_2	20	35	S	S	S	S	S
		20	87	U	U	U	U	S
-sulphide	H_2S	20		U	U	S	U	S
iSO-OCTANE (2,2,4-trimethylbentane)	C_8H_{18}	20		U	S	L	U	U
ISOPROPYL -alcohol	$(CH_3)_2CHOH$	20		S	S	S	S	S
-chloride		20			U	U		U
-ether		20			L	L	U	U
KEROSINE		20			S	U	U	U
LACTIC ACID	$CH_3CHOHCOOH$	20	90	S	L	S	S	S
LEAD -acetate	$Pb(CH_3COO)_2$	20	10	S	S	S	S	S
-nitrate		20		S	S	S	S	S
-sulphamate		20			L	S	L	S
LINSEED OIL		20		U	S	L	U	S
LIQUIFIED PETROLEUM GAS		20			S	L	U	U
LUBRICATING OIL		20		U	S	S	U	U
MAGNESIUM -carbonate	$MgCO_3$	20		S	S	S	S	S
-chloride	$MgCL_2$	20			S	S	S	S
-hydroxide	$MgOH_2$	20			L	S	L	S
-sulphate	$MgSO_4$	20			S	S	L	S
MANGANESE -sulphate		20		S	S	S	S	S
MURCURIC -chloride	$HgCi_2$	20		S	S	S	S	S
METHYL -alcohol (methanol)	CH_3OH	20		S	S	S	S	S
-bromide (bromomethane)	CH_3Br	20		U	U	U	U	U
-ethyl ketone	$CH_3COCH_2CH_3$	20		U	U	U	U	S
METHYLENE -chloride	CH_2Cl_2	20		U	U	U	U	U
MOLASSES		20		S	S	S	S	S
NAPTHALENE		20		U	U	U	U	U
NATURAL GAS		20			S	S	U	U
NICKEL -chloride	$NiCl^2$	20		S	S	S	S	S
-sulphate	$NiSO_4$	20			S	S	L	S
NITRIC ACID	HNO3	20	10	L	L	L	L	S
		20	70	U	U	U	U	U
NITROBENZENE	$C_6H_5NO_2$	20		U	U	U	U	S
NITROMETHANE		20		L	L	S	L	L
NITROPROPANE		20		L	U	L	L	S
OLEIC ACID	$C_8H_{17}CHCH(CH_2)_7CO_2H$	20		U	S	L	U	L
OXALIC ACID	HO_2CCO_2H	20		S	L	S	L	S
OZONE	O_3	20		U	U	L	U	S
PARAFIN -emulsion/oil		20		U	S	L	U	U
PETROL		20		U	S	U	L	U
PERCHLOROETHYLENE		20		U	U	U	U	U
PHENOL	C_6H_5OH	20		L	U	L	L	S

MATERIAL

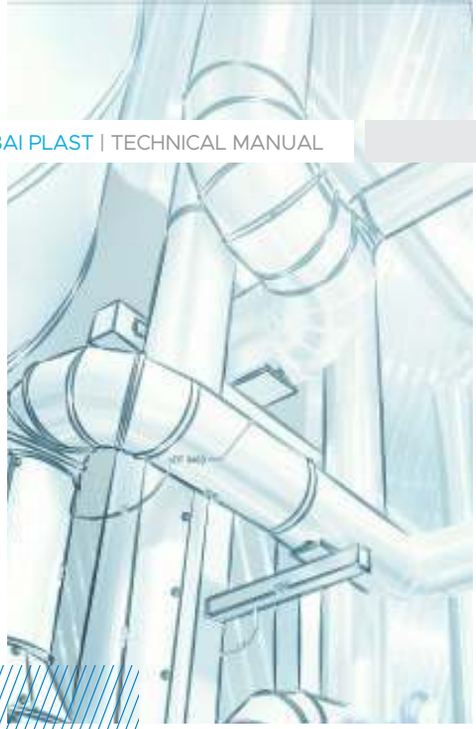
Chemical	Formula	Temp. (°C)	Conc. (%)	NR	NBR	CR	SBR	EPDM
PHOSPHORIC -acid	H_3PO_4	20	85	S	U	S	S	S
PICRIC ACID	$HO_6H_2(NO_2)_3$	20		L	L	L	L	S
POTASSIUM -cyanide	KCN	20		S	S	S	S	S
-floride	KF	20		S	S	S	S	S
-hydroxide	KOH	20	50	S	S	S	L	S
-permanganate	$KMnO_4$	20	25	L	S	S	L	S
-nitrate	KNO_3	20		S	S	S	S	S
-sulphate	K_2SO_4	20		S	S	S	S	S
PROPYLENE OXIDE		20		L	U	L	U	L
PYRIDINE	$CH(CHCH)_2N$	20		U	U	U	U	L
SEA WATER		20		S	S	S	S	S
SEWAGE		20		S	S	S	S	S
SODIUM -carbonate	NA2CO3	20	10	S	S	S	S	S
-chloride	NaCl	20	25	S	S	S	S	S
-cyanide	NaCN	20		S	S	S	S	S
-hydroxide	NaOH	20	10	L	S	S	S	S
		20		S	S	S	S	S
-hypochlorite	NaOCl	20	20	S	S	S	L	S
-nitrate	$NaNO_3$	20		S	L	S	L	S
-nitrite	$NaNO_2$	20		S	S	S	S	S
-perborte		20			L	L	L	S
-peroxide		20						
-phosphate		20		S	S	S	S	S
-silicate		20			S	S	S	S
-sulphate	$Na2SO_4$	20			S	S	L	S
-thiosulphate		20			L	S	L	S
STANNIC CHLORIDE (Tin (IV) Chloide)	$SnCl_4$	20		S	S	S	S	S
SULPHAMIC ACID		20		S	S	S	S	S
SULPHUR DIOXIDE (gas)	SO_2	20		U	L	L	U	S
SULPHURIC ACID	H2SO4	20	10	S	S	S	S	S
		20	70	U	U	L	U	S
		20	96	U	U	U	U	U
TETRACHLOROETHANE	$CHCl_2CHCl_2$	20		U	U	U	U	U
TETRAHYDROFURAN	C_4H_8O	20		U	U	U	U	U
THIONYL CHLORIDE	$SOCl_3$	20		U	U	U	U	L
TITANIUM TETRACHLORIDE		20		U	L	U	U	U
TOLUENE	C_6H_5CH3	20		U	U	U	U	U
TRICHLOROACETIC ACID	CCl_3COOH	20		L	L	U	L	L
TRICHLOROETHANE		20		U	U	U	U	U
TRICHLORETHYLENE	Cl_2CCHCl	20		U	U	U	U	U
TRIETHANOLAMINE	$N(CH_2CH_2OH)_2$	20		L	S	S	L	S
TRIETHYLAMINE		20		U	L	U	U	U
TURPENTINE		20		U	S	U	U	U
VEGETABLE OILS		20		U	S	S	U	L
VINYL ACETATE	CH_3CO_2CHCH2	20		U	L	S	U	U
WATER	H_2O	20		S	S	S	S	S
XYLENE	C_8H_{10}	20		U	U	U	U	U
ZINC -acetate		20			L	L	U	S
-chloride	$ZnCl_2$	20		S	S	S	S	S
-sulphate	$ZnSO_4$	20			S	S	L	S

MEMO

CONTENTS

DESIGN

SELECTION OF PIPE DIAMETER AND CLASS	**58**
Effect of Varying Parameters Charts	59
HAMMER RESISTANCE TO FLOW	**60**
Worked Examples	62
Flow Charts	65
PRESSURE CONSIDERATIONS	**71**
Static Stresses	71
Dynamic Stresses	72
Safety Factors	74
Expansion and Contraction	75
THRUST SUPPORT	**76**
Velocity Thrust	78
AIR AND SCOUR VALVES	**80**



“Reliabilty, Quality and Value”

DESIGN

SELECTION OF PIPE DIAMETER AND CLASS

The pipe diameter and class of PVC pipes is selected by consideration of the required hydraulic capacity and the expected operating conditions. For determination of the flow capacity, it is the mean internal diameter or bore which is the significant dimension. The mean bore for pipes to accepted Standards is calculated as mean OD minus twice the mean wall thickness. Along with other relevant dimensions, the mean bore of PVC-U.

Amongst the factors to be considered are:

1. **Operating pressure characteristics:**
   a) Maximum steady state or static pressures.
   b) Dynamic conditions, frequency and magnitude of pressure variations due to system operation or demand variation.

2. **Temperature:**
   The stress capability of PVC is temperature dependent.

3. **Other load conditions:**
   Earth loads, traffic loads, bending stresses, installation loads, expansion and contraction stresses and other mechanical loads.

4. **Service life required:**
   For short-term projects, e.g. mining, a life of 5 to 15 years could be appropriate; for irrigation, possibly 15 to 30 years; for municipal water supplies, 30 to 100 years.

For situations involving high costs of down-time and repair, a higher factor should be used.

These considerations are discussed in detail later in this section.

PN	Meters head	(MPa)
4.5	46	0.45
6	61	0.6
8	81	0.8
9	91	0.9
10	102	1.0
12	122	1.2
12.5	127	1.25
15	153	1.5
16	163	1.6
18	184	1.8
20	204	2.0

Effect of Varying Parameters Charts

For a given discharge Q, the friction head loss H developed in a pipeline will vary with the following parameters:

Parameter	Set Value
Water temperature	20°C
Small changes in pipe diameter	mean diameter
Roughness coefficient	k = 0.003mm

Designers should use their own discretion as to whether or not it is appropriate to vary these parameters.

Water Temperature

The viscosity of water decreases with increasing temperature.

As the temperature increases the friction head will decrease.

An approximate allowance for the effect of the variation in water temperature is as follows:-
Increase the chart value of the hydraulic gradient by 1% for each 2 °C below 20 °C. Decrease the chart value of the hydraulic gradient by 1% for each 2 °C above 20 °C.

DESIGN

HAMMER RESISTANCE TO FLOW

Flow considerations

In a pipeline, energy is lost wherever there is a change in cross section or flow direction. These energy losses which occur as a result of disturbances to the normal flow show up as pressure drops in the pipeline.

These “form losses” which occur at sudden changes in section, at valves and at fittings are usually small compared with the friction losses in long pipelines. However, they may contribute a significant part to the total losses in short pipeline systems with several fittings.

It can be shown that form losses in pipes may be expressed as a constant multiplied by the velocity head:
i.e. loss in pressure head

$$H_L \ (m) = K \frac{V^2}{2g}$$

Where:
V = velocity (m/s) from the flow chart
K = resistance coefficient

Fitting Type	K
Pipe Entry Losses	
Square Inlet	0.50
Re-entrant Inlet	0.80
Slightly Rounded Inlet	0.25
Bellmouth Inlet	0.05
Pipe Intermediate Losses	
Elbows R/D < 0.6	45° 0.35 90° 1.10
Long Radius Bends (R/D > 2)	11¼° 0.05 22½° 0.10 45° 0.20 90° 0.50
Tees	
(a) Flow in line	0.35
(b) Line to branch flow	1.00
Sudden Enlargements	
Ratio d/D	
0.9	0.04
0.8	0.13
0.7	0.26
0.6	0.41
0.5	0.56
0.4	0.71
0.3	0.83
0.2	0.92
<0.2	1.00
Sudden Contractions	
Ratio d/D	
0.9	0.10
0.8	0.18
0.7	0.26
0.6	0.32
0.5	0.38
0.4	0.42
0.3	0.46
0.2	0.48
<0.2	0.50

Fitting Type	K
Gradual Enlargements	
Ratio d/D q = 10° typical	
0.9	0.02
0.7	0.13
0.5	0.29
0.3	0.42
Gradual Contractions	
Ratio d/D q = 10° typical	
0.9	0.03
0.7	0.08
0.5	0.12
0.3	0.14
Valves	
Gate Valve (fully open)	0.20
Reflux Valve	2.50
Globe Valve	10.00
Butterfly Valve (fully open)	0.20
Angle Valve	5.00
Foot Valve with strainer	15.00
Air Valves	zero
Ball Valve	0.10
Pipe Exit Losses	
Square Outlet	1.00
Rounded Outlet	1.00

Example

What is the head loss in a DN 100 short radius 90° elbow when the flow velocity is 1m/s?

$$\text{Head loss } H_L = K \bullet \frac{V^2}{2g}$$

$$= 1.1 \text{ X } \frac{1^2}{2X9.8}$$

$$= 0.06m$$

Hence for any pipeline system the total form resistance to flow can be determined by adding together the individual head losses at each valve, fitting or change in cross section.

Equivalent Length (Le)

Form losses in fittings, valves, etc., are sometimes expressed in terms of an 'equivalent length' of straight pipe which has the same resistance to flow as the valve or fitting. By equating the form loss expression to the Darcy formula for energy loss in pipelines

$$\text{i.e. } H_L = K \bullet \frac{V^2}{2g} = F \bullet \frac{Le}{D} \bullet \frac{V^2}{2g}$$

the 'equivalent length' Le is given by

$$Le = \frac{KD}{f}$$

As a general rule the 'equivalent length' method is not preferred as the value of the friction factor f depends not only on the Colebrook- White roughness coefficient chosen but also on the particular pipe size and velocity of flow

ID (m)	Friction Factor f
0.5	0.021
0.10	0.018
0.15	0.0165
0.20	0.0158
0.30	0.0146
0.45	0.0135

Value of Darcy Friction Factor f at Flow Velocity of 1 m/s and Roughness Coefficient 0.003 mm

With increasing flow velocity, f will decrease.

At V = 4 m/s, t is approximately 75% of the above values, i.e. the values in the table above are conservative.

Example

What is the equivalent straight pipe length of a DN 100 short radius 90° elbow?

$$Le = \frac{KD}{f} = \frac{1.1}{0.018} \text{ X } 0.096 = 5.9m$$

K = 1.1 D = 0.096m f = 0.018

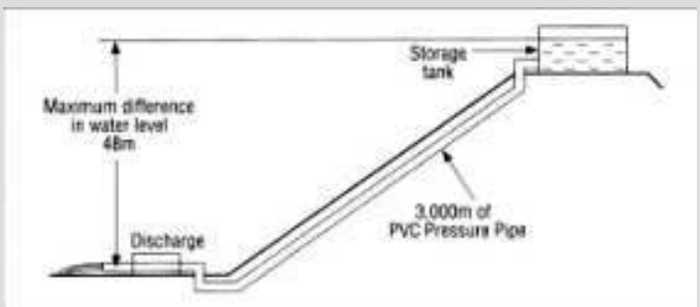
DESIGN

Worked Examples

Example 1: Gravity Main

Water is required to flow at a discharge of 36,000 litres per hour from a storage tank on a hill to an outlet 3 km away.

The difference in water level between the tank and the discharge end is 48m.



1. What size and class of Dubai Plast PVC-U pipe is required?

2. What is the flow velocity and actual discharge?

Discharge Q = 36,000 L/s = 10 L/s

Hydraulic Gradient =

$$\frac{H}{L} = \frac{48m}{3{,}000m} \times 100 = 1.6m/100m$$

1. Minimum Class required is PN 6. From flow chart: find intersection of Q = 10 L/s (Left hand scale) and H/L = 1.6 (Top scale)

Read off nearest larger pipe DN 100 (Right hand scale). Therefore DN 100, PN 6 pipe is required.

2. Now that the pipe has been selected, check actual flow.

Using PN 6 flow chart find the intersection of DN 100 line and Hydraulic Gradient = 1.6m/100m.

Velocity	V = 1.41m/s (Bottom scale)
Discharge	Q = 12.8L/s (Left hand scale) = 46,080L/h

Example 2: Pumping Main and Form Losses

A pumping line is required to deliver 35 L/s from a low level dam to a high level holding tank. The length of the line is 5 km. The maximum level of the holding tank is 100 m and the minimum level of the dam is 60 m. To avoid the need for sophisticated water hammer control gear, the engineer wishes to restrict flow velocity to a maximum 1 m/s. Calculate: Try PN6 PVC-U pipe.

Discharge Q = 35L/s (Left hand scale).

1. The size and class of Dubai Plast PVC-U pipe required.

2. The form head losses due to valves and fittings.

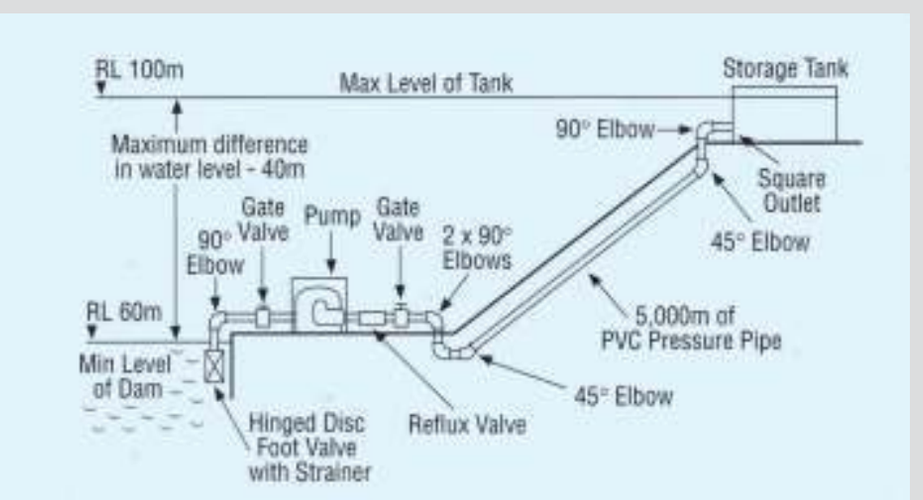
3. The head required at the pump.

This intersects the 1m/sec velocity line (Bottom scale) at approximately DN 200 pipe. Try DN200 and DN225:

Size DN	Flow velocity (Bottom scale)	Hydraulic gradient (Top scale)
200	0.99 m/s	0.36m/100m
225	0.81 m/s	0.22m/100m

Calculate friction head in pipelines

Size DN	Pipe friction head
200	0.36 x 5000m/100m = 18m
225	0.22 x 5000m/100m = 11m



DESIGN

1. The pipe friction Head
2. Form head losses
   a) DN200 pipe.

First calculate velocity head $\frac{V^2}{2g} - \frac{0.99^2}{2 \times 9.8} = 0.05m$

Valve or fitting	K value	Head loss (m)
Hinge disc foot valve (with strainer)	15.00	15.00 x 0.05 = 0.75
2 Gate valves (fully open)	0.2	2 x 0.2 x 0.05 = 0.02
1 Reflux valve	2.50	2.50 x 0.05 = 0.125
4 x 90° elbows	1.10	4 x 1.10 x 0.05 = 0.220
2 x 45° elbows	0.35	2 x 0.35 x 0.05 = 0.035
1 square outlet	1.00	1.00 x 0.05 = 0.050
	Total form head losses	= 1.2m

b) DN 225 pipe. Form head losses = 0.72m

3. Total pumping head = pipe friction + form + static
   head losses head

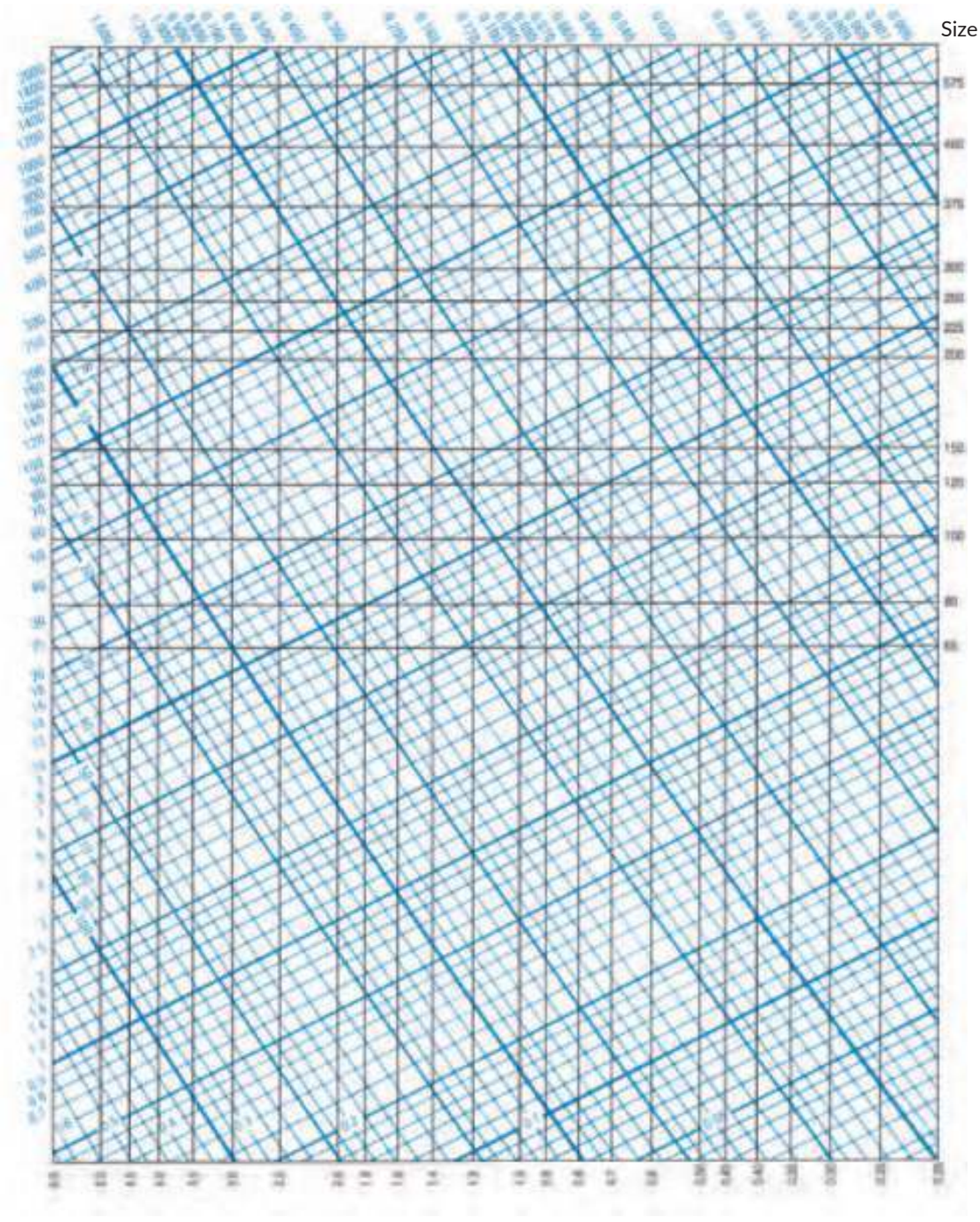
Static head = difference in level storage tank to dam
= l00m - 60m = 40m

Size DN	Friction head	+	form losses	+	static head	+	Total head
200	18m	+	1.2m	+	40m	+	59.2m
225	11m	+	0.7m	+	40m	+	51.7m

Conclusion:
It can be seen that PN 6 PVC-U pipe is required. The effect of valves and fittings in a system such as this is far outweighed by the pipe flow friction and static head losses. The most efficient and economic choice would be the DN 200 pipeline, giving a pumping head of 59.2 m and a flow velocity of 0.99 m/s.

Flow Chart for PVC-U Pressure pipe Series 1 - PN4.5

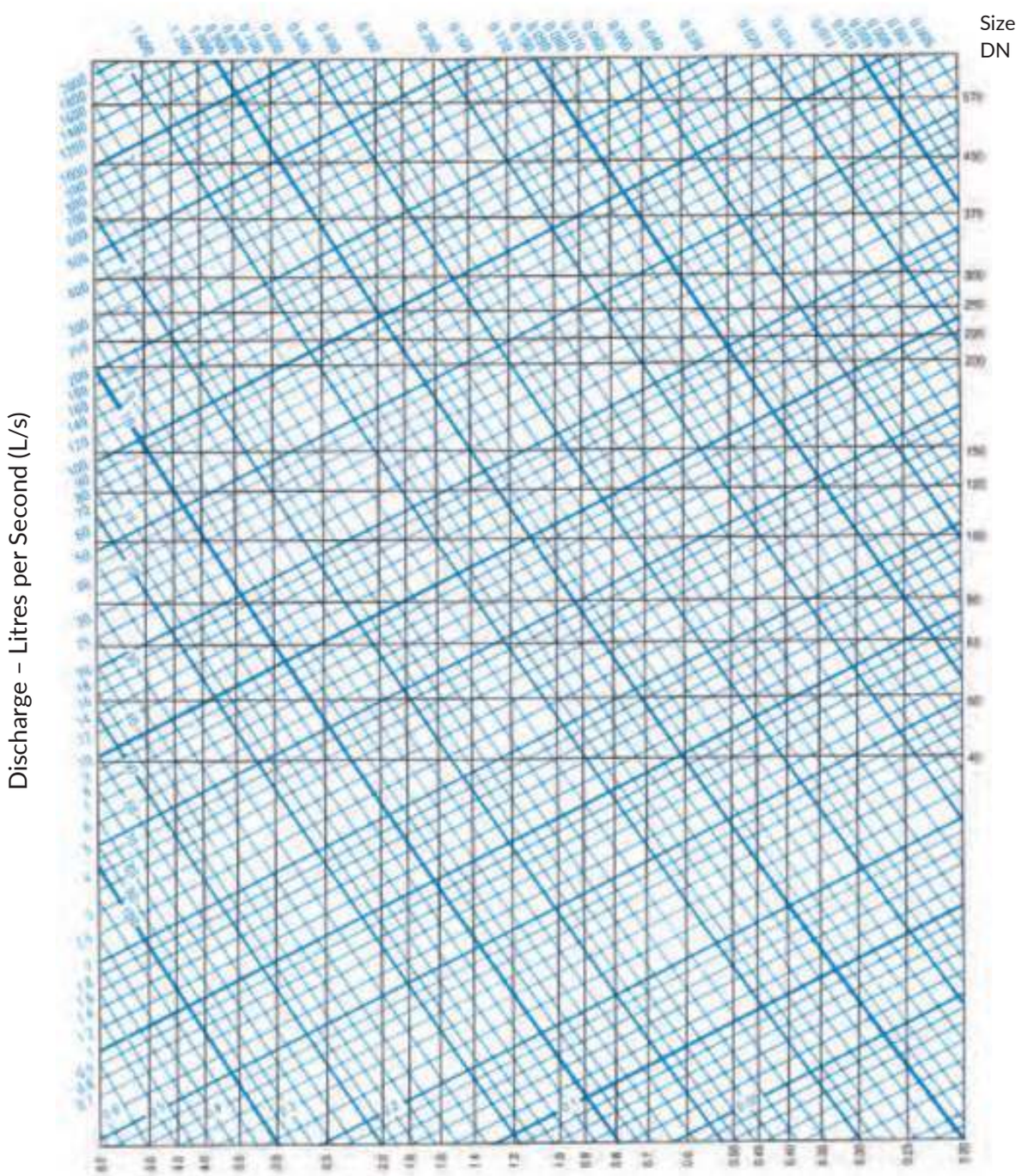
Head Loss – Metres Head of Water per 100 meters of Pipe



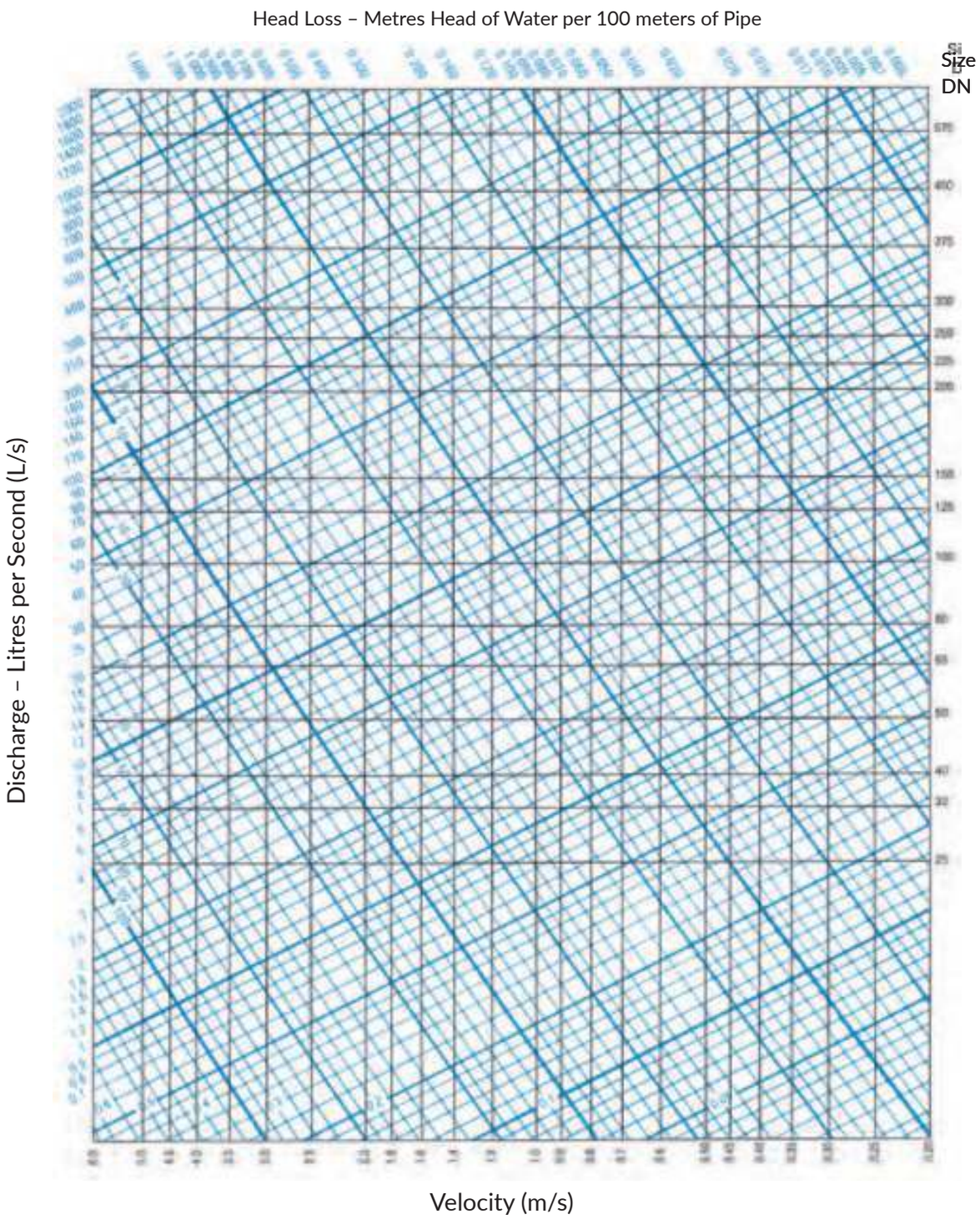
DESIGN

Flow Chart for PVC-U Pressure pipe Series 1 – PN6

Head Loss – Metres Head of Water per 100 meters of Pipe



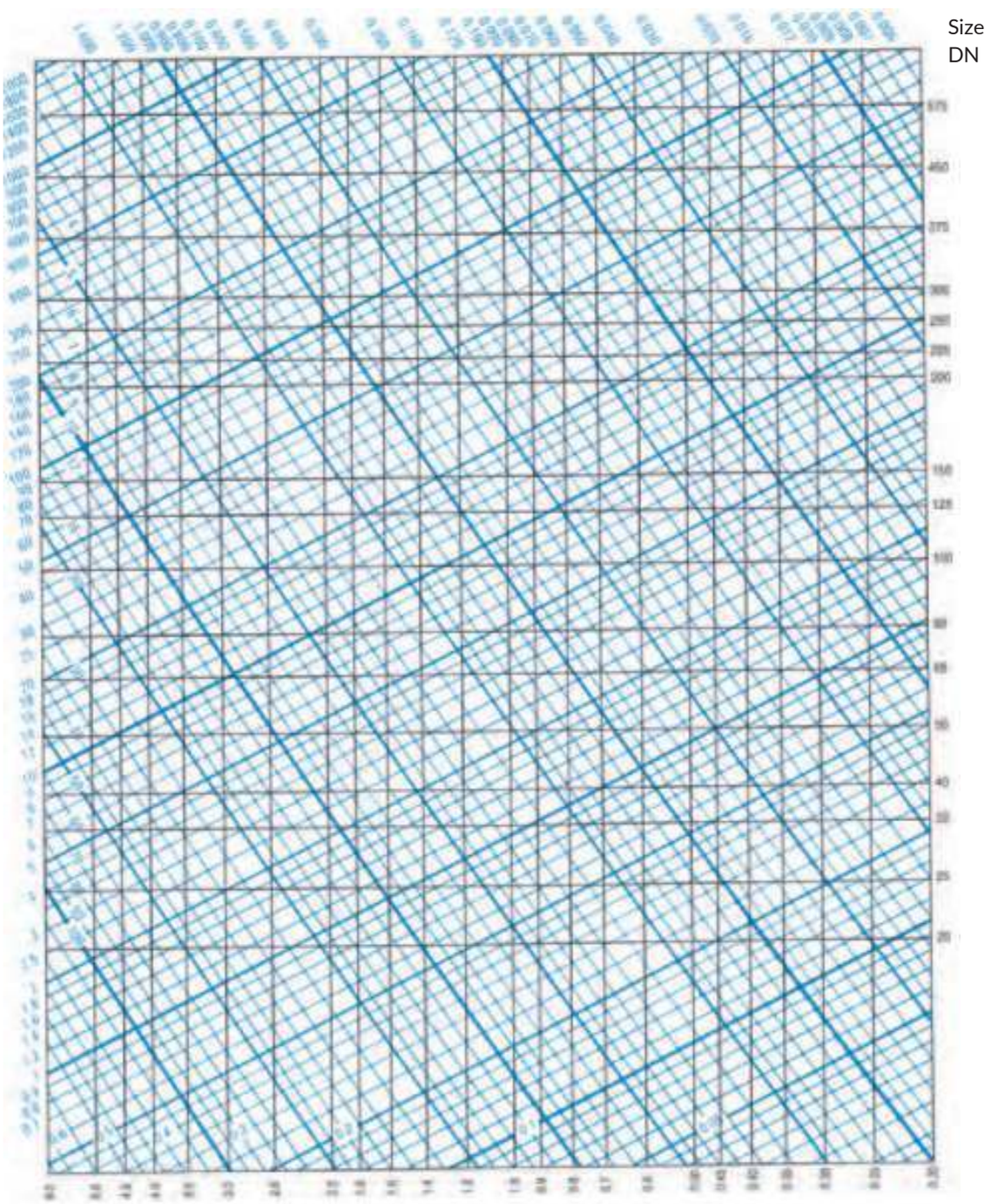
Flow Chart for PVC-U Pressure pipe Series 1 – PN9



DESIGN

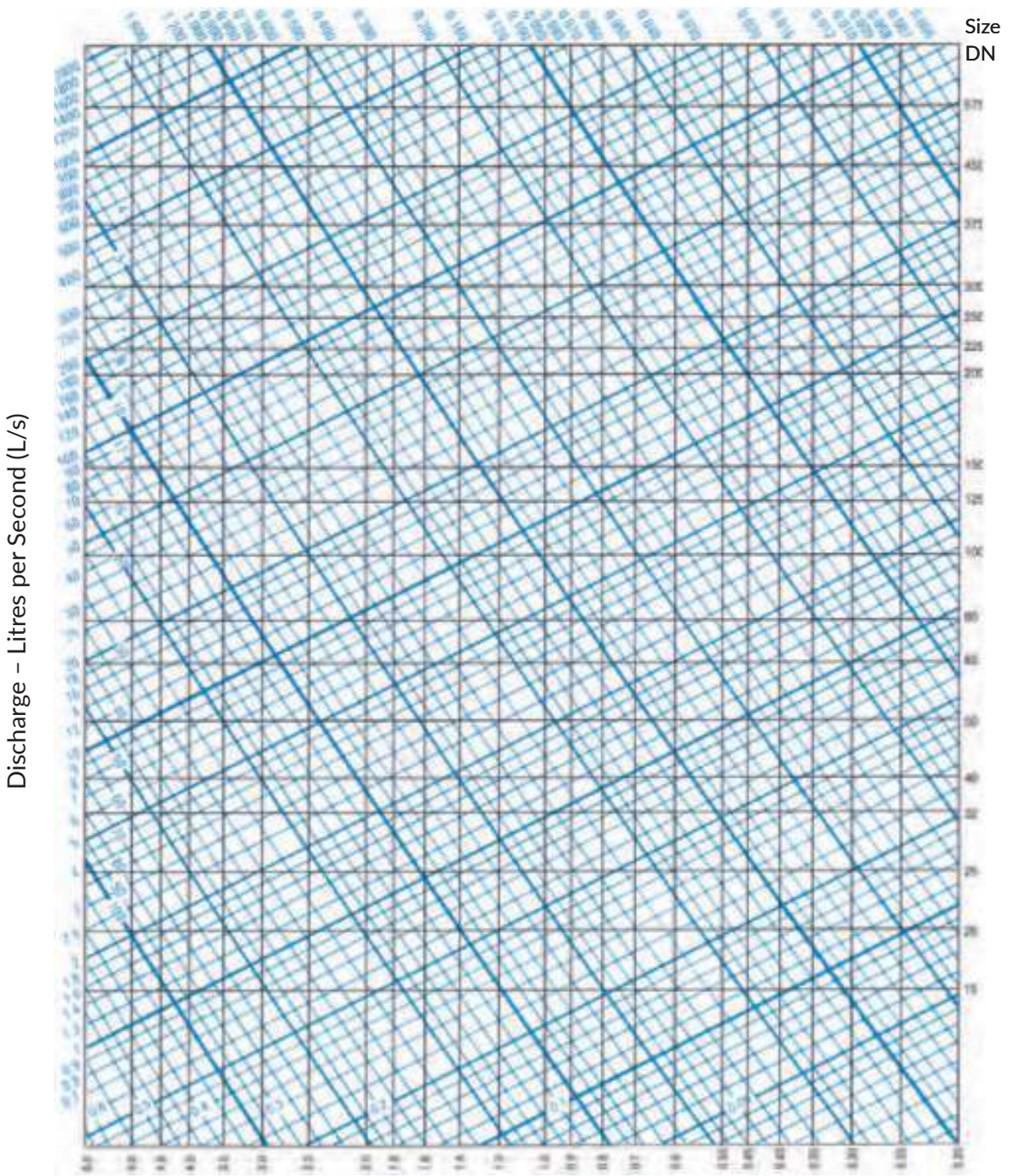
Flow Chart for PVC-U Pressure pipe Series 1 – PN12

Head Loss – Metres Head of Water per 100 meters of Pipe



Flow Chart for PVC-U Pressure pipe Series 1 – PN15

Head Loss – Metres Head of Water per 100 meters of Pipe

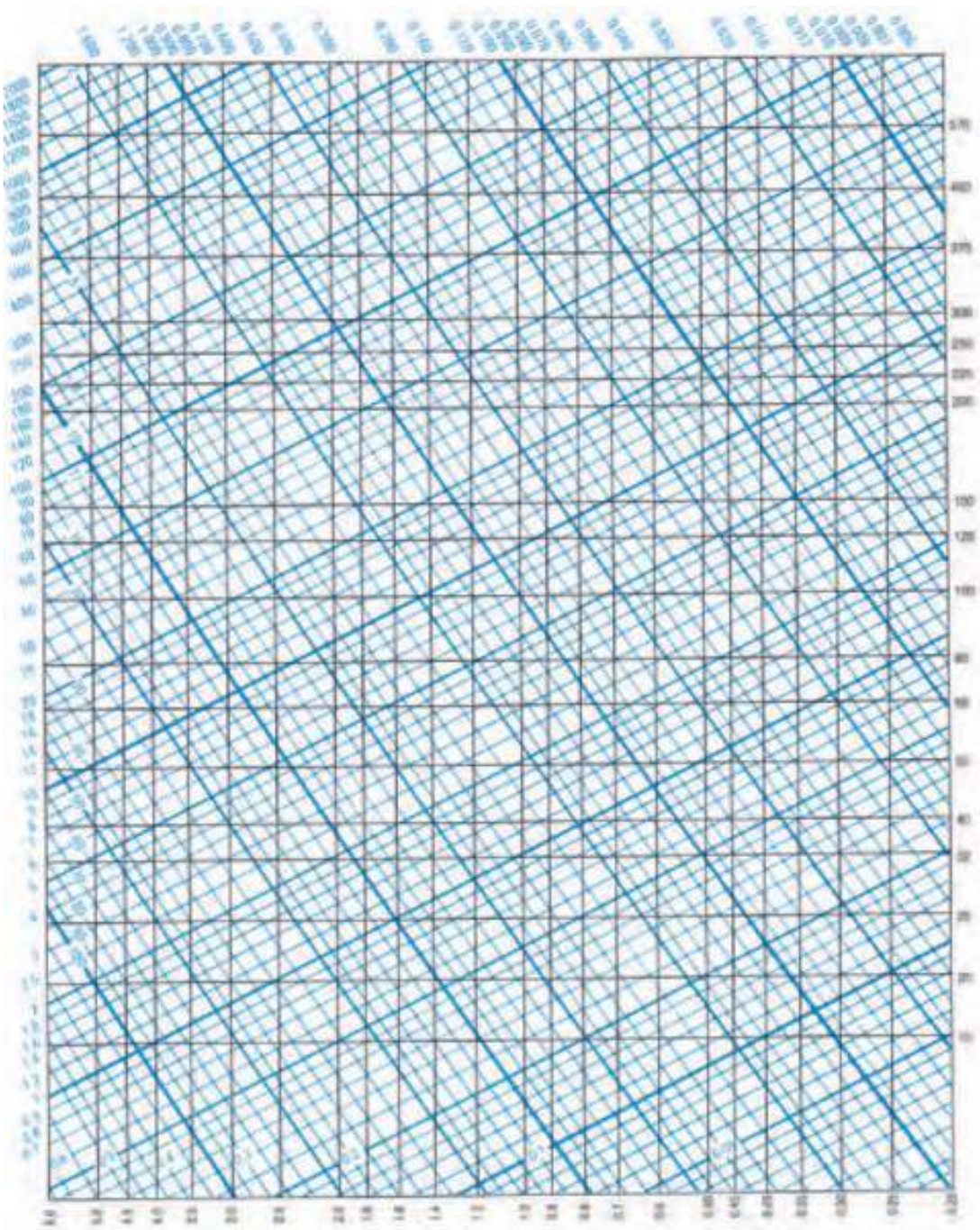


DESIGN

Flow Chart for PVC-U Pressure pipe Series 1 – PN18

Head Loss – Metres Head of Water per 100 meters of Pipe

Discharge – Litres per Second (L/s)



PRESSURE CONSIDERATIONS

Static Stresses

The hydrostatic pressure capacity of PVC pipe is related to the following variables:

1. The ratio between the outer diameter and the wall thickness (dimension ratio).
2. The hydrostatic design stress for the PVC material.
3. The operating temperature.
4. The duration of the stress applied by the internal hydrostatic pressure.

The pressure rating of PVC pipe can be ascertained by dividing the long-term pressure capacity of the pipe by the desired factor of safety. Although PVC pipe can withstand short-term hydro-static pressure applications at levels substantially higher than pressure rating or class, the performance of PVC pipe in response to applied internal hydrostatic pressure should be based on the pipe's long- term strength.

By international convention, the relationship between the internal pressure in the pipe, the diameter and wall thickness and the circumferential hoop stress developed in the wall, is given by the Barlow Formula, which can be expressed in the following forms:

$$P = \frac{2TS}{D_{mean}} = \frac{2T_{min}S}{(D_{mmin} - t_{min})}$$

and alternatively, for pipe design,

$$T_{min} = \frac{PDm_{min}}{2S + P}$$

where:
T = wall thickness (mm)
D_m = mean outside diameter (mm)
D_{mean} = Diameter the mid wall (mm)
P = internal pressure (MPa)
S = circumferential hoop stress (MPa)

These formulas have been standardised for use in design, routine testing and research work and are thus applicable at all levels of pressure and stress. They form the basis for establishment of ultimate material limitations for plastic pipes by pressure testing.

For design purposes, P is taken as the maximum allowable working pressure with s being the maximum allowable hoop stress (at 20 C) given below:

PVC-U pipes up to DN150	11MPa
DN175 PVC-U pipes and larger	12.3MPa
Material Class 400 Oriented PVC pipes (PVC-O)	25MPa
Material Class 450 Orientated PVC pipes (PVC-O)	28MPa
Material Class 500 Orientated PVC pipes (PVC-O)	32MPa
Modified PVC pipes (PVC-M)	17.5MPa

DESIGN

PRESSURE CONSIDERATIONS

Dynamic Stresses

PVC pressure pipes are designed on the basis of a burst regression line for pipes subjected to constant internal pressure. From this long term testing and analysis, nominal working pressure classes are allocated to pipes as a first indication of the duty for which they are suitable. However, there are many other factors which must be considered, including the effects of dynamic loading. Whilst most gravity pressure lines operate substantially under constant pressure, pumped lines frequently do not. Pressure fluctuations in pumped mains result from events such as pump start-up and shutdown and valves opening and closing. It is essential that the effects of this type of loading be considered in the pipeline design phase to avoid premature failure.

The approach adopted for pipe design and class selection when considering these events depends on the anticipated frequency of the pressure fluctuation. For frequent, repetitive pressure variations, the designer must consider the potential for fatigue and design accordingly. For random, isolated surge events, for example, those which result from emergency shutdowns, the designer must ensure that the maximum and minimum pressures experienced by the system are within acceptable limits.

Definitions

Surge

For the purposes of this document, surge is defined as a rapid, very short-term pressure variation caused by an accidental, unplanned event such as an emergency shutdown resulting from a power failure. Surge events are characterised by high pressure rise rates with no time spent at the peak pressure.

Fatigue

In contrast, fatigue is associated with a large number of repetitive events. Many materials will fail at a lower stress when subjected to cyclic of repetitive loads than when under static loads. This type of failure is known as (cyclic) fatigue. For thermoplastic pipe materials, fatigue is only relevant where a large number of cycles are anticipated. The important factors to consider are the magnitude of the stress fluctuation, the loading frequency and the intended service life. Where large pressure fluctuations are predicted, fatigue design might be required if the total number of cycles over the intended lifetime of the pipeline exceeds 25,000. For smaller pressure cycles, a larger number of cycles can be tolerated.

Pressure Range

Pressure range is defined as the maximum pressure minus the minimum pressure, including all transients, experienced by the system during normal operations

Diurnal pressure changes

Diurnal pressure changes are gradual pressure changes which occur in most distribution pipelines as a result of demand variation. It is generally accepted that diurnal pressure changes will not cause fatigue. The only design consideration required for this type of pressure fluctuation is that the maximum pressure should not exceed the pressure rating of the pipe.

Definition of Pressure Range and effect of Surges

For simplicity, the pressure range is defined as the maximum pressure minus the minimum pressure, including all transients, experienced by the system during normal operations. The effect of accidental conditions such as power failure may be excluded. This is illustrated in the figure below.

This figure also illustrates the definition of a cycle as a repetitive event. In some cases, the cycle pattern will be complex and it may be necessary to also consider the contribution of secondary cycles.

Pumping systems are frequently subject to surging following the primary pressure transient on switching. Such pressure surging decays exponentially, and in effect the system is subjected to a number of minor pressure cycles of reducing magnitude. In order to take this into account, the effect of each minor cycle is related to the primary cycle in terms of the number of cycles which would produce the same crack growth as one primary cycle.

According to this technique, a typical exponentially decaying surge regime is equivalent to 2 primary cycles. Thus for design purposes, the primary pressure range only is considered, with the frequency doubled.

Complex Cycle Patterns

In general, a similar technique may be applied to any situation where smaller cycles exist in addition to the primary cycle.

Empirically crack growth is related to stress cycle amplitude according to (II)3.2. Thus n secondary cycles of magnitude nn, may be deemed equivalent in effect to one primary cycle,

where $n = \left(\frac{\Delta\sigma_0}{\Delta\sigma_1}\right)^{3.2}$

For example a secondary cycle of half the magnitude of the primary cycle:

$$n = \left(\frac{2}{1}\right)^{3.2} = 9.2$$

so it would require 9 secondary cycles to produce the same effect as one primary cycle. If they are occurring at the same frequency, the effective frequency of primary cycling is increased by 1.1 for the purpose of design.

Effect of Temperature

The available data indicates that there is no evidence of a change in response of PVC fatigue crack growth rates with temperature, at least in the lower temperature region where results are available. This is logically consistent with known fatigue behavior, since the propensity to propagate a crack reduces with increasing ductility which results in yielding and blunting of the crack tip and a reduction in local stress intensity. Thus one would expect that PVC, with increasing ductility and decreasing yield strength, would not be degraded in fatigue performance at higher temperatures.

It follows that, while normal derating principles must be applied in class selection for static pressures, (ductile burst), no additional temperature derating need be applied for dynamic design.

ie. Select the highest class arrived via:-

a) Static design including temperature derating
b) Dynamic design as covered herein.

DESIGN

Safety Factors

The tabulated fatigue cycle factors represent the lower bound of test data generated from a number of different sources over the last few years on commercially produced PVC pipes. The mean line for this data is approximately half a log decade higher than this, and the relationship assumes no threshold stress level at low stress amplitudes and long times.

It is therefore considered conservative and no additional safety factor need be applied in general. However, where the magnitude or frequency of dynamic stresses cannot be estimated in design with any reasonable degree of accuracy, appropriate caution should obviously be applied. This judgement is in the hands of the designer.

Whilst it is always possible to predict the steady operating conditions with good accuracy, it will occasionally be the case, in complex systems, that it is impossible to predict the extent of surge pressures. In such circumstances, relatively low cost surge mitigation techniques, for example the solid state soft-start motor controllers should be considered. It is of course recommended that actual operating conditions for all systems should be checked by measurement, as a matter of routine, when the system is commissioned. Should surge pressure amplitudes in the event exceed expected levels, it is relatively easy matter to retrofit control equipment to ensure that they are kept in check.

Design Hints

To reduce the effect of dynamic fatigue in an installation, the designer can:

1. Limit the number of cycles by:
a. Increasing well capacity for a sewer pumping station.
b. Matching pump performance to tank size to eliminate short demand cycles for an automatic pressure unit:
c. Using double-acting float valves or limiting starts on the pump by the use of a time clock when filling a reservoir

2. Reduce the dynamic range by:
a. Eliminating excessive water hammer

3. Using a larger bore pipe to reduce friction losses

Fittings

C fittings present a problem worthy of special consideration. Complex stress patterns in fittings can 'amplify' the apparent stress cycle. An apparently harmless pressure cycle can thus produce a damaging stress cycle leading to a relatively short fatigue life.

This factor is particularly severe in the case of branch fittings such as tees, where amplification factors up four times have been noted. The condition can be aggravated
further by the existence of stress cycling from other sources, for example bending stresses induced flexing under hydraulic thrust in improperly supported systems.

Prudence therefore dictates that a suitable factor of safety be applied to fittings in assessing class requirements. It is recommended that the following factors be applied to the design dynamic pressure cycle for fittings:

Tees	Equal	Dx3/4D	Dx1/2D	Dx1/4D
Safety Factor	4	3	2	1.5

Bends	90° short	45° short	90° long	45° long
Safety Factor	3	2	2	1.5

Reducers	Dx3/4D	Dx1/2D	Dx1/4D
Safety Factor	1.5	2	2.5

Adaptors & Couplings	Equal Size	Wyes
Safety Factor	1	6

Expansion and Contraction

All materials expand and contract with changes in temperature and PVC has a relatively high rate of change.

The coefficient of thermal expansion is 7 x 10-5/°C.

A handy rule is 7 mm change in length for every 10 metres for every 10°C change in temperature

Example

A 150 metre line of PVC pipe is being installed with the temperature at 28°C. The service temperature will be 18°C. What allowance has to be made for expansion?

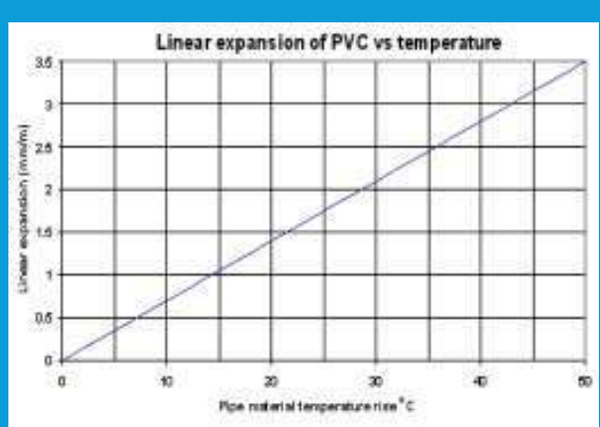
1. Find difference between maximum and minimum temperature,
i.e. 28°C - 18° C = 10°C.

2. Check chart above for expansion per metre.
10° C = 0.7 mm.

3. Multiply answer by total length of line
0.7 x 150 = 105 mm

This means the pipe will contract approximately 0.1 metres when in service.

Methods of providing for thermal expansion or contraction will depend on the nature of the installation and whether it is above or below ground.



DESIGN

THRUST SUPPORT

An imbalanced thrust is developed by a pipeline at:
- Direction changes (> 10°), e.g. tees and bends.
- Changes in pipeline size at reducers.
- Pipeline terminations, e.g. at blank ends and valves.

The support system or soil must be capable of sustaining such thrusts.

Pressure thrust results from internal pressure in the line acting on fittings. Velocity thrust results from inertial forces developed by a change in direction of flow. The latter is usually insignificant compared to the former.

PRESSURE THRUST

The pressure thrust developed for various types of fittings can be calculated as follows:

Blank ends, tees, valves	$\phi = AP\ 10^{-3}$
Reducers and tapers	$\phi = (A - A)\ P\ 10^{-3}$
Bends	$\phi = 2\ A\ P \sin(\phi/2)\ 10^{-3}$

where:
ϕ= resultant thrust force (kN)
A = area of pipe taken at the OD (mm2)
P = design internal pressure (MPa)
ϕ= included angle of bend (degrees)

The design pressure used should be the maximum pressure, including water hammer, to be applied to the line. This will usually be the field test pressure.

Size	Area	Bends				Tees
DN	(mm²)	11 1/4°	22 1/2°	45°	90°	Ends
15	363	0.01	0.01	0.03	0.05	0.04
20	568	0.01	0.02	0.04	0.08	0.06
25	892	0.02	0.03	0.07	0.12	0.09
32	1410	0.03	0.05	0.11	0.20	0.14
40	1840	0.04	0.07	0.14	0.26	0.18
50	2870	0.06	0.11	0.22	0.40	0.28
65	4480	0.09	0.17	0.34	0.62	0.44
80	6240	0.12	0.24	0.47	0.87	0.61
100	10300	0.20	0.39	0.77	1.43	1.01
125	15500	0.30	0.59	1.16	2.15	1.52
150	20200	0.39	0.77	1.52	2.80	1.98
200	40000	0.77	1.53	3.00	5.55	3.92
225	49400	0.95	1.89	3.71	6.85	4.84
250	61900	1.19	2.37	4.65	8.58	6.07
300	78400	1.51	3.00	5.88	10.87	7.69
375	126000	2.42	4.82	9.46	17.47	12.36

Pressure Thrust at Fittings in kN for each 10 meters Head of Water
Series 1 pipe

Size	Area	Bends				Tees
DN	(mm²)	11 1/4°	22 1/2°	45°	90°	Ends
100	11700	0.23	0.46	0.89	1.65	1.17
150	24800	0.48	0.96	1.89	3.50	2.47
200	42500	0.83	1.65	3.24	5.99	4.24
250	52900	1.04	2.06	4.04	7.47	5.28
300	93700	1.84	3.66	7.17	13.25	9.37
375	142700	2.80	5.57	10.92	20.18	14.27

Series 2 pipe

DESIGN

VELOCITY THRUST

Applies only at changes in direction of flow:
F = WAV2 • 2 sin(ϕ/2) • 10^-9^ (kN)

where: A = cross sectional area of pipe taken at the inside diameter (mm2)
W = density of fluid (water = 1,000) (kg/m3) V = velocity of flow (m/s)

THRUST BLOCKS

Concrete thrust blocks are usually required to transfer unbalanced forces in buried pipelines to the surrounding soil. See Installation Guidelines for construction of thrust blocks.

To determine the bearing area of the thrust block required, divide the resultant thrust by the bearing capacity of the soil.

The bearing capacity of the soil is dependent on the mode of failure. For deep situations, compressive characteristics will govern.

For shallow cover, shearing slip failure can occur and bearing loads are very much reduced. For cover less than 600 mm, or less than three pipe diameters, or if the ground is potentially unstable, e.g. embankment conditions, a complete soil analysis should be carried out.

Slip failure may be avoided by extending the thrust block downwards with reinforcement against bending loads.

Example

Thrust block design for a DN100 Tee operating at 120 m head in clayey sand soil, *h=1.0m.
Resultant force = 1.01 x 12 = 12.1 kN

Bearing Area = 12.1 / 92 = 0.13 m2

That is, a bearing area 0.25 m high and 0.55 m wide would be suitable.

Vertical Thrusts

For resultant upward forces, the mass of the thrust block plus any soil directly above the pipe can be taken as the counterbalancing force, provided the overburden can reasonably be expected to remain there for the life time of the pipeline. It is often better to bury the pipe deeper than to add more concrete to counterbalance an upward thrust.

Soil description	USBR Soil Classification see ASTM D2478	Soil Bearing Strength (kN/m ^{2}) for cover height *h			
		0.75m	1.0m	1.25m	1.5m
Well graded gravel-sand mixtures, well graded sands, little or no fines	GW,SW	57	76	95	114
Poorly graded gravels and gravel-sand mixtures, Poorly graded sands, little or no fines	GP,SP	48	64	80	97
Silty gravels, gravel-sand-silt mixtures, silty sands, sand-silt mixtures	GM,SM	48	64	80	96
Clayey gravels, gravel-sand-clay mixtures, Clayey sands, sand-clay mixtures	GC,SC	79	92	105	119
Inorganic clays of low to med plasticity, gravelly clays, sandy clays, silty clays, lean clays	CL	74	85	95	106
Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	ML	69	81	93	106
Organic clays of medium to high plasticity	OH	0	0	0	0
Rock		240	240	240	240

DESIGN

AIR AND SCOUR VALVES

Air Valves

All water contains dissolved air. Normally this would be about 2% but it can vary largely depending on temperature and pressure. Air trapped in the line in pockets is continually moving in and out of solution.

Air in the line not only reduces the flow by causing a restriction but amplifies the effects of pressure surges. Air valves should be placed in the line at sufficient intervals so that air can be evacuated, or, if the line is drained, air can enter the line.

Air valves should be placed along the pipeline at all high points or significant changes in grade. On long rising grades or flat runs where there are no significant high points or grade changes, air valves should be placed at least every 500 - 1,000 metres at the engineer's discretion.

Size DN	Air Valve Size
Up to 100	25 Single
100 - 200	50 double
200 - 450	80 double

Scour Valves

Scour valves are located at low points or between valved sections of the pipeline. Their function is to allow periodic flushing of the lines to remove sediment and to allow the line to be drained for maintenance and repair work.

The scour valve should be sized to allow a minimum scour velocity of 0.6 m/s to be achieved in the main pipe.

Scour tees over nominal size 100 should be offset tees to 45 allow the debris to be taken from the invert of the pipe. In the absence of specific design criteria, the following sizes are generally acceptable.

Size DN	Scour Valve Size
Up to 100	80
100 - 200	100
200 - 450	150

SOIL AND TRAFFIC LOADS

Loads are exerted on buried pipe due to:
- Soil pressures
- Traffic loads
- Superimposed loads

For normal water supply systems, laid in accordance with the installation guidelines in the Pressure Pipe Installation section, the minimum depths of burial (cover).
Under these conditions and up to a maximum of 6 metres cover, soil and traffic loadings are of little significance and design calculations are not warranted. This applies to all classes of pipe.

For depths shallower than those recommended, traffic loading may be of significance.

At greater depths, soil loadings may control selection of pipe class. In these instances, lighter pipe classes may not be suitable and specific design calculations and/or special construction techniques may be required. Wet trench conditions may also require further investigation.

Special construction techniques can involve backfill stabilisation, load bearing overlay or slab protection.

It should be noted that cover of less than 1.5 diameters may result in flotation of empty pipes under wet conditions. Low covers may also result in pipe “jacking” (lifting at vertically deflected joints) when pressurised.

BENDING LOADS

Under bending stress PVC pipe will bend rather than break. However, the following precautions are very important

1. In below-ground installations, the pipes must have uniform, stable support. (See Installation Section - Below Ground Installation)

2. In above-ground installations, proper, correctly spaced supports must be provided. (See Installation Section - Above Ground Installation)

3. In above-ground installation, pumps, valves and other heavy appendages must be supported independently.

Installing Pipes on a Curve

When installing PVC piping, some changes in the alignment of the pipe may be achieved without the use of direction-change fittings such as elbows and sweeps. Deflection at rubber ring joints or other mechanical joints and/or controlled longitudinal bending of the pipe, within acceptable limits, can achieve the small direction changes in the pipeline, required to accommodate natural land gradients or to avoid obstacles.

DESIGN

Joint Deflection

The allowable angular deflection at the pipe joint varies depending on the manufacturing tolerances of the spigot and the socket but for design purposes all Dubai Plast rubber ring joints can be assumed to allow a maximum deflection of 1T. This is approximately equivalent to a 100mm offset for a 6m pipe. In most circum- stances, the required change in direction can be taken up over several pipe lengths, perhaps in combination with pipe bending. Tighter curves can be achieved by cutting pipes to insert more joints, and/ or the use of PVC couplings that effectively double the deflection available.

Note that this angular deflection is only available when pipes are jointed to the witness marks. If pipes are pushed to the back of the socket, movement of the spigot is restrained and the deflection is severely restricted.

The effective radius of curvature obtainable for various pipe lengths is given in table.

Bending of Pipes

Small diameter PVC pipes are sufficiently flexible to allow some bending of the pipe barrel in order to install on a curve. Deflection through bending is not practicable, due to the large forces required, for pipe sizes above about DN 200 particularly for the higher pressure classes.

The amount of bending that can be applied is limited by the axial flexural stress and strain levels induced in the pipe, which must be acceptable, in combination with other stresses and strains, for long term service. Radix Plastic Industries LLC recommends that for pipe under pressure, the bending radius should not be less than 300 times the diameter.

Pipe length m	Approximate offset mm	Radius of curvature m
12	200	688
9	150	516
6	100	344
4	70	229
3	50	172
2	35	115
1	20	57

CONTENTS

INSTALLATION

JOINTING PROCEDURES 86
- Cutting 86
- Solvent Cement Joint Principles 86
- Rubber Ring Joints 91
- Jointing Pipes with Couplings 94
- Flanged Joints 95
- Threaded Joints 95
- Compression Joints 95
- Connection to Other Materials 95

HANDLING AND STORAGE 96
- Transportation of PVC Pipes 96
- Storage of PVC Pipes 96

BELOW-GROUND INSTALLATION 97
- Preparing the Pipes 97
- Preparing the Trench 97
- PVC Pipes Under Roads 100
- Pipeline Buoyancy 100
- Expansion and Contraction 100
- Electrical Earthing 100

INSTALLING PIPES ON A CURVE 101
- Thrust Blocks 102
- Pipelines on Steep Slopes 102

ABOVE-GROUND INSTALLATION 103
- General Considerations 103
- Supports 103

TESTING AND COMMISSIONING 106

FLUSHING 107

DETECTING BURIED PIPES 107
- Metal Detectable Tapes 107
- Trace Wires 107
- Audio Detection 107

“Reliabilty, Quality and Value”

INSTALLATION

JOINTING PROCEDURES

Cutting

During manufacture pipes are cut to standard length by cut-off saws. These saws have carbide-tipped circular blades which produce a neat cut without burrs.

However, pipes may be cut on site with a variety of cutting tools. These are:

- Proprietary cutting tools - These tools can cut, deburr and chamfer the pipe in one operation. They are the best tools for cutting pipe.
- A portable petrol-driven 'quick cut saw - This is quick and easy to use. However, care must be taken and some deburring will be required.
- Air-driven tools - This produces a neat, clean cut. It does, however require a compressor.
- A hand saw and mitre box - This saw produces a square cut but requires more deburring. It takes comparatively more time and effort and requires a stand.

The use of roller cutters is not recommended.

Solvent Cement Joint Principles

Pressure pipes and fittings for solvent cement jointing are tapered, ensuring the right level of interference. This may not apply to all pipes and fittings, particularly from other countries which may have a low interference joint requiring a gap filling solvent cement.

- Type 'P' for pressure, including potable water installations, designed to develop high shear strengths with an interference fit (green solvent, green print & lid)
- Type 'N' for non-pressure applications, designed for the higher gap filling properties needed for clearance fits.
- Type 'G'" gap filling for parallel or low interference pressure and non pressure joints (clear)
- Priming fluid for use with all solvent cements (red priming fluid, red label & lid)

Always use the correct solvent cement for the application.

Solvent cement jointing is a 'chemical welding', not a gluing process. The priming fluid cleans, degreases and removes the glazed surface thus preparing and softening the surface of the pipe so that the solvent cement bonds the PVC. The solvent cement softens, swells and dissolves the spigot and socket surfaces. These surfaces form a bond into one solid material as they cure.

Procedure

1 Prepare the pipe
Before jointing, check that the pipe has been cut square and all the burrs are removed from the inside and outside edge. Remove the sharp edge from the outside and inside of the pipe with a deburring tool. Do not create a large chamfer that will trap a pool of solvent cement. Remove all dirt, swarf, and moisture from spigot and socket.

2 Witness mark the pipe
It is essential to be able to determine when the spigot is fully home in the socket. Mark the spigot with a pencil line ('witness mark') at a distance equal to the internal depth of the socket. Other marking methods may be used provided that they do not damage or score the pipe.

3 'Dry fit' the joint
'Dry fit' the spigot into the socket, check the pipe for proper alignment. Any adjustments for the correct fit can be made now, not later. For pressure pipes, the spigot should interfere in the socket before it is fully inserted to the pencil line. Ovality in the pipe and socket will automatically be re-rounded in the final solvent cementing process, but heavy-walled pipe may give a false indication of the point of interference. Do not attempt to make a pressure pipe joint that does not have an interference fit. Contact Radix Plastic Industries LLC if this occurs.

4 Prepare with priming fluid
Dry, degrease and prime the spigot and socket with a lint-free cloth (natural fibres) dampened with fluid.

5 Brush selection
The brush should be large enough to apply the solvent cement to the joint in a maximum of 30 seconds. Approximately one third the pipe diameter is a good guide. Do not use the brush attached to the lid for pipes over 100mm in diameter. Decanting is not advisable, and excess should never be returned to the can. For large diameter pipes, it may be necessary to decant to an open larger vessel for a large brush to be used, in this case decant for one joint at a time.

Diameter of pipe mm	Recommended size of brush mm
15, 20, 25, 32, 40, 50	use brush supplied
65, 80	25
100, 125	38
150	50
200	63
225, 250	75
300, 375	100

INSTALLATION

Procedure

6 Apply solvent cement
Using a suitably sized brush, apply a thin even coat of solvent cement to the internal surface of the socket first. Solvents will evaporate faster from the exposed spigot than from the socket. Special care should be taken to ensure that excess solvent cement isn't built up at the back of the socket (pools of solvent will continue to attack the PVC and weaken the pipe). Then apply a heavier, even coat of solvent cement up to the witness mark on the spigot. Ensure the entire surface is covered. A 'dry' patch will not develop a proper bond, even if the mating surface is covered. An unlubricated patch may also make it difficult to obtain full insertion.

7 Inserting the spigot
Make the joint immediately, in a single movement. Do not stop halfway, since the bond will start to set immediately and it will be almost impossible to insert further. It will aid distribution of the solvent cement to twist the spigot into the socket so that it rotates about a 1/4 turn whilst (not after) inserting, but where this cannot be done, particular attention should be paid to uniform solvent application.

8 Push the spigot home
The spigot must be fully homed to the full depth of the socket. The final 10% of spigot penetration is vital to the interference fit. Mechanical force will be required for larger joints. Be ready in advance. Pipe pullers are commercially available for this purpose. Polyester pipe slings are very useful for gripping a pipe, in order to apply a winch or lever.

9 Hold the joint
Hold the joint against movement and rejection of the spigot for a minimum of 30 seconds. Disturbing the joint during this phase will seriously impair the strength of the joint.

10 Wipe off excess solvent cement
For a neat professional joint wipe off excess solvent cement , with a clean rag, immediately from the outside of the joint.

11 Do not disturb the joint
Once the joint is made, do not disturb it for five minutes or rough handle it for at least one hour. Do not fill the pipe with water for
at least one hour after making the last joint. Do not pressurise the line until fully cured.

12 Cure the joint
The process of curing, is a function of temperature, humidity and time. Joints cure faster when the humidity is low and the temperature is high. The higher the temperature, the faster the joints will cure. As a guide, at a temperature of 16°C and above, 24 hours should be allowed, at 0°C, 48 hours is necessary.

Precautions to Achieve an Effective Joint

Make sure that the end of each pipe is square in its socket and in the same alignment and grade as the preceding pipes or fittings.

Create a 0.5mm chamfer, as a sharp edge on the spigot will wipe off the solvent and reduce the interface area. Remove all swarf and burrs so that filings cannot later become dislodged and jam taps and valves.

Do not attempt to joint pipes at an angle. Curved lines should be jointed without stress, and then curved after the joint is cured. Support the spigot clear of the ground when jointing, this will avoid contamination with soil or sand.

An unsatisfactory solvent cement joint cannot be re- executed, nor can previously cemented spigots and sockets be re-used. To affect repairs, cut out the joint and remake or use mechanical repair fittings.

Correct Solvent Quantity

The correct amount of solvent is a uniform self-levelling layer without runs, achieved by experience and judgement.

Too much solvent will form pools and continue to attack and weaken the pipe. Too little solvent will require you to brush out excessively, the solvent will quickly evaporate with vigorous brushing.

Take care not to spill solvent cement onto pipes or fittings. Accidental spillage should be wiped off immediately.

Adverse Weather

High temperature and air movement will radically increase the loss of solvents, and solvent cement jointing should not be performed when the temperature is more than 35°C. Some form of protection should be provided when jointing in windy and dusty conditions.

When jointing under wet and very cold conditions, make sure that the mating surfaces are dry and free from ice, as moisture may prevent the solvent cement from obtaining its maximum strength.

Storage

Keep the containers stored below 30°C. The solvent cement lids should be tightly sealed when not in use to prevent evaporation of the solvent. Do not use solvent cement that has gone cloudy or has started to gel in the can. Do not use solvent cement after the ‘use by’ date shown on the can, the chemical constituents can change over a long period, even in a sealed can.

INSTALLATION

Safety

Forced ventilation should be used in confined spaces. Do not bring a naked flame within the vicinity of solvent cement operations. Spillage onto the skin should be washed off im- mediately with soap and water.

Should the solvent cement get in the eyes, wash them with clean water for at least 15 minutes and seek medical advice.

Priming Fluid

If poisoning occurs, contact a doctor or Poisons Information Centre.

If swallowed, do not induce vomiting and drink up a glass of water.

For further safety information, refer to Material Safety Data

Solvent Cement

If poisoning occurs, contact a doctor or Poisons Information Centre.

Average number of joints per 500ml

The following table provides an indication as to the number of joints that are made per 500ml container of priming fluid and solvent cement.

Size DN (mm)	Priming fluid	Solvent cement
15	105	300
20	625	175
25	450	130
32	325	95
40	250	70
50	150	42
65	125	35
80	100	30
100	70	25
125	60	20
150	45	15
200	20	10
225	15	7
250	12	6
300	12	5
375	12	5

Rubber Ring Joints

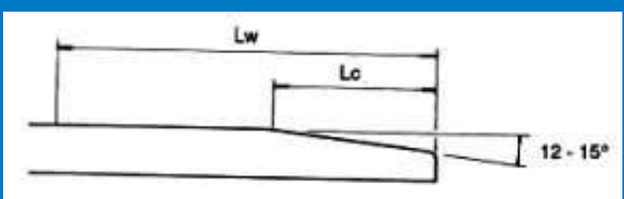
Jointing rings are supplied with the pipe, together with a lubricant suitable for the purpose. Other lubricants may not be suitable for potable water contact and may affect the ring. They should not be substituted without specific knowledge of these effects.

Chamfering

PVC pipes for rubber ring jointing are supplied with a chamfered end. However, if a pipe which has been cut in the field is to be used for making a rubber ring joint, the spigot end must be chamfered. Special chamfering tools are available for this purpose, but in the absence of this equipment a body file can be used provided it does not leave any sharp edges which may cut the rubber ring. Do not make an excessively sharp edge at the rim of the bore and do not chip or break this edge.

When a pipe is cut, a witness mark should be pencilled in. Care should be taken to mark the correct position.

For the correct chamfer lengths and witness mark positions, consult the Joint Assembly and Control Dimensions Table for the relevant pipe type. Where two witness mark positions are given, both should be marked on the pipe and the joint made so that one mark remains visible.



Socketed Pipe

Size DN (mm)	Approx. length of chamfer Lc (mm)	Witness mark Lw (mm)
50	6	76
65	8	82
80	10	86
100	11	97
125	13	109
150	14	116
200	17	140
225	18	150
250	20	176
300	23	187
375	28	212

Socketed Pipe

Size DN (mm)	Approx. length of chamfer Lc (mm)	Witness mark Lw (mm)
100	12	105
150	14	127
200	18	171
225	21	180
250	23	191
300	28	211
375	36	226

INSTALLATION

Procedure

1. Pipes may be jointed out of the trench but it is preferable that connections be made in the trench to prevent possible “pulling” of the joint.

2. Clean the socket, especially the ring groove. Do not use rag with lubricant on it.

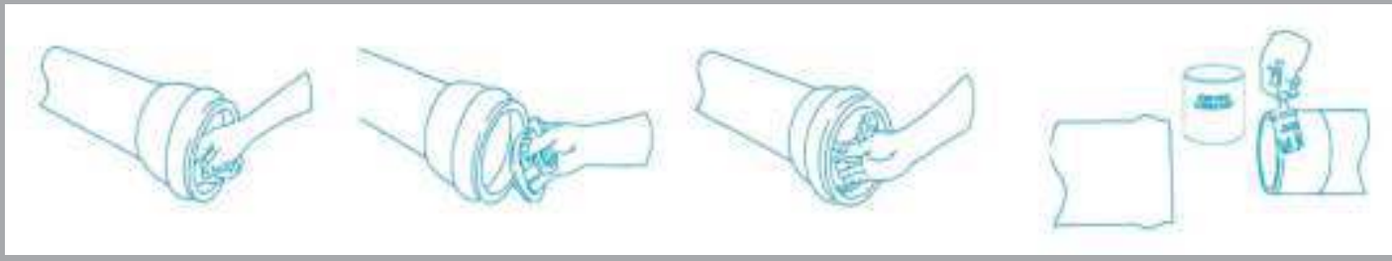
3. Check that the spigot end, if cut in the field, has a chamfer of approximately 12° to 15°. Insert the rubber ring into the groove with the color marking on the ring facing outwards. The rubber ring is correctly fitted when the thickest cross section of the ring is positioned towards the outside of the socket and the groove in the rubber ring is positioned inside the socket.

4. Run your finger around the lead-in angle of the rubber ring to check that it is correctly seated, not twisted, and that it is evenly distributed around the ring groove.

5. Clean the spigot end of the pipe as far back as the witness mark.

6. Apply jointing lubricant to the spigot end as far back as the witness mark and especially to the chamfered section.

Note: Keep the rubber ring and ring groove free of jointing lubricant until the joint is actually being made.



7. Align the spigot with the socket and apply a firm, even thrust to push the spigot into the socket. It is possible to joint 100 mm and 150 mm diameter pipes by hand. However, larger diameter pipes such as 200 mm and above may require the use of a bar and timber block as illustrated. Alternatively, a commercially available pipe puller may be used to joint the pipes.

8. Brace the socket end of the line so that previously jointed pipes are prevented from closing up.

9. Inspect each joint to ensure that the witness mark is just visible at the face of each socket.

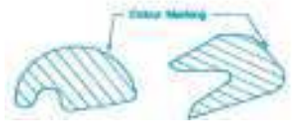
10. Pipe joints must not be pushed home to the bottom of the socket. They must go no further than the witness mark. This is to allow for possible expansion of the pipe. Polydex PVC and cast iron fittings use the same rubber ring as Polydex pipe and jointing procedures are identical.

11. If a pipe joint is homed too far, it may be withdrawn immediately, but once the lubricant is dry (which takes only a few minutes in hot weather) mechanical aids are required to pull the joint apart.

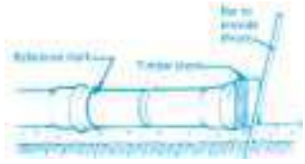
12. With mechanical assistance, rubber ring joints can be recovered and re-made years after the original joint was made. New rubber rings should be used and care should be taken to ensure that there is no damage to pipe or socket.

If the joint is likely to be dismantled in the future the task is much easier if silicone lubricant is used.

TYPICAL RING CROSS-SECTION



BAR & BLOCK JOINTING



Hint: If excessive force is required to make a joint, this may mean that the rubber ring has been displaced. To check placement of the ring without having to dismantle the joint, a feeler gauge can be inserted between the socket and pipe to check even placement of the ring.

INSTALLATION

JOINTING PIPES WITH COUPLINGS

Procedure

To simplify the jointing process it is suggested that the initial joint made with the coupling is carried out before the pipe is placed in the trench.

1. Clean the socket of the coupling and spigot of the pipe.

2. Apply jointing lubricant to the spigot of the pipe as far back as the witness mark and especially to the chamfered section. Align the spigot with the coupling and apply a firm even thrust to push the spigot into the coupling. For this joint, ensure that the spigot is inserted until the witness mark is no longer visible. It is possible to joint the 150mm pipe by hand. It may be found helpful to brace the coupling against a solid vertical surface.The second joint is made with the coupling of the pipe already in the trench.

3. Use the same technique as before but only insert the spigot into the coupling sufficiently to leave one witness mark visible at the face of the coupling. This is necessary to allow for possible expansion of the pipe after installation.

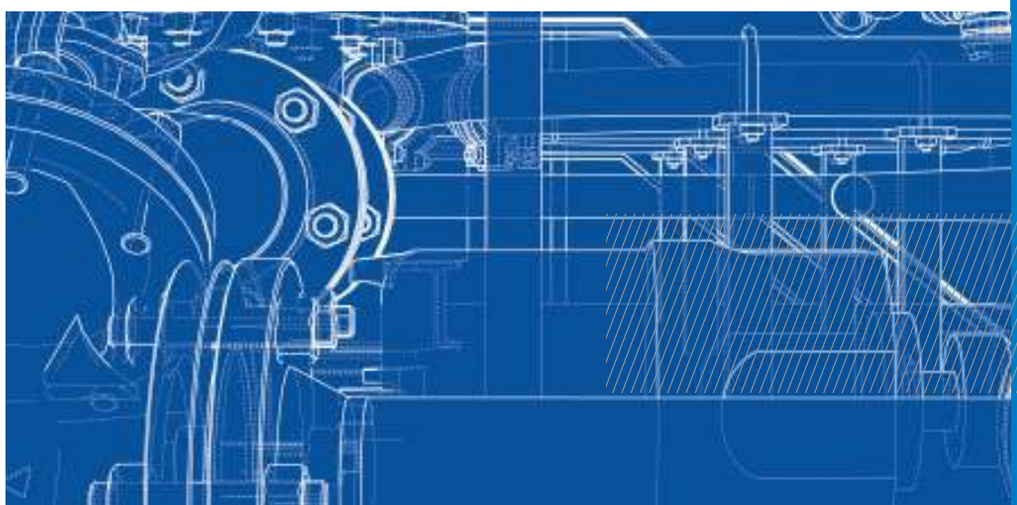
If a joint is inserted too far, it may be withdrawn immediately, but once the lubricant is dry (which only takes a few minutes in hot weather) mechanical aids are required to pull the joint apart.

Ensure the coupling to be jointed is supported to prevent closing of preceding couplings.

The diagram below indicates the correct pipe positions in the coupling.

Use of Other Brand Fittings

A variety of other cast/ductile iron, bronze, aluminium, steel ABS and UPVC fittings maybe used with Dubai Plast PVC pipes. In most cases the fittings have sockets that are shorter than pipe sockets. When the socket is too short for the spigot to be inserted to the witness mark, the pipe should be fully homed and special precautions should be taken during construction to ensure that no contraction of the pipe will be taken up at these joints, i.e. it should be taken up at other joints.



Flanged Joints

The main functions of a flanged joint is to create a demountable joint, to connect valves and vessels where strength in tension is required, or to joint to other materials.

The three types of flanges available are:

1. Full-faced PVC socketed flanges.

2. PVC socketed stub flanges with loose PVC or metal backing rings.

3. Tapered cores with either metal or PVC flanges. Flange joints require gaskets to seal them. In high stress situations, metal backing plates or flat washers are also required to spread the force and prevent damage to the flange. Bolts should not be over tightened.

Epoxy-coated aluminium or ductile iron flange adaptors are also available.

Threaded Joints

or normal water supply purposes, the cutting of threads on PVC pipes is not an acceptable practice. A moulded threaded adaptor should be used.

When making threaded joints the following points should be observed:-

1. A thread sealant is recommended and the only acceptable material is PTFE (TEFLON) tape. Hemp, grease or solvent cement should never be used.

Test the 'fit' of the joint, particularly when connecting to other materials or to other manufacturers' fittings. Judge the amount of tape accordingly. Under no circumstances should the thread bottom against a stop on either the male or female fitting.

2. Hand tighten initially. Usually a further two more turns are sufficient to effect a seal. Tighten only just enough to seal, plus half a turn more.
Note. Over tightening will over stress the fitting. Avoid using serrated grip tools particularly on the plain barrel of fittings or pipes.

3. If a threaded connection is made to a metal fitting, it is preferable that the male thread be PVC. For female PVC fittings special care should be taken to avoid overstressing.

GOLDEN RULE
DO NOT OVERTIGHTEN

Compression Joints

There are various types of compression joints available for use with PVC pipes. In principle all of these effect a seal by mechanical compression of a rubber ring by means of threaded caps or bolted end plates. Because immediate pressurisation is possible such joints are generally preferred for repair work.

They are also used frequently for final connections in difficult situations where slight mis alignment can not be avoided.

When making compression joints the manufacturers' recommendations should be followed. Over-tightening should be avoided. It may be found advantageous to use a lubricant on the rubber ring.

Connection to Other Materials

A wide range of adaptors to joint PVC pipes and fittings to pipes and fittings of other materials is available.

See Product Data section for more details.

INSTALLATION

HANDLING AND STORAGE

PVC pipe is very robust, but still can be damaged by rough handling. Pipes should not be thrown from trucks or dragged over rough surfaces. Plastic piping becomes more susceptible to damage in very cold weather so extra care should be taken when the temperature is low.

Since the soundness of any pipe joint depends on the condition of the spigot and the socket, special care should be taken not to allow them to come into contact with sharp edges or protruding nails.

Transportation of PVC Pipes

While in transit pipes should be well secured and supported. Chains or wire ropes may be used only if suitably padded to protect the pipe from damage. Care should be taken that the pipes are firmly tied so that the sockets can not rub together.

Pipes may be unloaded from vehicles by rolling them gently down timbers, care being taken to ensure that the pipes do not fall onto one another or onto any hard or uneven surface.

Storage of PVC Pipes

Pipes should be given adequate support at all times. Pipes should be stacked in layers with sockets placed at alternate ends of the stack and with the sockets protruding.

Horizontal supports of about 75 mm wide should be spaced not more than 1.5 m centre- to-centre beneath the pipes to provide even support.

Vertical side supports should also be provided at intervals of 3 m along rectangular pipe stacks.

For long-term storage (longer than 3 months) the maximum free height should not exceed 1.5 m. The heaviest pipes should be on the bottom.

Crated pipes, however, may be stacked higher provided that the load bearing is not taken directly by the lower pipes.

In all cases, stacking should be such that pipes will not become distorted.

If it is planned to store pipes in direct sunlight for a period in excess of one year, then the pipes should be covered with material such as hessian, placed so as to not restrict the circulation of air in the pipes which has a cooling effect.

Coverings such as black plastic must not be used as these can greatly increase the temperatures within the stack.

Pipes should not be stored close to heat sources or hot objects, eg., heaters, boilers steam lines or engine exhaust, or against reflective metal fences which may concentrate heat.

Size DN (mm)	Minimum (mm)	Maximum (mm)
100	320	800
125	340	825
150	360	825
200	425	900
225	450	925
250	480	950
300	515	1000
375	600	1200

BELOW-GROUND INSTALLATION

Preparing the Pipes

Before installation, each pipe and fitting should be inspected to see that its bore is free from foreign matter and that its outside surface has no large scores or any other damage. Pipe ends should be checked to ensure that the spigots and sockets are free from damage.

Pipes of the required diameter and class should be identified and matched with their respective fittings and placed ready for installation.

Preparing the Trench

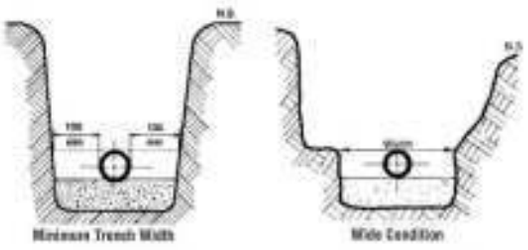
PVC pipe is likely to be damaged or deformed if its support by the ground on which it is laid is not made as uniform as possible. The trench bottom should be examined for irregularities and any hard projections removed.

Trench Widths

A trench should be as narrow as practical but adequate to allow space for working area and for tamping the side support. It should be not less than 200 mm wider than the outside diameter of the pipe irrespective of soil condition.

Wide Trenches

For deep trenches where significant soil loading may occur, the trench should not exceed the widths given in the table on top of this page without further investigation.



Unstable Conditions

Where a trench, during or after excavation, tends to collapse or cave in, it is considered unstable. If the trench is located, for instance, in a street or a narrow pathway and it is therefore impractical to widen the trench, support should be provided for the trench walls in the form of timber planks or other suitable shoring. Alternatively the trench should be widened until stability is reached. At this point, a smaller trench may then be excavated in the bottom of the trench to accept the pipe.

In either case do not exceed the maximum trench width at the top of the pipe unless allowance has been made for the increased load.

Trench Depths

The recommended minimum trench depth is determined by the loads imposed on the pipe such as the mass of backfill material, the anticipated traffic loads and any other superimposed loads. The depth of the trench should be sufficient to prevent damage to the pipe when the anticipated loads are imposed upon it.

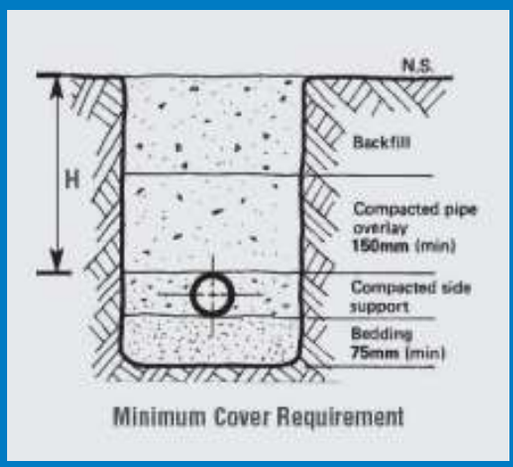
INSTALLATION

Minimum Cover

Trenches should be excavated to allow for the specified depth of bedding, the pipe diameter and the minimum recommended cover, overlay plus backfill, above the pipes. The table in the page provides recommendations for minimum cover.

The above cover requirements will provide adequate protection for all classes of pipe. Where it is necessary to use lower covers, several options are available.

1. Use a high quality granular backfill, eg crushed gravel or road base.
2. Use a higher class of pipe than required for normal pressure or other considerations.
3. Provide additional structural load bearing bridging over the trench. Temporary steel plates may be used in the case of construction loads.



Minimum Cover Requirement

Loading	Cover, H (mm)
No vehicle loading	300
Vehicular loading:-	
not roadways	450
sealed roadways	600
unsealed roadways	750
Embankments	750
Construction equipment loading	750

Bedding Material

1. Suitable sand, free from rock or other hard or sharp objects that would be retained on a 13.2 mm sieve.
2. Crushed rock or gravel of approved grading up to a maximum size of 14 mm.
3. The excavated material may provide a suitable pipe underlay if it is free from rock or hard matter and broken up so that it contains no soil lumps having any dimension greater than 75 mm which would prevent adequate compaction of the bedding.

The suitability of a material depends on its compactability. Granular materials (gravel or sand) containing little or no fines, or specification graded materials, require little or no compaction, and are preferred.

Sands containing fines, and clays are difficult to compact and should only be used where it can be demonstrated that appropriate compaction can be achieved.

Variations in the hard bed should never exceed 20% of the bedding depth. Absolute minimum underlay should be 75 mm. It may be necessary to provide a groove under each socket to ensure that even support along the pipe barrel is achieved.

Pipe Side Support

Material selected for pipe side support should be adequately tamped in layers of not more than 150 mm. Care should be taken not to damage the exposed pipe and to tamp evenly on either side of the pipe to prevent pipe distortion.

Unless otherwise specified, the pipe side support and pipe overlay material used should be identical with the pipe bedding material.

The pipe overlay material should be levelled and tamped in layers to a minimum height of 150 mm above the crown of the pipe. Care should be taken not to disturb the line or grade of the pipeline, where this is critical, by excessive tamping.

INSTALLATION

Backfill

Unless otherwise specified, excavated material from the site should constitute the backfill.

Gravel and sand can be compacted by vibratory methods and clays by tamping. This is best achieved when the soils are wet. If water flooding is used and extra soil has to be added to the original backfill, this should be done only when the flooded backfill is firm enough to walk on. When flooding the trench, care should be taken not to float the pipe.

PVC Pipes Under Roads

PVC pipes can be installed under roads in either the longitudinal or transverse direction.

The type of rock/granular materials specified for road subgrades have a very high soil modulus and offer excellent side support for flexible pipes as well as minimising the effects of dead and live loads. This represents an ideal structural environment for PVC pipes.

Consideration should be given at the time of installation to ensure:

1. Construction loadings are allowed
2. The pipes are buried at sufficient depth to ensure they are not disturbed during future realignments or regrading of the road
3. Minimum depths of cover and compaction techniques are observed.

Pipeline Buoyancy

Pipe, under wet conditions, can become buoyant in the trench. PVC pipe, being lighter than most pipe materials, should be covered with sufficient overlay and backfill material to prevent inadvertent flotation and movement. A depth of cover over the pipe of 1.5 times the diameter is usually adequate.

Expansion and Contraction

Pipe will expand or contract if it is installed during very hot or very cold weather, so it is recommended that the final pipe connections be made when the temperature of the pipe has stabilised at a temperature close to that of the backfilled trench.

When the pipe has to be laid in hot weather, precautions should be taken to allow for the contraction of the line which will occur when it cools to its normal working temperature.

For solvent cemented systems, the lines should be free to move until a strong bond has been developed (see Solvent Cement Jointing Procedures) and installation procedure should ensure that contraction does not impose strain on newly made joints.

For rubber ring jointed pipes, if contraction accumulates over several lengths, pull-out of a joint can occur. To avoid this possibility the preferred technique is to backfill each length, at least partially, as laying proceeds. (It may be required to leave joints exposed for test and inspection.)

It should be noted that rubber ring joint design allows for contraction to occur. Provided joints are made to the witness mark in the first instance, and contraction is taken up approximately evenly at each joint, there is no danger of loss of seal. A gap between witness mark and socket of up to 10 mm after contraction is quite acceptable.

Further contraction may be observed on pressurisation of the line (so-called Poisson contraction due to circumferential strain). Again this is anticipated in joint design and is quite in order.

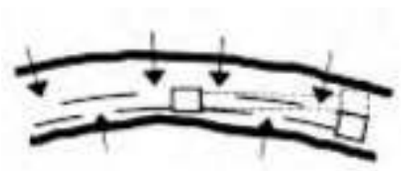
Electrical Earthing

PVC piping is a non-conductive material and cannot be used for earthing electrical installations or for dissipating static charges. Local authorities, both water and electrical, should be consulted for their requirements.

INSTALLING PIPES ON A CURVE

When installing pipes on a curve, the pipe should be jointed straight and then laid to the curve. Bending of pipes is achieved in practice after each joint is made, by laterally loading the pipe by any convenient means, and fixing in place by compacted soil, or appropriate fixings above ground. The technique used depends on the size and class of pipe involved, as clearly the forces required to induce bending vary over a very large range.

For buried lines in good soil, the compaction process can be used to induce bending as illustrated below. Bending aids, crowbars etc. must always be padded to prevent damage to pipes. Permanent point loads are not acceptable.



Size DN (mm)	Force applied at centre span			Forces applied at quarter points		
	Max. deflection angle	Max. displace-ment	Max. end offset	Max. deflection angle	Max. displace-ment	Max. end offset
	deg	mm	mm	deg	mm	mm
Minimum radius of curvature/diameter ratio			300			
Series 1 diameters						
15	23	470	1200	34	650	1800
20	18	380	950	27	520	1400
25	14	300	740	21	410	1100
32	11	240	580	17	330	900
40	9.9	210	520	15	290	790
50	7.9	170	410	12	230	630
65	6.3	130	330	9.5	180	500
80	5.4	110	280	8.1	160	420
100	4.2	88	220	6.3	120	330
125	3.4	71	180	5.1	98	270
150	3.0	63	160	4.5	86	240
175	2.4	50	130	3.6	69	190
200	2.1	44	110	3.2	61	170
Series 2 diameters						
100	3.9	82	200	5.9	110	310
150	2.7	56	140	4.0	78	210
200	2.1	43	110	3.1	59	160

INSTALLATION

Thrust Blocks

Underground PVC pipelines jointed with rubber ring joints require concrete thrust blocks to prevent movement of the pipeline when a pressure load is applied. In some circumstances, thrust support may also be advisable in solvent cement jointed systems.

Uneven thrust will be present at most fittings. The thrust block transfers the load from the fitting, around which it is placed, to the larger bearing surface of the solid trench wall.

Construction of Thrust Blocks

Concrete should be placed around the fitting in a wedge shape with its widest part against the solid trench wall. Some forming may be necessary to achi eve an adequate bearing area with a minimum of concrete. The concrete mix should be allowed to cure for seven days before pressurisation.

A thrust block should bear firmly against the side of the trench and to achieve this, it may be necessary to hand trim the trench side or hand excavate the trench wall to form a recess. The thrust acts through the centre line of the fitting and the thrust block should be constructed symmetrically about this centre line. (See Thrust Support for design of thrust block size.)

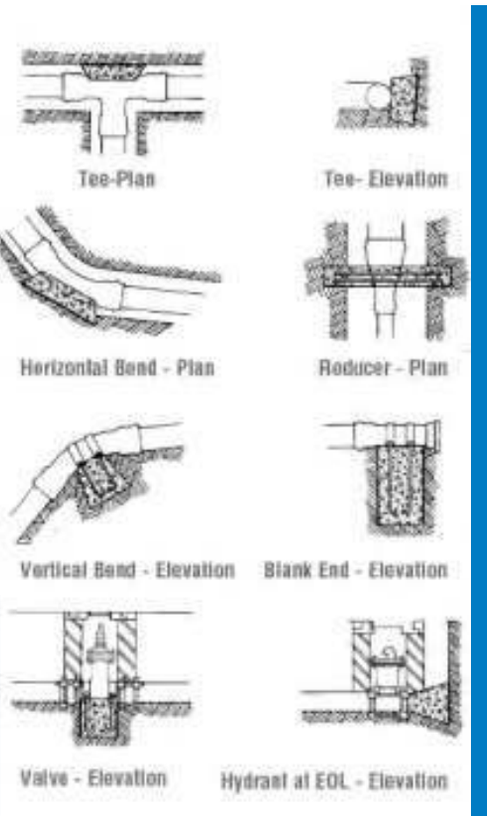
PVC pipes and fittings should be covered with a protective membrane of PVC, polyethylene or felt when adjacent to concrete so that they can move without being damaged. (See Setting of pipes in concrete)

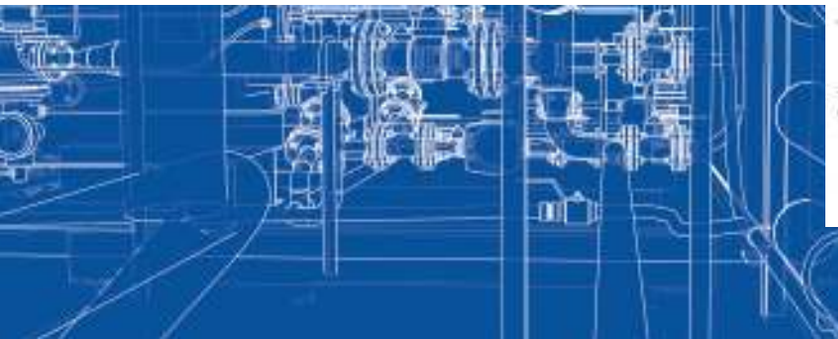
Pipelines on Steep Slopes

Two problems can occur when pipes are installed on steep slopes, i.e. slopes steeper than 20% (1:5).

1. The pipes may slide downhill so that the witness mark positioning is lost. It maybe necessary to support each pipe with some cover during construction to prevent the pipe slipping.
2. The generally coarse backfill around the pipe may be scoured out by water movement in the backfill. Clay stops or sandbags should be placed at appropriate intervals above and below the pipe to stop erosion of the backfill.

Where bulkheads are used, one restraint per pipe length, placed adjacent to the socket, is considered sufficient for all slopes.





ABOVE-GROUND INSTALLATION

General Considerations

In above ground installations, pipes should be laid on broad, smooth bearing surfaces wherever possible to minimise stress concentration and to prevent physical damage.

PVC pipe should not be laid on steam lines or in proximity to other high temperature surfaces.

Where a PVC pressure pipeline is used to supply cold water to a hot water cylinder, the last two metres of pipe should be made of copper and a non-return valve fitted between the PVC and copper line to prevent pipe failure.

Where connections are made to other sections or to fixtures such as pumps or motors, care should be taken to ensure that the sections are axially aligned. Any deviations will result in undue stress on the jointing fittings which could lead to premature failure.

If a pipeline is subjected to continuous vibration such as at the connection with a pump, it should be connected by a flexible joint or, if possible, the system should be redesigned to eliminate the vibration.

The pipe must be adequately supported in order to prevent sagging and excessive distortion. Clamp, saddle, angle, spring or other standard types of supports and hangers may be used where necessary.

Pipe hangers should not be over-tightened. Metal surfaces should be insulated from the pipe by plastic coating, wrapping or other means.

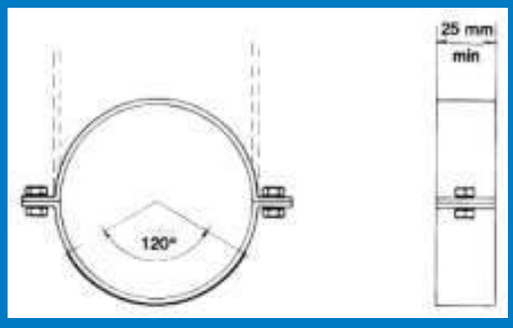
SUPPORTS

Brackets and Clips

For either free or fixed pipeline supports using brackets or clips, the bearing surface should provide continuous support for at least 120° of the circumference.

Straps

Metal straps used as supports should be at least 25 mm wide, either plastic-coated or wrapped in a protective material such as nylon or PE sheet. If a strap is fastened around a pipe, it should not distort the pipe in any way.



Free Supports

A free support allows the pipe to move without restraint along its axis while still being supported. To prevent the support from scuffing or damaging the pipe as it expands and contracts, a 6 mm thick layer of felt or lagging material is wrapped around the support. Alternatively, a swinging type of support can be used and the support strap, protected with felt or lagging, must be securely fixed to the pipe.

INSTALLATION

Placement of Supports

Careful consideration should be given to the layout of piping and its support system. Even for non pressure lines the effects of thermal expansion and contraction have to be taken into account. In particular, the layout should ensure that thermal and other movements do not induce significant bending moments at rigid connections to fixed equipment or at bends or tees.

For solvent-cement jointed pipe any expansion coupling must be securely clamped with a fixed support. Other pipe clamps should allow for movement due to expansion and contraction. Rubberring jointed pipe should have fixed supports behind each pipe socket.

When PVC pipes are encased in concrete, certain precautions should be taken:-

1. Pipes should be fully wrapped with a compressible material, such as felt, with a minimum thickness of 5% of the pipe diameter, i.e. 5 mm for a 100mm diameter pipe.
2. Alternatively, flexible (rubber ring) joints should be provided at entry to and exit from the concrete as shown.

This procedure also allows for possible differential movement between the pipeline and concrete structure.

It must be borne in mind, however, that without a compressible membrane; stress transfer to the concrete will occur and may damage the concrete section.

3. Expansion joints coinciding with concrete expansion joints should be provided to accommodate movement due to thermal expansion or contraction in the concrete.

Anchorage at Fittings

It is advisable to rigidly clamp at valves and other fittings located at or near sharp directional changes, particularly when the line is subjected to wide temperature variations.

With the exception of solvent-cement jointed couplings, all PVC fittings should be supported individually and valves should be braced against operating torque.

Thrust Anchorage

A solvent-cement jointed PVC pipeline will not usually require thrust anchorage, but the designer should take into consideration any stress on the fittings. As pipe diameter or working pressure increases it is good practice to install thrust anchors where necessary. A rubberring jointed pressure pipeline requires anchorage at all joints, at changes in direction and at other positions where unbalanced pressure forces exist.

Expansion Joints

For above-ground installations with solvent cement joints provision should be made in the pipeline for expansion and contraction. If the ends are constrained and there is likely to be significant thermal variation, then a rubber ring joint should be installed at least every 12 m to allow for movement within the pipeline.

Vertical Installation

Generally, vertical runs are supported by spring hangers and guided with rings or long U-bolts which restrict movement of the rise to one plane. It is sometimes helpful to support a long riser with a saddle at the bottom.

Where a PVC pipeline is to pass through or is to be built into a floor or wall of a building, allowance should be made for it to move without shearing against any hard surfaces or without causing damage to the pipe or fittings.

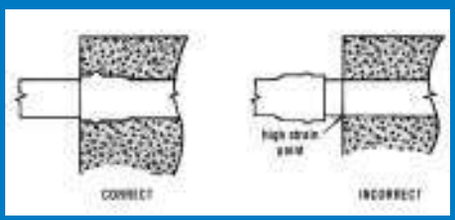
An annular space of not less than 6 mm should be left around the pipe or fitting.

This clearance should be maintained and sealed with a flexible sealant such as loosely packed felt, a rubber convolute sleeve or other suitable flexible sealing material.

If the pipeline has to pass through a fire-rated wall, appropriate fire stop collars should be installed.

When a fire breaks out, the fire stop collar will expand and seal off the pipe, thus preventing fire from spreading by means of the pipe access hole. Because fire stop collars seal off the pipe they must not be used on the water supply lines required for fire fighting.

Size DN (mm)	Maximum Support Spacing	
	Horizontal (m)	Vertical (m)
15	0.60	1.20
20	0.70	1.40
25	0.75	1.50
32	0.85	1.70
40	0.90	1.80
50	1.05	2.10
65	1.20	2.40
80	1.35	2.70
100	1.50	3.00
125	1.70	3.40
150	2.00	4.00
175	2.20	4.40
200	2.30	4.60
225	2.50	5.00
250	2.60	5.20
300	3.00	6.00



INSTALLATION

Protection from Solar Degradation

Although PVC pipe can be installed in direct sunlight, it will be affected by ultraviolet light which tends to discolour the pipe and can cause a loss of impact strength. No other properties are impaired. If the pipe is to be installed in continuous direct sunlight, it is advisable to paint the exterior with a white or light-coloured PVA paint.

TESTING AND COMMISSIONING

Protection from Solar Degradation

The pipeline may be tested as a whole or in sections, depending on the diameter and length of the pipe, the spacing between sectioning valves or blank ends and the availability of water.

Pipelines should be bedded and backfilled, but with the joints left uncovered for inspection before and after testing if possible.

All thrust supports for fittings and valves must be finished and the concrete properly cured (the minimum time is seven days). Blank ends installed temporarily should be adequately supported to take the pressure thrust.

Fill the pipeline with water and remove air from the system as far as possible. Allow the temperature to stabilize.

Pressurize the system. Selection of field test pressures is related to the system operating conditions. A maximum test pressure of 1.25 times the system design pressure, measured at the lowest point in the system, is specified although the test pressure should not exceed 1.25 times the PN of the lowest rated component in the system. Additional water will be required to bring the line up to pressure because the pipe expands slightly.

Recommends that the pressurized pipe should be allowed to stand for a minimum period of 15 minutes without make up pressure. Where the joints are available for inspection, and there is no evidence of leaks after 15 minutes, the pipeline is deemed to have passed the test.

Where joints are not accessible, measure the amount of water required to re-pressurize the

section. Where the make-up water does not exceed the allowance in the equation 4.1 below, the pipeline is deemed to have passed the test. The make-up water is not a leakage allowance. It is normal for a pressure drop to occur as the remaining air goes into solution and some further expansion of the pipe occurs.

$Q = 0.14\ LDH \quad (4.1)$

Where:
Q = allowable make-up water (l/h)
L = length of the test section (km)
D = nominal diameter of the pipe (m)
H = average test head over the test length (m)

This simple test above should suffice if the pipe is well supported by soil. If however, the allowable make up water level is exceeded, it does not necessarily mean that the pipeline has a leak. Viscoelastic creep of the pipe can give result in a drop in pressure even if there is no leak, particularly for higher strain pipes such as PVC-M and PVC-O if the soil compaction levels are not high. In this situation, further testing will be required to verify the leak tightness of the test section. This testing is based on the known relationship between creep strain and time.

Re-pressurize the pipe and maintain the pressure for 5 hours by successively pumping in sufficient water at the same temperature (±3°C) as the water in the pipeline. Measure and record the volume (V1) of water required between the second and third hour. Measure and record the volume (V2) of water required between the fourth and fifth hour. The pipeline is deemed to have passed the test if the following equation is satisfied:

$V_2 = 0.55\ V_1 + Q \quad (4.2)$

Where Q is the allowable make-up water from (4.1)

It should be borne in mind that static pressure testing does not necessarily simulate pressures developed under operating conditions, and in order to obtain adequate testing of all parts of the line it may be desirable to divide it into sections.

FLUSHING

Following successful testing, the line should be thoroughly flushed and dosed with a sterilizing agent such as chlorine. Local authority requirements should be followed.

DETECTING BURIED PIPES

Because PVC is a non-magnetic and non-conductive material, direct location by magnetic and electronic means is not possible. Several techniques are appropriate.

Metal Detectable Tapes

The use of metal detectable tapes is now common. These offer the dual facility of a color-coded early warning visual marker during excavation and traceability of the pipe when the precise location is not known.

The tape is placed on top of the pipe surround material and can later be located by using simple metal detectors operating in the 4-20 MHz range at depths ranging to 450 - 600 mm depending on equipment.

Trace Wires

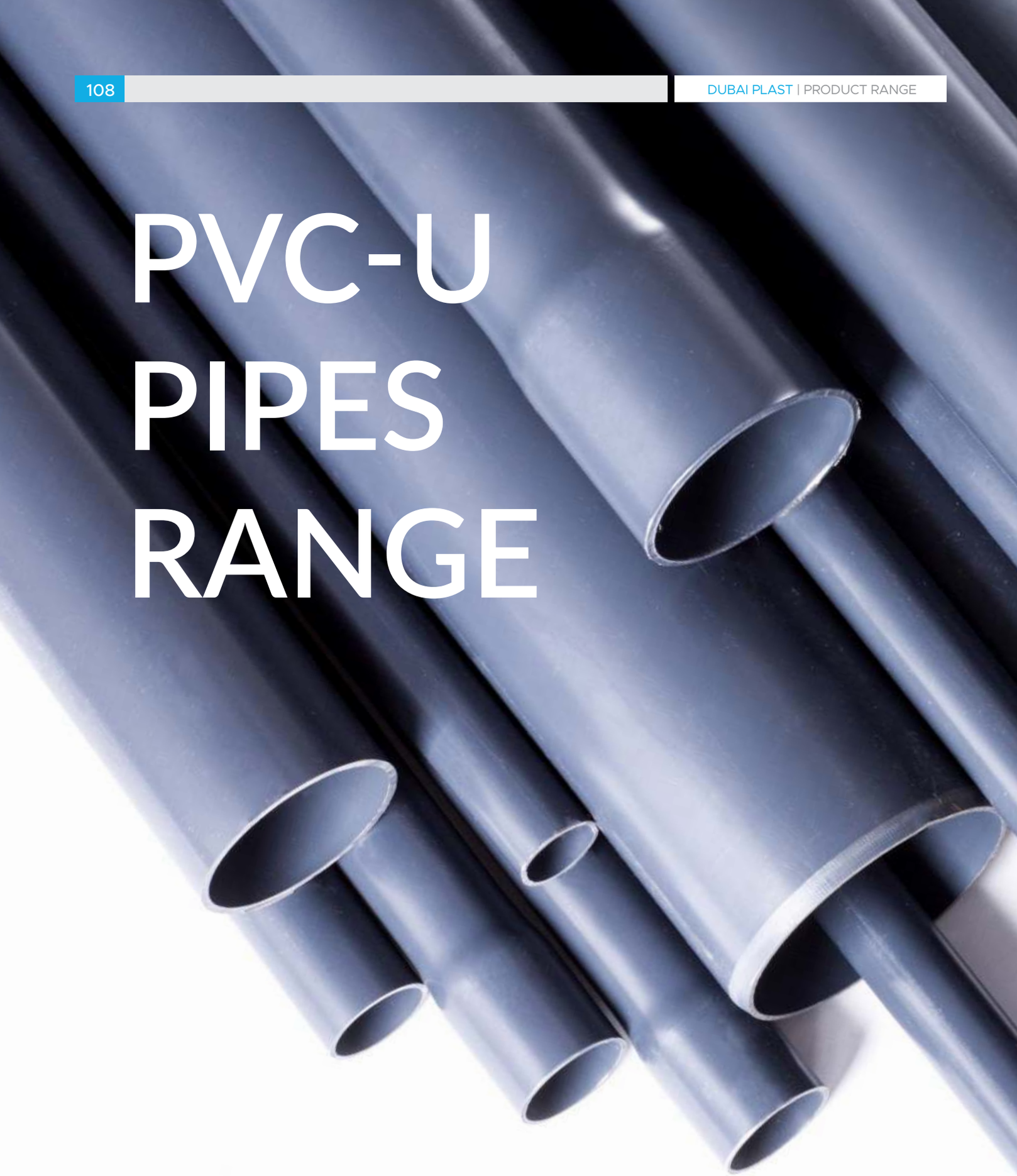
Trace wires are useful where pipes are buried significantly deeper. The trace wire is usually laid under the pipe, to avoid damage, and when a suppressed current is applied it can be detected at depths up to 3 metres using commercially available inductive detectors.

Suitable trace wires are the vinyl-coated single copper wire conductors for conveyance of an electric current. Disadvantages of the system are that both ends of the wire have to be accessed to apply the current, and if the wire is broken the system can not be used.

Audio Detection

Several excellent audio leak detectors are now available. One type requires an acoustic signal to be introduced to the pipe at some convenient location, e.g. a hydrant. A tuned detector is then used to locate the pipeline. These units are still effective with high background noise levels.

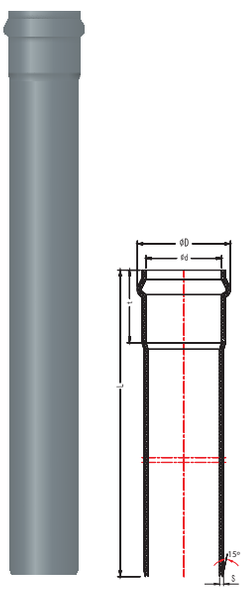
A second type picks up the sound of turbulence from flowing water in the pipe. This must be done in the absence of extraneous background noise, particularly traffic sounds. Skilled operators can also pinpoint the location of fittings. The equipment can also be used for detecting underground leaks.



PVC-U PIPES RANGE

PRODUCT DATA
PIPES

PVC-U PIPES - SERIES 1 (4 BAR)



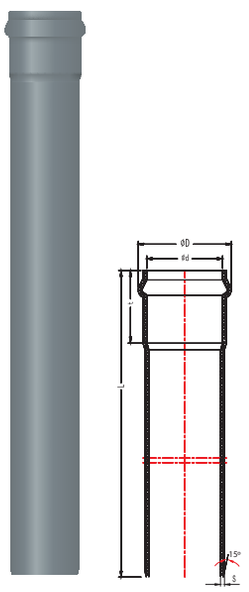
Code	d (mm)		s (mm)		t (mm)	D (mm)	
	Min.	Max.	Min.	Max.		Min.	Max.
4050010101	75	75.3	1.8	2.2	111	97.5	98.3
4050010102	90	90.3	1.8	2.2	116	114.3	115.1
4050010103	110	110.3	2.2	2.7	123	136.9	137.8
4050010104	125	125.3	2.5	3	128	153.4	154.3
4050010105	140	140.4	2.8	3.3	133	169.8	170.8
4050010106	160	160.4	3.2	3.8	140	192.4	193.4
4050010107	180	180.4	3.6	4.2	146	214.2	215.3
4050010108	200	200.4	4	4.6	152	236	237.2
4050010109	225	225.5	4.5	5.2	161	263.5	264.7
4050010110	250	250.5	4.9	5.6	169	290.8	292.2
4050010111	280	280.6	5.5	6.3	181	325.7	327.1
4050010112	315	315.6	6.2	7.1	192	363.7	365.3
4050010113	355	355.7	7	7.9	206	408.5	410.3
4050010114	400	400.7	7.9	8.9	220	458.9	460.9
4050010115	450	450.8	8.9	10	235	513.2	515.2
4050010116	500	500.9	9.8	11	255	569.4	571.8
4050010117	560	561	11	12.3	273	636	638.5
4050010118	630	631.1	12.4	13.9	295	713.6	716.3
4050010119	710	711.2	14	15.6	320	802.6	805.6
4050010120	800	801.3	15.7	17.5	345	899.2	902.4
4050010121	900	901.5	17.7	19.7	369	1009.2	1012.7
4050010122	1000	1001.6	19.7	21.9	392	1118.4	1122.2

Matrial: PVC-U, Polyvinylchloride unplasticized DIN 8062

Color: Dark-Grey

Pipe Length: 6 meters with rubber ring socket and plain end

PVC-U PIPES - SERIES 2 (6 BAR)



Code	d (mm)		s (mm)		t (mm)	D (mm)	
	Min.	Max.	Min.	Max.		Min.	Max.
4050010201	50	50.2	1.8	2.2	95	68.7	69.3
4050010202	63	63.2	1.9	2.3	104	83.3	84.6
4050010203	75	75.3	2.2	2.7	111	98.3	99.1
4050010204	90	90.3	2.7	3.2	116	116.1	116.9
4050010205	110	110.3	3.2	3.8	123	138.9	139.8
4050010206	125	125.3	3.7	4.3	128	155.8	156.7
4050010207	140	140.4	4.1	4.8	133	172.4	173.4
4050010208	160	160.4	4.7	5.4	140	195.4	196.4
4050010209	180	180.4	5.3	6.1	146	217.6	218.7
4050010210	200	200.4	5.9	6.7	152	239.8	241
4050010211	225	225.5	6.6	7.5	161	267.7	268.9
4050010212	250	250.5	7.3	8.3	169	295.6	297
4050010213	280	280.6	8.2	9.3	181	331.1	332.5
4050010214	315	315.6	9.2	10.4	192	369.7	371.3
4050010215	355	355.7	10.4	11.7	206	415.3	417.1
4050010216	400	400.7	11.7	13.1	220	466.5	468.5
4050010217	450	450.8	13.2	14.8	235	521.8	523.8
4050010218	500	500.9	14.6	16.3	255	579	581.4
4050010219	560	561	16.4	18.3	273	646.8	649.3
4050010220	630	631.1	18.4	20.5	295	725.6	728.3
4050010221	710	711.2	20.7	23	320	816	819
4050010222	800	801.3	23.3	25.9	345	914.4	917.6
4050010233	900	901.5	26.3	29.2	369	1026	1029.5
4050010234	1000	1001.6	29.2	32.4	392	1137	1140.8

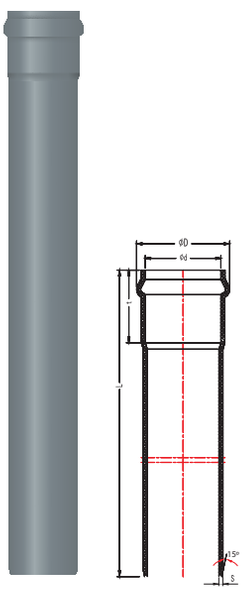
Matrial: PVC-U, Polyvinylchloride unplasticized DIN 8062

Color: Dark-Grey

Pipe Length: 6 meters with rubber ring socket and plain end

PRODUCT DATA
PIPES

PVC-U PIPES - SERIES 3 (10 BAR)



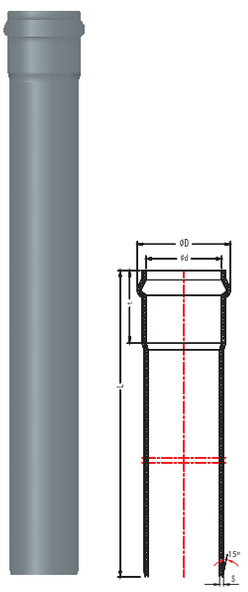
Code	d (mm)		s (mm)		t (mm)	D (mm)	
	Min.	Max.	Min.	Max.		Min.	Max.
4050010301	50	50.2	2.4	2.9	95	69.9	70.5
4050010302	63	63.2	3	3.5	104	86	86.8
4050010303	75	75.3	3.6	4.2	111	101.1	101.9
4050010304	90	90.3	4.3	5	116	119.3	120.1
4050010305	110	110.3	5.3	6.1	123	143.1	144
4050010306	125	125.3	6	6.8	128	160.4	161.3
4050010307	140	140.4	6.7	7.6	133	177.6	178.6
4050010308	160	160.4	7.7	8.7	140	201.4	202.4
4050010309	180	180.4	8.6	9.7	146	224.2	225.3
4050010310	200	200.4	9.6	10.8	152	247.2	248.4
4050010311	225	225.5	10.8	12.1	161	276.1	277.3
4050010312	250	250.5	11.9	13.3	169	304.8	306.2
4050010313	280	280.6	13.4	15	181	341.5	342.9
4050010314	315	315.6	15	16.7	192	381.3	382.9
4050010315	355	355.7	16.9	18.8	206	428.3	430.1
4050010316	400	400.7	19.1	21.3	220	481.3	483.3
4050010317	450	450.8	21.5	23.9	235	538.4	540
4050010318	500	500.9	23.9	26.5	255	597.6	600
4050010319	560	561	26.7	29.6	273	667.4	669.9
4050010320	630	631.1	30	33.2	295	748.8	751.5

Matrial: PVC-U, Polyvinylchloride unplasticized DIN 8062

Color: Dark-Grey

Pipe Length: 6 meters with rubber ring socket and plain end

PVC-U PIPES - SERIES 4 (16 BAR)



Code	d (mm)		s (mm)		t (mm)	D (mm)	
	Min.	Max.	Min.	Max.		Min.	Max.
4050010401	50	50.2	3.7	4.3	95	72.5	73.1
4050010402	63	63.2	4.7	5.4	104	89.4	90.2
4050010403	75	75.3	5.6	6.4	111	105.2	106
4050010404	90	90.3	6.7	7.6	116	124.3	125.1
4050010405	110	110.3	8.2	9.3	123	149.1	150
4050010406	125	125.3	9.3	10.5	128	167.5	168.4
4050010407	140	140.4	10.4	11.7	133	185.5	186.8
4050010408	160	160.4	11.9	13.3	140	211	212
4050010409	180	180.4	13.4	15	146	235.6	236.7
4050010410	200	200.4	14.9	16.6	152	259.6	260.8
4050010411	225	225.5	16.7	18.6	161	290.5	291.7
4050010412	250	250.5	18.6	20.7	169	321.1	322.5
4050010413	280	280.6	20.8	23.1	181	359.7	361.1
4050010414	315	315.6	23.4	26	192	402.3	403.9
4050010415	355	355.7	26.3	29.2	206	451.9	453.7
4050010416	400	400.7	29.7	32.9	220	508	510

Matrial: PVC-U, Polyvinylchloride unplasticized DIN 8062

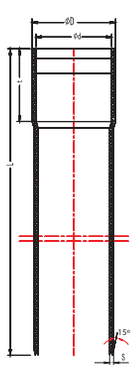
Color: Dark-Grey

Pipe Length: 6 meters with rubber ring socket and plain end

PRODUCT DATA

PIPES

PVC-U PIPES - SERIES 1 (4 BAR)



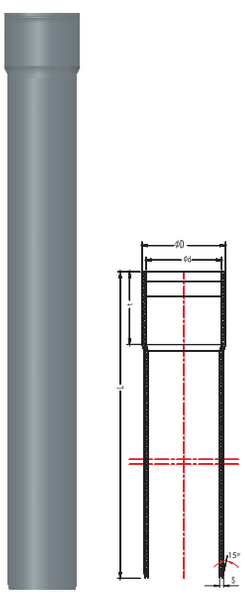
Code	d (mm)		s (mm)		t (mm)	D (mm)	
	Min.	Max.	Min.	Max.		Min.	Max.
4050020101	75	75.3	1.8	2.2	70	78.7	79.7
4050020102	90	90.3	1.8	2.2	79	93.7	94.7
4050020103	110	110.3	2.2	2.7	91	114.5	115.7
4050020104	125	125.3	2.5	3	100	130.1	131.3
4050020105	140	140.4	2.8	3.3	109	145.7	147
4050020106	160	160.4	3.2	3.8	121	166.5	168
4050020107	180	180.4	3.6	4.2	133	187.3	188.8
4050020108	200	200.4	4	4.6	145	208.1	209.6
4050020109	225	225.5	4.5	5.2	160	234.2	235.9
4050020110	250	250.5	4.9	5.6	175	260	261.7
4050020111	280	280.6	5.5	6.3	193	291.2	293.1
4050020112	315	315.6	6.2	7.1	214	327.6	329.7
4050020113	355	355.7	7	7.9	238	369.4	371.6
4050020114	400	400.7	7.9	8.9	265	416.2	418.6
4050020115	450	450.8	8.9	10	295	468.3	470.9
4050020116	500	500.9	9.8	11	325	520.2	523

Matrial: PVC-U, Polyvinylchloride unplasticized DIN 8062

Color: Dark-Grey

Pipe Length: 6 meters with solvent cement socket and plain end

PVC-U PIPES - SERIES 2 (6 BAR)



Code	d (mm)		s (mm)		t (mm)	D (mm)	
	Min.	Max.	Min.	Max.		Min.	Max.
4050020201	40	40.2	1.8	2.2	40	43.7	44.7
4050020202	50	50.2	1.8	2.2	50	53.7	54.7
4050020203	63	63.2	1.9	2.3	63	66.9	69.9
4050020204	75	75.3	2.2	2.7	70	79.5	80.7
4050020205	90	90.3	2.7	3.2	79	95.5	96.7
4050020206	110	110.3	3.2	3.8	91	116.5	117.9
4050020207	125	125.3	3.7	4.3	100	132.5	133.9
4050020208	140	140.4	4.1	4.8	109	148.3	150
4050020209	160	160.4	4.7	5.4	121	169.5	171.2
4050020210	180	180.4	5.3	6.1	133	190.7	192.6
4050020211	200	200.4	5.9	6.7	145	211.9	213.8
4050020212	225	225.5	6.6	7.5	160	238.4	240.5
4050020213	250	250.5	7.3	8.3	175	264.8	267.1
4050020214	280	280.6	8.2	9.3	193	296.6	299.1
4050020215	315	315.6	9.2	10.4	214	333.6	336.3
4050020216	355	355.7	10.4	11.7	238	376.2	379.2
4050020217	400	400.7	11.7	13.1	265	423.8	427
4050020218	450	450.8	13.2	14.8	295	476.9	480.5
4050020219	500	500.9	14.6	16.3	325	529.8	533.6

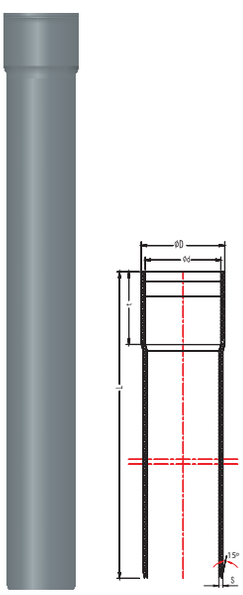
Matrial: PVC-U, Polyvinylchloride unplasticized DIN 8062

Color: Dark-Grey

Pipe Length: 6 meters with solvent cement socket and plain end

PRODUCT DATA
PIPES

PVC-U PIPES - SERIES 3 (10 BAR)



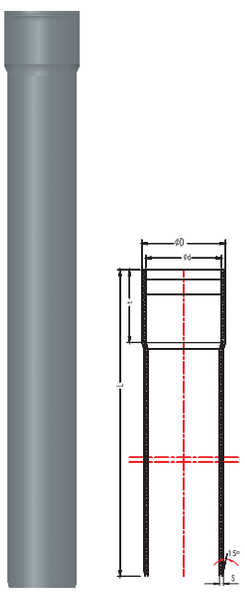
Code	d (mm)		s (mm)		t (mm)	D (mm)	
	Min.	Max.	Min.	Max.		Min.	Max.
4050020301	25	25.2	1.5	1.9	32	28.1	29.1
4050020302	32	32.2	1.8	2.2	32	35.7	36.7
4050020303	40	40.2	1.9	2.3	40	43.9	44.9
4050020304	50	50.2	2.4	2.9	50	54.9	56.1
4050020305	63	63.2	3	3.5	63	69.1	70.3
4050020306	75	75.3	3.6	4.2	70	82.3	83.7
4050020307	90	90.3	4.3	5	79	98.7	100.3
4050020308	110	110.3	5.3	6.1	91	120.7	122.5
4050020309	125	125.3	6	6.8	100	137.1	138.9
4050020310	140	140.4	6.7	7.6	109	153.5	155.6
4050020311	160	160.4	7.7	8.7	121	175.5	177.8
4050020312	180	180.4	8.6	9.7	133	197.3	199.8
4050020313	200	200.4	9.6	10.8	145	219.3	222
4050020314	225	225.5	10.8	12.1	160	246.8	249.7
4050020315	250	250.5	11.9	13.3	175	274	277.1
4050020316	280	280.6	13.4	15	193	307	310.5
4050020317	315	315.6	15	16.7	214	345.2	248.9
4050020318	355	355.7	16.9	18.8	238	389.2	393.4
4050020319	400	400.7	19.1	21.3	265	438.6	443.4
4050020320	450	450.8	21.5	23.9	295	493.5	498.7
4050020321	500	500.9	23.9	26.5	325	548.4	554

Matrial: PVC-U, Polyvinylchloride unplasticized DIN 8062

Color: Dark-Grey

Pipe Length: 6 meters with solvent cement socket and plain end

PVC-U PIPES - SERIES 4 (16 BAR)

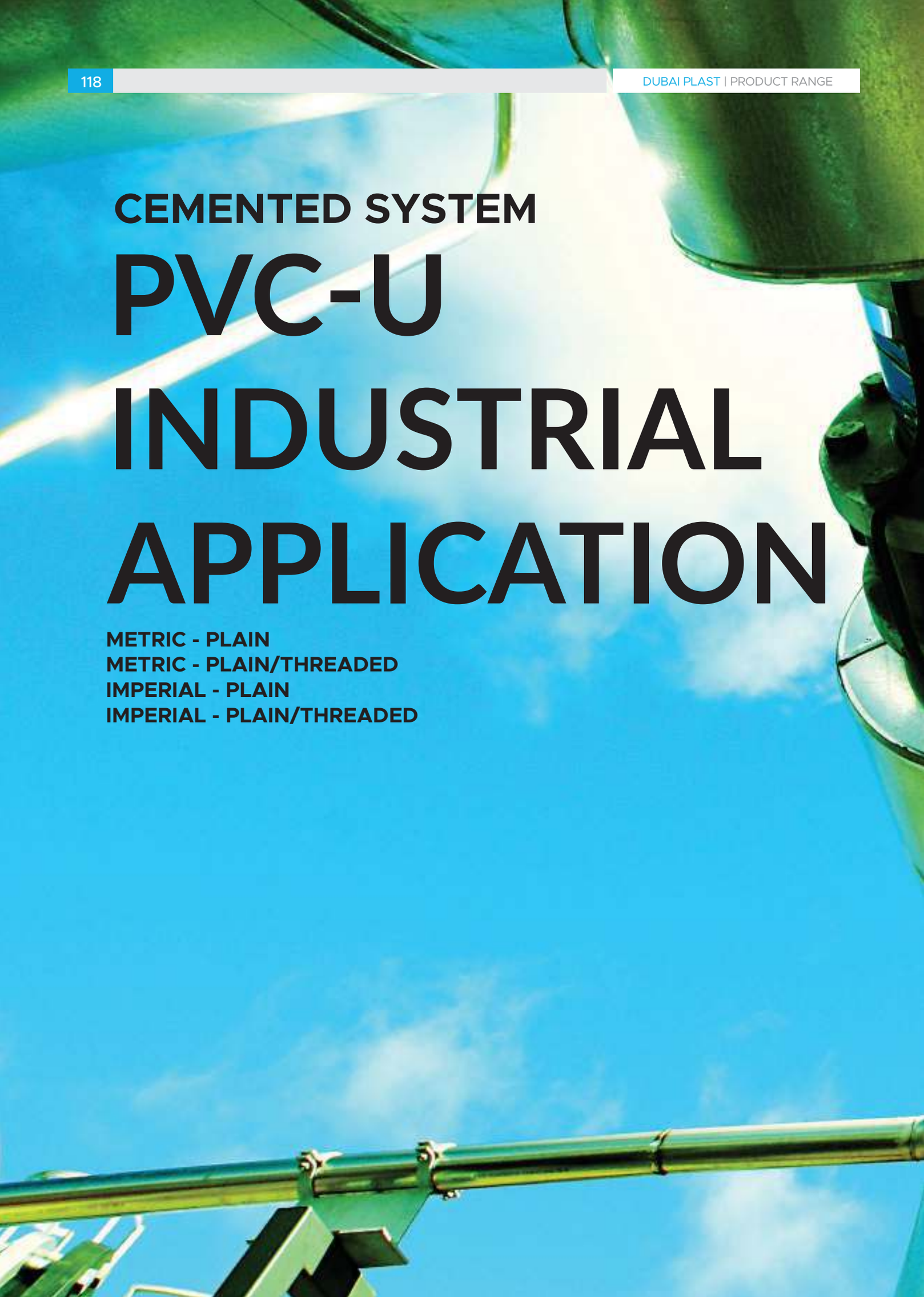


Code	d (mm)		s (mm)		t (mm)	D (mm)	
	Min.	Max.	Min.	Max.		Min.	Max.
4050020401	16	16.2	1.2	1.6	32	18.5	19.5
4050020402	20	20.2	1.5	1.9	32	23.1	24.1
4050020403	25	25.2	1.9	2.3	32	28.9	29.9
4050020404	32	32.2	2.4	2.9	32	36.9	38.1
4050020405	40	40.2	3	3.5	40	46.1	47.3
4050020406	50	50.2	3.7	4.3	50	57.5	58.9
4050020407	63	63.2	4.7	5.4	63	72.5	74.1
4050020408	75	75.3	5.6	6.4	70	86.3	88.1
4050020409	90	90.3	6.7	7.6	79	103.5	105.5
4050020410	110	110.3	8.2	9.3	91	126.5	128.9
4050020411	125	125.3	9.3	10.5	100	143.5	146.3
4050020412	140	140.4	10.4	11.7	109	160.9	163.8
4050020413	160	160.4	11.9	13.3	121	183.9	187
4050020414	180	180.4	13.4	15	133	206.9	210.4
4050020415	200	200.4	14.9	16.6	145	229.9	233.6
4050020416	225	225.5	16.7	18.6	160	258.6	262.7
4050020417	250	250.5	18.6	20.7	175	287.4	291.9
4050020418	280	280.6	20.8	23.1	193	321.8	326.7
4050020419	315	315.6	23.4	26	214	362	367.5
4050020420	355	355.7	26.3	29.2	238	408	414.2
4050020421	400	400.7	29.7	32.9	265	459.8	466.6

Matrial: PVC-U, Polyvinylchloride unplasticized DIN 8062

Color: Dark-Grey

Pipe Length: 6 meters with solvent cement socket and plain end



CEMENTED SYSTEM

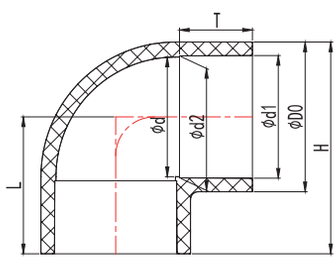
PVC-U INDUSTRIAL APPLICATION

METRIC - PLAIN
METRIC - PLAIN/THREADED
IMPERIAL - PLAIN
IMPERIAL - PLAIN/THREADED

PRODUCT DATA

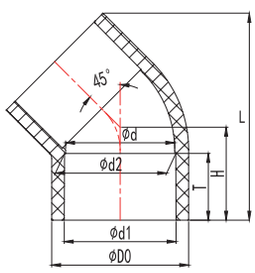
METRIC - PLAIN

PVC-U ELBOW 90°



Code	D	Dimensions (mm)							Nominal Pressure PN(kg/cm²)
		D0	d1	d2	d	T	L	H	
2010100101	20	26.3	20.3	19.95	18	16.2	27.7	40.8	PN16
2010100102	25	31.8	25.3	24.95	23	18.7	32.7	48.6	PN16
2010100103	32	39.9	32.3	31.9	30	22.2	39.7	59.6	PN16
2010100104	40	49.7	40.4	39.9	38	26.2	47.7	72.5	PN16
2010100105	50	61.9	50.4	49.9	48	31.2	57.7	88.7	PN16
2010100106	63	77.9	63.4	62.9	61	37.7	70.7	109.7	PN16
2010100107	75	91	75.4	74.9	70.9	43.7	82.5	128	PN16
2010100108	90	107.4	90.5	89.9	85.9	51.2	97.5	151.2	PN16
2010100109	110	127	110.6	109.9	103.9	61.2	117.5	181.1	PN16
2010100110	125	144.3	125.7	124.9	118.9	68.7	132.5	204.7	PN16
2010100111	140	162.3	140.8	139.9	133.9	76.2	148	229.1	PN16
2010100112	160	184.6	160.8	159.9	153.5	86.2	168.5	260.8	PN16
2010100113	180	202.6	180.9	179.9	178.5	97	190	291.3	PN16
2010100114	200	230.5	201	199.9	193.5	106.2	208	323.3	PN16
2010100115	225	259.4	226.2	224.9	216.9	119.1	233.6	363.2	PN16
2010100116	250	287.9	251.3	249.9	241.9	131.65	258.5	402.5	PN16
2010100117	280	314.8	281.5	279.9	278	147	291	448.4	PN16
2010100118	315	358.2	316.7	314.9	306.9	164.3	323	502.1	PN16
2010100119	355	391	356.8	355	326	184.3	368.3	561.4	PN10
2010100120	400	442	402	400	369.8	204.2	413	629.4	PN10

PVC-U ELBOW 45°

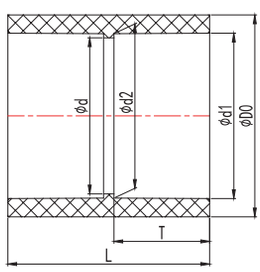


Code	D	Dimensions (mm)							Nominal Pressure PN(kg/cm²)
		D0	d1	d2	d	T	L	H	
2010100201	20	26.3	20.3	19.95	18	16.2	22.1	46.9	PN16
2010100202	25	31.8	25.3	24.95	23	18.7	25.7	54.9	PN16
2010100203	32	38.6	32.3	31.9	30	22.2	30.6	66.2	PN16
2010100204	40	49.7	40.4	39.9	38	26.2	36.3	79.3	PN16
2010100205	50	61.9	50.4	49.9	48	31.2	43.3	95.7	PN16
2010100206	63	77.5	63.4	62.9	61	37.7	52.5	116.9	PN16
2010100207	75	91.2	75.4	74.9	70.9	43.7	64.6	142.5	PN16
2010100208	90	107.6	90.5	89.9	85.9	51.2	75.6	166.9	PN16
2010100209	110	127	110.6	109.9	103.9	61.2	89.2	197.6	PN16
2010100210	125	144.3	125.7	124.9	118.9	68.7	100.7	222.9	PN16
2010100211	140	161.6	140.8	139.9	133.9	76.2	112.4	248.9	PN16
2010100212	160	184.6	160.8	159.9	153.9	86.2	126.9	281.9	PN16
2010100213	180	202.6	180.9	179.9	178.5	97	137.9	307	PN16
2010100214	200	230.5	201	199.9	193.5	106.2	157.1	349.5	PN16
2010100215	225	259.4	226.2	224.9	216.9	119.1	175.7	391.5	PN16
2010100216	250	287.9	251.3	249.9	241.9	131.65	193.3	432.2	PN16
2010100217	280	314.8	281.5	279.9	278	147	209.6	469.1	PN16
2010100218	315	358.2	316.7	314.9	306.9	164.3	242.8	541.2	PN16
2010100219	355	391	356.8	355	326	184.3	272.8	602.2	PN10
2010100220	400	442	402	400	369.8	204.2	298.5	662.2	PN10

PRODUCT DATA

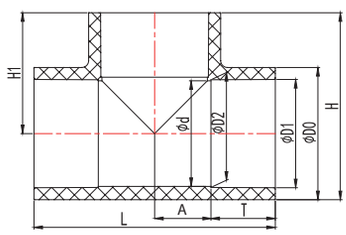
METRIC - PLAIN

PVC-U COUPLING



Code	D	Dimensions (mm)						Nominal Pressure PN(kg/cm²)
		D0	d1	d2	d	T	L	
2010100301	20	26.3	20.3	19.95	18	16.2	34.4	PN16
2010100302	25	31.8	25.3	24.95	23	18.7	39	PN16
2010100303	32	39.9	32.3	31.9	30	22.2	46.4	PN16
2010100304	40	49.4	40.4	39.9	38	26.2	54.4	PN16
2010100305	50	61.4	50.4	49.9	48	31.2	64.4	PN16
2010100306	63	77.1	63.4	62.9	61	37.7	77.1	PN16
2010100307	75	91	75.4	74.9	68.2	43.7	90	PN16
2010100308	90	107.6	90.5	89.9	83.8	51.2	106.4	PN16
2010100309	110	127.2	110.6	109.9	103	61.2	128.3	PN16
2010100310	125	144.3	125.7	124.9	118.6	68.7	144	PN16
2010100311	140	161.6	140.8	139.9	133.8	76.2	159.5	PN16
2010100312	160	184.6	160.8	159.9	153.8	86.2	179.7	PN16
2010100313	180	202.6	180.9	179.9	178.5	97	199	PN16
2010100314	200	230.3	201	199.9	193.5	106.2	217.5	PN16
2010100315	225	259.4	226.2	224.9	216.9	119.1	243	PN16
2010100316	250	287.9	251.3	249.9	241.9	131.65	268.3	PN16
2010100317	280	314.5	281.5	279.9	278	147	300	PN16
2010100318	315	354	316.7	314.9	306.9	164.3	335.4	PN16
2010100319	355	384.25	356.8	355	326	184.3	373.5	PN10
2010100320	400	430.15	402	400	369.8	205.5	422.8	PN10

PVC-U TEE 90°

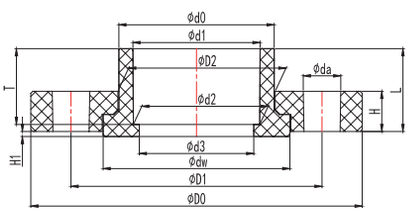


Code	D	Dimensions (mm)								Nominal Pressure PN(kg/cm²)
		D0	d1	d2	d	T	L	H1	H	
2010100401	20	26.3	20.3	19.95	18	16.2	55.4	27.7	40.85	PN16
2010100402	25	31.8	25.3	24.95	23	18.7	65.4	32.7	48.6	PN16
2010100403	32	39.9	32.3	31.9	30	22.2	79.4	39.7	59.65	PN16
2010100404	40	49.7	40.4	39.9	38	26.2	97.2	47.7	72.55	PN16
2010100405	50	61.9	50.4	49.9	48	31.2	114.5	57.7	88.65	PN16
2010100406	63	77.9	63.4	62.9	61	37.7	141	70.7	109.65	PN16
2010100407	75	91.2	75.4	74.9	70.9	43.7	165	82.5	128.1	PN16
2010100408	90	107.6	90.5	89.9	85.9	51.2	194	97.5	151.3	PN16
2010100409	110	127	110.6	109.9	103.9	61.2	234	117.5	181	PN16
2010100410	125	144.3	125.7	124.9	118.9	68.7	264	132.5	204.65	PN16
2010100411	140	161.6	140.8	139.9	133.9	76.2	296	148	228.8	PN16
2010100412	160	184.6	160.8	159.9	153.9	86.2	334	168	260.3	PN16
2010100413	180	202.6	180.9	179.9	178.5	97	380	190	291.3	PN16
2010100414	200	230.5	201	199.9	193.5	106.2	415	208	323.25	PN16
2010100415	225	259.4	226.2	224.9	216.9	119.1	463.5	233.5	363.2	PN16
2010100416	250	287.9	251.3	249.9	241.9	131.65	516	258.5	402.45	PN16
2010100417	280	314.8	281.5	279.9	278	147	581.5	291	448.4	PN16
2010100418	315	358.2	316.7	314.9	306.9	164.3	645	323	502.1	PN16
2010100419	355	391	356.8	355	326	184.3	736	368.5	564	PN10
2010100420	400	442	402	400	369.8	204.2	825	413	634	PN10

PRODUCT DATA

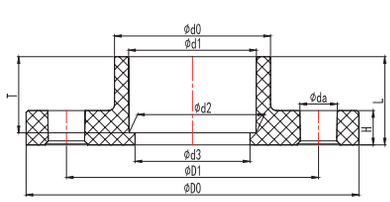
METRIC - PLAIN

PVC-U VANSTONE FLANGE



Code	D		
		D0	D1
2010100501	20	95	65
2010100502	25	105	75
2010100503	32	115	85
2010100504	40	140	100
2010100505	50	150	110
2010100506	63	165	125
2010100507	75	185	145
2010100508	90	200	160
2010100509	110	220	180
2010100510	125	250	210
2010100511	140	250	210
2010100512	160	285	240
2010100513	180	340	295
2010100514	200	340	295
2010100515	225	395	350
2010100516	250	398	351.5
2010100517	280	445	400
2010100518	315	510	450
2010100519	355	570	500
2010100520	400	620	565

PVC-U ONE-PIECE FLANGE



Code	D		
		D0	D1
2010101201	20	95	65
2010101202	25	105	75
2010101203	32	115	85
2010101204	40	140	100
2010101205	50	150	110
2010101206	63	165	125
2010101207	75	185	145
2010101208	90	200	160
2010101209	110	220	180
2010101210	125	250	210
2010101211	140	250	210
2010101212	160	285	240
2010101213	180	285	240
2010101214	200	340	295
2010101215	225	340	295
2010101216	250	395	350
2010101217	280	405	350
2010101218	315	445	400

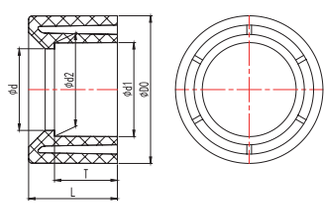
Dimensions (mm)												Nominal Pressure PN(kg/cm²)
D2	d0	d1	d2	d3	dw	da	T	H1	H	L	n	
31	30.5	20.3	19.95	16	37.6	14	23.22	2.5	13	24.7	4	PN16
37.9	36.9	25.35	24.95	20.6	47	14	26.4	2.5	14	27.9	4	PN16
45.7	44.7	32.35	31.95	27	56	14	29.58	2.5	15	31.08	4	PN16
55	54	40.4	39.95	36	64	18	32.75	2.5	15	35.25	4	PN16
62.6	61.6	50.35	49.9	45	74	18	31.2	2.5	18	33.7	4	PN16
78.4	77.4	63.4	62.9	57	93	18	37.7	2.5	20	41.2	4	PN16
91.4	90.4	75.4	74.9	69	110	18	43.7	2.5	23	47.2	4	PN16
107.5	106.5	90.5	89.9	83	126	18	51.2	2.5	26	55.7	8	PN16
127.9	126.9	110.6	109.9	103	147	18	61.2	2.5	28	65.7	8	PN16
145	144	125.7	124.9	117	164	18	68.7	2.5	29	74.2	8	PN16
162.3	161.3	140.75	139.9	131.5	181	18	76.2	2.5	30	81.7	8	PN16
186.3	184.3	160.8	159.9	151	204	22	86.2	3	32	92.2	8	PN16
229	227	201	199.9	190	257.4	22	106.2	3	36	112.2	8	PN10
256.1	254.1	226.2	224.9	216	271	22	119.1	3	38	127.7	8	PN10
283.3	281.3	251.3	249.9	239.5	310	22	131.65	3.5	40	138.2	12	PN10
308	305.5	281.5	280.15	272	325	22	147	10	35	159	12	PN10
356.6	354.6	316.7	314.9	302	373	22	167.7	5	44	175.7	12	PN10
393	391	356.8	355	326	417	24	184.3	32	40	197	16	PN10
444	442	402	400	369.8	453	24	204.2	40	44	226	16	PN6
488.5	486	451.94	450.05	447	518	27	233	38	45	245	20	PN6

Dimensions (mm)									Nominal Pressure PN(kg/cm²)
d0	d1	d2	d3	da	T	H	L	n	
26.8	20.3	19.95	16	14	16.2	12.4	20.2	4	PN16
32.5	25.3	24.95	21	14	18.7	13.5	22.7	4	PN16
40.3	32.3	31.9	28	14	22.2	15	26.2	4	PN16
49.3	40.35	39.9	36	18	26.2	14.4	31.2	4	PN16
61.6	50.35	49.9	46	18	31.2	15.5	36.2	4	PN16
77.4	63.4	62.9	57	18	37.7	15.5	43.7	4	PN16
90.4	75.4	74.9	69	18	43.7	17.3	50.2	4	PN16
106.5	90.5	89.9	83	18	51.2	18.5	58.7	8	PN16
126.9	110.6	109.9	103	18	61.2	20.3	68.7	8	PN16
144	125.7	124.9	117	18	68.7	22	77.2	8	PN16
161.3	140.75	139.9	131.5	18	76.2	22.2	84.7	8	PN16
184.3	160.8	159.9	151	22	86.2	25	95.7	8	PN16
202.6	180.8	179.9	166	22	97	25.5	115	8	PN10
227	201	199.9	190	22	106.2	26.3	116.2	8	PN10
254.1	226.2	224.9	216	22	119.1	27	129.7	8	PN10
281.3	251.3	249.9	239.5	22	131.65	28	142.2	12	PN10
310.4	281.5	279.9	264	22	147	29	169	12	PN10
354.6	316.7	314.9	302	22	167.7	31.5	179.7	12	PN10

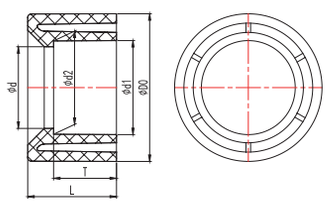
PRODUCT DATA

METRIC - PLAIN

PVC-U BUSHING



Code	D	Dimensions (mm)					
		d0	d1	d2	d	T	L
201010601	25*20	25	20.3	19.95	16	17	19.2
201010602	32*20	32	20.3	19.95	16	17	22.2
2010100603	32*25	32	25.3	24.95	21	19.5	22.2
2010100604	40*20	40	20.3	19.95	16	17	26.3
2010100605	40*25	40	25.3	24.95	21	19.5	26.3
2010100606	40*32	40	32.3	31.9	27.5	23	26.3
2010100607	50*20	50	20.3	19.95	16	17	31.2
2010100608	50*25	50	25.3	24.95	21	19.5	31.2
2010100609	50*32	50	32.3	31.9	27.5	23	31.2
2010100610	50*40	50	40.35	39.9	35	27	31.2
2010100611	63*20	63	20.3	19.95	16	17	38.1
2010100612	63*25	63	25.3	24.95	21	19.5	38.1
2010100613	63*32	63	32.3	31.9	27.5	23	38.1
2010100614	63*40	63	40.35	39.9	35	27	38.1
2010100615	63*50	63	50.35	49.9	45	32	38.1
2010100616	75*25	75	25.3	24.95	21	19.5	44.1
2010100617	75*32	75	32.3	31.9	27.5	23	44.1
2010100618	75*40	75	40.35	39.9	35	27	44.1
2010100619	75*50	75	50.35	49.9	45	32	44.1
2010100620	75*63	75	63.4	62.9	56	38.5	44.1
2010100621	90*32	90	32.3	31.9	27.5	23	51
2010100622	90*40	90	40.35	39.9	35	27	51
2010100623	90*50	90	50.35	49.9	45	32	51
2010100624	90*63	90	63.4	62.9	56	38.5	51
2010100625	90*75	90	75.4	74.9	67	44.5	51
2010100626	110*50	110	50.35	49.9	45	32	61

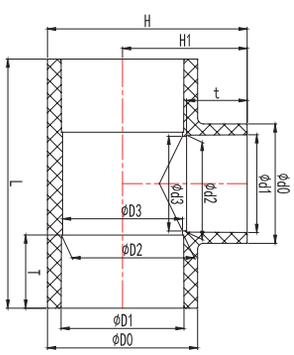


Code	D	Dimensions (mm)					
		d0	d1	d2	d	T	L
2010100627	110*63	110	63.4	62.9	56	38.5	61
2010100628	110*75	110	75.4	74.9	67	44.5	61
2010100629	110*90	110	90.5	89.9	80.5	52	61
2010100630	125*110	125	110.4	109.9	102	62	68.7
2010100631	140*63	140	63.4	62.9	102	62	77
2010100632	140*75	140	75.4	74.9	117	68.7	76.2
2010100633	140*90	140	90.5	89.9	56	38.5	76.2
2010100634	140*110	140	110.6	109.9	67	44.5	76.2
2010100635	140*125	140	125.7	124.9	80.5	52	76.2
2010100636	160*63	160	63.4	62.9	96	62	86
2010100637	160*75	160	75.4	74.9	130	77	86
2010100638	160*90	160	90.5	89.9	56	38.5	86
2010100639	160*110	160	110.6	109.9	67	44.5	86
2010100640	160*140	160	125.7	139.9	80.5	52	86
2010100641	180*160	180	160.8	159.9	150.9	86.2	96
2010100642	200*160	200	160.8	159.9	151.5	85.5	106.5
2010100643	200*180	200	180.9	179.9	169.7	96	106.2
2010100644	225*110	225	110.6	109.9	96	62	118.7
2010100645	225*140	225	140.75	139.9	130	77	118.7
2010100646	225*160	225	160.8	159.9	150.5	85.5	118.7
2010100647	225*200	225	201	199.9	188.8	106.2	118.7
2010100648	250*110	250	110.6	109.9	96	62	131.2
2010100649	250*160	250	160.8	159.9	150.5	85.5	131.2
2010100650	250*200	250	201	199.9	188.8	106.2	131.2
2010100651	250*225	250	226.2	224.9	210.8	119.1	131.2
2010100652	280*225	280	226.2	224.9	208.8	119.1	146.2

PRODUCT DATA

METRIC - PLAIN

PVC-U REDUCING TEE



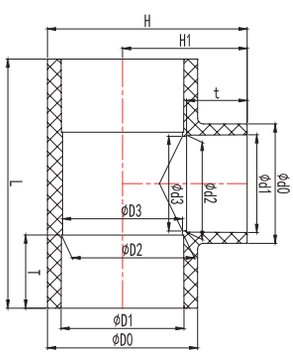
Code	D	D0	D1
2010100701	25*20	31.8	25.25
2010100702	32*20	39.9	32.3
2010100703	32*25	39.9	32.3
2010100704	40*20	49.7	40.35
2010100705	40*25	49.7	40.35
2010100706	40*32	49.7	40.35
2010100707	50*20	61.9	50.35
2010100708	50*25	61.9	50.35
2010100709	50*32	61.9	50.35
2010100710	50*40	61.9	50.35
2010100711	63*20	77.9	63.4
2010100712	63*25	77.9	63.4
2010100713	63*32	77.9	63.4
2010100714	63*40	77.9	63.4
2010100715	63*50	77.9	63.4
2010100716	75*20	91.2	75.4
2010100717	75*25	91.2	75.4
2010100718	75*32	91.2	75.4
2010100719	75*40	91.2	75.4
2010100720	75*50	91.2	75.4
2010100721	75*63	91.2	75.4
2010100722	90*25	107.6	90.5
2010100723	90*32	107.6	90.5
2010100724	90*40	107.6	90.5
2010100725	90*50	107.6	90.5
2010100726	90*63	107.6	90.5
2010100727	90*75	107.6	90.5
2010100728	110*25	127	110.6
2010100729	110*32	127	110.6
2010100730	110*40	127	110.6
2010100731	110*50	127	110.6
2010100732	110*63	127	110.6
2010100733	110*75	127	110.6
2010100734	110*90	127	110.6
2010100735	125*110	144.3	125.7
2010100736	140*50	161.6	140.75
2010100737	140*63	161.6	140.75
2010100738	140*75	161.6	140.75
2010100739	140*90	161.6	140.75
2010100740	140*110	161.6	140.75

Dimensions (mm)											Nominal Pressure PN(kg/cm²)
D2	D3	d0	d1	d2	d3	T	t	H1	H	L	
24.95	23	26.3	20.3	19.95	18	18.7	16.2	30.2	46.1	60.4	PN16
31.9	30	26.5	20.3	19.95	18	22.2	16.2	34.4	54.35	69	PN16
31.9	30	31.8	25.3	24.95	23	22.2	16.2	36.2	56.15	72.1	PN16
39.9	38	26.4	20.3	19.95	18	26.2	16.2	39	63.85	75.5	PN16
39.9	38	31.1	25.3	24.95	23	26.2	18.7	40.7	65.55	80.6	PN16
39.9	38	39.7	32.3	31.9	30	26.2	22.2	43.7	68.55	87.4	PN16
49.9	48	26.3	20.3	19.95	18	31.2	16.2	45.2	76.15	85.4	PN16
49.9	48	31.8	25.3	24.95	23	31.2	18.7	46.7	77.65	90.2	PN16
49.9	48	39.9	32.3	31.9	30	31.2	22.2	49.5	80.45	97.4	PN16
49.9	48	49.3	40.35	39.9	38	31.2	26.2	52.7	83.65	65.25	PN16
62.9	61	26.6	20.3	19.95	18	37.7	16.2	53.2	92.15	98.25	PN16
62.9	61	31.8	25.3	24.95	23	37.7	18.7	54.7	93.65	103.1	PN16
62.9	61	40	32.3	31.9	30	37.7	22.2	57.2	96.15	110.4	PN16
62.9	61	49.7	40.35	39.9	38	37.7	26.2	59.2	98.15	118.4	PN16
62.9	61	61.5	50.35	49.9	48	37.7	31.2	64.2	103.15	127.7	PN16
74.9	70.9	26.3	20.3	19.95	18	43.7	16.2	55.2	100.8	140	PN16
74.9	70.9	31.8	25.3	24.95	23	43.7	18.7	57.7	103.3	140	PN16
74.9	70.9	39.9	32.3	31.9	23	43.7	22.2	61.2	106.8	140.3	PN16
74.9	70.9	49.7	40.35	39.9	30	43.7	26.2	65.2	110.8	140	PN16
74.9	70.9	61.5	50.35	49.9	48	43.7	31.2	70.2	115.8	140	PN16
74.9	70.9	77.3	63.4	62.9	61	43.7	37.7	77.3	122.9	152.2	PN16
89.9	85.9	31.8	25.3	24.95	23	51.2	18.7	65.2	119	167.8	PN16
89.9	85.9	39.5	32.3	31.9	23	51.2	22.2	68.7	122.5	168.2	PN16
89.9	85.9	49.5	40.35	39.9	38	51.2	26.2	72.7	126.5	168.2	PN16
89.9	85.9	61.9	50.35	49.9	48	51.2	31.2	77.7	131.5	168	PN16
89.9	85.9	77.3	63.4	62.9	61	51.2	37.7	84.2	138	168.2	PN16
89.9	85.9	91.2	75.4	74.9	70.9	51.2	43.7	92.3	146.1	180.7	PN16
109.9	103.9	31.8	25.3	24.95	23	61.2	18.7	74.2	137.7	189	PN16
109.9	103.9	40.1	32.3	31.9	23	61.2	22.2	77.7	141.2	190	PN16
109.9	103.9	49.7	40.35	39.9	38	61.2	26.2	81.7	145.2	190.5	PN16
109.9	103.9	61.9	50.35	49.9	48	61.2	31.2	86.7	150.2	189	PN16
109.9	103.9	77.3	63.4	62.9	61	61.2	37.7	93.2	156.7	190	PN16
109.9	103.9	91.2	75.4	74.9	70.9	61.2	43.7	99	162.5	201.5	PN16
109.9	103.9	107.6	90.5	89.9	85.9	61.2	51.2	110.35	173.85	214.8	PN16
124.9	118.9	127	110.6	109.9	103.9	68.7	61.2	127.8	199.95	251	PN16
139.9	133.9	61.6	50.35	49.9	48	76.2	31.2	101.7	182.5	247.4	PN16
139.9	133.9	77.3	63.4	62.9	61	76.2	37.7	108.2	189	247	PN16
139.9	133.9	91.2	75.4	74.9	70.9	76.2	43.7	114	194.8	248	PN16
139.9	133.9	107.4	90.5	89.9	85.9	76.2	51.2	121.5	202.3	247	PN16
139.9	133.9	127	110.6	109.9	103.9	76.2	61.2	136.7	217.5	266.4	PN16

PRODUCT DATA

METRIC - PLAIN

PVC-U REDUCING TEE



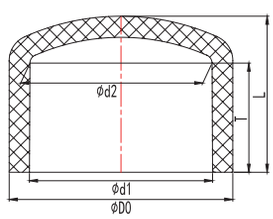
Code	D		
		D0	D1
2010100741	140*125	161.6	140.75
2010100742	160*63	184.6	160.8
2010100743	160*75	184.6	160.8
2010100744	160*90	184.6	160.8
2010100745	160*110	184.6	160.8
2010100746	160*140	184.6	160.8
2010100747	180*160	202.6	180.8
2010100748	200*90	230.5	201
2010100749	200*110	230.5	201
2010100750	200*140	230.5	201
2010100751	200*160	230.5	201
2010100752	225*63	259.4	226.2
2010100753	225*75	259.4	226.2
2010100754	225*90	259.4	226.2
2010100755	225*110	259.4	226.2
2010100756	225*140	259.4	226.2
2010100757	225*160	259.4	226.2
2010100758	225*200	259.4	226.2
2010100759	250*63	281.1	251.3
2010100760	250*75	281.1	251.3
2010100761	250*90	281.1	251.3
2010100762	250*110	281.1	251.3
2010100763	250*140	281.1	251.3
2010100764	250*160	281.1	251.3
2010100765	250*225	287.9	251.3
2010100766	280*225	314.8	281.5
2010100767	315*90	354.7	316.7
2010100768	315*110	354.7	316.7
2010100769	315*140	354.7	316.7
2010100770	315*160	354.7	316.7
2010100771	315*200	354.7	316.7
2010100772	315*225	354.7	316.7
2010100773	315*250	354.7	316.7
2010100774	315*280	391	316.7
2010100775	355*200	388	356.8
2010100776	355*250	388	356.8
2010100777	355*315	388	356.8
2010100778	400*200	432.7	401.6
2010100779	400*250	432.4	401.6
2010100780	400*315	432.7	401.6

Dimensions (mm)											Nominal Pressure PN(kg/cm²)
D2	D3	d0	d1	d2	d3	T	t	H1	H	L	
139.9	133.9	144.3	125.7	124.9	118.9	76.2	68.7	142.4	223.2	280.5	PN16
159.9	153.9	77.7	63.4	62.9	61	86.2	37.7	118.2	210.5	286	PN16
159.9	153.9	89.9	75.4	74.9	70.9	86.2	43.7	124	216.3	285	PN16
159.9	153.9	107.6	90.5	89.9	85.9	86.2	51.2	131.5	223.8	285.5	PN16
159.9	153.9	127.3	110.6	109.9	103.9	86.2	61.2	142.5	234.8	286	PN16
159.9	153.9	161.8	140.75	139.9	133.9	86.2	76.2	161.5	253.8	315.5	PN16
180.1	178.5	184.6	160.8	159.9	153.9	97	86.2	180	281.3	326	PN16
199.9	193.5	107.7	90.5	89.9	85.9	106.2	51.2	151.5	266.75	356.5	PN16
199.9	193.5	127.5	110.6	109.9	103.9	106.2	61.2	162.5	277.75	357	PN16
199.9	193.5	162.2	140.75	139.9	133.9	106.2	76.2	178	293.25	356.5	PN16
199.9	193.5	184.6	160.8	159.9	153.9	106.2	86.2	197.5	312.75	415.5	PN16
224.9	216.9	77.3	63.4	62.9	61	119.1	37.7	149.7	279.4	384	PN16
224.9	216.9	91.2	75.4	74.9	70.9	119.1	43.7	155.5	285.2	384	PN16
224.9	216.9	107.6	90.5	89.9	85.9	119.1	51.2	163	292.7	384	PN16
224.9	216.9	127	110.6	109.9	103.9	119.1	61.2	174	303.7	384	PN16
224.9	216.9	161.9	140.75	139.9	133.9	119.1	76.2	189.5	319.2	384	PN16
224.9	216.9	185	160.8	159.9	153.9	119.1	86.2	209.7	339.4	403	PN16
224.9	216.9	230.5	201	199.9	193.5	119.1	106.2	231.5	361.2	384	PN16
249.9	241.9	77.3	63.4	62.9	61	132	37.7	162	302.55	429.5	PN16
249.9	241.9	91.2	75.4	74.9	70.9	132	43.7	167.8	308.35	429.5	PN16
249.9	241.9	107.8	90.5	89.9	85.9	132	51.2	175.3	315.85	429.5	PN16
249.9	241.9	127	110.6	109.9	103.9	132	61.2	186.3	326.85	429.5	PN16
249.9	241.9	161.6	140.75	139.9	153.9	132	76.2	201.8	342.35	429.5	PN16
249.9	241.9	184.6	160.8	159.9	178.5	132	86.2	211.8	352.35	429.5	PN16
249.9	241.9	259.4	226.2	224.9	218.9	132	119.1	254	397.95	429.5	PN16
279.9	278	259.2	226.2	224.9	218.9	147	132	276	433.4	526.5	PN16
314.9	306.9	107.6	90.5	89.9	85.9	164.3	51.2	198.7	376.05	445.9	PN16
314.9	306.9	127	110.6	109.9	103.9	164.3	61.2	209.7	387.05	600.1	PN16
314.9	306.9	161.6	140.75	139.9	133.9	164.3	76.2	225.2	402.55	600.1	PN16
314.9	306.9	184.6	160.8	159.9	153.9	164.3	86.2	235.2	412.55	600.1	PN16
314.9	306.9	230.5	201	199.9	193.5	164.3	106.2	268.5	445.85	538	PN16
314.9	306.9	259.4	226.2	224.9	220.9	164.3	119.1	269.2	446.55	600.1	PN16
314.9	306.9	288.6	251.3	249.9	241.9	164.3	132	282	459.35	644	PN16
314.9	306.9	314.5	281.5	279.9	278	164.3	147	321.5	517	647	PN16
355	326	230.5	201	199.9	193.5	184.3	106.2	285.5	478	590.5	PN10
355	326	281.1	251.3	249.9	241.9	184.3	132	311.5	504.6	639	PN10
400	326	344.2	316.7	314.9	306.9	184.3	164.3	350.6	544.6	693	PN10
400	398.5	220.9	200.9	199.85	197	107	208	318.6	534.95	623	PN10
400	398.5	273.5	251.15	249.41	247	132	208	342.8	559	672	PN10
400	398.5	344.5	316.55	315.05	312	165	208	370	586.35	752	PN10

PRODUCT DATA

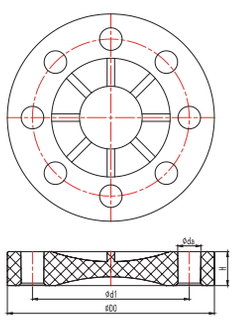
METRIC - PLAIN

PVC-U CAP



Code	D	Dimensions (mm)					Nominal Pressure PN(kg/cm²)
		D0	d1	d2	T	L	
2010100801	20	26.3	20.3	19.95	16.2	21.9	PN16
2010100802	25	31.8	25.3	24.95	18.7	25.7	PN16
2010100803	32	39.9	32.3	31.9	22.2	30.7	PN16
2010100804	40	49.7	40.4	39.9	26.2	36.9	PN16
2010100805	50	61.9	50.4	49.9	31.2	44.7	PN16
2010100806	63	77.9	63.4	62.9	37.7	54	PN16
2010100807	75	91.2	75.4	74.9	43.7	62.6	PN16
2010100808	90	107.6	90.5	89.9	51.2	73.3	PN16
2010100809	110	127	110.6	109.9	61.2	84.5	PN16
2010100810	125	144.3	125.7	124.9	68.7	96.1	PN16
2010100811	140	161.6	140.8	139.9	76.2	109.7	PN16
2010100812	160	184.6	160.8	159.9	86.2	126.2	PN16
2010100813	180	202.6	180.9	179.9	97	142.9	PN16
2010100814	200	230.5	201	199.9	106.2	151.1	PN16
2010100815	225	259.4	226.2	224.9	119.1	170.4	PN16
2010100816	250	287.9	251.3	249.9	131.65	186.9	PN16
2010100817	280	314.8	281.5	279.9	147	212.5	PN16
2010100818	315	358.2	316.7	314.9	164.3	234.5	PN16
2010100819	355	391	356.8	355	184.3	265	PN10
2010100820	400	442	402	400	204.2	294	PN10

PVC-U BLIND FLANGE

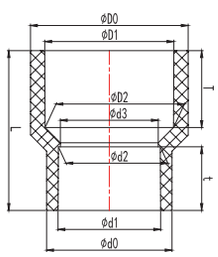


Code	D	Dimensions (mm)					Nominal Pressure PN(kg/cm²)
		D0	d1	da	H	n	
2010100901	20	95	65	14	12.5	4	PN16
2010100902	25	105	75	14	13.4	4	PN16
2010100903	32	115	85	14	14	4	PN16
2010100904	40	140	100	18	14.4	4	PN16
2010100905	50	150	110	18	16.4	4	PN16
2010100906	63	165	125	18	16.2	4	PN16
2010100907	75	185	145	18	17.5	4	PN16
2010100908	90	200	160	18	18	8	PN16
2010100909	110	220	180	18	22	8	PN16
2010100910	160	285	240	22	28	8	PN16
2010100911	280	445	400	22	31.5	12	PN10
2010100912	315	510	450	24	40	16	PN10
2010100913	355	570	500	27	42	16	PN6

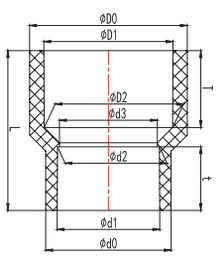
PRODUCT DATA

METRIC - PLAIN

PVC-U REDUCER



Code	D	Dimensions (mm)										Nominal Pressure PN(kg/cm²)
		D0	D1	D2	d0	d1	d2	d3	t	T	L	
2010101001	25*20	31.8	25.3	24.95	26.3	20.3	19.95	18	16.2	18.7	40	PN16
2010101002	32*20	39.9	32.3	31.9	26.3	20.3	19.95	18	16.2	22.2	48.5	PN16
2010101003	32*25	39.9	32.3	31.9	31.8	25.3	24.95	23	18.7	22.2	47.4	PN16
2010101004	40*20	49.4	40.35	39.9	26.3	20.3	19.95	18	16.2	26.2	56.5	PN16
2010101005	40*25	49.3	40.35	39.9	31.8	25.3	24.95	23	18.7	26.2	56.8	PN16
2010101006	40*32	49.4	40.35	39.9	39.7	32.3	31.9	30	22.2	26.2	54.8	PN16
2010101007	50*20	61.5	50.35	49.9	26.3	20.3	19.95	18	16.2	31.2	66	PN16
2010101008	50*25	61.5	50.35	49.9	31.8	25.3	24.95	23	18.7	31.2	66	PN16
2010101009	50*32	61.5	50.35	49.9	39.9	32.3	31.9	30	22.2	31.2	67	PN16
2010101010	50*40	61.9	50.35	49.9	49.7	40.35	39.9	38	26.2	31.2	65	PN16
2010101011	63*20	77.2	63.4	62.9	26.3	20.3	19.95	18	16.2	37.7	79	PN16
2010101012	63*25	77.3	63.4	62.9	31.8	25.3	24.95	23	18.7	37.7	79	PN16
2010101013	63*32	77.9	63.4	62.9	39.9	32.3	31.9	30	22.2	37.7	80	PN16
2010101014	63*40	77.3	63.4	62.9	49.7	40.35	39.9	38	26.2	37.7	80	PN16
2010101015	63*50	77.3	63.4	62.9	61.9	50.35	49.9	48	31.2	37.7	77.7	PN16
2010101016	75*20	90.8	75.4	74.9	26.3	20.3	19.95	18	16.2	43.7	93	PN16
2010101017	75*25	90.8	75.4	74.9	31.8	25.3	24.95	23	18.7	43.7	92.7	PN16
2010101018	75*32	90.8	75.4	74.9	39.9	32.3	31.9	30	22.2	43.7	93.5	PN16
2010101019	75*40	90.8	75.4	74.9	49.4	40.35	39.9	38	26.2	43.7	93	PN16
2010101020	75*50	91	75.4	74.9	61.7	50.35	49.9	48	31.2	43.7	93.3	PN16
2010101021	75*63	91	75.4	74.9	77.5	63.4	62.9	61	37.7	43.7	92.5	PN16
2010101022	90*25	107.3	90.5	89.9	32	25.3	24.95	23	18.7	51.2	108	PN16
2010101023	90*32	107.2	90.5	89.9	40.4	32.3	31.9	30	22.2	51.2	108.1	PN16
2010101024	90*40	107.2	90.5	89.9	49.7	40.35	39.9	38	26.2	51.2	108.5	PN16
2010101025	90*50	107.3	90.5	89.9	61.6	50.35	49.9	48	31.2	51.2	108.2	PN16
2010101026	90*63	107.3	90.5	89.9	77.3	63.4	62.9	61	37.7	51.2	108	PN16
2010101027	90*75	107.3	90.5	89.9	91.2	75.4	74.9	70.9	43.7	51.2	107.3	PN16
2010101028	110*25	127	110.6	109.9	32	25.3	24.95	23	18.7	61.2	127.8	PN16

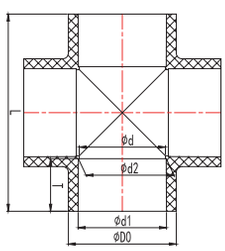


Code	D	Dimensions (mm)										Nominal Pressure PN(kg/cm²)
		D0	D1	D2	d0	d1	d2	d3	t	T	L	
2010101029	110*32	127	110.6	109.9	40.1	32.3	31.9	30	22.2	61.2	128.3	PN16
2010101030	110*40	126.8	110.6	109.9	49.7	40.35	39.9	38	26.2	61.2	128.6	PN16
2010101031	110*50	127	110.6	109.9	61.7	50.35	49.9	48	31.2	61.2	128	PN16
2010101032	110*63	127.4	110.6	109.9	77.5	63.4	62.9	61	37.7	61.2	128	PN16
2010101033	110*75	127	110.6	109.9	90.8	75.4	74.9	70.9	43.7	61.2	128.6	PN16
2010101034	110*90	127	110.6	109.9	107.3	90.5	89.9	85.9	51.2	61.2	127.4	PN16
2010101035	125*110	144	125.7	124.9	127	110.6	109.9	103.9	61.2	68.7	142.6	PN16
2010101036	140*50	161.6	140.75	139.9	61.6	50.3	49.9	48	31.11	76.2	157.6	PN16
2010101037	140*63	161.6	140.75	139.9	77.6	63.4	62.9	61	37.59	76.2	158	PN16
2010101038	140*75	161.6	140.75	139.9	91	75.35	74.9	70.9	43.57	76.2	158.5	PN16
2010101039	140*90	161.7	140.75	139.9	77.5	90.5	89.9	85.9	52	76.2	158.3	PN16
2010101040	140*110	161.8	140.75	139.9	127.2	110.6	109.9	103.9	61.02	76.2	157.7	PN16
2010101041	140*125	161.8	140.75	139.9	144.6	125.65	124.9	118.9	68.7	76.2	157.5	PN16
2010101042	160*63	184.6	160.7	159.9	127	63.35	62.9	61	37.82	87	180.5	PN16
2010101043	160*75	184.6	160.7	159.9	91.2	75.35	74.9	70.9	43.83	87	179	PN16
2010101044	160*90	184.6	160.7	159.9	107.7	90.5	89.9	85.9	51.36	87	178.7	PN16
2010101045	160*110	184.6	160.7	159.9	127.5	110.6	109.9	103.9	61.4	87	180.2	PN16
2010101046	160*140	184.6	160.7	159.9	161.9	140.75	139.9	133.9	77	87	177.3	PN16
2010101047	180*160	202.6	180.8	179.9	180	160.7	159.9	153.9	87	97	202.2	PN16
2010101048	200*160	230	201	199.9	184	160.8	159.9	153.9	86.2	106.2	217.5	PN16
2010101049	225*160	259.4	226.2	224.9	184	160.8	159.9	153.9	86.2	119.1	242.5	PN16
2010101050	225*200	259.4	226.2	224.9	230.5	201	199.9	193.5	106.2	119.1	243	PN16
2010101051	250*225	287.9	251.3	249.9	259	226.2	224.9	216.9	119.1	131.65	269.5	PN16
2010101052	280*225	314.8	281.3	279.9	259.4	226.2	224.9	216.9	119.1	147	304.5	PN16
2010101053	315*280	354.6	316.6	314.9	314.8	281.3	279.9	278	147	164.3	338	PN16
2010101054	355*315	391	356.8	355	354.6	316.6	314.9	306.9	164.3	184.3	384	PN10
2010101055	400*315	442	402	400	344	316.6	314.9	306.9	164.3	207	435	PN10
2010101056	400*355	442	402	400	384.25	356.8	355	326	184.3	207	430.7	PN10

PRODUCT DATA

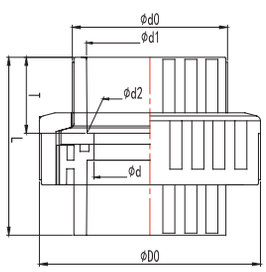
METRIC - PLAIN

PVC-U CROSS



Code	D	Dimensions (mm)						Nominal Pressure PN(kg/cm²)
		D0	d1	d2	d	T	L	
2010101101	20	26.3	20.3	19.95	18	16.2	55.4	PN16
2010101102	25	31.8	25.3	24.95	21	18.7	65.4	PN16
2010101103	32	39.9	32.3	31.9	28	22.2	79.4	PN16
2010101104	40	49.5	40.35	39.9	36	26.2	95.4	PN16
2010101105	50	61.5	50.35	49.9	46	31.2	115.4	PN16
2010101106	63	77.4	63.4	62.9	59	37.7	141	PN16
2010101107	75	91.2	75.4	74.9	70.9	43.7	165	PN16
2010101108	90	107.6	90.5	89.9	85.9	51.2	194.5	PN16
2010101109	110	127	110.6	109.9	103.9	61.2	234.5	PN16
2010101110	125	144.3	125.7	124.9	118.9	68.7	263.8	PN16
2010101111	140	161.6	140.75	139.9	133.9	76.2	295	PN16
2010101112	160	185.3	160.8	159.9	153.9	86.2	336	PN16
2010101113	200	230	201	199.9	193.9	106.2	414	PN16
2010101114	225	259.4	226.2	224.9	216.9	119.1	465	PN16
2010101115	250	287.9	251.3	249.9	241.4	131.65	515.5	PN16
2010101116	280	314.8	281.2	280.1	276	147	582	PN16
2010101117	315	354	316.7	314.9	307	164.3	643	PN16

PVC-U UNION

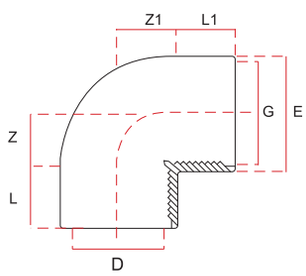


Code	D	Dimensions (mm)							Nominal Pressure PN(kg/cm²)
		D0	d0	d1	d2	d	T	L	
2010101301	20	47	26.8	20.3	19.95	15.5	16.5	41.5	PN16
2010101302	25	53.9	32	25.3	24.95	20	19	48	PN16
2010101303	32	67	40.3	32.3	31.9	26	22.5	55	PN16
2010101304	40	78.5	49.1	40.35	39.9	34	26.5	63.5	PN16
2010101305	50	93	61.6	50.35	49.9	43	31.5	75.5	PN16
2010101306	63	110.6	76	63.4	62.9	56	38	89.5	PN16
2010101307	75	130	89.6	75.4	74.9	67	44	102	PN16
2010101308	90	147.5	105.5	90.5	89.9	82	51.5	120	PN16
2010101309	110	173	126.5	110.6	109.9	102	61.5	140	PN16

PRODUCT DATA

METRIC - PLAIN/THREADED

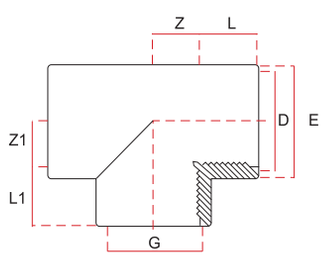
PVC-U ELBOW 90



- With solvent cement socket metric and parallel female thread Rp
- Connection to plastic threads only
- Do not use thread sealing pastes that are harmful to PVC-U
- Install with low mechanical stress and avoid large cyclic temperature changes

Code	DXG	Dimensions (mm)					Nominal Pressure PN(kg/cm²)
		L	L1	Z	Z1	E	
2010200101	20 X 1/2 "	16	15	11	12	26.5	16
2010200102	25 X 3/4 "	19	16.3	14	16.7	32.5	16
2010200103	32 X 1 "	22	19.1	17	19.9	41	16
2010200104	40 X 1 1/4 "	26	21.4	23	27.6	50	16
2010200105	50 X 1 1/2 "	31	21.4	28	37.6	60	16
2010200106	63 X 2 "	38	25.7	34	46.3	75	16

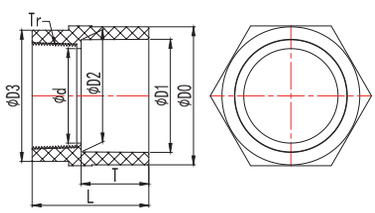
PVC-U TEE 90



- With solvent cement socket metric and parallel female thread Rp
- Connection to plastic threads only
- Do not use thread sealing pastes that are harmful to PVC-U
- Install with low mechanical stress and avoid large cyclic temperature changes

Code	DXG	Dimensions (mm)					Nominal Pressure PN(kg/cm²)
		L	L1	Z	Z1	E	
2010200201	20 X 1/2 "	18	15	11	12	27.5	16
2010200202	25 X 3/4 "	19	16.3	14	16.7	33.5	16
2010200203	32 X 1 "	22	19.1	17	19.9	42	16
2010200204	40 X 1 1/4 "	26	21.4	21	25.6	51	16
2010200205	50 X 1 1/2 "	31	21.4	26	35.6	61	16
2010200206	63 X 2 "	38	25.7	33	45.3	75	16

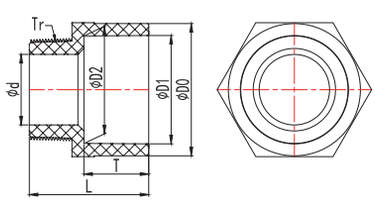
PVC-U FEMALE ADAPTOR



- With solvent cement socket metric and taper female thread Rp
- Connection to plastic threads only
- Do not use thread sealing pastes that are harmful to PVC-U
- Install with low mechanical stress and avoid large cyclic temperature changes

Code	D	Dimensions (mm)								Nominal Pressure PN(kg/cm²)
		D0	D1	D2	D3	d	T	L	Tr	
2010200301	20	27.1	20.3	19.95	27.6	16.5	16.5	33.5	1/2"	PN16
2010200302	25	32.5	25.3	24.95	33.6	22	19	37	3/4"	PN16
2010200303	32	40.3	32.3	31.9	41.3	28	22.5	42.2	1"	PN16
2010200304	40	49.5	40.35	39.9	51.1	36	26.5	49	1-1/4"	PN16
2010200305	50	61.6	50.35	49.9	59	42	31.5	54	1-1/2"	PN16
2010200306	63	77.4	63.4	62.9	73.6	53	38	65.5	2"	PN16
2010200307	75	90.4	75.4	74.9	90.2	68	44	76	2-1/2"	PN16
2010200308	90	106.5	90.5	89.9	107.6	80	51.5	86.5	3"	PN16
2010200309	110	126.9	110.6	109.9	129.4	104.5	61.5	103	4"	PN16

PVC-U MALE ADAPTOR



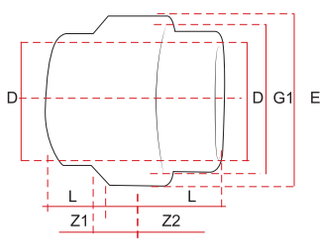
- With solvent cement socket metric and taper male thread Rp
- Do not use thread sealing pastes that are harmful to PVC-U
- Install with low mechanical stress and avoid large cyclic temperature changes

Code	D	Dimensions (mm)							Nominal Pressure PN(kg/cm²)
		D0	D1	D2	d	T	L	Tr	
2010200401	20	26.8	20.3	19.95	11.3	16.5	35	1/2"	PN16
2010200402	25	32.5	25.3	24.95	16.1	19	38.5	3/4"	PN16
2010200403	32	40.3	32.3	31.9	21.4	22.5	44.5	1"	PN16
2010200404	40	49.5	40.35	39.9	28.8	26.5	51	1-1/4"	PN16
2010200405	50	61.6	50.35	49.9	32.5	31.5	56.5	1-1/2"	PN16
2010200406	63	77	63.4	62.9	41.3	38	69.4	2"	PN16
2010200407	75	90.4	75.4	74.9	55.8	44	79.9	2-1/2"	PN16
2010200408	90	106.5	90.5	89.9	67.3	51.5	91.5	3"	PN16
2010200409	110	126.9	110.6	109.9	91.6	61.5	108	4"	PN16

PRODUCT DATA

METRIC - PLAIN/THREADED

PVC-U UNION WITH O-RING



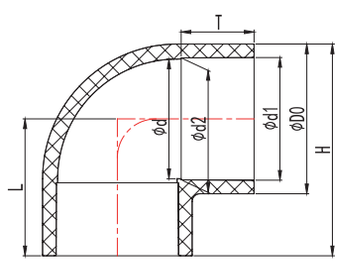
- Union end: solvent socket metric
- Union bush : parallel female thread Rp
- Connection to plastic threads only
- Do not use thread sealing pastes that are harmful to PVC-U

Code	DXG	Dimensions (mm)						Nominal Pressure PN(kg/cm²)
		L	L1	Z	Z2	G	E	
2010200501	20 X 1/2 "	16	15	3	11	1	42	PN16
2010200502	25 X 3/4 "	19	16.3	3	12.7	1 1/4 "	52	PN16
2010200503	32 X 1 "	22	19.1	3	12.9	1 1/2 "	59	PN16
2010200504	40 X 1 1/4 "	26	21.4	3	16.6	2 "	72	PN16
2010200505	50 X 1 1/2 "	31	21.4	3	23.6	2 1/4 "	79	PN16
2010200506	63 X 2 "	38	25.7	3	30.3	2 3/4 "	96	PN16

MEMO

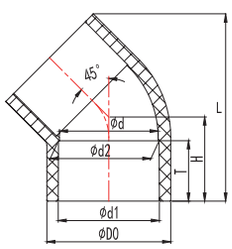
PRODUCT DATA
IMPERIAL - PLAIN

PVC-U ELBOW 90°



Code	Size	Dimensions (mm)							Nominal Pressure PN(kg/cm²)
		D0	d1	d2	d	T	L	H	
2020100101	1/2"	30.5	21.54	21.23	17	23.22	36.25	51.5	PN16
2020100102	3/4"	36.9	26.87	26.57	22.5	26.4	41.4	59.85	PN16
2020100103	1"	44.7	33.66	33.27	29	29.57	47.1	69.45	PN16
2020100104	1-1/4"	54	42.42	42.04	38	32.75	55.75	82.75	PN16
2020100105	1-1/2"	60.6	48.56	48.11	43	35.93	61.95	92.25	PN16
2020100106	2"	73.1	60.63	60.17	55	39.1	70.85	107.4	PN16
2020100107	2-1/2"	88.4	73.38	72.85	67.5	45.45	84.5	128.7	PN16
2020100108	3"	105.3	89.31	88.7	83	48.63	97.63	149.3	PN16
2020100109	4"	132	114.76	114.07	106	58.15	117.25	183.25	PN16
2020100110	5"	161.9	141.81	141.04	133	67.68	143.5	224.45	PN16
2020100111	6"	190.9	168.83	168	160	77.2	166.25	261.7	PN16
2020100112	8"	245.9	219.84	218.69	208	102.6	216.3	340.55	PN16
2020100113	10"	305.8	273.81	272.67	262.5	128	278	430.9	PN16

PVC-U ELBOW 45°

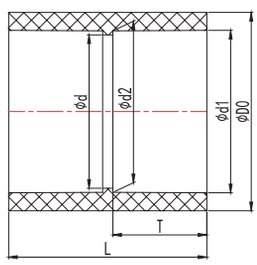


Code	Size	Dimensions (mm)						Nominal Pressure PN(kg/cm²)
		D0	d1	d2	d	T	H	
2020100201	1/2"	30.5	21.54	21.23	17	23.22	29.72	PN16
2020100202	3/4"	35.27	26.87	26.57	22.5	26.4	34.4	PN16
2020100203	1"	43.66	33.66	33.27	29	29.57	37.58	PN16
2020100204	1-1/4"	53.02	42.42	42.04	38	32.75	42.75	PN16
2020100205	1-1/2"	59.86	48.56	48.11	43	35.93	47.93	PN16
2020100206	2"	72.22	60.63	60.17	55	39.1	55.1	PN16
2020100207	2-1/2"	88	73.38	72.85	67.5	45.45	63.5	PN16
2020100208	3"	105.3	89.31	88.7	83	48.63	68.63	PN16
2020100209	4"	132	114.76	114.07	106	58.15	84.15	PN16
2020100210	5"	161.9	141.81	141.04	133	67.68	104.55	PN16
2020100211	6"	190.9	168.83	168	160	77.2	122.2	PN16
2020100212	8"	245.9	219.84	218.69	208	102.6	153.8	PN16
2020100213	10"	305.2	273.8	272.67	262.5	128	188	PN16

PRODUCT DATA

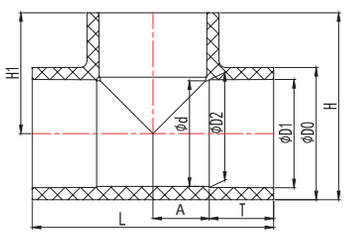
IMPERIAL - PLAIN

PVC-U COUPLING



Code	Size	Dimensions (mm)						Nominal Pressure PN(kg/cm²)
		D0	d1	d2	d	T	L	
2020100301	1/2"	30.5	21.54	21.23	17	23.22	50.4	PN16
2020100302	3/4"	36.9	26.87	26.57	22.5	26.4	56.8	PN16
2020100303	1"	44.7	33.66	33.27	29	29.57	63.1	PN16
2020100304	1-1/4"	54	42.42	42.04	38	32.75	69.5	PN16
2020100305	1-1/2"	60.6	48.56	48.11	43	35.93	75.8	PN16
2020100306	2"	73.1	60.63	60.17	55	39.1	82.2	PN16
2020100307	2-1/2"	88.4	73.38	72.85	67.5	45.45	96	PN16
2020100308	3"	105.3	89.31	88.7	83	48.63	102.3	PN16
2020100309	4"	132	114.76	114.07	106	58.15	124	PN16
2020100310	5"	161.9	141.81	141.04	133	67.68	144	PN16
2020100311	6"	190.9	168.83	168	160	77.2	164.4	PN16
2020100312	8"	245.9	219.84	218.69	208	102.6	215.2	PN16
2020100313	10"	305.8	273.81	272.67	262.5	128	266	PN16

PVC-U TEE 90°

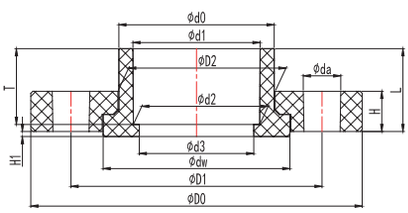


Code	Size	Dimensions (mm)								Nominal Pressure PN(kg/cm²)
		D0	d1	d2	d	T	H1	H	L	
2020100401	1/2"	30.14	21.54	21.23	17	23.22	36.25	51.5	72.5	PN16
2020100402	3/4"	35.87	26.87	26.57	22.5	26.4	41.4	59.85	82.8	PN16
2020100403	1"	44.3	33.66	33.27	29	29.57	47.1	69.45	94.2	PN16
2020100404	1-1/4"	53.42	42.42	42.04	38	32.75	55.75	82.75	111.5	PN16
2020100405	1-1/2"	60.4	48.56	48.11	43	35.93	62	92.25	124	PN16
2020100406	2"	73.1	60.63	60.17	55	39.1	70.85	107.4	141.7	PN16
2020100407	2-1/2"	88.4	73.38	72.85	67.5	45.45	83.28	128.7	166.55	PN16
2020100408	3"	105.7	89.31	88.7	83	48.63	97.08	149.3	194.15	PN16
2020100409	4"	132.5	114.76	114.07	106	58.15	117.25	183.25	234.5	PN16
2020100410	5"	161.6	141.81	141.04	133	67.68	142.8	227.95	285.6	PN16
2020100411	6"	192	168.83	168	160	77.2	166.25	261.7	332.5	PN16
2020100412	8"	246.5	219.84	218.69	208	102.6	217.6	340.55	435.2	PN16
2020100413	10"	305.8	273.81	272.67	262.5	128	278	430.9	556	PN16

PRODUCT DATA

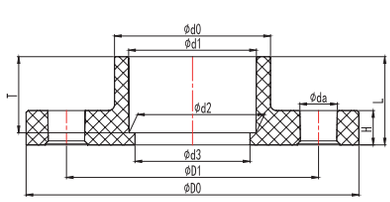
IMPERIAL - PLAIN

PVC-U VANSTONE FLANGE



Code	Size		
		D0	D1
2020100501	1/2"	89	61
2020100502	3/4"	98	70
2020100503	1"	108	79
2020100504	1-1/4"	117	89
2020100505	1-1/2"	127	98
2020100506	2"	152	121
2020100507	2-1/2"	178	140
2020100508	3"	191	152
2020100509	4"	229	191
2020100510	5"	254	216
2020100511	6"	284	241
2020100512	8"	343	298
2020100513	10"	410	362

PVC-U ONE-PIECE FLANGE



Code	Size		
		D	D0
2020101201	1/2"	1/2"	89
2020101202	3/4"	3/4"	89
2020101203	1"	1"	108
2020101204	1-1/4"	1-1/4"	117
2020101205	1-1/2"	1-1/2"	127
2020101206	2"	2"	152
2020101207	2-1/2"	2-1/2"	178
2020101208	3"	3"	191
2020101209	4"	4"	229
2020101210	5"	5"	254
2020101211	6"	6"	284
2020101212	8"	8"	343

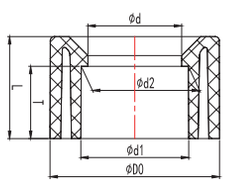
Dimensions (mm)												Nominal Pressure PN(kg/cm²)
D2	d0	d1	d2	d3	dw	da	T	H1	H	L	n	
31	30.5	21.54	21.23	16	37.6	16	23.22	2.5	13	24.72	4	PN16
37.9	36.9	26.87	26.57	20.6	47	16	26.4	2.5	14	27.9	4	PN16
45.7	44.7	33.66	33.27	27	56	16	29.58	2.5	15	31.08	4	PN16
55	54	42.42	42.04	36	64	16	32.75	2.5	15	35.25	4	PN16
62.6	61.6	50.46	50.46	45	72.4	16	35.93	2.5	18	38.43	4	PN16
74.1	73.1	60.63	60.17	52.5	88.5	19	39.1	2.5	20	42.6	4	PN16
89.4	88.4	73.38	72.85	65	108	19	45.5	2.5	23	49	4	PN16
106.3	105.3	89.31	88.7	80	124.8	19	48.63	2.5	26	53.13	4	PN16
133	132	114.76	114.07	102	152	19	58.15	2.5	28	62.65	8	PN16
162.9	161.9	141.81	141.04	122	181.5	22	68	2.5	30	73.5	8	PN16
192.5	191.5	168.83	168	150	209.5	22	77.2	3	32	83.2	8	PN16
247.9	246.9	219.84	218.69	193	264.9	22	102.6	3	36	108.6	8	PN10
309.8	305.8	273.81	272.67	262.5	327.37	24	128	3	42	138	12	PN10

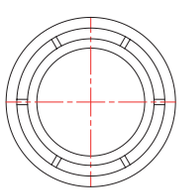
Dimensions (mm)										Nominal Pressure PN(kg/cm²)
D1	d0	d1	d2	d3	da	T	H	L	n	
60.3	29.54	21.54	21.23	17	16	23.22	13	27.72	4	PN16
69.85	35.27	26.87	26.57	22.5	16	26.4	14	30.9	4	PN16
79.38	43.66	33.66	33.27	29	16	29.57	15	34.1	4	PN16
88.9	53.02	42.42	42.04	38	16	32.75	15	38.75	4	PN16
98.43	59.86	48.56	48.11	43	16	35.93	17	41.95	4	PN16
120.65	72.23	60.63	60.17	55	19	39.1	19	46.1	4	PN16
139.7	88	73.38	72.85	67.5	19	45.45	20	53	4	PN16
152.4	105.3	89.31	88.7	83	19	48.63	20.5	57.15	4	PN16
190.5	132	114.76	114.07	106	19	58.15	21	66.65	8	PN16
216	162	141.81	141.04	133	22	67.68	23.5	77.5	8	PN16
241.3	190.85	168.83	168	160	22	77.2	26.5	88.2	8	PN16
298.45	245.84	219.84	218.69	208	22	102.6	27	113.6	8	PN10

PRODUCT DATA

IMPERIAL - PLAIN

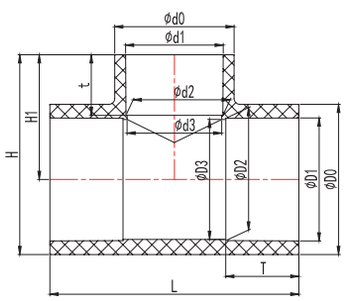
PVC-U BUSHING





Code	Size	Dimensions (mm)						
		D0	D1	D2	D3	d0	d1	d2
2020100601	1/2"*1/4"	21.34	14.02	13.60	10.00	16.50	23.50	29.00
2020100602	1/2"*3/8"	21.34	17.45	17.04	12.00	19.50	23.50	29.00
2020100603	3/4"*1/2"	26.67	21.54	21.23	17.00	23.22	26.40	31.90
2020100604	1"*3/8"	33.40	17.45	17.04	12.00	19.50	29.58	35.58
2020100605	1"*1/2""	33.40	21.54	21.23	17.00	23.22	29.58	35.58
2020100606	1"*3/4"	33.40	26.87	26.57	22.50	26.40	29.58	35.58
2020100607	1-1/4"*1/2"	42.16	21.54	21.23	17.00	23.22	30.00	36.00
2020100608	1-1/4"*3/4"	42.16	26.87	26.57	22.50	26.40	30.00	36.00
2020100609	1-1/4"*1"	42.16	33.66	33.27	29.00	29.57	30.00	36.00
2020100610	1-1/2"*1/2"	48.26	21.54	21.23	17.00	23.22	35.93	41.93
2020100611	1-1/2"*3/4""	48.26	26.87	26.57	22.50	26.40	35.93	41.93
2020100612	1-1/2"*1"	48.26	33.66	33.27	29.00	29.57	35.93	41.93
2020100613	1-1/2"*1-1/4"	48.26	42.42	42.04	38.00	32.75	35.93	41.93
2020100614	2"*1/2"	60.33	21.54	21.23	17.00	23.22	39.10	45.10
2020100615	2"*3/4"	60.33	26.87	26.57	22.50	26.40	39.10	45.10
2020100616	2"*1"	60.33	33.66	33.27	29.00	29.57	39.10	45.10
2020100617	2"*1-1/4"	60.33	42.42	42.04	38.00	32.75	39.10	45.10
2020100618	2"*1-1/2"	60.33	48.56	48.11	43.00	35.93	39.10	45.10
2020100619	2-1/2"*1-1/2"	70.03	48.56	48.11	43.00	35.93	45.00	51.00
2020100620	2-1/2"*2"	70.03	60.63	60.17	55.00	39.10	45.00	51.00
2020100621	3"*1-1/2"	88.90	48.56	48.11	43.00	35.93	49.00	57.00
2020100622	3"*2"	88.90	60.63	60.17	55.00	39.10	49.00	57.00
2020100623	3"*2-1/2"	88.90	48.56	48.11	67.50	35.93	49.00	57.00
2020100624	4"*2"	114.30	60.63	60.17	55.00	39.10	59.00	67.00
2020100625	4"*2-1/2"	114.30	48.56	48.11	67.50	35.93	59.00	67.00
2020100626	4"*3"	114.30	89.31	88.70	83.00	48.63	59.00	67.00
2020100627	5"*4"	141.30	114.76	114.07	106.00	58.15	69.00	79.00
2020100628	6"*3"	168.30	89.31	88.70	83.00	48.63	78.00	90.00
2020100629	6"*4"	168.30	114.76	114.07	106.00	58.15	78.00	90.00
2020100630	7"*3"	168.30	141.81	141.04	133.00	67.68	78.00	90.00
2020100631	8"*4"	219.10	114.76	114.07	106.00	58.15	103.00	115.00
2020100632	8"*6"	219.10	168.83	168.00	160.00	77.20	103.00	115.00
2020100633	10"*3"	273.05	89.31	88.70	83.00	48.63	127.00	148.00
2020100634	10"*4"	273.05	114.76	114.07	106.00	58.15	127.00	148.00
2020100635	10"*6"	273.05	168.83	168.00	160.00	77.20	127.00	148.00
2020100636	10"*8"	273.05	219.84	218.69	208.00	102.60	127.00	148.00
2020100637	12"*4"	323.85	114.76	114.07	106.00	58.15	151.00	169.00
2020100638	12"*6"	323.85	168.83	168.00	160.00	77.20	151.00	169.00
2020100639	12"*8"	323.85	219.84	218.69	208.00	102.60	151.00	169.00
2020100640	12"*10"	323.85	273.81	272.67	262.50	128.00	151.00	169.00

PVC-U REDUCING TEE

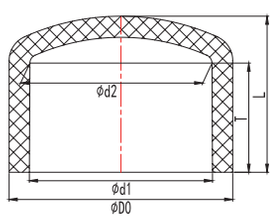


Code	Size	Dimensions (mm)												Nominal Pressure PN(kg/cm²)
		D0	D1	D2	D3	d0	d1	d2	d3	t	T	H	L	
2020100701	3/4"*1/2"	35.87	26.87	26.57	22.5	30.14	21.54	21.23	17	23.22	26.4	38.55	82.8	PN16
2020100702	1"*1/2"	44.3	33.66	33.27	29	30.14	21.54	21.23	17	23.22	29.57	41.75	94.2	PN16
2020100703	1"*3/4"	44.3	33.66	33.27	29	35.87	26.87	26.57	22.5	26.4	29.57	44.6	94.2	PN16
2020100704	1-1/4"*3/4"	53.42	42.42	42.04	38	35.87	26.87	26.57	22.5	26.4	32.75	49.1	111.5	PN16
2020100705	1-1/4"*1"	53.42	42.42	42.04	38	44.3	33.66	33.27	29	29.57	32.75	51.6	111.5	PN16
2020100706	1-1/2"*1"	60.4	48.56	48.11	43	44.3	33.66	33.27	29	29.57	35.93	54.35	124	PN16
2020100707	1-1/2"*1-1/4"	60.4	48.56	48.11	43	53.42	42.42	42.04	38	32.75	35.93	58.5	124	PN16
2020100708	2"*1-1/4"	73.1	60.63	60.17	55	53.42	42.42	42.04	38	32.75	39.1	64	141.7	PN16
2020100709	2"*1-1/2"	73.1	60.63	60.17	55	60.4	48.56	48.11	43	35.93	39.1	67.45	141.7	PN16
2020100710	2-1/2"*1-1/2"	88.4	73.38	72.85	67.5	60.4	48.56	48.11	43	35.93	45.45	73.7	169	PN16
2020100711	2-1/2"*2"	88.4	73.38	72.85	67.5	73.1	60.63	60.17	55	39.1	45.45	77.1	169	PN16
2020100712	3"*2"	105.7	89.31	88.7	83	73.1	60.63	60.17	55	39.1	48.63	84.6	194.15	PN16
2020100713	3"*2-1/2"	105.7	89.31	88.7	83	88.4	73.38	72.85	67.5	45.45	48.63	92	194.15	PN16
2020100714	4"*2-1/2"	132.5	114.76	114.07	106	88.4	73.38	72.85	67.5	45.45	58.15	103	234.5	PN16
2020100715	4"*3"	132.5	114.76	114.07	106	105.7	89.31	88.7	83	48.63	58.15	107.65	234.5	PN16
2020100716	5"*2"	161.6	141.81	141.04	133	72.7	60.63	60.17	55	39.1	67.68	105.1	285.6	PN16
2020100717	6"*2"	192	168.83	168	160	73.1	60.63	60.17	55	39.1	77.2	128.85	332.5	PN16
2020100718	6"*4"	192	168.83	168	160	132.5	114.76	114.07	106	58.15	77.2	144.25	332.5	PN16
2020100719	8"*4"	246.5	219.84	218.69	208	132.5	114.76	114.07	106	58.15	102.6	162.75	435.2	PN16
2020100720	8"*6"	246.5	219.84	218.69	208	192	168.83	168	160	77.2	102.6	190.25	435.2	PN16
2020100721	10"*6"	305.8	273.81	272.67	262.5	192	168.83	168	160	77.2	128	217.5	446.6	PN16
2020100722	10"*8"	305.8	273.81	272.67	262.5	246.5	219.84	218.69	208	102.6	128	245	496.5	PN16
2020100723	12"*8"	361.6	324.6	323.47	313	246.5	219.84	218.69	208	102.6	153.4	269.3	583	PN16
2020100724	12"*10"	361.6	324.6	323.47	313	305.8	273.81	272.67	262.5	128	153.4	296.8	656.8	PN16

PRODUCT DATA

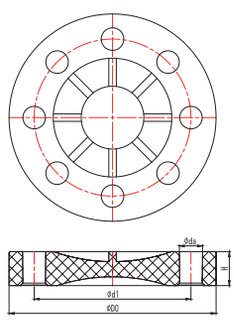
IMPERIAL - PLAIN

PVC-U CAP



Code	Size DN	Dimensions (mm)				
		D0	d1	d2	T	L
2020100801	1/2"	29.54	21.54	21.23	23.22	30.8
2020100802	3/4"	35.31	26.87	26.57	26.4	35.13
2020100803	1"	43.7	33.66	33.27	29.57	40
2020100804	1-1/4"	53.05	42.42	42.04	32.75	45
2020100805	1-1/2"	59.86	48.56	48.11	35.93	49
2020100806	2"	72.23	60.63	60.17	39.1	53.95
2020100807	2-1/2"	87.98	73.38	72.85	45.45	64.2
2020100808	3"	105.3	89.31	88.7	48.63	58
2020100809	4"	132	114.76	114.07	58.15	81
2020100810	5"	161.8	141.81	141.04	67.68	106.5
2020100811	6"	190.85	168.83	168	77.2	119.55
2020100812	8"	245.85	219.84	218.69	102.6	141.7
2020100813	10"	305.8	273.81	272.67	128	186.25

PVC-U BLIND FLANGE

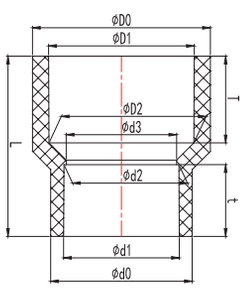


Code	Size	Dimensions (mm)						Nominal Pressure PN(kg/cm²)
		D	D0	d1	da	H	n	
2020100901	1/2"	1/2"	89	60.3	16	14.5	4	PN16
2020100902	3/4"	3/4"	89	69.85	16	15.3	4	PN16
2020100903	1"	1"	108	79.38	16	16.3	4	PN16
2020100904	1-1/4"	1-1/4"	117	88.9	16	15.8	4	PN16
2020100905	1-1/2"	1-1/2"	127	98.43	16	18.5	4	PN16
2020100906	2"	2"	152	120.65	19	20.5	4	PN16
2020100907	2-1/2"	2-1/2"	178	139.7	19	21.3	4	PN16
2020100908	3"	3"	191	152.4	19	22	4	PN16
2020100909	4"	4"	229	190.5	19	23.2	8	PN16
2020100910	5"	5"	254	216	22	25	8	PN16
2020100911	6"	6"	284	241.3	22	28.3	8	PN16
2020100912	8"	8"	343	298.45	22	28.7	8	PN10
2020100913	10"	10"	410	362	24	40	12	PN10
2020100914	12"	12"	482.6	432	24	42	12	PN10
2020100915	14"	14"	534	476.3	28.6	45	12	PN6
2020100916	16"	16"	598.35	540.8	28.6	52	16	PN6

PRODUCT DATA

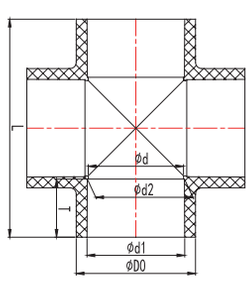
IMPERIAL - PLAIN

PVC-U REDUCER



Code	Size	Dimensions (mm)										Nominal Pressure PN(kg/cm²)
		D0	D1	D2	d0	d1	d2	d3	t	T	L	
2020101001	3/4"*1/2"	36.9	26.87	26.57	30.5	21.54	21.23	17	23.22	26.4	58.6	PN16
2020101002	1"*1/2"	44.7	33.66	33.27	30.5	21.54	21.23	17	23.22	29.57	65.1	PN16
2020101003	1"*3/4"	44.7	33.66	33.27	36.9	26.87	26.57	22.5	26.4	29.57	66.3	PN16
2020101004	1-1/4"*1/2"	54	42.42	42.04	30.5	21.54	21.23	17	23.22	32.75	72.68	PN16
2020101005	1-1/4"*3/4"	54	42.42	42.04	36.9	26.87	26.57	22.5	26.4	32.75	73.8	PN16
2020101006	1-1/4"*1"	54	42.42	42.04	44.7	33.66	33.27	29	29.57	32.75	73.8	PN16
2020101007	1-1/2"*3/4"	60.6	48.56	48.11	36.9	26.87	26.57	22.5	26.4	35.93	80	PN16
2020101008	1-1/2"*1"	60.6	48.56	48.11	40.7	33.66	33.27	29	29.57	35.93	80	PN16
2020101009	1-1/2"*1-1/4"	60.6	48.56	48.11	54	42.42	42.04	38	32.75	35.93	78.7	PN16
2020101010	2"*1"	73.1	60.63	60.17	44.7	33.66	33.27	29	29.57	39.1	88.2	PN16
2020101011	2"*1-1/4"	73.1	60.63	60.17	54	42.42	42.04	38	32.75	39.1	88.2	PN16
2020101012	2"*1-1/2"	73.1	60.63	60.17	60.6	48.56	48.11	43	35.93	39.1	88.5	PN16

PVC-U CROSS

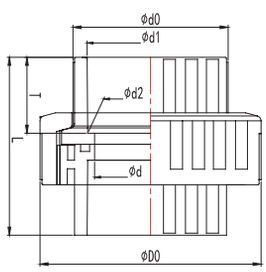


Code	Size	Dimensions (mm)							Nominal Pressure PN(kg/cm²)
		D	D0	d1	d2	d	T	L	
2020101101	1/2"	1/2"	29.54	21.54	21.23	17	23.22	72.5	PN16
2020101102	3/4"	3/4"	35.36	26.87	26.57	22.5	26.4	82.8	PN16
2020101103	1"	1"	43.66	33.66	33.27	29	29.57	94.2	PN16
2020101104	1-1/4"	1-1/4"	53.02	42.42	42.04	38	32.75	111.5	PN16
2020101105	1-1/2"	1-1/2"	59.86	48.56	48.11	43	35.93	124	PN16
2020101106	2"	2"	72.23	60.63	60.17	55	39.1	143.7	PN16
2020101107	2-1/2"	2-1/2"	88	73.38	72.85	67.5	45.45	169	PN16
2020101108	3"	3"	105.3	89.31	88.7	83	48.63	193.26	PN16
2020101109	4"	4"	132	114.76	114.07	106	58.15	234.5	PN16
2020101110	5"	5"	162	141.81	141.04	133	67.68	287	PN16
2020101111	6"	6"	190.85	168.83	168	160	77.2	332.5	PN16

PRODUCT DATA

IMPERIAL - PLAIN

PVC-U UNION



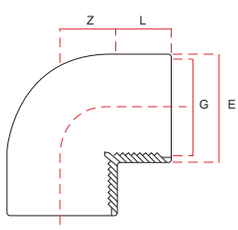
Code	Size	Dimensions (mm)								Nominal Pressure PN(kg/cm²)
		D	D0	d0	d1	d2	d	T	L	
2020101301	1/2"	1/2"	47	29.54	21.54	21.23	17	23.22	48.2	PN16
2020101302	3/4"	3/4"	54	35.36	26.87	26.57	22.5	26.4	55.5	PN16
2020101303	1"	1"	67	43.66	33.66	33.27	29	29.57	62.1	PN16
2020101304	1-1/4"	1-1/4"	78.5	53.02	42.42	42.04	38	32.75	70	PN16
2020101305	1-1/2"	1-1/2"	93	59.86	48.56	48.11	43	35.93	80	PN16
2020101306	2"	2"	110.6	72.23	60.63	60.17	55	39.1	90.5	PN16
2020101307	2-1/2"	2-1/2"	130.6	88	73.38	72.85	67.5	45.45	104	PN16
2020101308	3"	3"	148.5	105.3	89.31	88.7	83	48.63	117	PN16
2020101309	4"	4"	173.5	132	114.76	114.07	106	58.15	136.6	PN16

MEMO

PRODUCT DATA

IMPERIAL - PLAIN/THREADED

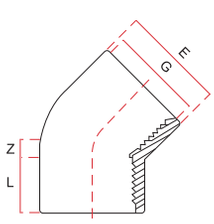
PVC-U ELBOW 90



- With solvent cement socket BS inch and parallel female thread Rp
- Connection to plastic threads only
- Do not use thread sealing pastes that are harmful to PVC-U
- Install with low mechanical stress and avoid large cyclic temperature changes

Code	Size	Dimensions (mm)			Nominal Pressure PN(kg/cm²)
		L	Z	E	
2010200101	1/2 "	15	12	26.5	16
2010200102	3/4 "	16.3	16.7	32.5	16
2010200103	1 "	19.1	19.9	41	16
2010200104	1 1/4 "	21.4	27.6	50	16
2010200105	1 1/2 "	21.4	37.6	60	16
2010200106	2 "	25.7	46.3	75	16

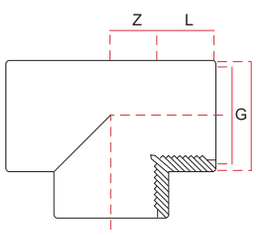
PVC-U ELBOW 45°



- With solvent cement socket BS inch and parallel female thread Rp
- Connection to plastic threads only
- Do not use thread sealing pastes that are harmful to PVC-U
- Install with low mechanical stress and avoid large cyclic temperature changes

Code	Size	Dimensions (mm)			Nominal Pressure PN(kg/cm²)
		L	Z	E	
2010200101	1/2 "	15	12	26.5	16
2010200102	3/4 "	16.3	16.7	32.5	16
2010200103	1 "	19.1	19.9	41	16
2010200104	1 1/4 "	21.4	27.6	50	16
2010200105	1 1/2 "	21.4	37.6	60	16
2010200106	2 "	25.7	46.3	75	16

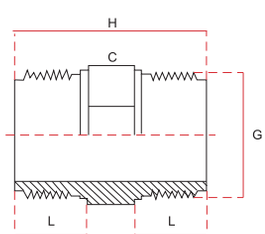
PVC-U TEE



- With solvent cement socket BS inch and parallel female thread Rp
- Connection to plastic threads only
- Do not use thread sealing pastes that are harmful to PVC-U
- Install with low mechanical stress and avoid large cyclic temperature changes

Code	Size	Dimensions (mm)			Nominal Pressure PN(kg/cm²)
		L	Z	E	
2010200301	1/2 "	15	12	27	16
2010200302	3/4 "	16.3	16.7	33.5	16
2010200303	1 "	19.1	19.9	42	16
2010200304	1 1/4 "	21.4	27.6	51	16
2010200305	1 1/2 "	21.4	37.6	61	16
2010200306	2 "	25.7	46.3	75	16

PVC-U NIPPLE

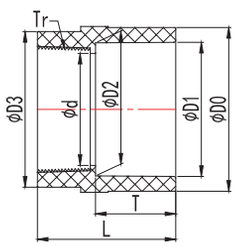


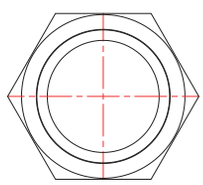
Code	Size	Dimensions (mm)			Nominal Pressure PN(kg/cm²)
		L	H	C	
2010200601	1/2 "	15	42	24	16
2010200602	3/4 "	16.3	44	30	16
2010200603	1 "	19.1	50	36	16
2010200604	1 1/4 "	21.4	58	46	16
2010200605	1 1/2 "	21.4	58	55	16
2010200606	2 "	25.7	66	65	16

PRODUCT DATA

IMPERIAL - PLAIN/THREADED

PVC-U FEMALE ADAPTOR

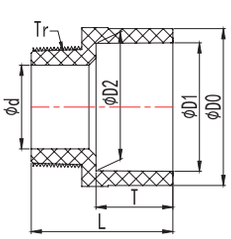


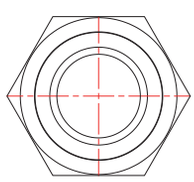


- With solvent cement socket BS inch and taper female thread Rp
- Connection to plastic threads only
- Do not use thread sealing pastes that are harmful to PVC-U
- Install with low mechanical stress and avoid large cyclic temperature changes

Code	Size	Dimensions (mm)							
		D0	D1	D2	D3	d	T	L	Tr
2010200401	1/2"	29.7	21.54	21.23	29.22	16	23.22	40.22	1/2″
2010200402	3/4"	35.3	26.87	26.57	34.97	20.6	26.4	44.4	3/4″
2010200403	1"	43.7	33.66	33.27	43.35	26	29.57	49.6	1″
2010200404	1-1/4"	53.1	42.42	42.04	52.58	36	32.75	55.25	1-1/4″
2010200405	1-1/2"	59.9	48.56	48.11	59.45	41	35.93	58.45	1-1/2″
2010200406	2"	73.1	60.63	60.17	72.1	52	39.1	66.6	2″
2010200407	2-1/2"	88	73.38	72.85	87.3	64	45.45	77.5	2-1/2″
2010200408	3"	105.3	89.31	88.7	104.6	78	48.63	83.65	3″
2010200409	4"	132	114.76	114.07	131.65	102.5	58.15	99.7	4″

PVC-U MALE ADAPTOR



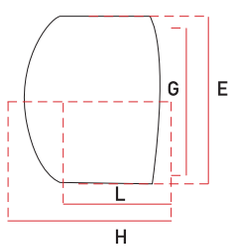


- With solvent cement socket metric and taper male thread Rp
- Do not use thread sealing pastes that are harmful to PVC-U
- Install with low mechanical stress and avoid large cyclic temperature changes

Code	Size	Dimensions (mm)							
		D	D0	D1	D2	d	T	L	Tr
2010200501	1/2"	1/2"	29.55	21.54	21.23	11.3	23.22	41.5	1/2″
2010200502	3/4"	3/4"	35.3	26.87	26.57	16	26.4	45.9	3/4″
2010200503	1"	1"	43.66	33.66	33.27	21.35	29.57	51.5	1″
2010200504	1-1/4"	1-1/4"	50	42.42	42.04	28.8	32.75	56.8	1-1/4″
2010200505	1-1/2"	1-1/2"	59.85	48.56	48.11	32.5	35.93	61.5	1-1/2″
2010200506	2"	2"	72.25	60.63	60.17	41.3	39.1	71	2″
2010200507	2-1/2"	2-1/2"	88	73.38	72.85	55.8	45.45	82	2-1/2″
2010200508	3"	3"	105.45	89.31	88.7	67.3	48.63	88.65	3″
2010200509	4"	4"	132	114.76	114.07	91.6	58.15	104.65	4″

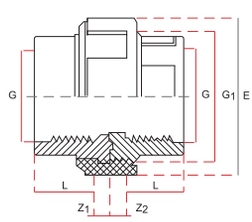
PVC-U CAP

- With solvent cement socket BS inch and taper female thread Rp
- Connection to plastic threads only
- Do not use thread sealing pastes that are harmful to PVC-U
- Install with low mechanical stress and avoid large cyclic temperature changes



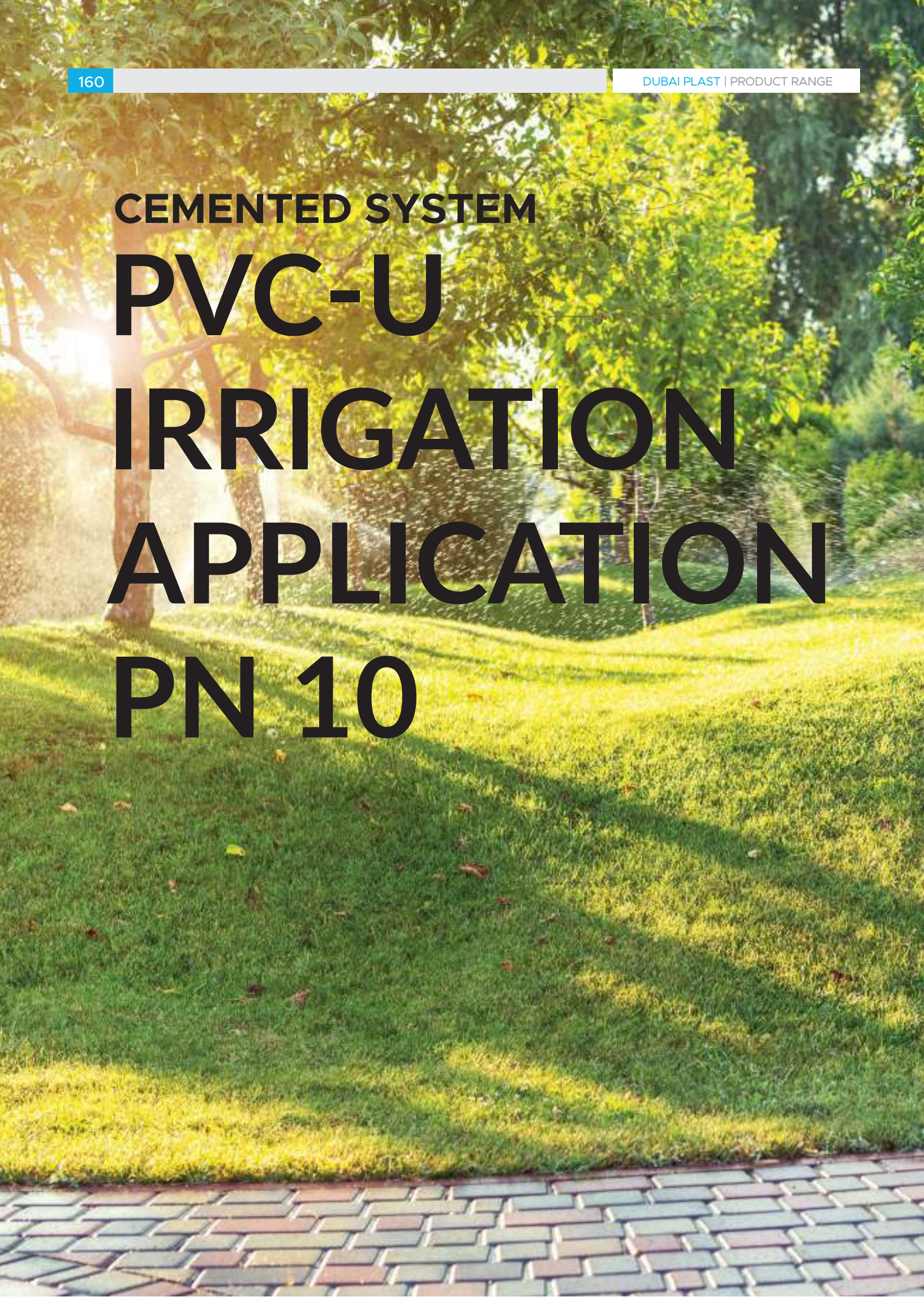
Code	Size	Dimensions (mm)			Nominal Pressure PN(kg/cm²)
		L	H	E	
2010200701	1/2 "	15	26	28	16
2010200702	3/4 "	16.3	28	34	16
2010200703	1 "	19.1	32	42	16
2010200704	1 1/4 "	21.4	35	51	16
2010200705	1 1/2 "	21.4	35	58	16
2010200706	2 "	25.7	39	72	16

PVC-U UNION WITH O-RING



- Union end: solvent socket BS inch
- Union bush: parallel female thread Rp
- Connection to plastic threads only
- Do not use thread sealing pastes that are harmful to PVC-U

Code	Size	Dimensions (mm)						Nominal Pressure PN(kg/cm²)
		L	Z1	Z2	G1	E	O-Ring	
2010200801	1/2 "	15	4	11	1 "	42	4.081	16
2010200802	3/4 "	16.3	5.7	12.7	1 1/4 "	52	4.112	16
2010200803	1 "	19.1	5.9	12.9	1 1/2 "	59	4.131	16
2010200804	1 1/4 "	21.4	7.6	16.6	2 "	72	6.162	16
2010200805	1 1/2 "	21.4	12.6	23.6	2 1/4 "	79	6.187	16
2010200806	2 "	25.7	15.3	30.3	2 3/4 "	96	6.237	16



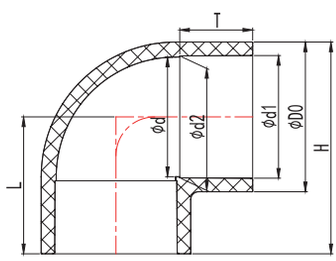
CEMENTED SYSTEM

PVC-U IRRIGATION APPLICATION PN 10

PRODUCT DATA

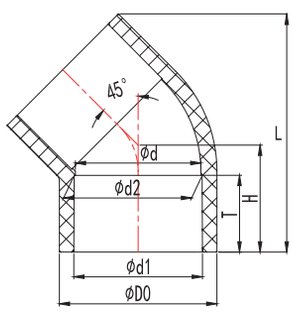
IRRIGATION PVC-U FITTINGS

PVC-U ELBOW 90°



Code	Size DN	Dimensions (mm)						
		D0	d1	d2	d	T	L	H
3010100101	20	24.08	20.24	19.96	19	17	28.5	40.74
3010100102	25	30.18	25.24	24.95	24	19.5	33.5	48.59
3010100103	32	37.14	32.25	31.95	31	23	40.5	59.07
3010100104	40	46.56	40.28	39.95	39	27	48.5	71.78
3010100105	50	57.1	50.33	49.94	49	32	58.5	87.05
3010100106	63	71.18	63.34	62.93	62	38.5	71.5	107.09
3010100107	75	84.34	75.35	74.93	73.5	44.5	83.25	125.42
3010100108	90	99.1	90.38	89.93	88.5	52	98.25	147.8
3010100109	110	120.4	110.42	109.92	108	62	118	178.2
3010100110	125	135.5	125.52	124.93	123	69.5	118.5	186.25
3010100111	140	153.1	140.58	139.88	138	77	149	225.55
3010100112	160	175	160.62	159.87	158	87	169	256.5
3010100113	180	202.5	180.81	179.91	178.5	97	190	291.25
3010100114	200	219.3	200.9	199.85	197	107	211	320.65

PVC-U ELBOW 45°

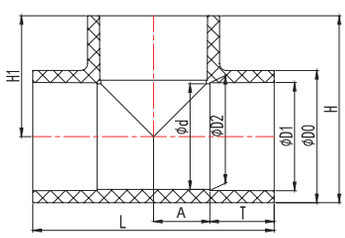


Code	Size DN	Dimensions (mm)					
		D0	d1	d2	d	T	H
3010100201	20	24.6	20.24	19.96	19	17	22.14
3010100202	25	29.84	25.24	24.95	24	19.5	25.67
3010100203	32	37.16	32.25	31.95	31	23	30.62
3010100204	40	46.48	40.28	39.95	39	27	36.28
3010100205	50	57	50.33	49.94	49	32	43.35
3010100206	63	70.38	63.34	62.93	62	38.5	52.54
3010100207	75	83.05	75.35	74.93	73.5	44.5	61.72
3010100208	90	99.28	90.38	89.93	88.5	52	72.33
3010100209	110	120.4	110.42	109.92	108	62	87.5
3010100210	125	135	125.52	124.93	123	69.5	98
3010100211	140	153.1	140.58	139.88	138	77	108.6
3010100212	160	174.52	160.62	159.87	158	87	122.7
3010100213	180	202.6	180.81	179.91	178.5	97	137.87
3010100214	200	217.4	200.9	199.85	197	107	108.4

PRODUCT DATA

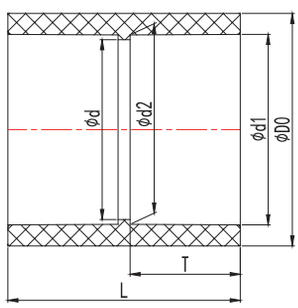
IRRIGATION PVC-U FITTINGS

PVC-U TEE 90°



Code	Size DN	Dimensions (mm)							
		D0	d1	d2	d	T	H1	H	L
3010100301	20	24.8	20.24	19.96	19	17	28.5	40.9	57
3010100302	25	30.1	25.24	24.95	24	19.5	33.5	48.55	67
3010100303	32	37.5	32.25	31.95	31	23	40.5	59.25	81
3010100304	40	46.48	40.28	39.95	39	27	48.5	71.74	95.6
3010100305	50	57.3	50.33	49.94	49	32	58.5	87.15	117.5
3010100306	63	70.5	63.34	62.93	62	38.5	71.5	106.75	142.7
3010100307	75	84	75.35	74.93	73.5	44.5	83.25	125.25	166.5
3010100308	90	100.6	90.38	89.93	88.5	52	98.25	148.55	203
3010100309	110	120.8	110.42	109.92	108	62	118	178.4	237
3010100310	125	136.8	125.52	124.93	123	69.5	118.5	186.9	267
3010100311	140	153.5	140.58	139.88	138	77	149	225.75	298
3010100312	160	175	160.62	159.87	158	87	169	256.5	338.5
3010100313	180	202.6	180.81	179.91	178.5	97	190	291.3	379
3010100314	200	219	200.9	199.85	197	107	211	320.5	420

PVC-U COUPLING

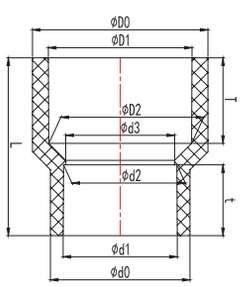


Code	Size DN	Dimensions (mm)					
		D0	d1	d2	d	T	L
3010100401	20	24.6	20.24	19.96	19	17	36
3010100402	25	29.84	25.24	24.95	24	19.5	41.3
3010100403	32	37.16	32.25	31.95	31	23	48.1
3010100404	40	46.48	40.28	39.95	39	27	56.6
3010100405	50	57	50.33	49.94	49	32	67
3010100406	63	70.38	63.34	62.93	62	38.5	81
3010100407	75	83.05	75.35	74.93	73.5	44.5	93
3010100408	90	99.28	90.38	89.93	88.5	52	107.6
3010100409	110	120.4	110.42	109.92	108	62	128.3
3010100410	125	135	125.52	124.93	123	69.5	147.2
3010100411	140	153.1	140.58	139.88	138	77	163.6
3010100412	160	174.52	160.62	159.87	158	87	183.3
3010100413	180	202.6	180.81	179.91	178.5	97	203.5
3010100414	200	217.4	200.9	199.85	197	107	217

PRODUCT DATA

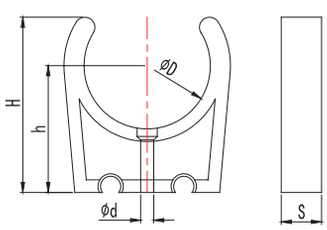
IRRIGATION PVC-U FITTINGS

PVC-U REDUCER



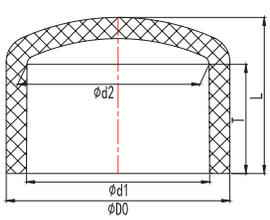
Code	Size DN	Dimensions (mm)									
		D0	D1	D2	d0	d1	d2	d3	t	T	L
3010100501	25*20	30.05	25.24	24.95	24.85	20.24	19.96	19	17	19.5	41.8
3010100502	32*20	37.4	32.25	31.95	24.85	20.24	19.96	19	17	23	48.5
3010100503	32*25	37.4	32.25	31.95	30	25.24	24.95	24	19.5	23	48.5
3010100504	40*20	46.7	40.28	39.95	26.1	20.24	19.96	19	17	27	55.1
3010100505	40*25	46.7	40.28	39.95	31.3	25.24	24.95	24	19.5	27	55.5
3010100506	40*32	46.8	40.28	39.95	38.7	32.25	31.95	31	23	27	55.2
3010100507	50*20	56.6	50.33	49.94	24.85	20.24	19.96	19	17	32	66.5
3010100508	50*25	56.8	50.33	49.94	30	32.25	31.95	24	23	32	66.5
3010100509	50*32	56.6	50.33	49.94	37.5	40.28	39.95	31	27	32	66.5
3010100510	50*40	57.2	50.33	49.94	47.1	40.28	39.95	39	27	32	66.2
3010100511	63*25	71.7	63.34	62.93	31.2	25.24	24.95	24	19.5	38.5	79.5
3010100512	63*32	72.1	63.34	62.93	38.3	32.25	31.95	31	23	38.5	79.5
3010100513	63*40	71.5	63.34	62.93	47	40.28	39.95	39	27	38.5	78.8
3010100514	63*50	83.3	63.34	62.93	57.4	50.33	49.94	49	32	38.5	80
3010100515	75*32	83.3	75.35	74.93	38	32.25	31.95	31	23	44.5	92.5
3010100516	75*40	83.3	75.35	74.93	46.2	40.28	39.95	39	27	44.5	92.5
3010100517	75*50	83.3	75.35	74.93	56.5	50.33	49.94	49	32	44.5	92.3
3010100518	75*63	83.3	75.35	74.93	70.3	63.34	62.93	62	38.5	44.5	91.8
3010100519	90*40	99.2	90.38	89.93	46	40.28	39.95	39	27	52	106.5
3010100520	90*50	99.2	90.38	89.93	56.3	50.33	49.94	49	32	52	107.5
3010100521	90*63	99.2	90.38	89.93	71	63.34	62.93	62	38.5	52	109
3010100522	90*75	99.2	90.38	89.93	84	75.35	74.93	73.5	44.5	52	107.5
3010100523	110*50	120.8	110.42	109.92	56.7	50.33	49.94	49	32	62	125.75
3010100524	110*63	120.8	110.42	109.92	70.55	63.34	62.93	62	38.5	62	125
3010100525	110*75	120.8	110.42	109.92	84.2	75.35	74.93	73.5	44.5	62	128.6
3010100526	110*90	120.8	110.42	109.92	100.3	90.38	89.93	88.5	52	62	125.78
3010100527	125*63	135.2	125.52	124.93	69.5	63.34	62.93	62	38.5	69.5	142.5
3010100528	125*75	135.2	125.52	124.93	82.7	75.35	74.93	73.5	44.5	69.5	142.5
3010100529	125*90	137.3	125.52	124.93	99.5	90.38	89.93	88.5	52	69.5	142.5
3010100530	125*110	137	125.52	124.93	121.6	110.42	109.92	108	62	69.5	142.5
3010100531	140*90	151.5	140.58	139.88	99.3	90.38	89.93	88.5	52	77	151.5
3010100532	140*110	152.6	140.58	139.88	119.6	110.42	109.92	108	62	77	157
3010100533	160*90	175.3	160.62	159.87	99.5	90.38	89.93	88.5	52	87	175.3
3010100534	160*110	175.1	160.62	159.87	121.6	110.42	109.92	108	62	87	178
3010100535	160*125	175.6	160.62	159.87	137.2	125.52	124.93	123	69.5	87	119
3010100536	160*140	175.1	160.62	159.87	152.8	140.58	139.88	138	77	87	178
3010100537	180*160	202.8	180.81	179.91	180	160.62	159.87	158	87	97	202.5
3010100538	200*110	217.9	200.9	199.85	122.6	110.42	109.92	108	62	107	218.5
3010100539	200*125	217.4	200.9	199.85	136.7	125.52	124.93	123	69.5	107	219
3010100540	200*140	218.5	200.9	199.85	153.1	140.58	139.88	138	77	107	221
3010100541	200*160	218.5	200.9	199.85	175	160.62	159.87	158	87	107	221

PVC-U BRACKET



Code	Size DN	Dimensions (mm)				
		D	d	S	h	H
3010100601	20	20	4.5	12.6	29.8	38.2
3010100602	25	25	4.5	16.1	32.4	40
3010100603	32	32	4.5	19.1	35.7	46
3010100604	40	40	6	22	44	53
3010100605	50	50	6	24	51	60
3010100606	63	63	6	26	60.5	69

PVC-U CAP

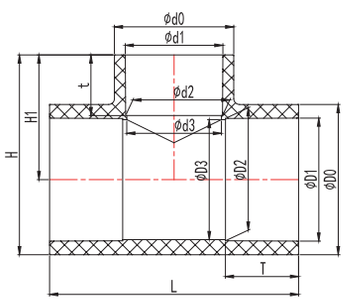


Code	Size DN	Dimensions (mm)				
		D0	D1	D2	T	L
3010100701	20	24.5	20.24	19.96	17	21.2
3010100702	25	29.8	25.24	24.95	19.5	24.8
3010100703	32	37.1	32.25	31.95	23	30
3010100704	40	45.8	40.28	39.95	27	35
3010100705	50	56.7	50.33	49.94	32	42
3010100706	63	70.3	63.34	62.93	38.5	50.4
3010100707	75	83.3	75.35	74.93	44.5	58.5
3010100708	90	100.1	90.38	89.93	52	68.3
3010100709	110	119.8	110.42	109.92	62	80
3010100710	125	136.38	125.52	124.93	69.5	91
3010100711	140	151	140.58	139.88	77	101
3010100712	160	173.5	160.62	159.87	87	116
3010100713	180	202.6	180.81	179.91	97	143
3010100714	200	220	200.9	199.85	107	150

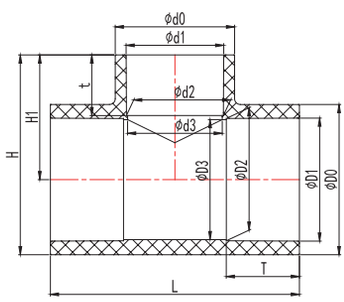
PRODUCT DATA

IRRIGATION PVC-U FITTINGS

PVC-U REDUCING TEE



Code	Size DN	Dimensions (mm)												
		D0	D1	D2	D3	d0	d1	d2	d3	t	T	H1	H	L
3010100801	25*20	30.02	25.24	24.95	24	24.18	20.24	19.96	19	17	19.5	31	46.01	62.1
3010100802	32*20	37.44	32.25	31.95	31	24.74	20.24	19.96	19	17	23	34.5	53.22	69.2
3010100803	32*25	37.44	32.25	31.95	31	30.1	25.24	24.95	24	19.5	23	37	55.72	73.8
3010100804	40*20	46.3	40.28	39.95	39	25.4	20.24	19.96	19	17	27	38.5	61.65	77.3
3010100805	40*25	46.3	40.28	39.95	39	30.05	25.24	24.95	24	19.5	27	41	64.15	80.4
3010100806	40*32	46.3	40.28	39.95	39	37.44	32.25	31.95	29	23	27	44.5	67.65	89
3010100807	50*20	57.2	50.33	49.94	49	25	20.24	19.96	19	17	32	43.5	72.1	86
3010100808	50*25	57.72	50.33	49.94	49	30.05	25.24	24.95	24	19.5	32	46	74.86	92
3010100809	50*32	57.8	50.33	49.94	49	37.5	32.25	31.95	31	23	32	49.5	78.4	98.7
3010100810	50*40	57.1	50.33	49.94	49	47.02	40.28	39.95	39	27	32	53.5	82.05	108.4
3010100811	63*20	70	63.34	62.93	62	24.9	20.24	19.96	19	17	38.5	50	85	100
3010100812	63*25	70.1	63.34	62.93	62	30.2	25.24	24.95	24	19.5	38.5	52.5	87.55	105
3010100813	63*32	70.8	63.34	62.93	62	37.5	32.25	31.95	31	23	38.5	56	91.4	112
3010100814	63*40	70.3	63.34	62.93	62	45.8	40.28	39.95	39	27	38.5	60	95.15	119.85
3010100815	63*50	70.8	63.34	62.93	62	56.5	50.33	49.94	49	32	38.5	65	100.4	130.6
3010100816	75*32	84.3	75.35	74.93	73.5	38.2	32.25	31.95	31	23	44.5	61.75	103.9	125.75
3010100817	75*40	84.1	75.35	74.93	73.5	46.6	40.28	39.95	39	27	44.5	65.75	107.8	135.7
3010100818	75*50	84	75.35	74.93	73.5	57	50.33	49.94	49	32	44.5	70.75	112.75	153.5
3010100819	75*63	83.8	75.35	74.93	73.5	70.7	63.34	62.93	62	38.5	44.5	77.25	119.15	156.6
3010100820	90*50	100.7	90.38	89.93	88.5	56.7	50.33	49.94	49	32	52	78.25	128.6	158
3010100821	90*63	100.7	90.38	89.93	88.5	69.7	63.34	62.93	62	38.5	52	84.75	135.1	170.3

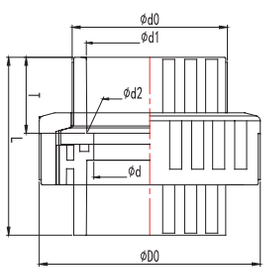


Code	Size DN	Dimensions (mm)												
		D0	D1	D2	D3	d0	d1	d2	d3	t	T	H1	H	L
3010100822	90*75	100.7	90.38	89.93	88.5	84.1	75.35	74.93	73.5	44.5	52	90.75	141.1	183
3010100823	110*50	123	110.42	109.92	108	56.3	50.33	49.94	49	32	62	88	149.5	177
3010100824	110*63	122.7	110.42	109.92	108	74	63.34	62.93	62	38.5	62	94.5	155.85	190.1
3010100825	110*75	121.32	110.42	109.92	108	84.3	75.35	74.93	73.5	44.5	62	101.5	162.16	201.5
3010100826	110*90	121.5	110.42	109.92	108	100.6	90.38	89.93	88.5	52	62	109	169.75	220.4
3010100827	125*75	136.5	125.52	124.93	123	84.3	75.35	74.93	73.5	44.5	69.5	109	177.25	219.5
3010100828	125*90	137.8	125.52	124.93	123	99.2	90.38	89.93	88.5	52	69.5	116.5	185.4	232.3
3010100829	125*110	136	125.52	124.93	123	120.6	110.42	109.92	108	62	69.5	125.75	193.75	250.7
3010100830	140*110	151.5	140.58	139.88	138	108.7	110.42	109.92	108	62	77	134	209.75	268
3010100831	160*63	175.3	165.5	160	157	70.9	63.3	63	63	38	86	119.4	207.05	251
3010100832	160*75	175.3	165.5	160	157	84.3	75.3	75	72	44	86	125.4	213.05	251
3010100833	160*90	175.3	160.62	159.87	158	101.6	90.38	89.93	88.5	52	87	134	221.65	268
3010100834	160*110	175.4	160.62	159.87	158	122.3	110.42	109.92	108	62	87	144	231.7	288
3010100835	160*125	175.3	160.62	159.87	158	137	125.3	124.93	123	69.5	87	151.5	239.15	300
3010100836	160*140	175.1	160.62	159.87	158	153	140.3	139.88	138	77	87	159	246.55	318.5
3010100837	180*160	202.6	180.81	179.91	178.5	180	160.35	159.87	158	87	97	180	281.3	379
3010100838	200*75	220.9	180.81	199.85	197	82.74	75.35	74.93	73.5	44.5	107	148.5	258.95	291.5
3010100839	200*90	220.9	200.9	199.85	197	99.2	90.38	89.93	88.5	52	107	156	266.45	307
3010100840	200*110	219.2	200.9	199.85	197	122.8	110.42	109.92	108	62	107	166	275.6	328
3010100841	200*160	219.8	200.9	199.85	197	175.4	160.62	159.87	158	87	107	191	300.9	377

PRODUCT DATA

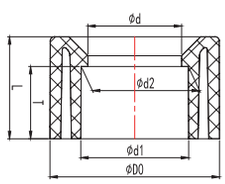
IRRIGATION PVC-U FITTINGS

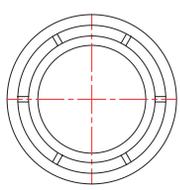
PVC-U UNION



Code	Size DN	Dimensions (mm)						
		D0	d0	D1	D2	d	T	L
2010107001	20	45.5	26	20.24	19.96	19	17	53
2010107002	25	54.5	32	25.24	24.95	24	19.5	59.8
2010107003	32	65	39.5	32.25	31.95	31	23	68.5
2010107004	40	75.5	48.5	40.28	39.95	39	27	80.5
2010107005	50	88.5	59	50.33	49.94	49	32	94
2010107006	63	102	74.5	63.34	62.93	62	38.5	110
2010107007	75	122.6	86	75.35	74.93	73.5	44.5	104.7
2010107008	90	140.7	101.2	90.38	89.93	88.5	52	121.1
2010107009	110	163.6	122.2	110.42	109.92	108	62	147

PVC-U BUSHING



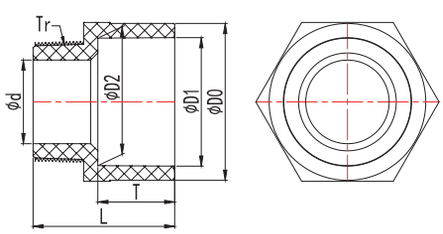


Code	Size DN	Dimensions (mm)					
		D0	d1	d2	d	T	L
3010100901	25*20	25.1	20.24	19.96	19	17	19
3010100902	32*25	32.2	25.24	24.95	24	19.5	22.2
3010100903	40*32	40.1	32.25	31.95	31	23	26.5
3010100904	50*40	50.06	40.28	39.95	39	27	30.6
3010100905	63*50	63.1	50.33	49.94	49	32	38
3010100906	75*63	75.1	63.34	62.93	62	38.5	44
3010100907	90*75	90.1	75.35	74.93	73	44.5	51
3010100908	110*90	110.1	90.38	89.93	88.5	52	60.5
3010100909	125*110	125.1	110.42	109.92	108	62	68.5
3010100910	140*110	140.1	110.42	109.92	108	62	76.7
3010100911	140*125	140.1	125.52	124.93	123	69.5	76.7
3010100912	160*110	160.1	110.42	109.92	108	62	86
3010100913	160*140	160.1	140.58	139.88	138	77	86
3010100914	180*160	180.1	160.62	159.87	158	87	96
3010100915	200*160	200.1	160.62	159.87	158	87	106
3010100916	200*180	200.1	180.81	179.91	178.5	97	106

PRODUCT DATA

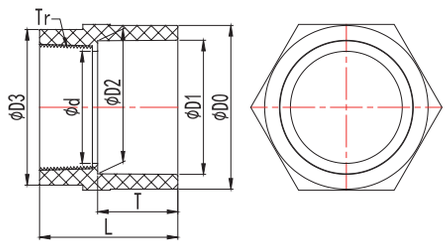
IRRIGATION PVC-U FITTINGS

PVC-U MALE ADAPTOR



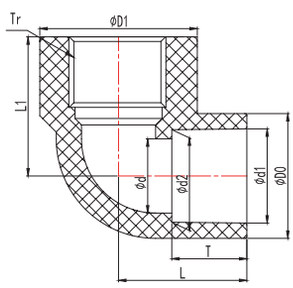
Code	Size DN	Dimensions (mm)						
		D0	D1	D2	d	T	L	Tr
3010200201	20*1/2"	26	20.24	19.96	17	17	38.5	1/2"
3010200202	25*3/4"	30.4	25.24	24.95	17.8	19.5	40.5	3/4"
3010200203	32*1"	37.5	32.25	31.95	23	23	47.5	1"
3010200204	40*1-1/4"	46.2	40.28	39.95	30.3	27	54.5	1-1/4"
3010200205	50*1-1/2"	56.8	50.33	49.94	37.6	32	63.1	1-1/2"
3010200206	63*2"	70.6	63.34	62.93	47.5	38.5	76.5	2"
3010200207	75*2-1/2"	83.6	75.35	74.93	60	44.5	87.5	2-1/2"
3010200208	90*3"	100.7	90.38	89.93	72	52	94	3"
3010200209	110*4"	121.4	110.42	109.92	95	62	119.5	4"

PVC-U FEMALE ADAPTOR



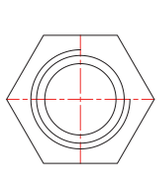
Code	Size DN	Dimensions (mm)							
		D0	D1	D2	D3	d	T	L	Tr
3010200301	20*1/2"	26.5	20.24	19.96	28	19	17	36.5	1/2"
3010200302	25*3/4"	30.5	25.24	24.95	32	24	19.5	37	3/4"
3010200303	32*1"	37.4	32.25	31.95	38	31	23	43	1"
3010200304	40*1-1/4"	46.2	40.28	39.95	47.6	39	27	50	1-1/4"
3010200305	50*1-1/2"	56.6	50.33	49.94	54	49	32	54	1-1/2"
3010200306	63*2"	70.5	63.34	62.93	57	62	38.5	64.3	2"
3010200307	75*2-1/2"	84	75.35	74.93	84	73.5	44.5	76.6	2-1/2"
3010200308	90*3"	100.6	90.38	89.93	100	88.5	52	93.4	3"
3010200309	110*4"	121.4	110.42	109.92	125.3	108	62	105.5	4"

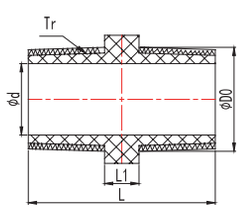
PVC-U THREADED ELBOW 90



Code	Size DN	Dimensions (mm)								
		D0	D1	d1	d2	d	T	L1	L	Tr
3010200401	20*1/2"	25.8	34	20.24	19.96	18	17	32	33	1/2"
3010200402	25*3/4"	31.66	42.1	25.24	24.95	24	19.5	33	39	3/4"

PVC-U MALE ADAPTOR (T - T)



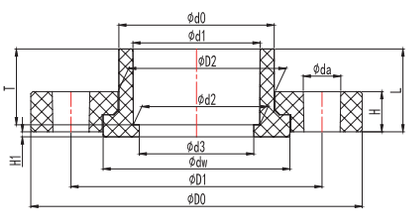


Code	Size DN	Dimensions (mm)				
		D0	d	L1	L	Tr
3010200501	20*1/2"	20.8	14.5	7	40.5	1/2"
3010200502	25*3/4"	25.7	17.5	8	45	3/4"
3010200503	32*1"	33.1	24	11	50	1"
3010200504	40*1-1/4"	41.4	32	11	52.5	1-1/4"
3010200505	50*1-1/2"	47.3	37.5	12.5	55	1-1/2"
3010200506	63*2"	58.6	48.5	12.5	67	2"

PRODUCT DATA

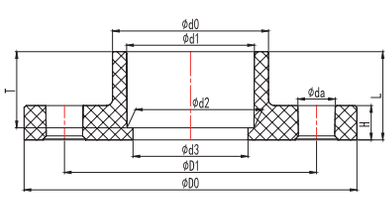
IRRIGATION PVC-U FITTINGS

PVC-U VANSTONE FLANGE



Code	Size DN		
		D0	D1
3010101001	50	148	110
3010101002	63	165.6	125
3010101003	75	185	145
3010101004	90	194.9	160
3010101005	110	219	180
3010101006	125	248	210
3010101007	140	248.5	210
3010101008	160	284	240
3010101009	200	340	295

PVC-U ONE-PIECE FLANGE



Code	Size DN		
		D0	D1
3010101101	20	94	65
3010101102	25	104	75
3010101103	32	114	85
3010101104	40	133.5	100
3010101105	50	148	110
3010101106	63	164	125
3010101107	75	183.4	145
3010101108	90	198.5	160
3010101109	110	218.2	180
3010101110	140	249	210
3010101111	160	283.5	240
3010101112	180	284	240
3010101113	200	340.5	295

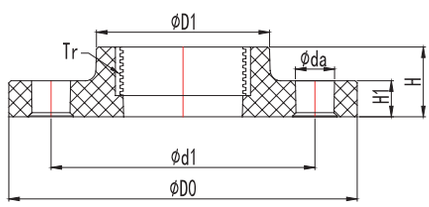
Dimensions (mm)											
D2	d0	d1	d2	d3	dw	da	T	H1	H	L	Number of screws
60.1	56.6	50.33	49.94	49	82	18	32	7.6	14.5	35	4
75.2	69.6	63.34	62.93	62	93.7	18	38.5	8	15.6	42.3	4
87	82.6	75.35	74.93	73	103.8	18	44.5	8.3	16.1	47.8	4
105	99.3	90.38	89.93	88.5	128.4	18	52	10.5	18.2	54.5	8
132	120.3	110.42	109.92	108	150	18	62	14.5	20	66.1	8
145	136.6	125.52	124.93	123	163.8	18	69.5	15.5	19.3	74.1	8
152.5	151.6	140.58	139.88	138	167.8	18	77	12.5	21	83	8
186.5	177.6	160.62	159.87	158	260.5	22	87	19.5	26	91.2	8
230.5	220.5	200.9	199.85	197	258.5	22	107	20	29.8	113	8

Dimensions (mm)								
d0	d1	d2	d3	da	T	H	L	Number of screws
28.3	20.24	19.96	19	14	17	14.5	24.5	4
33.2	25.24	24.95	24	14	19.5	14.5	24.8	4
41.6	32.25	31.95	31	14	23	13.5	23.3	4
49.6	40.28	39.95	39	18	27	17.2	36	4
57.4	50.33	49.94	49	18	32	15.7	46.5	4
71.4	63.34	62.93	62	18	38.5	17	48.5	4
86.8	75.35	74.93	73	18	44.5	19.3	61.5	4
101.3	90.38	89.93	88.5	18	52	19.5	70	8
123.2	110.42	109.92	108	18	62	19.1	80	8
152.8	140.58	139.88	138	18	77	20	87	8
176.2	160.62	159.87	158	22	87	22	105	8
202.6	180.81	179.91.	178.5	22	97	25.3	114	8
219.4	200.9	199.85	197	22	107	25.5	128.5	8

PRODUCT DATA

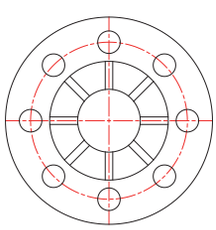
IRRIGATION PVC-U FITTINGS

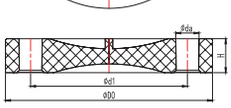
PVC-U COPPER THEADED BLIND FLANGE



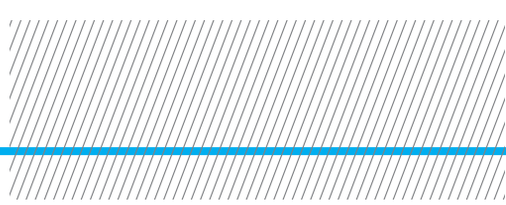
Code	Size DN	Dimensions (mm)							
		D0	D1	d1	da	H1	H	Tr	Number of screws
3030100101	110*2"	219	82	178	18	21.5	39.5	2"	8
3030100102	160*2"	283	82	238	22	25	38	2"	8
3030100103	200*2"	340	84	293	22	30	48	2"	8

PVC-U BLIND FLANGE

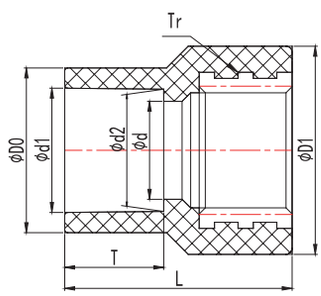




Code	Size DN	Dimensions (mm)				
		D0	d1	da	H	Number of screws
3010101201	20	95	65	14	12.5	4
3010101202	25	105	75	14	13.4	4
3010101203	32	115	85	14	14	4
3010101204	40	140	100	18	14.4	4
3010101205	50	150	110	18	16.4	4
3010101206	63	165	125	18	16.2	4
3010101207	75	185	145	18	17.5	4
3010101208	90	200	160	18	18	8
3010101209	110	219	178	18	21.5	8
3010101210	160	283	238	22	25	8
3010101211	200	340	293	22	30	8

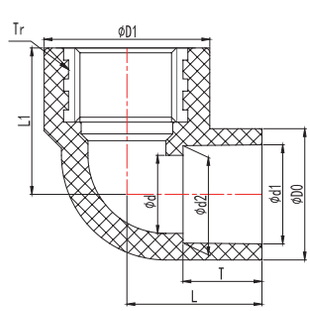


PVC-U COPPER THREADED REDUCER



Code	Size DN	Dimensions (mm)							
		D0	D1	d1	d2	d	T	L	Tr
3030100201	20*-1/2"	24.3	32	20.24	19.96	18	17	36.7	1/2"
3030100202	25*1/2"	31	33	25.24	24.95	18.8	19.5	39.2	1/2"
3030100203	25*3/4"	29.8	38.1	25.24	24.95	18.8	19.5	39.5	3/4"
3030100204	32*1/2"	37.3	32	32.25	31.95	18.8	23	48.5	1/2"
3030100205	32*3/4"	37.5	37.5	32.25	31.95	24	23	48.5	3/4"
3030100206	32*1"	38	46.4	32.25	31.95	31	23	42.4	1"

PVC-U COPPER THREADED ELBOW 90

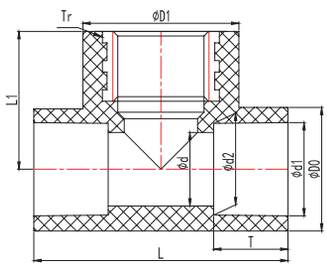


Code	Size DN	Dimensions (mm)								
		D0	D1	d1	d2	d	T	L1	L	Tr
3030100301	20*1/2"	24.7	32	20.24	19.96	18	17	30.8	28.5	1/2"
3030100302	25*1/2"	29.7	32	25.24	24.95	24	19.5	33.15	33	1/2"
3030100303	25*3/4"	29.7	37.1	25.24	24.95	24	19.5	33.15	34.84	3/4"
3030100304	32*1/2"	37.3	32	32.25	31.95	18.8	23	39.35	42	1/2"
3030100305	32*3/4"	37.3	37	32.25	31.95	24	23	45.35	42.5	3/4"
3030100306	32*1"	37.3	44.3	32.25	31.95	31	23	41.35	39.85	1"

PRODUCT DATA

IRRIGATION PVC-U FITTINGS

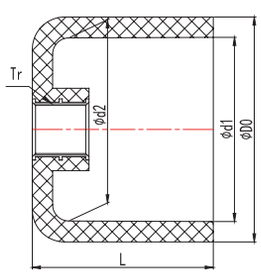
PVC-U COPPER THREADED TEE



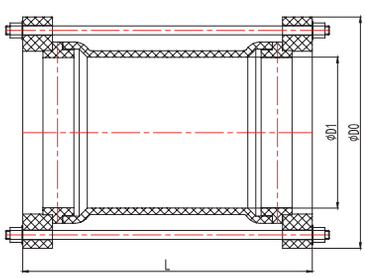
Code	Size DN	Dimensions (mm)							
		D0	D1	d1	d2	T	L1	L	Tr
3030100401	20*1/2"	24.5	32	20.24	19.96	17	32	58	1/2"
3030100402	25*1/2"	29.5	32	25.24	24.95	19.5	35	60.3	1/2"
3030100403	25*3/4"	30	38.1	25.24	24.95	19.5	38	60.7	3/4"
3030100404	32*1/2"	37	32	32.25	31.95	23	38	67.6	1/2"
3030100405	32*3/4"	38	38	32.25	31.95	23	38	74.1	3/4"
3030100406	32*1"	37.7	44	32.25	31.95	23	40	81	1"
3030100407	63*3/4"	70	38	63.34	62.93	38.5	53	105.7	3/4"
3030100408	63*1"	70	44	63.34	32.93	38.5	56	112	1"

PVC-U COPPER THREADED CAP

Code	Size DN	Dimensions (mm)				
		D0	d1	d2	L	Tr
3030100501	63*3/4"	70.5	63.34	62.93	56	3/4"
3030100502	63*1"	70.5	63.34	62.93	56	1"

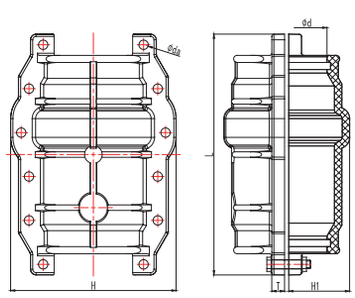


PVC-U REPAIRED COUPLING



Code	Size DN	Dimensions (mm)		
		D0	D1	L
3040100101	110	218.5	110.42	303
3040100102	160	285	160.62	350
3040100103	200	340	200.9	435

PVC-U SADDLED REPAIRED COUPLING

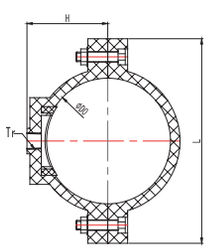


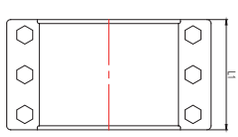
Code	Size DN	Dimensions (mm)						
		d	d1	H1	H	T	L	Number of screws
3040100201	63	65	11.5	52	155	15	250	12
3040100202	75	77	11.5	62	172.1	16	280	12
3040100203	90	92	13.5	71.5	205	18	320	12
3040100204	110	112	13.5	86	234	18	340	12
3040100205	125	128	13.5	96	257	20	360	12
3040100206	140	142	13.5	102.34	260.82	20	338	14
3040100207	160	162	13.5	119.5	299	20	380	14
3040100208	180	182	13.5	132	332.3	22	432	16
3040100209	200	202	13.5	150.4	349.7	22	460	18

PRODUCT DATA

IRRIGATION PVC-U FITTINGS

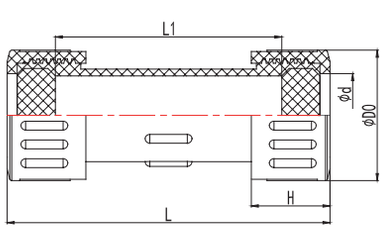
PVC-U SADDDLE CLAMP





Code	Size DN	Dimensions (mm)				
		D0	H	L	L1	Tr
3040100301	63*1"	63	65.3	138.5	89.3	1"
3040100302	75*1"	75	63.5	143.5	89.3	1"
3040100303	75*1-1/2"	75	63.5	143.5	89.3	1-1/2"
3040100304	90*1/2"	90	74	159.7	68	1/2"
3040100305	90*3/4"	90	74	159.7	68	3/4"
3040100306	90*1"	90	74	159.7	68	1"
3040100307	90*1-1/2"	90	74	159.7	89.5	1-1/2"
3040100308	110*1/2"	110	78	198	109.5	1/2"
3040100309	110*3/4"	110	78	200	109.5	3/4"
3040100310	110*1"	110	81	198	109.5	1"
3040100311	110*1-1/2"	110	91	199	108	1-1/2"
3040100312	110*2"	110	91	198	109.5	2"
3040100313	110*2-1/2"	110	91	198	109.5	2-1/2"
3040100314	125*1-1/2"	125	99	225	110	1-1/2"
3040100315	125*2"	125	99	225	110	2"
3040100316	125*2-1/2"	125	99	225	110	2-1/2"
3040100317	160*1/2"	160	104.5	253	120	1/2"
3040100318	160*3/4"	160	104.5	253	120	3/4"
3040100319	160*1"	160	104.5	253	120	1"
3040100320	160*1-1/2"	160	118.5	253	120	1-1/2"
3040100321	160*2"	160	114	253	120	2"
3040100322	160*2-1/2"	160	118.5	253	120	2-1/2"
3040100323	200*1-1/2"	200	135	317	130	1-1/2"
3040100324	200*2"	200	138	317	130	2"
3040100325	200*2-1/2"	200	140	317	130	2-1/2"
3040100326	225*1-1/2"	225	150	335	140	1-1/2"
3040100327	225*2"	225	152	335	140	2"
3040100328	225*2-1/2"	225	168	335	140	2-1/2"
3040100329	250*2"	250	170	351	141	2"
3040100330	250*2-1/2"	250	170	351	141	2-1/2"
3040100331	250*3"	250	170	351	141	3"
3040100332	315*110	315	240	467	160	
3040100333	315*160	315	247	467	238	
3040100334	315*2"	315	200	472	158	2"
3040100335	315*3"	315	205	472	158	3"
3040100336	315*4"	315	205	472	158	4"
3040100337	400*200	400	320	545	275	

PVC-U COMPRESSION COUPLING



Code	Size DN	Dimensions (mm)				
		D0	d	H	L1	L
3040100401	20	44.5	20.6	30	100	123
3040100402	25	49	25.5	31	111.5	131
3040100403	32	57.5	33	34.5	115	140
3040100404	40	72.3	40.6	37	120	148
3040100405	50	77	51	40	132	165
3040100406	63	91.6	69	47	153	190
3040100407	75	105.5	76	47	183	210
3040100408	90	132	92	55	210	258
3040100409	110	158	112.5	62	230	290
3040100410	125	183	125.75	52	184.5	290
3040100411	160	219	161	59	248.5	283

PUSH FIT SYSTEM

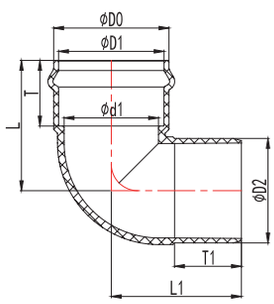
PVC-U WITH RABBER RING

This product is vailable in PN10 and PN 16.

PRODUCT DATA

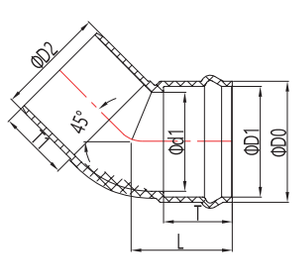
PUSH-FIT SYSTEM (WITH RUBBER RING)

PVC-U ELBOW 90° (F/S)



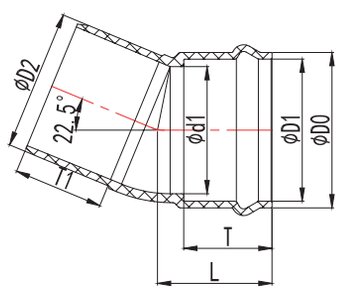
Code	Size DN	Dimensions (mm)							
		D0	D1	D2	d1	T1	T	L1	L
4050010101	200	225.00	202.50	200.20	197.00	223.00	152.00	285.00	270.00
4050010102	225	251.50	227.50	225.30	221.00	212.00	139.00	304.00	288.00
4050010103	250	276.50	252.30	250.30	247.00	252.00	152.00	328.00	312.00
4050010104	315	347.80	318.30	315.20	312.00	291.30	198.00	393.00	393.00

PVC-U ELBOW 45° (F/S)



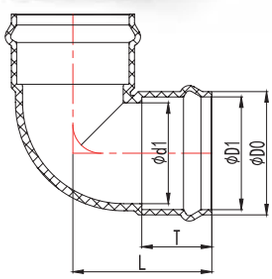
Code	Size DN	Dimensions (mm)						
		D0	D1	D2	d1	T1	T	L
4050010201	200	225.00	202.50	202.00	197.00	223.00	152.00	202.00
4050010202	225	251.50	227.50	225.30	221.00	212.00	139.00	196.00
4050010203	250	276.50	252.30	250.30	247.00	252.00	152.00	236.00
4050010204	315	347.80	318.30	315.20	312.00	291.30	198.00	291.30

PVC-U ELBOW 22.5° (F/S)



Code	Size DN	Dimensions (mm)						
		D0	D1	D2	d1	T1	T	L
4050010301	225	251.50	227.50	225.30	221.00	212.00	139.00	196.00
4050010302	250	276.50	252.30	250.30	247.00	228.00	152.00	212.00
4050010303	315	347.80	318.30	315.20	312.00	257.00	198.00	257.00

PVC-U PVC-U ELBOW 90° (F/F)

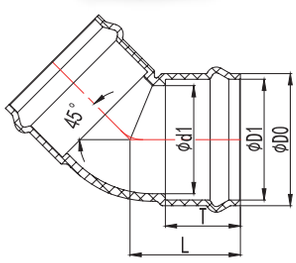


Code	Size DN	Dimensions (mm)				
		D0	D1	d1	T	L
4050010401	63	74.50	65.30	62.00	76.00	110.00
4050010402	75	88.50	77.50	73.50	84.50	125.75
4050010403	90	105.50	92.50	88.50	95.00	142.50
4050010404	110	125.70	111.50	108.00	122.00	188.50
4050010405	160	181.50	162.30	158.00	141.00	236.50
4050010406	200	225.00	202.50	197.00	152.00	270.00
4050010407	225	251.50	227.50	221.00	139.00	288.00
4050010408	250	276.50	252.30	247.00	152.00	312.00
4050010409	315	347.80	318.30	312.00	198.00	393.00
4050010410	355	388.50	356.63	326.00	235.00	410.00

PRODUCT DATA

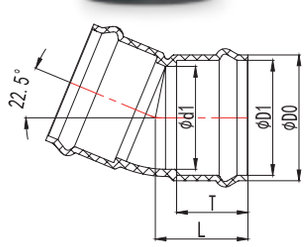
PUSH-FIT SYSTEM (WITH RUBBER RING)

PVC-U ELBOW 45° (F/F)



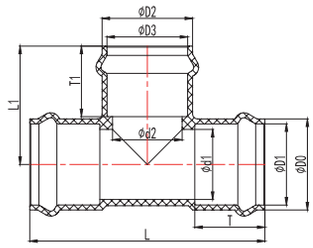
Code	Size DN	Dimensions (mm)				
		D0	D1	d1	T	L
4050010501	63	74.50	65.30	62.00	76.00	96.00
4050010502	75	88.50	77.50	73.50	84.50	110.00
4050010503	90	105.50	92.50	88.50	95.00	122.50
4050010504	110	125.70	111.50	108.00	122.00	152.00
4050010505	160	181.50	162.30	158.00	141.00	183.50
4050010506	200	225.00	202.50	197.00	152.00	203.00
4050010507	225	251.50	227.50	221.00	139.00	217.00
4050010508	250	276.50	252.30	247.00	152.00	236.00
4050010509	315	347.80	318.30	312.00	198.00	291.00
4050010510	355	388.50	356.63	326.00	235.00	315.00

PVC-U ELBOW 22.5° (F/F)



Code	Size DN	Dimensions (mm)				
		D0	D1	d1	T	L
4050010601	63	74.50	65.30	62.00	76.00	94.50
4050010602	75	88.50	77.50	73.50	84.50	106.00
4050010603	90	105.50	92.50	88.50	95.00	110.00
4050010604	110	125.70	111.50	108.00	122.00	152.00
4050010605	160	181.50	162.30	158.00	141.00	168.00
4050010606	200	225.00	202.50	197.00	152.00	178.50
4050010607	225	251.50	227.50	221.00	139.00	196.00
4050010608	250	276.50	252.30	247.00	152.00	212.00
4050010609	315	347.80	318.30	312.00	198.00	257.00

PVC-U TEE (F/F/F)

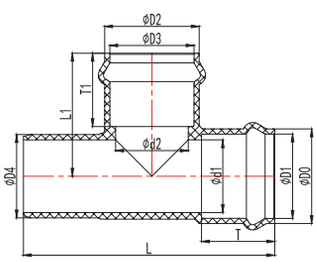


Code	Size DN	Dimensions (mm)									
		D0	D1	D2	D3	d1	d2	T1	T	L1	L
4050010701	63	74.50	65.30	74.50	65.30	62.00	62.00	76.00	76.00	110.00	220.00
4050010702	75	88.50	77.50	88.50	77.50	73.50	73.50	84.50	84.50	125.00	255.00
4050010703	90	105.50	92.50	105.50	92.50	88.50	88.50	95.00	95.00	142.50	285.00
4050010704	110	125.70	111.50	125.70	111.50	108.00	108.00	122.00	122.00	202.50	404.00
4050010705	160	181.50	162.30	181.50	162.30	158.00	158.00	141.00	141.00	236.50	470.00
4050010706	200	225.00	202.50	225.00	202.50	197.00	197.00	152.00	152.00	270.00	555.00
4050010707	225	251.50	227.50	251.50	227.50	221.00	221.00	139.00	139.00	288.00	592.00
4050010708	250	276.50	252.30	276.50	252.30	247.00	247.00	152.00	152.00	312.00	640.00
4050010709	315	347.80	318.30	347.80	318.30	312.00	312.00	198.00	198.00	393.00	786.00
4050010710	355	389.00	318.30	389.00	318.30	326.00	326.00	198.00	198.00	410.00	820.00
4050010711	75*63	88.50	77.50	74.50	65.30	73.50	62.00	76.00	84.50	115.00	243.00
4050010712	90*63	105.50	92.50	74.50	65.30	88.50	62.00	76.00	95.00	121.40	262.20
4050010713	90*75	105.50	92.50	88.50	77.50	88.50	73.50	84.50	95.00	132.90	272.20
4050010714	110*63	125.70	111.50	74.50	65.30	108.00	62.00	76.00	122.00	150.00	405.00
4050010715	110*75	125.70	111.50	88.50	77.50	108.00	73.50	84.50	122.00	159.50	405.00
4050010716	110*90	125.70	111.50	105.50	92.50	108.00	88.50	95.00	122.00	170.00	405.00
4050010717	160*63	181.50	162.30	74.50	65.30	158.00	62.00	76.00	141.00	175.00	446.00
4050010718	160*75	181.50	162.30	88.50	77.50	158.00	73.50	84.50	141.00	185.00	446.00
4050010719	160*90	181.50	162.30	105.50	92.50	158.00	88.50	95.00	141.00	195.00	446.00
4050010720	160*110	181.50	162.30	125.70	111.50	158.00	108.00	122.00	141.00	220.00	446.00
4050010721	200*63	225.00	202.50	74.50	65.30	197.00	62.00	76.00	152.00	195.00	490.00
4050010722	200*75	225.00	202.50	88.50	77.50	197.00	73.50	84.50	152.00	205.00	490.00
4050010723	200*90	225.00	202.50	105.50	92.50	197.00	88.50	95.00	152.00	215.00	490.00
4050010724	200*110	225.00	202.50	125.70	111.50	197.00	108.00	122.00	152.00	240.00	490.00
4050010725	200*160	225.00	202.50	182.00	162.30	197.00	158.00	141.00	152.00	250.00	500.00
4050010726	225*110	251.50	227.50	125.70	111.50	221.00	108.00	122.00	139.00	263.00	466.00
4050010727	225*160	251.50	227.50	182.00	162.30	221.00	158.00	141.00	139.00	290.00	504.00
4050010728	250*110	276.50	252.30	125.70	111.50	247.00	108.00	122.00	152.00	275.00	500.00
4050010729	250*160	276.50	252.30	182.00	162.30	247.00	158.00	141.00	152.00	302.00	638.00
4050010730	250*200	276.50	252.30	225.00	202.50	247.00	197.00	152.00	152.00	310.00	578.00
4050010731	250*225	276.50	252.30	251.50	227.50	226.00	216.00	150.00	152.00	315.00	626.00
4050010732	315*110	347.80	318.30	125.70	111.50	312.00	108.00	122.00	198.00	317.00	592.00
4050010733	315*160	347.80	318.30	182.00	162.30	312.00	158.00	141.00	198.00	336.50	626.00
4050010734	315*200	347.80	318.30	225.00	202.50	312.00	197.00	152.00	198.00	347.00	660.00
4050010735	315*225	347.80	318.30	251.50	227.50	312.00	221.00	139.00	198.00	340.00	735.00
4050010737	315*250	347.80	318.30	276.50	252.30	312.00	247.00	152.00	198.00	347.00	735.00
4050010738	355*160	389.00	318.30	182.00	162.30	326.00	158.00	141.00	198.00	347.50	635.00
4050010739	355*200	389.00	318.30	225.00	202.50	326.00	197.00	152.00	198.00	360.00	730.00
4050010740	355*225	389.00	318.30	251.50	227.50	326.00	221.00	139.00	198.00	354.00	730.00
4050010741	355*250	389.00	318.30	276.50	252.30	326.00	247.00	152.00	198.00	369.00	730.00
4050010742	355*315	389.00	318.30	347.80	318.30	326.00	312.00	198.00	198.00	418.00	820.00

PRODUCT DATA

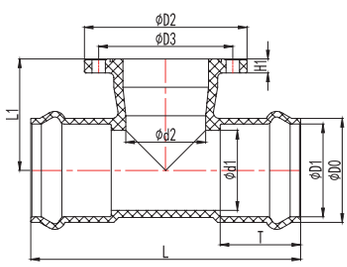
PUSH-FIT SYSTEM (WITH RUBBER RING)

PVC-U TEE (F/F/S)



Code	Size DN	Dimensions (mm)										
		D0	D1	D2	D3	D4	d1	d2	T1	T	L1	L
4050010801	110	125.70	111.50	125.70	111.50	110.20	108.00	108.00	122.00	122.00	202.50	405.00
4050010802	160	181.50	162.30	181.50	162.30	160.30	158.00	158.00	141.00	141.00	236.50	485.00
4050010803	200	225.00	202.50	225.00	202.50	202.20	197.00	197.00	152.00	152.00	270.00	555.00
4050010804	225	251.50	227.50	251.50	227.50	225.30	221.00	221.00	139.00	139.00	288.00	595.00
4050010805	250	276.50	252.30	276.50	252.30	250.30	247.00	247.00	152.00	152.00	312.00	640.00
4050010806	315	347.80	318.30	347.80	318.30	315.20	312.00	312.00	198.00	198.00	393.00	785.00
4050010807	160*110	181.50	162.30	125.70	111.50	160.30	158.00	108.00	122.00	141.00	220.00	450.00
4050010808	200*110	225.00	202.50	125.70	111.50	202.20	197.00	108.00	122.00	152.00	240.00	495.00
4050010809	200*160	225.00	202.50	181.50	162.30	202.20	197.00	158.00	141.00	152.00	250.00	515.00
4050010810	225*110	251.50	227.50	125.70	111.50	225.30	221.00	108.00	122.00	139.00	263.00	485.00
4050010811	225*160	251.50	227.50	181.50	162.30	225.30	221.00	158.00	141.00	139.00	290.00	520.00
4050010812	250*110	276.50	252.30	125.70	111.50	250.30	247.00	108.00	122.00	152.00	275.00	515.00
4050010813	250*160	276.50	252.30	181.50	162.30	250.30	247.00	158.00	141.00	152.00	302.00	538.00
4050010814	250*200	276.50	252.30	225.00	202.50	250.30	247.00	197.00	152.00	152.00	228.00	555.00
4050010815	315*110	347.80	318.30	125.70	111.50	315.20	312.00	108.00	122.00	198.00	317.00	595.00
4050010816	315*160	347.80	318.30	181.50	162.30	315.20	312.00	158.00	141.00	198.00	336.50	625.00
4050010817	315*200	347.80	318.30	225.00	202.50	315.20	312.00	197.00	152.00	198.00	393.00	660.00

PVC-U TEE WITH FLANGED BRANCH (F/F)

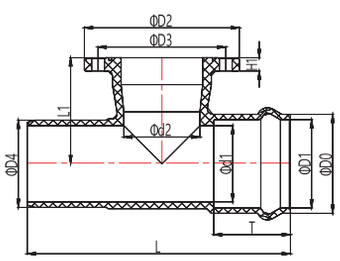


Code	Size DN	Dimensions (mm)										
		D0	D1	D2	D3	d1	d2	T	H1	L1	L	N
4050011501	110	125.70	111.50	224.00	185.00	108.00	108.00	122.00	19.00	160.00	405.00	8
4050011502	160	181.50	162.30	284.00	235.00	158.00	158.00	141.00	23.00	195.00	473.00	8
4050011503	200	225.00	202.50	338.00	300.00	197.00	197.00	152.00	26.00	230.00	540.00	8
4050011504	225	251.50	227.50	344.00	293.00	221.00	221.00	139.00	29.50	255.00	576.00	8
4050011505	250	276.50	252.30	394.00	250.00	247.00	247.00	152.00	31.50	280.00	624.00	12
4050011506	315	347.80	318.30	443.00	398.00	312.00	312.00	198.00	36.00	330.00	788.00	12
4050011507	160*110	181.50	162.30	224.00	185.00	158.00	108.00	141.00	19.00	192.00	446.00	8
4050011508	200*110	225.00	202.50	224.00	185.00	197.00	108.00	152.00	19.00	215.00	488.00	8
4050011509	200*160	225.00	202.50	284.00	235.00	197.00	158.00	152.00	23.00	220.00	500.00	8
4050011510	225*110	251.50	227.50	224.00	185.00	221.00	108.00	139.00	19.00	233.50	466.00	8
4050011511	225*160	251.50	227.50	284.00	235.00	221.00	158.00	139.00	23.00	245.00	504.00	8
4050011512	250*110	276.50	252.30	224.00	185.00	247.00	108.00	152.00	19.00	245.50	500.00	8
4050011513	250*160	276.50	252.30	284.00	235.00	247.00	158.00	152.00	23.00	257.00	538.00	8
4050011514	250*200	276.50	252.30	338.00	300.00	247.00	197.00	152.00	26.00	268.50	578.00	8
4050011515	315*110	347.80	318.30	224.00	185.00	312.00	108.00	198.00	19.00	277.50	592.00	8
4050011516	315*160	347.80	318.30	284.00	235.00	312.00	158.00	198.00	23.00	288.50	626.00	8
4050011517	315*200	347.80	318.30	338.00	300.00	312.00	197.00	198.00	26.00	299.00	667.00	8

PRODUCT DATA

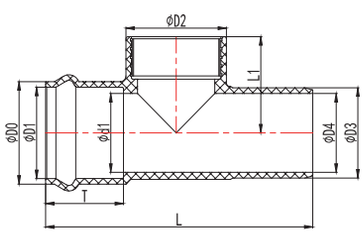
PUSH-FIT SYSTEM (WITH RUBBER RING)

PVC-U TEE WITH FLANGED BRANCH (F/S)



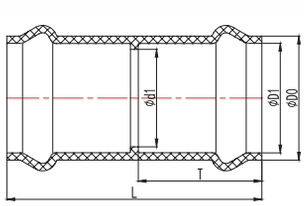
Code	Size DN	Dimensions (mm)											
		D0	D1	D2	D3	D4	d1	d2	T	H1	L1	L	N
4050010901	110	125.70	111.50	224.00	185.00	110.20	108.00	108.00	122.00	19.00	160.00	405.00	8
4050010902	160	181.50	162.30	284.00	235.00	160.30	158.00	158.00	141.00	23.00	195.00	485.00	8
4050010903	200	225.00	202.50	338.00	300.00	200.20	197.00	197.00	152.00	26.00	230.00	555.00	8
4050010904	225	251.50	227.50	344.00	293.00	225.30	221.00	221.00	139.00	29.50	255.00	595.00	8
4050010905	250	276.50	252.30	394.00	250.00	250.30	247.00	247.00	152.00	31.50	280.00	640.00	12
4050010906	315	347.80	318.30	443.00	398.00	315.20	312.00	312.00	198.00	36.00	330.00	785.00	12
4050010907	160*110	181.50	162.30	224.00	185.00	160.30	158.00	108.00	141.00	19.00	192.00	450.00	8
4050010908	200*110	225.00	202.50	224.00	185.00	200.20	197.00	108.00	152.00	19.00	215.00	495.00	8
4050010909	200*160	225.00	202.50	284.00	235.00	200.20	197.00	158.00	152.00	23.00	220.00	515.00	8
4050010910	225*110	251.50	227.50	224.00	185.00	225.30	221.00	108.00	139.00	19.00	233.50	485.00	8
4050010911	225*160	251.50	227.50	284.00	235.00	225.30	221.00	158.00	139.00	23.00	245.00	520.00	8
4050010912	250*110	276.50	252.30	224.00	185.00	250.30	247.00	108.00	152.00	19.00	257.00	515.00	8
4050010913	250*160	276.50	252.30	284.00	235.00	250.30	247.00	158.00	152.00	23.00	257.00	538.00	8
4050010914	250*200	276.50	252.30	338.00	300.00	250.30	247.00	197.00	152.00	26.00	268.50	555.00	8
4050010915	315*110	347.80	318.30	224.00	185.00	315.20	312.00	108.00	198.00	19.00	277.50	595.00	8
4050010916	315*160	347.80	318.30	284.00	235.00	315.20	312.00	158.00	198.00	23.00	288.50	625.00	8
4050010917	315*200	347.80	318.30	338.00	300.00	315.20	312.00	197.00	198.00	26.00	299.00	660.00	8

PVC-U TEE (F/F/S)



Code	Size DN	Dimensions (mm)								
		D0	D1	D2	D3	D4	d1	T	L1	L
4050020101	110*2"	125.70	111.50	80.00	110.20	79.00	108.00	122.00	79.00	335.00
4050020102	160*2"	181.50	162.30	80.00	160.30	140.00	158.00	141.00	102.00	375.00
4050020103	200*2"	225.00	202.50	80.00	202.20	178.00	197.00	152.00	123.00	410.00

PVC-U COUPLING (F/F)

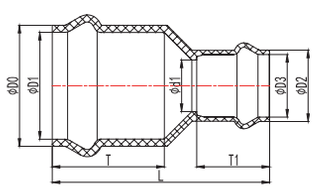


Code	Size DN	Dimensions (mm)				
		D0	D1	d1	T	L
4050011001	63	74.50	65.30	62.00	76.00	158.00
4050011002	75	88.50	77.50	73.50	84.50	177.50
4050011003	90	105.50	92.50	88.50	95.00	200.00
4050011004	110	125.70	111.50	108.00	122.00	280.00
4050011005	160	181.50	162.30	158.00	141.00	303.00
4050011006	200	225.00	202.50	197.00	152.00	310.00
4050011007	225	251.50	227.50	221.00	139.00	362.00
4050011008	250	276.50	252.30	247.00	152.00	382.70
4050011009	315	347.80	318.30	312.00	198.00	484.00
4050011010	355	388.50	356.63	326.00	235.00	384.30

PRODUCT DATA

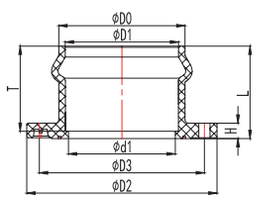
PUSH-FIT SYSTEM (WITH RUBBER RING)

PVC-U REDUCER (F-F)



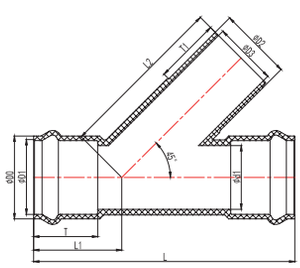
Code	Size DN	Dimensions (mm)							
		D0	D1	D2	D3	d1	T1	T	L
4050011101	75*63	88.50	77.50	74.50	65.30	62.00	76.00	84.50	168.00
4050011102	90*63	105.50	92.50	74.50	65.30	62.00	76.00	95.00	194.00
4050011103	90*75	105.50	92.50	88.50	77.50	73.50	84.50	95.00	200.00
4050011104	110*63	125.70	111.50	74.50	65.30	62.00	76.00	122.00	232.00
4050011105	110*75	125.70	111.50	88.50	77.50	73.50	84.50	122.00	236.00
4050011106	110*90	125.70	111.50	105.50	92.50	88.50	95.00	122.00	238.00
4050011107	160*110	181.50	162.30	125.70	111.50	108.00	122.00	141.00	312.00
4050011108	200*110	225.00	202.50	125.70	111.50	108.00	122.00	152.00	335.50
4050011109	200*160	225.00	202.50	181.50	162.30	158.00	141.00	152.00	300.00
4050011110	225*110	251.50	227.50	125.70	111.50	108.00	122.00	139.00	358.00
4050011111	225*160	251.50	227.50	181.50	162.30	158.00	141.00	139.00	346.00
4050011112	225*200	251.50	227.50	225.00	202.50	197.00	152.00	139.00	389.25
4050011113	250*110	276.50	252.30	125.70	111.50	108.00	122.00	152.00	387.00
4050011114	250*160	276.50	252.30	181.50	162.30	158.00	141.00	152.00	375.50
4050011115	250*200	276.50	252.30	225.00	202.50	197.00	152.00	152.00	389.00
4050011116	250*225	276.50	252.30	251.50	227.50	221.00	139.00	152.00	371.75
4050011117	315*110	347.80	318.30	125.70	111.50	108.00	122.00	198.00	444.60
4050011118	315*160	347.80	318.30	181.50	162.30	158.00	141.00	198.00	436.00
4050011119	315*200	347.80	318.30	225.00	202.50	197.00	152.00	198.00	454.00
4050011120	315*225	347.80	318.30	251.50	227.50	221.00	139.00	198.00	458.00
4050011121	315*250	347.80	318.30	276.50	252.30	247.00	152.00	198.00	458.00
4050011122	355*200	388.50	356.63	225.00	202.50	197.00	152.00	235.00	455.00
4050011123	355*315	388.50	356.63	347.80	318.30	312.00	198.00	235.00	476.00

PVC-U FAUCET FLANGE



Code	Size DN	Dimensions (mm)								
		D0	D1	D2	D3	d1	T	H	L	n
4050011401	63	74.50	65.30	165.00	125.00	62.00	76.00	17.30	84.00	4
4050011402	75	88.50	77.50	185.00	145.00	73.50	84.50	18.00	92.30	4
4050011403	90	105.30	92.50	200.00	160.00	88.50	95.00	18.80	103.00	8
4050011404	110	125.70	111.50	225.00	180.00	108.00	122.00	19.50	134.00	8
4050011405	125	142.10	127.00	250.00	210.00	123.00	135.00	21.60	135.00	8
4050011406	140	160.10	143.00	251.80	195.40	125.90	141.30	20.30	151.40	8
4050011407	160	181.50	162.30	285.00	240.00	158.00	141.00	22.80	150.00	8
4050011408	200	225.50	202.50	345.00	295.00	197.00	152.00	26.50	163.00	8
4050011409	225	250.50	227.50	345.00	295.00	221.00	139.00	30.00	153.50	8
4050011410	250	276.50	252.30	395.00	350.00	247.00	152.00	32.00	167.50	12
4050011411	315	347.50	318.30	445.00	400.00	312.00	198.00	35.00	210.00	12
4050011412	355	388.50	359.00	510.00	460.00	326.00	235.00	38.00	210.00	16
4050011413	400	435.00	404.00	570.00	510.00	568.20	228.00	42.50	247.00	16

PVC-U Y-TEE

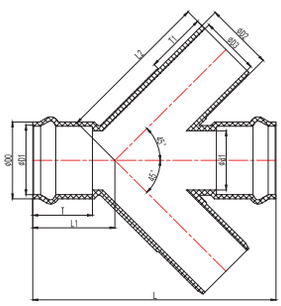


Code	Size DN	Dimensions (mm)									
		D0	D1	D2	D3	d1	T1	T	L1	L2	L
4050011201	110	125.7	111.5	110.2	96	108	125	122	160.8	282	455
4050011202	160	181.5	162.3	160.3	140	158	145	141	194	371.2	575
4050011203	200	225	202.5	200.2	178	197	160	152	215.8	426.5	660
4050011204	250	276.5	252.3	250.3	227	247	180	152	232.5	508.7	739
4050011205	315	347.8	318.3	315.2	288	312	202	198	284	636.8	917

PRODUCT DATA

PUSH-FIT SYSTEM (WITH RUBBER RING)

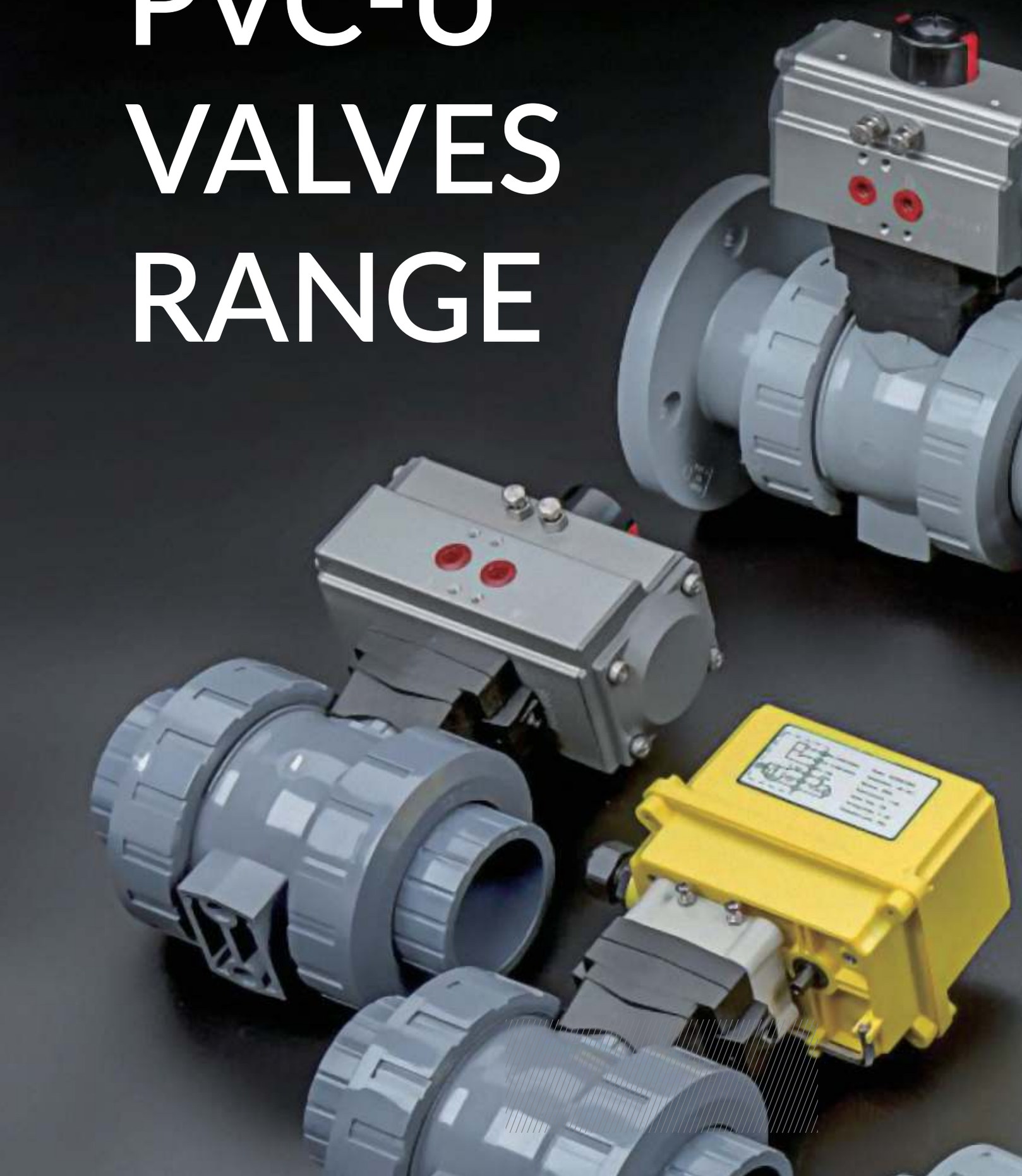
PVC-U LATERAL CROSS (F/F/S/S)

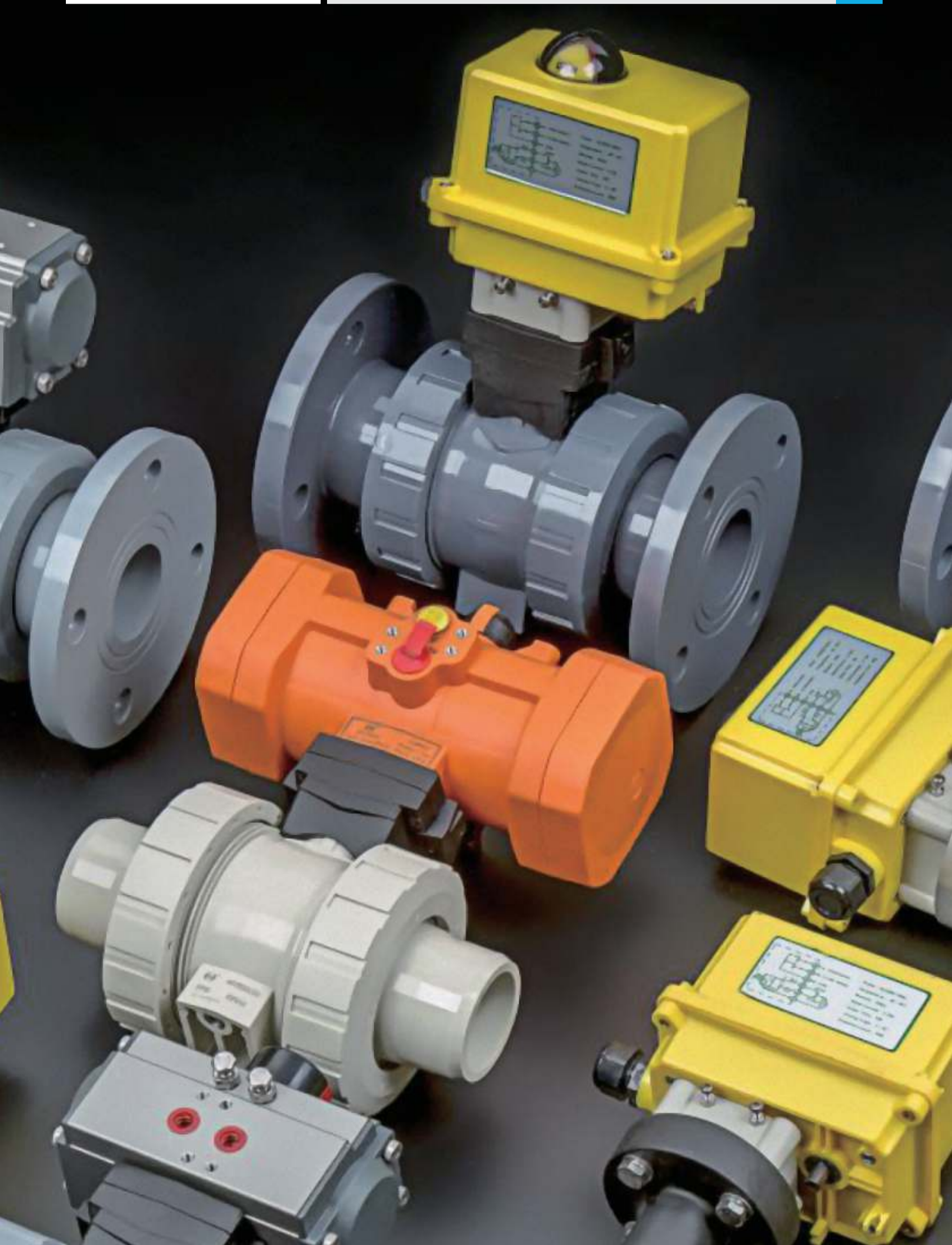


Code	Size DN	Dimensions (mm)									
		D0	D1	D2	D3	d1	T1	T	L1	L2	L
4050011301	110	125.70	111.50	110.20	96.00	108.00	125.00	122.00	160.80	282.00	455.00
4050011302	160	181.50	162.30	160.30	140.00	158.00	145.00	141.00	194.00	371.20	575.00
4050011303	200	225.00	202.50	200.20	178.00	197.00	160.00	152.00	215.80	426.50	660.00
4050011304	250	276.50	252.30	250.30	227.00	247.00	180.00	152.00	232.50	508.70	739.00
4050011305	315	347.80	318.30	315.20	288.00	312.00	202.00	198.00	284.00	636.80	917

MEMO

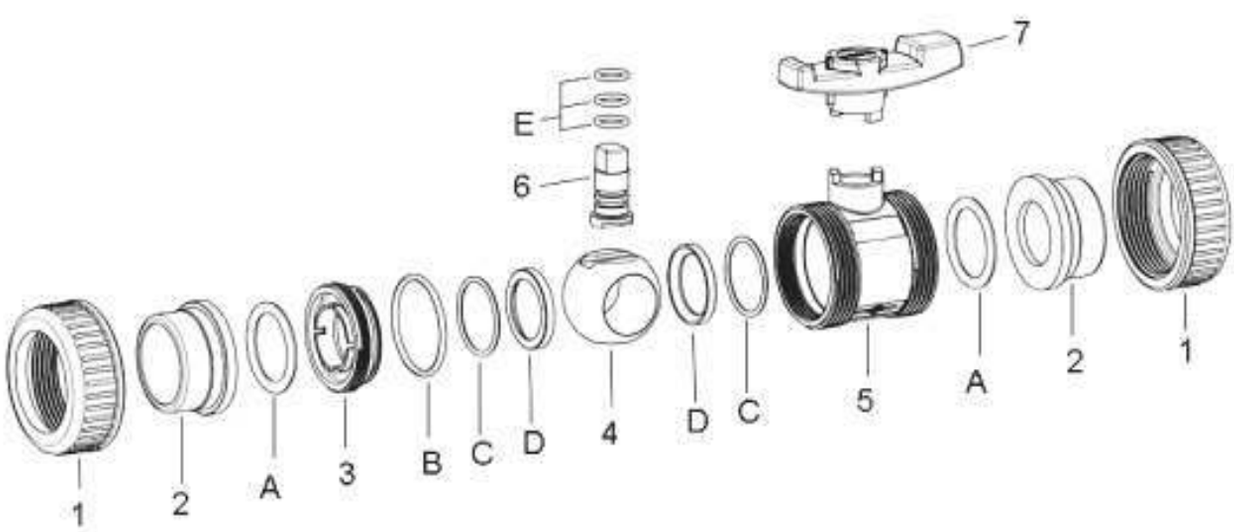
PVC-U VALVES RANGE





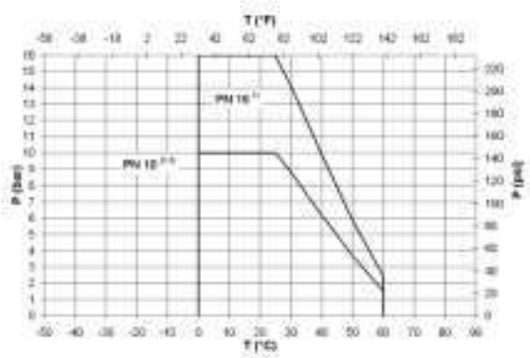
PRODUCT DATA
VALVES

PVC-U DOUBLE UNION BALL VALVE



1- Union nut
2- End connector
3- Union Bushing
4- Ball
5- Body
6- Steam
7- Lever.
A- Face seal
B- Body seal
C- Baking seal
D- Ball seal
E- Stem seal

MAX WORKING PRESSURE:



Comments:

The Pressure-temperature diagrams are based on a service

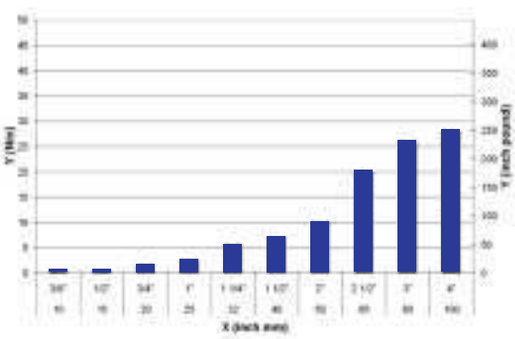
Life of 25 Years and apply to water or similar media.

1) For nominal dimensions of DN10 - DN50. The Central body of the ball valve is designed for nominal pressure Pn16
2) For nominal dimensions of DN65 - DN100. The central body of the ball vValve Is Designed For Nominal pressure PN10
3) Depending on the end connection. At nominal dimensions of DN10 - DN50. The nominal pressure reduces To PNl0

P Permissible operating pressure in bar. Psit

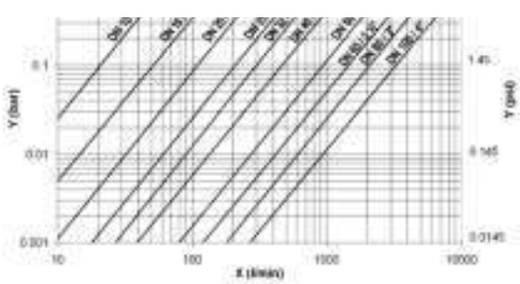
Temperature in °c. °f

TORQUE:



X Nominal Width On (Mm. Inch)
Y Torque (Nm. Inch Pound)
Guide Values At Nominal Pressure

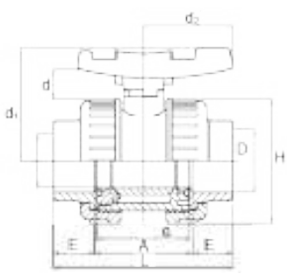
PRESSURE LOSS:



PRODUCT DATA
VALVES

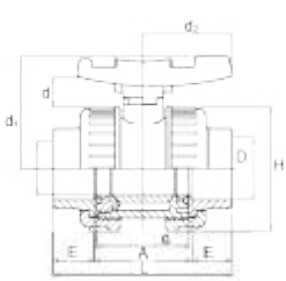
PVC-U DOUBLE UNION BALL VALVE

METRIC /PLAIN



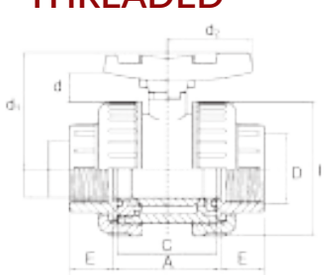
Code	Dimensions (mm)								
	D	I	D1	D2	D	C	E	A	L
501010100101	20	50	51	36	12	42	16	48	80
501010100102	25	59	58	39	15	48	19	53	91
501010100103	32	68	65	45	16	54	22	58	102
501010100104	40	80	76	51	18	62	26	68	120
501010100105	50	94	88	57	21	72	31	78	140
501010100106	63	115	103	66	23	86	38	93	169
501010100107	75	145	124	78	24	110	44	118	206
501010100108	90	168	137	84	26	128	51	140	242
501010100109	110	210	162	96	28	150	61	160	282

IMPERIAL/BS



Code	Dimensions (mm)								
	D	I	D1	D2	D	C	E	A	L
501010100201	1/2"	50	51	36	12	42	16	48	80
501010100202	3/4"	59	58	39	15	48	19	53	91
501010100203	1"	68	65	45	16	54	22	58	102
501010100204	1-1/4"	80	76	51	18	62	26	68	120
501010100205	1-1/2"	94	88	57	21	72	31	78	140
501010100206	2"	115	103	66	23	86	38	93	169
501010100207	2-1/2"	145	124	78	24	110	44	118	206
501010100208	3"	168	137	84	26	128	51	140	242
501010100209	4"	210	162	96	28	150	61	160	282

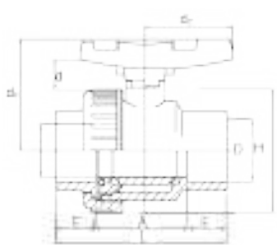
IMPERIAL/ THREADED



Code	Dimensions (mm)								
	D	I	D1	D2	D	C	E	A	L
501010100301	1/2"	50	51	36	12	42	16	48	80
501010100302	3/4"	59	58	39	15	48	19	53	91
501010100303	1"	68	65	45	16	54	22	58	102
501010100304	1-1/4"	80	76	51	18	62	26	68	120
501010100305	1-1/2"	94	88	57	21	72	31	78	140
501010100306	2"	115	103	66	23	86	38	93	169
501010100307	2-1/2"	145	124	78	24	110	44	118	206
501010100308	3"	168	137	84	26	128	51	140	242
501010100309	4"	210	162	96	28	150	61	160	282

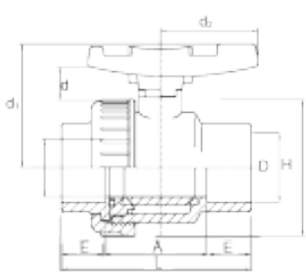
PVC-U SINGLE UNION BALL VALVE

METRIC /PLAIN



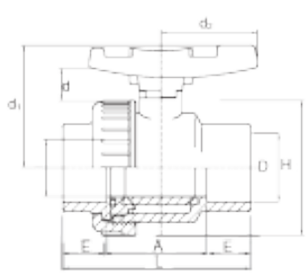
Code	Dimensions (mm)								
	D	I	D1	D2	D	C	E	A	L
501010100401	20	50	51	36	12	42	16	45	77
501010100402	25	59	58	39	15	48	19	50	88
501010100403	32	68	65	45	16	54	22	54	98
501010100404	40	80	76	51	18	62	26	64	116
501010100405	50	94	88	57	21	72	31	74	136
501010100406	65	115	103	66	23	86	38	89	165
501010100407	80	145	124	78	24	110	44	107	195
501010100408	100	168	137	84	26	128	51	130	232
501010100409	110	210	162	96	28	150	61	152	274

IMPERIAL/BS



Code	Dimensions (mm)								
	D	I	D1	D2	D	C	E	A	L
501010100501	1/2"	50	51	36	12	42	16	45	77
501010100502	3/4"	59	58	39	15	48	19	50	88
501010100503	1"	68	65	45	16	54	22	54	98
501010100504	1-1/4"	80	76	51	18	62	26	64	116
501010100505	1-1/2"	94	88	57	21	72	31	74	136
501010100506	2"	115	103	66	23	86	38	89	165
501010100507	2-1/2"	145	124	78	24	110	44	107	195
501010100508	3"	168	137	84	26	128	51	130	232
501010100509	4"	210	162	96	28	150	61	152	274

IMPERIAL/ THREADED

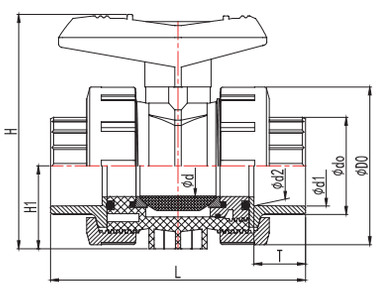


Code	Dimensions (mm)								
	D	I	D1	D2	D	C	E	A	L
501010200101	1/2"	50	51	36	12	42	16	45	77
501010200102	3/4"	59	58	39	15	48	19	50	88
501010200103	1"	68	65	45	16	54	22	54	98
501010200104	1-1/4"	80	76	51	18	62	26	64	116
501010200105	1-1/2"	94	88	57	21	72	31	74	136
501010200106	2"	115	103	66	23	86	38	89	165
501010200107	2-1/2"	145	124	78	24	110	44	107	195
501010200108	3"	168	137	84	26	128	51	130	232
501010200109	4"	210	162	96	28	150	61	152	274

PRODUCT DATA
VALVES

PVC-U SOCKET TRUE UNION BALL VALVE

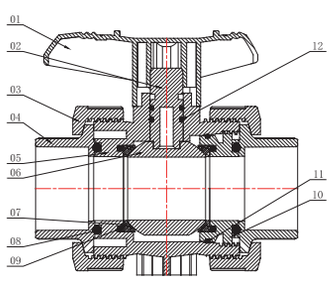
NEW



Code	Size DN	Dimensions (mm)								
		D0	d0	d1	d2	d	T	H1	H	L
501010100501	15(20)	51.50	27.40	20.30	19.95	15.50	17.00	26.30	82.80	95.50
501010100502	20(25)	59.00	32.70	25.30	24.95	20.50	19.50	30.60	92.80	109.10
501010100503	25(32)	70.00	41.30	32.30	31.90	26.00	23.00	39.10	109.20	122.60
501010100504	32(40)	85.40	49.60	40.35	39.90	33.00	27.00	44.20	131.80	147.30
501010100505	40(50)	98.90	60.20	50.35	49.90	39.00	32.00	52.20	143.20	158.80
501010100506	50(63)	122.20	76.00	63.40	62.90	51.00	38.50	71.30	175.70	182.80
501010100507	65(75)	158.60	89.60	75.40	74.90	64.00	44.50	82.80	231.50	234.00
501010100508	80(90)	192.10	105.40	90.50	89.90	81.00	52.00	99.30	260.60	255.00
501010100509	100(110)	223.60	128.40	110.60	109.90	99.00	62.00	115.20	292.10	297.00

Code	Size DN	Dimensions (mm)								
		D0	d0	d1	d2	d	H1	H	T	L
501010100601	1/2"	51.50	27.40	21.54	21.23	15.50	26.30	82.80	23.22	107.90
501010100602	3/4"	59.00	32.70	26.87	26.57	20.50	30.60	92.80	26.40	122.90
501010100603	1"	70.00	41.30	33.66	33.27	26.00	39.10	109.20	29.57	135.70
501010100604	1-1/4"	85.40	49.60	42.42	42.04	33.00	44.20	131.80	32.75	158.80
501010100605	1-1/2"	98.90	60.20	48.56	48.11	39.00	52.20	143.20	32.00	166.80
501010100606	2"	122.20	76.00	60.63	60.17	51.00	71.30	175.70	39.10	182.80
501010100607	2-1/2"	158.60	89.60	73.38	72.85	64.00	82.80	231.50	44.50	236.00
501010100608	3"	192.10	105.40	89.31	88.70	81.00	99.30	260.60	48.60	249.00
501010100609	4"	223.60	128.40	114.76	114.07	99.00	115.20	292.10	58.15	289.00

N0.	Name	Quantity	Material
1	Lever	1	PVC-U/PP
2	Shaft	1	PVC-U
3	Nut	2	PVC-U
4	Faucet	2	PVC-U
5	Body	1	PVC-U
6	Ball	1	PVC-U
7	Ball Seat	2	PTFE
8	O-ring1	2	EPDM
9	O-ring2	2	EPDM
10	Seal Carrier	1	PVC-U
11	O-ring3	1	EPDM
12	O-ring4	2	EPDM

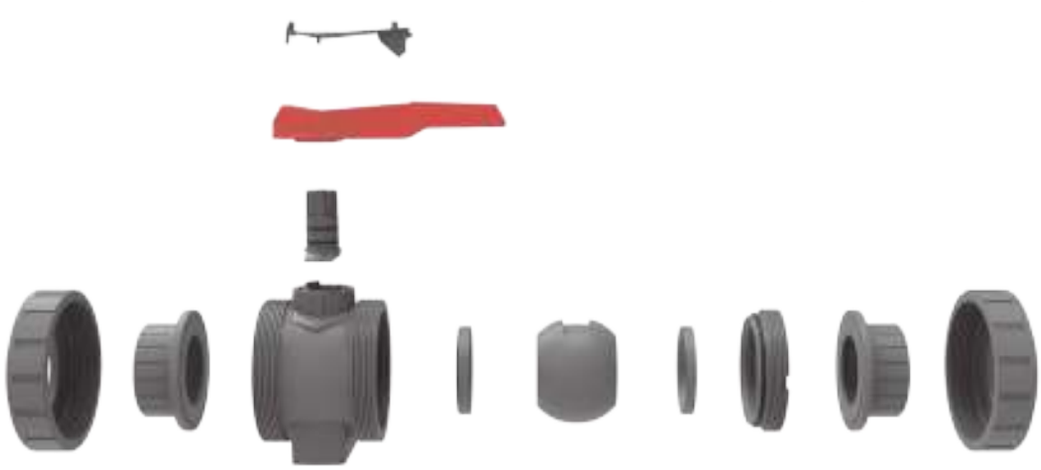


Valve description

1. Material: PVC-U
2. Size: DN15-100
3. Standard: DIN, ASTM
4. Connection: Socket
5. Color: Handle-Red, Body-Dark gray

Product Features

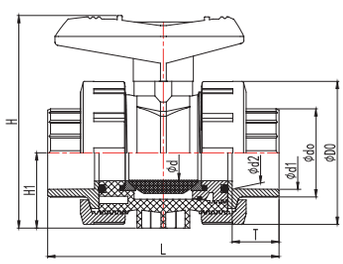
1. Switch torque is small
2. Simple economy
3. The material is nano-modified to improve the pressure resistance and impact resistance of the product
4. Thickened valve body for high compression resistance
5. Valve factory 100% pressure test



PRODUCT DATA
VALVES

PVC-U THREADED TRUE UNION BALL VALVE

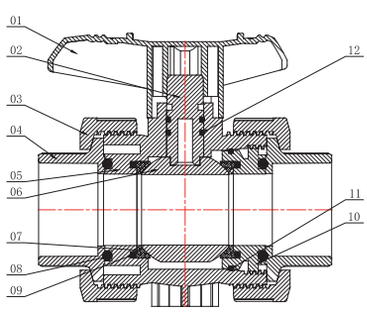
NEW



Code	Size DN	Dimensions (mm)										
		D0	d0	d1	d2	d3	d	H1	H	T	L	Tr
501010200401	1/2"	51.50	30.43	20.95	18.63	16.00	15.50	26.30	82.80	17.00	95.50	1/2"
501010200402	3/4"	59.00	36.30	26.44	24.12	20.60	20.50	30.60	92.80	19.50	109.10	3/4"
501010200403	1"	70.00	44.61	33.25	30.29	26.00	26.00	39.10	109.20	23.00	122.60	1"
501010200404	1-1/4"	85.40	53.87	41.91	38.95	33.00	33.00	44.20	131.80	27.00	147.30	1-1/4"
501010200405	1-1/2"	98.90	61.12	47.80	44.85	39.00	39.00	52.20	143.20	32.00	158.80	1-1/2"
501010200406	2"	122.20	73.83	59.61	56.66	51.00	51.00	71.30	175.70	38.50	182.80	2"
501010200407	2-1/2"	158.60	87.71	75.18	74.23	64.00	64.00	82.80	231.50	44.50	234.00	2-1/2"
501010200408	3"	192.10	106.81	87.88	84.93	81.00	81.00	99.30	260.60	52.00	255.00	3"
501010200409	4"	223.60	133.46	113.03	110.07	99.00	99.00	115.20	292.10	62.00	297.00	4"

Code	Size DN	Dimensions (mm)										
		D0	d0	d1	d2	d3	d	H1	H	T	L	Tr
501010200401	1/2"	51.50	30.43	20.95	18.63	16.00	15.50	26.30	82.80	17.00	95.50	1/2"
501010200402	3/4"	59.00	36.30	26.44	24.12	20.60	20.50	30.60	92.80	19.50	109.10	3/4"
501010200403	1"	70.00	44.61	33.25	30.29	26.00	26.00	39.10	109.20	23.00	122.60	1"
501010200404	1-1/4"	85.40	53.87	41.91	38.95	33.00	33.00	44.20	131.80	27.00	147.30	1-1/4"
501010200405	1-1/2"	98.90	61.12	47.80	44.85	39.00	39.00	52.20	143.20	32.00	158.80	1-1/2"
501010200406	2"	122.20	73.83	59.61	56.66	51.00	51.00	71.30	175.70	38.50	182.80	2"
501010200407	2-1/2"	158.60	87.71	75.18	74.23	64.00	64.00	82.80	231.50	44.50	234.00	2-1/2"
501010200408	3"	192.10	106.81	87.88	84.93	81.00	81.00	99.30	260.60	52.00	255.00	3"
501010200409	4"	223.60	133.46	113.03	110.07	99.00	99.00	115.20	292.10	62.00	297.00	4"

N0.	Name	Quantity	Material
1	Lever	1	PVC-U/PP
2	Shaft	1	PVC-U
3	Nut	2	PVC-U
4	Faucet	2	PVC-U
5	Body	1	PVC-U
6	Ball	1	PVC-U
7	Ball Seat	2	PTFE
8	O-ring1	2	EPDM
9	O-ring2	2	EPDM
10	Seal Carrier	1	PVC-U
11	O-ring3	1	EPDM
12	O-ring4	2	EPDM

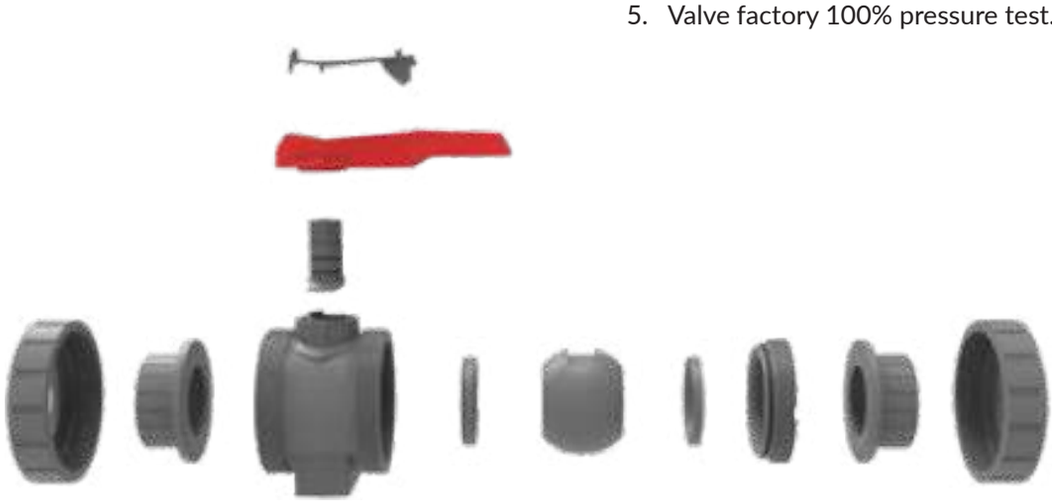


Valve description

1. Material: PVC-U
2. Size: DN15-100 1/ 2” -4”
3. Standard: DIN, ASTM
4. Connection: Threaded
5. Color: Handle-Red, Body-Dark gray

Product Features

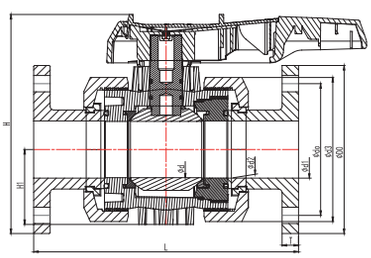
1. Switch torque is small.
2. Simple economy.
3. The material is nano-modified to improve the pressure resistance and impact resistance of the product.
4. Thickened valve body for high compression resistance.
5. Valve factory 100% pressure test.



PRODUCT DATA
VALVES

PVC-U FLANGED TRUE UNION BALL VALVE

NEW

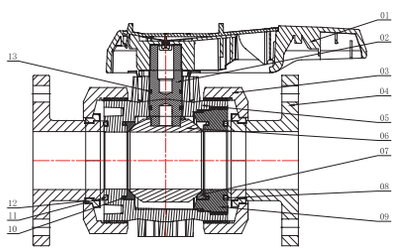


Code	Size DN	Dimensions (mm)									
		D0	d0	d1	d2	d3	d	H1	H	T	L
501010100701	15(20)	95.00	65.00	20.30	19.95	51.50	15.50	26.30	103.90	13.00	143.00
501010100702	20(25)	105.00	75.00	25.30	24.95	59.00	20.50	30.60	114.66	14.00	172.00
501010100703	25(32)	115.00	85.00	32.30	31.90	70.00	26.00	39.10	127.56	15.00	187.00
501010100704	32(40)	140.00	100.00	40.35	39.90	85.40	33.00	44.20	157.51	15.00	190.00
501010100705	40(50)	150.00	110.00	50.35	49.90	98.90	39.00	52.20	166.00	17.00	212.00
501010100706	50(63)	165.00	125.00	63.40	62.90	122.20	51.00	71.30	197.50	17.00	234.00
501010100707	65(75)	185.00	145.00	75.40	74.90	158.60	64.00	82.80	241.20	18.00	290.00
501010100708	80(90)	200.00	160.00	90.50	89.90	192.10	81.00	99.30	261.20	18.00	310.00
501010100709	100(110)	220.00	180.00	110.60	109.90	223.60	99.00	115.20	286.68	18.00	372.00

Valve description
1. Material: PVC-U
2. Size: DN15-100
3. Standard: DIN
4. Connection: Flanged
5. Color: Handle-Red, Body-Dark gray

Product Features
1. Switch torque is small.
2. Simple economy.
3. The material is nano-modified to improve the pressure resistance and impact resistance of the product.
4. Thickened valve body for high compression resistance.
5. Factory 100% pressure test

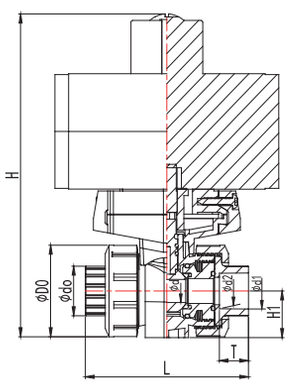
N0.	Name	Quantity	Material
01	Lever	1	PVC-U/PP
02	Shaft	1	PVC-U
03	Nut	2	PVC-U
04	Flange	2	PVC-U
05	Body	1	PVC-U
06	Ball	1	PVC-U
07	Ball Seat	2	PTFE
08	O-ring1	2	EPDM
09	Seal Carrier	1	PVC-U
10	O-ring2	2	EPDM
11	O-ring3	1	EPDM
12	Fixed snap ring	2	PVC-U
13	O-ring4	2	EPDM



PRODUCT DATA
VALVES

PVC-U PNEUMATIC SOCKET TRUE UNION BALL VALVE

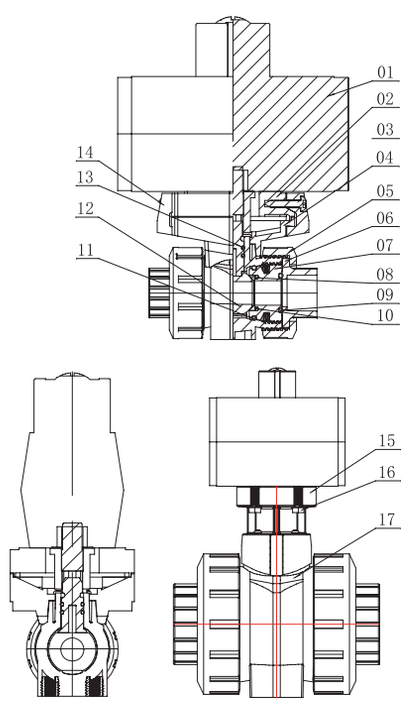
NEW



Code	Size DN	Dimensions (mm)								
		D0	d0	d1	d2	d	H1	H	T	L
501020100101	15(20)	51.50	27.40	20.30	19.95	15.50	26.30	156.50	17.00	95.50
501020100102	20(25)	59.00	32.70	25.30	24.95	20.50	30.60	194.00	19.50	109.10
501020100103	25(32)	70.00	41.30	32.30	31.90	26.00	39.10	210.00	23.00	122.60
501020100104	32(40)	85.40	49.60	40.35	39.90	33.00	44.20	243.40	27.00	147.30
501020100105	40(50)	98.90	60.20	50.35	49.90	39.00	52.20	268.90	32.00	158.80
501020100106	50(63)	122.20	76.00	63.40	62.90	51.00	71.30	301.20	38.50	182.80
501020100107	65(75)	158.60	89.60	75.40	74.90	64.00	82.80	373.60	44.50	234.00
501020100108	80(90)	192.10	105.40	90.50	89.90	81.00	99.30	430.10	52.00	255.00
501020100109	100(110)	223.60	128.40	110.60	109.90	99.00	115.20	493.60	62.00	297.00

Code	Size DN	Dimensions (mm)								
		D	d0	d1	d2	d	H1	H	T	L
501020100201	1/2"	51.50	27.40	21.54	21.23	15.50	26.30	156.50	23.22	107.90
501020100202	3/4"	59.00	32.70	26.87	26.57	20.50	30.60	194.00	26.40	122.90
501020100203	1"	70.00	41.30	33.66	33.27	26.00	39.10	210.00	29.57	135.70
501020100204	1-1/4"	85.40	49.60	42.42	42.04	33.00	44.20	243.40	32.75	158.80
501020100205	1-1/2"	98.90	60.20	48.56	48.11	39.00	52.20	268.90	32.00	166.80
501020100206	2"	122.20	76.00	60.63	60.17	51.00	71.30	301.20	39.10	182.80
501020100207	2-1/2"	158.60	89.60	73.38	72.85	64.00	82.80	373.60	44.50	236.00
501020100208	3"	192.10	105.40	89.31	88.70	81.00	99.30	430.10	48.60	249.00
501020100209	4"	223.60	128.40	114.76	114.07	99.00	115.20	493.60	58.15	289.00

N0.	Name	Quantity	Material
01	Pneumatic Actuator	1	Aluninum alloy/plastic
02	Connector top cover	1	PP
03	Bolt	2	Stainless steel 304
04	Connector bottom cover	1	PP
05	Nut	2	PVC-U
06	Faucet	2	PVC-U
07	Seal Carrier	1	PVC-U
08	Ball Seat	2	PTFE
09	O-ring1	2	EPDM
10	O-ring2	2	EPDM
11	O-ring3	1	EPDM
12	Ball	1	PVC-U
13	O-ring4	2	EPDM
14	Fixed buckle	2	PP
15	Connection	1	PP
16	Bolt	4	Stainless steel 304
17	Body	1	PVC-U



Valve description

1. Material: PVC-U
2. Size: DN15-100 1/ 2” -4”
3. Standard: DIN, ASTM
4. Connection: Socket
5. Color: Gray

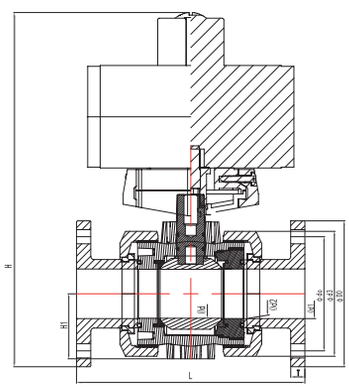
Product Features

1. Switch torque is small.
2. Simple economy.
3. The material is nano-modified to improve the pressure resistance and impact resistance of the product.
4. Thickened valve body for high compression resistance.
5. Factory 100% pressure test
6. Actuator performs 500,000 opening and closing tests.
7. Optional single-acting actuator and various solenoid valves, return positions witch.

PRODUCT DATA
VALVES

PVC-U PNEUMATIC FLANGED UNION BALL VALVE

NEW



Code	Size DN	Dimensions (mm)								
		D0	d0	d1	d2	d	H1	H	T	L
501020300101	15(20)	95.00	65.00	20.30	19.95	15.50	26.30	178.25	13.00	143.00
501020300102	20(25)	105.00	75.00	25.30	24.95	20.50	30.60	217.00	14.00	172.00
501020300103	25(32)	115.00	85.00	32.30	31.90	26.00	39.10	232.50	15.00	187.00
501020300104	32(40)	140.00	100.00	40.35	39.90	33.00	44.20	270.70	15.00	190.00
501020300105	40(50)	150.00	110.00	50.35	49.90	39.00	52.20	294.45	17.00	212.00
501020300106	50(63)	165.00	125.00	63.40	62.90	51.00	71.30	322.60	17.00	234.00
501020300107	65(75)	185.00	145.00	75.40	74.90	64.00	82.80	386.80	18.00	290.00
501020300108	80(90)	200.00	160.00	90.50	89.90	81.00	99.30	434.05	18.00	310.00
501020300109	100(110)	220.00	180.00	110.60	109.90	99.00	115.20	491.80	18.00	372.00

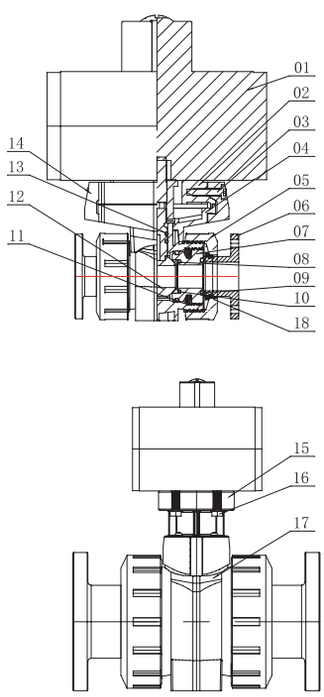
Valve description

1. Material: PVC-U
2. Size: DN15-100
3. Standard: DIN
4. Connection: Flanged
5. Color: Gray

Product Features

1. Switch torque is small.
2. Simple economy.
3. The material is nano-modified to improve the pressure resistance and impact resistance of the product.
4. Thickened valve body for high compression resistance
5. Factory 100% pressure test.
6. Optional single-acting actuator and various solenoid valves, return position switch.

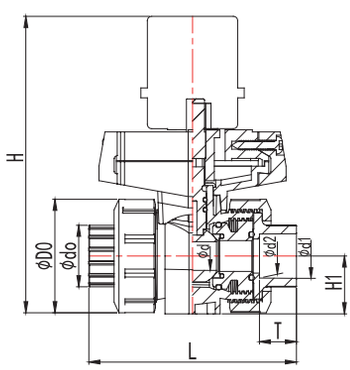
N0.	Name	Quantity	Material
01	Pneumatic Actuator	1	Aluminium alloy/Plastic
02	Connector top cover	1	PP
03	Bolt	2	Stainless steel 304
04	Connector bottom cover	1	PP
05	Nut	2	PVC-U
06	Flange	2	PVC-U
07	Seal Carrier	1	PVC-U
08	Ball Seat	2	PTFE
09	O-ring1	2	EPDM
10	O-ring2	2	EPDM
11	O-ring3	1	EPDM
12	Ball	1	PVC-U
13	O-ring4	2	EPDM
14	Fixed buckle	2	PP
15	Connection	1	PP
16	Bolt	4	Stainless steel 304
17	Body	1	PVC-U
18	Snap ring	2	PVC-U



PRODUCT DATA
VALVES

PVC-U PNEUMATIC THREADED TRUE UNION BALL VALVE

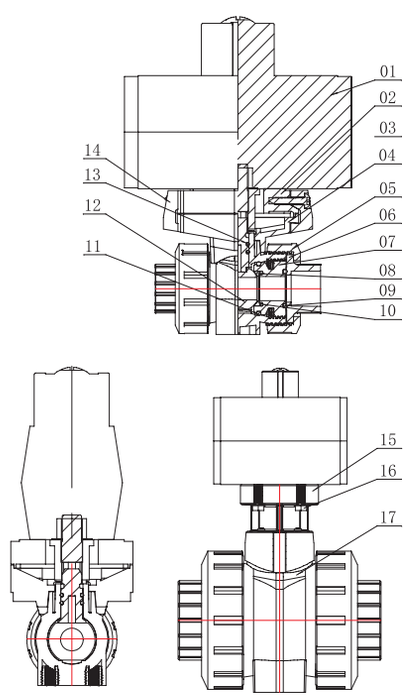
NEW



Code	Size DN	Dimensions (mm)								
		D0	d0	d1	d2	d	H1	H	T	L
501020200501	15(20)	51.50	30.43	20.95	18.63	15.50	26.30	156.50	17.00	95.50
501020200502	20(25)	59.00	36.30	26.44	24.12	20.50	30.60	194.00	19.50	109.10
501020200503	25(32)	70.00	44.61	33.25	30.29	26.00	39.10	210.00	23.00	122.60
501020200504	32(40)	85.40	53.87	41.91	38.95	33.00	44.20	243.40	27.00	147.30
501020200505	40(50)	98.90	61.12	47.80	44.85	39.00	52.20	268.90	32.00	158.80
501020200506	50(63)	122.20	73.83	59.61	56.66	51.00	71.30	301.20	38.50	182.80
501020200507	65(75)	158.60	87.71	75.18	74.23	64.00	82.80	373.60	44.50	234.00
501020200508	80(90)	192.10	106.81	87.88	84.93	81.00	99.30	430.10	52.00	255.00
501020200509	100(110)	223.60	133.46	113.03	110.07	99.00	115.20	493.60	62.00	297.00

Code	Size DN	Dimensions (mm)								
		D	d0	d1	d2	d	H1	H	T	L
501020200601	1/2"	51.50	30.43	20.95	18.63	15.50	26.30	156.50	17.00	95.50
501020200602	3/4"	59.00	36.30	26.44	24.12	20.50	30.60	194.00	19.50	109.10
501020200603	1"	70.00	44.61	33.25	30.29	26.00	39.10	210.00	23.00	122.60
501020200604	1-1/4"	85.40	53.87	41.91	38.95	33.00	44.20	243.40	27.00	147.30
501020200605	1-1/2"	98.90	61.12	47.80	44.85	39.00	52.20	268.90	32.00	158.80
501020200606	2"	122.20	73.83	59.61	56.66	51.00	71.30	301.20	38.50	182.80
501020200607	2-1/2"	158.60	87.71	75.18	74.23	64.00	82.80	373.60	44.50	234.00
501020200608	3"	192.10	106.81	87.88	84.93	81.00	99.30	430.10	52.00	255.00
501020200609	4"	223.60	133.46	113.03	110.07	99.00	115.20	493.60	62.00	297.00

N0.	Name	Quantity	Material
01	Pneumatic Actuator	1	Aluninum alloy/plastic
02	Connector top cover	1	PP
03	Bolt	2	Stainless steel 304
04	Connector bottom cover	1	PP
05	Nut	2	PVC-U
06	Faucet	2	PVC-U
07	Seal Carrier	1	PVC-U
08	Ball Seat	2	PTFE
09	O-ring1	2	EPDM
10	O-ring2	2	EPDM
11	O-ring3	1	EPDM
12	Ball	1	PVC-U
13	O-ring4	2	EPDM
14	Fixed buckle	2	PP
15	Connection	1	PP
16	Bolt	4	Stainless steel 304
17	Body	1	PVC -U



Valve Description

1. Material: PVC-U
2. Size: DN15-100 1/ 2” -4”
3. Standard: DIN, ASTM
4. Connection: Threaded
5. Color, Body: Gray

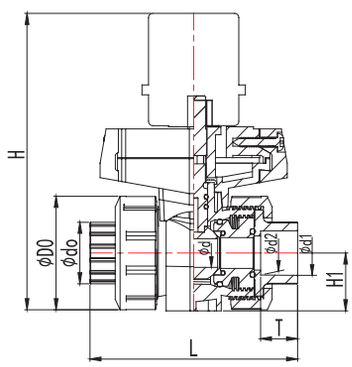
Product Features

1. Switch torque is small.
2. Simple economy.
3. The material is nano-modified to improve the pressure resistance and impact resistance of theproduct.
4. Thickened valve body for high compression resistance.
5. Factory 100% pressure test.
6. Optional single-acting actuator and various solenoid valves, return position switch.

PRODUCT DATA
VALVES

PVC-U ELECTRIC SOCKET TRUE UNION BALL VALVE

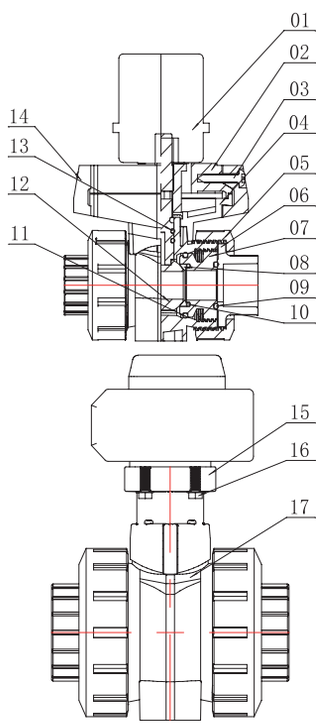
NEW



Code	Size DN	Dimensions (mm)								
		D0	d0	d1	d2	d	H1	H	T	L
501030100101	15(20)	51.50	27.40	20.30	19.95	15.50	26.30	201.50	17.00	95.50
501030100102	20(25)	59.00	32.70	25.30	24.95	20.50	30.60	209.00	19.50	109.10
501030100103	25(32)	70.00	41.30	32.30	31.90	26.00	39.10	220.00	23.00	122.60
501030100104	32(40)	85.40	49.60	40.35	39.90	33.00	44.20	235.40	27.00	147.30
501030100105	40(50)	98.90	60.20	50.35	49.90	39.00	52.20	248.90	32.00	158.80
501030100106	50(63)	122.20	76.00	63.40	62.90	51.00	71.30	272.20	38.50	182.80
501030100107	65(75)	158.60	89.60	75.40	74.90	64.00	82.80	353.60	44.50	234.00
501030100108	80(90)	192.10	105.40	90.50	89.90	81.00	99.30	397.10	52.00	255.00
501030100109	100(110)	223.60	128.40	110.60	109.90	99.00	115.20	438.60	62.00	297.00

Code	Size DN	Dimensions (mm)								
		D	d0	d1	d2	d	H1	H	T	L
501030100201	1/2"	51.50	27.40	21.54	21.23	15.50	26.30	201.50	23.22	107.90
501030100202	3/4"	59.00	32.70	26.87	26.57	20.50	30.60	209.00	26.40	122.90
501030100203	1"	70.00	41.30	33.66	33.27	26.00	39.10	220.00	29.57	135.70
501030100204	1-1/4"	85.40	49.60	42.42	42.04	33.00	44.20	235.40	32.75	158.80
501030100205	1-1/2"	98.90	60.20	48.56	48.11	39.00	52.20	248.90	32.00	166.80
501030100206	2"	122.20	76.00	60.63	60.17	51.00	71.30	272.20	39.10	182.80
501030100207	2-1/2"	158.60	89.60	73.38	72.85	64.00	82.80	353.60	44.50	236.00
501030100208	3"	192.10	105.40	89.31	88.70	81.00	99.30	397.10	48.60	249.00
501030100209	4"	223.60	128.40	114.76	114.07	99.00	115.20	438.60	58.15	289.00

N0.	Name	Quantity	Material
01	Electric Actuator	1	Aluninum alloy/plastic
02	Connector top cover	1	PP
03	Bolt	2	Stainless steel 304
04	Connector bottom cover	1	PP
05	Nut	2	PVC-U
06	Faucet	2	PVC-U
07	Seal Carrier	1	PVC-U
08	Ball Seat	2	PTFE
09	O-ring1	2	EPDM
10	O-ring2	2	EPDM
11	O-ring3	1	EPDM
12	Ball	1	PVC-U
13	O-ring4	2	EPDM
14	Fixed buckle	2	PP
15	Connection	1	PP
16	Bolt	4	Stainless steel 304
17	Body	1	PVC-U



Valve Description

1. Material: PVC-U
2. Size: DN15-100 1/ 2” -4”
3. Standard: DIN, ASTM
4. Connection: Socket
5. Color, Body: Gray

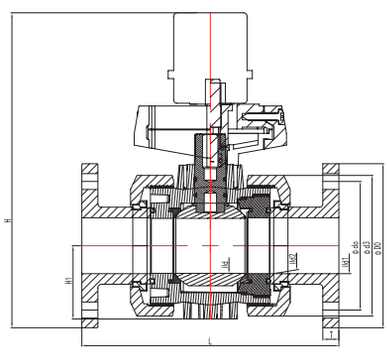
Product Features

1. Switch torque is small.
2. Simple economy.
3. The material is nano-modified to improve the pressure resistance and impact resistance of theproduct.
4. Thickened valve body for high compression resistance.
5. Valve factory 100% pressure test.
6. Optional adjustment, explosion-proof and various voltage actuators.

PRODUCT DATA
VALVES

PVC-U ELECTRIC FLANGED TRUE UNION BALL VALVE

NEW



Code	Size DN	Dimensions (mm)								
		D0	d0	d1	d2	d	H1	H	T	L
501030300101	15(20)	95.00	65.00	20.30	19.95	15.50	26.30	223.25	13.00	143.00
501030300102	20(25)	105.00	75.00	25.30	24.95	20.50	30.60	232.00	14.00	172.00
501030300103	25(32)	115.00	85.00	32.30	31.90	26.00	39.10	242.50	15.00	187.00
501030300104	32(40)	140.00	100.00	40.35	39.90	33.00	44.20	262.70	15.00	190.00
501030300105	40(50)	150.00	110.00	50.35	49.90	39.00	52.20	274.45	17.00	212.00
501030300106	50(63)	165.00	125.00	63.40	62.90	51.00	71.30	293.60	17.00	234.00
501030300107	65(75)	185.00	145.00	75.40	74.90	64.00	82.80	366.80	18.00	290.00
501030300108	80(90)	200.00	160.00	90.50	89.90	81.00	99.30	401.05	18.00	310.00
501030300109	100(110)	220.00	180.00	110.60	109.90	99.00	115.20	436.80	18.00	372.00

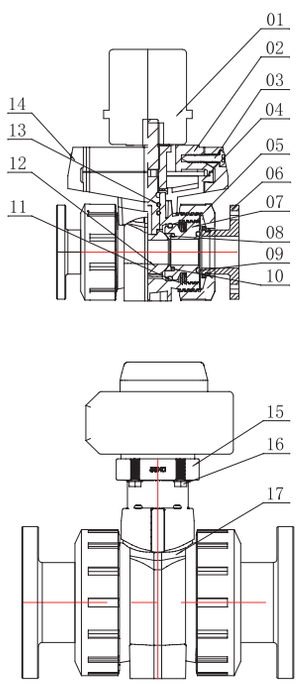
Valve Description

1. Material:
2. Size: DN15-100
3. Standard: DIN
4. Connection: Flanged
5. Color, Body: Gray

Product Features

1. Switch torque is small.
2. Simple economy.
3. The material is nano-modified to improve the pressure resistance and impact resistance of the product.
4. Thickened valve body for high compression resistance.
5. Valve factory 100% pressure test.
6. Optional adjustment, explosion-proof and various voltage actuators.

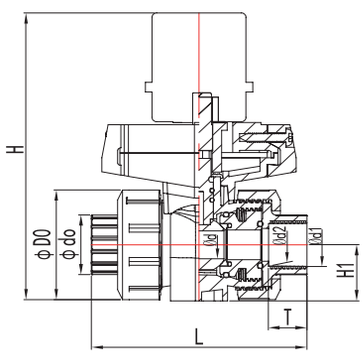
N0.	Name	Quantity	Material
01	Electric Actuator	1	Aluninum alloy/plastic
02	Connector top cover	1	PP
03	Bolt	2	Stainless steel 304
04	Connector bottom cover	1	PP
05	Nut	2	PVC-U
06	Flange	2	PVC-U
07	Seal Carrier	1	PVC-U
08	Ball Seat	2	PTFE
09	O-ring1	2	EPDM
10	O-ring2	2	EPDM
11	O-ring3	1	EPDM
12	Ball	1	PVC-U
13	O-ring4	2	EPDM
14	Fixed buckle	2	PP
15	Connection	1	PP
16	Bolt	4	Stainless steel 304
17	Body	1	PVC-U
18	Snap ring	2	PVC-U



PRODUCT DATA
VALVES

PVC-U ELECTRIC THREADED TRUE UNION BALL VALVE

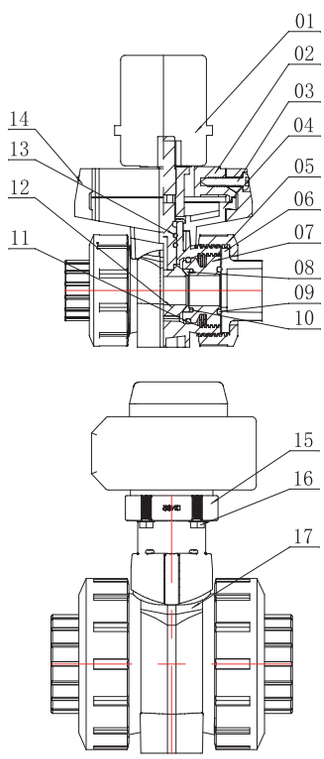
NEW



Code	Size DN	Dimensions (mm)								
		D0	d0	d1	d2	d	H1	H	T	L
501030200101	15(20)	51.50	30.43	20.95	18.63	15.50	26.30	201.50	17.00	95.50
501030200102	20(25)	59.00	36.30	26.44	24.12	20.50	30.60	209.00	19.50	109.10
501030200103	25(32)	70.00	44.61	33.25	30.29	26.00	39.10	220.00	23.00	122.60
501030200104	32(40)	85.40	53.87	41.91	38.95	33.00	44.20	235.40	27.00	147.30
501030200105	40(50)	98.90	61.12	47.80	44.85	39.00	52.20	248.90	32.00	158.80
501030200106	50(63)	122.20	73.83	59.61	56.66	51.00	71.30	272.20	38.50	182.80
501030200107	65(75)	158.60	87.71	75.18	74.23	64.00	82.80	353.60	44.50	234.00
501030200108	80(90)	192.10	106.81	87.88	84.93	81.00	99.30	397.10	52.00	255.00
501030200109	100(110)	223.60	133.46	113.03	110.07	99.00	115.20	438.60	62.00	297.00

Code	Size DN	Dimensions (mm)								
		D0	d0	d1	d2	d	H1	H	T	L
501030200201	1/2"	51.50	30.43	20.95	18.63	15.50	26.30	201.50	17.00	95.50
501030200202	3/4"	59.00	36.30	26.44	24.12	20.50	30.60	209.00	19.50	109.10
501030200203	1"	70.00	44.61	33.25	30.29	26.00	39.10	220.00	23.00	122.60
501030200204	1-1/4"	85.40	53.87	41.91	38.95	33.00	44.20	235.40	27.00	147.30
501030200205	1-1/2"	98.90	61.12	47.80	44.85	39.00	52.20	248.90	32.00	158.80
501030200206	2"	122.20	73.83	59.61	56.66	51.00	71.30	272.20	38.50	182.80
501030200207	2-1/2"	158.60	87.71	75.18	74.23	64.00	82.80	353.60	44.50	234.00
501030200208	3"	192.10	106.81	87.88	84.93	81.00	99.30	397.10	52.00	255.00
501030200209	4"	223.60	133.46	113.03	110.07	99.00	115.20	438.60	62.00	297.00

N0.	Name	Quantity	Material
01	Eletric Actuator	1	Aluninum alloy/plastic
02	Connector top cover	1	PP
03	Bolt	2	Stainless steel 304
04	Connector bottom cover	1	PP
05	Nut	2	PVC-U
06	Faucet	2	PVC-U
07	Seal Carrier	1	PVC-U
08	Ball Seat	2	PTFE
09	O-ring1	2	EPDM
10	O-ring2	2	EPDM
11	O-ring3	1	EPDM
12	Ball	1	PVC-U
13	O-ring4	2	EPDM
14	Fixed buckle	2	PP
15	Connection	1	PP
16	Bolt	4	Stainless steel 304
17	Body	1	PVC-U



Valve Description

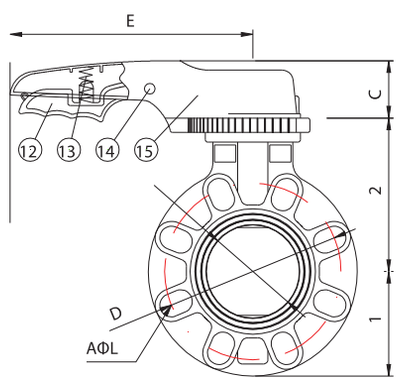
1. Material: PVC-U
2. Size: DN15-100 1/ 2” -4”
3. Standard: DIN, ASTM
4. Connection: Threaded
5. Color, Body: Gray

Product Features

1. Switch torque is small.
2. Simple economy.
3. The material is nano-modified to improve the pressure resistance and impact resistance of theproduct.
4. Thickened valve body for high compression resistance.
5. Factory 100% pressure test.
6. Optional single-acting actuator and various solenoid valves, return position switch.

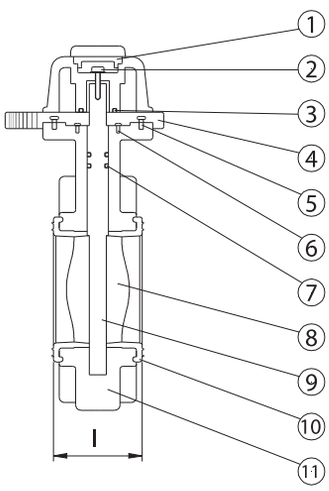
PRODUCT DATA
VALVES

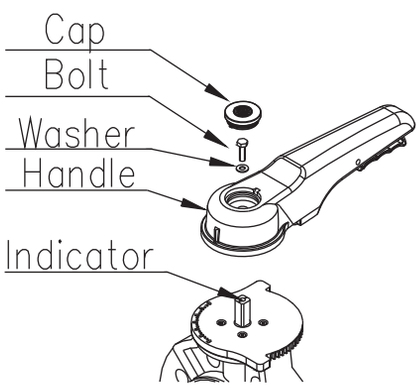
PVC-U BUTTERFLY VALVE



Code	Dimensions (mm)								
	D	I	D1	D2	D	C	E	A	L
5020100101	40 (1-1/2")	39	75	100	45	56	220	4	18
5020100102	50 (2")	42	83	110	56	56	220	4	18
5020100103	65 (2-1/2")	46	93	120	69	56	220	4	18
5020100104	480 (3")	46	106	135	77	56	250	8	18
5020100105	100 (4")	56	119	150	102	56	250	8	18
5020100106	125 (5")	66	132	168	129	69	320	8	18
5020100107	150 (6")	71	143	183	150	69	320	8	22
5020100108	200 (8")	87	170	214	195	69	400	8	22

N0.	Name
01	Cap
02	Bolt
03	O-ring
04	Locking Plate
05	Screw
06	Screw
07	O-ring
08	Disc
09	stem
10	Seat
11	Body
12	Hand Lever
13	Spring
14	Pin
15	Handle





Valve Description

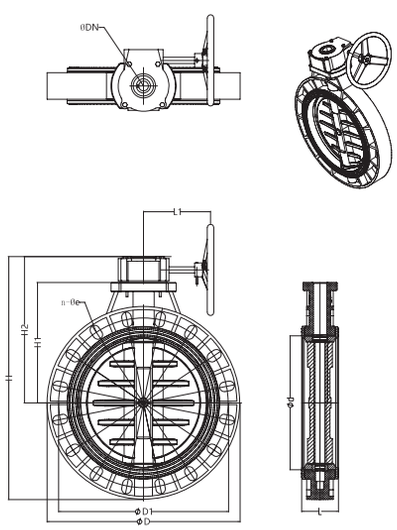
1. Material: PVC-U
2. Size: DN50-200
3. Standard: DIN
4. Connection: Flange
5. Color: handle red, Body: dark gray

Product Features

1. Meet drinking water standards.
2. Switch torque is small.
3. Parts can be replaced, simple and economical.
4. The material is nano-modified to improve the pressure resistance and impact resistance of the product.
5. Thickened valve body for high compression resistance.
6. Valve factory 100% pressure test.
7. And a sealing body specially treated, better performance.

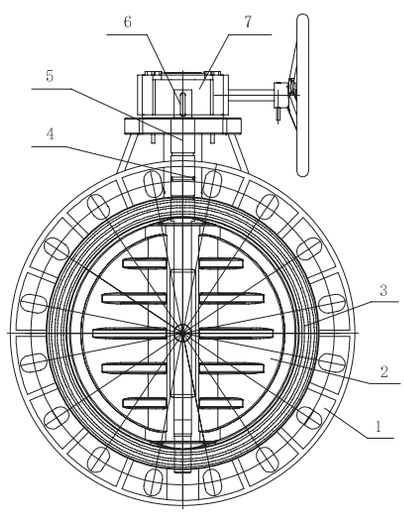
PRODUCT DATA
VALVES

PVC-U BUTTERFLY GEAR BOX VALVE



Code	Size DN	Dimensions (mm)										Nominal Pressure PN(kg/cm²)
		D	D1	d	L	DN	L1	H1	H2	H	n-Φe	
5020100201	100(110)	229.60	180.00	111.90	46.00	70.00	216.00	156.20	205.15	320.00	8-19	PN10
5020100202	125(140)	255.00	210.00	137.90	53.00	70.00	216.00	174.00	222.90	350.40	8-19	PN10
5020100203	150(160)	281.50	240.00	157.35	59.40	70.00	216.00	190.00	250.63	391.35	8-23	PN10
5020100204	200(225)	342.60	295.00	214.20	76.00	70 /102	190.00	229.00	299.00	470.00	8-23	PN10
5020100205	250(280)	409.65	355.00	250.00	85.00	102.00	190.00	264.00	334.00	540.00	12-22	PN8
5020100206	300(315)	483.55	400.00	290.00	92.00	102.00	190.00	301.50	371.50	613.00	12-22	PN8
5020100207	350(355)	510.00	450.00	370.00	95.00	102.00	190.00	330.00	410.00	660.00	16-27	PN6
5020100208	400(400)	570.00	500.00	420.00	95.00	140.00	190.00	360.00	440.00	730.00	16-30	PN6

NO.	Name	Quantity	Material
01	Body	1	PVC-U
02	Disc	1	PVC-U
03	Seat seal	1	EPDM
04	O-ring	3	EPDM
05	Shaft	1	STEEL
06	Key pin	1	STEEL
07	Gear	1	STEEL



Valve Description

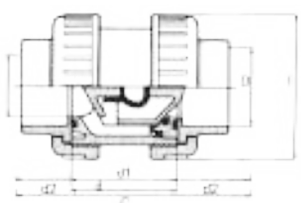
1. Material: PVC-U
2. Size: DN100-400
3. Standard: DIN
4. Connection: Flange
5. Color: turbine head black, Body: dark gray

Product Features

1. Meet drinking water standards.
2. Switch torque is small.
3. Parts can be replaced, simple and economical.
4. The material is nano-modified to improve the pressure resistance and impact resistance of the product.
5. Thickened valve body for high compression resistance.
6. Valve factory 100% pressure test.
7. And a sealing body specially treated, better performance.

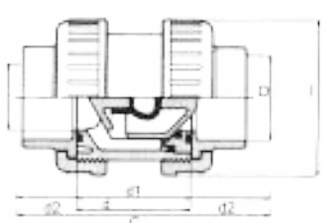
PRODUCT DATA
VALVES

DOUBLE UNION CHECK VALVE METRIC - PLAIN



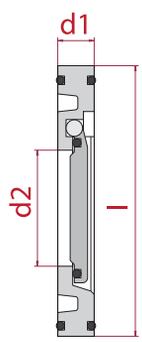
Code	Dimensions (mm)					
	D	I	D1	D2	D	C
5030100801	20	50	42	16	48	80
5030100802	25	59	48	19	53	91
5030100803	32	68	54	22	58	102
5030100804	40	80	62	26	68	120
5030100805	50	94	72	31	78	140
5030100806	63	115	86	38	93	169
5030100807	75	145	110	44	118	206
5030100808	90	168	128	51	140	242

DOUBLE UNION CHECK VALVE IMPERIAL - THREADED



Code	Dimensions (mm)					
	D	I	D1	D2	D	C
5030100901	1/2"	50	42	16	48	80
5030100902	3/4"	59	48	19	53	91
5030100903	1"	68	54	22	58	102
5030100904	1-1/4"	80	62	26	68	120
5030100905	1-1/2"	94	72	31	78	140
5030100906	2"	115	86	38	93	169
5030100907	2-1/2"	145	110	44	118	206
5030100908	3"	168	128	51	140	242

PVC-U GATE CHECK VALVE

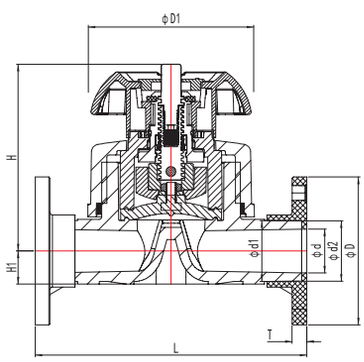


Code	Dimensions (mm)			
	D	l	D1	D2
5030200101	63	109	20	32
5030200102	75	129	20	40
5030200103	90	144	20	52
5030200104	110	164	22	70
5030200105	125	170	25	83
5030200106	140	195	23	92
5030200107	160	220	25	112
5030200108	200	247	28	139

PRODUCT DATA
VALVES

PVC-U FLANGED DIAPHRAGM VALVE

NEW



Code	Size DN	Dimensions (mm)									
		D	D1	d	H1	H	T	L	Flange Center	Flange Hole	Flange Aperture
503030300101	15(20)	95.00	80.00	16.00	14.00	90.00	13.00	121.00	65.00	14.00	4
503030300102	20(25)	105.00	80.00	21.00	18.00	102.00	14.00	142.00	75.00	14.00	4
503030300103	25(32)	115.00	94.00	28.00	21.00	119.00	15.00	151.00	85.00	14.00	4
503030300104	32(40)	140.00	117.00	36.00	26.00	126.00	15.00	169.00	100.00	16.00	4
503030300105	40(50)	150.00	117.00	45.00	33.00	139.00	17.00	193.00	110.00	16.00	4
503030300106	50(63)	165.00	152.00	57.00	39.00	172.00	17.00	227.00	125.00	19.00	4
503030300107	65(75)	185.00	151.60	85.00	91.00	173.00	17.00	290.00	145.00	19.00	4
503030300108	80(90)	197.00	263.00	85.00	109.00	226.00	18.00	310.00	160.00	19.00	8
503030300109	100(110)	220.00	263.00	106.00	134.00	234.00	20.00	350.00	180.00	19.00	8
503030300110	125(140)	250.00	263.00	106.00	134.00	234.00	22.00	350.00	210.00	22.00	8
503030300111	150(160)	286.00	392.60	150.00	212.00	333.00	24.00	480.00	240.00	22.00	8

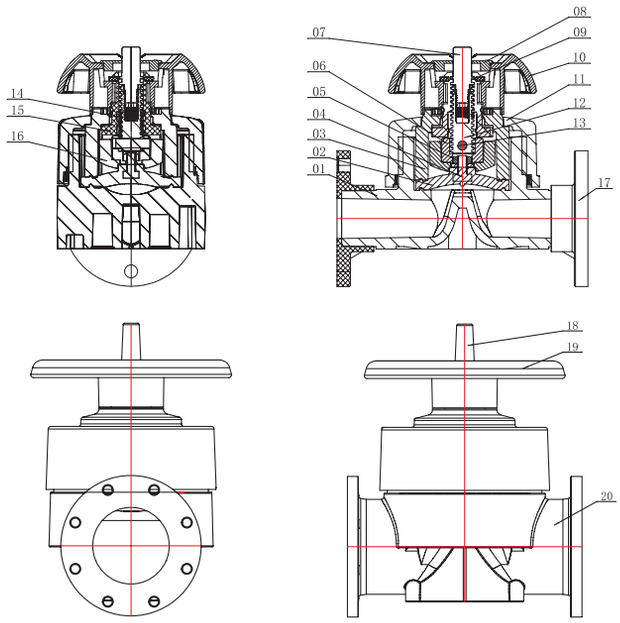
Valve Description

1. Material: PVC-U
2. Size: DN15-150
3. Standard: DIN
4. Connection: Flanged
5. Color: The body is gray, the bonnet is yellow, and the handle is black.

Product Features

1. Switch torque is small.
2. Simple economy.
3. The material is nano-modified to improve the pressure resistance and impact resistance of the product.
4. Thickened valve body for high compression resistance.
5. Valve factory 100% pressure test.
6. The body and seal are specially treated for better performance Actuator performs 500,000 opening and closing tests.

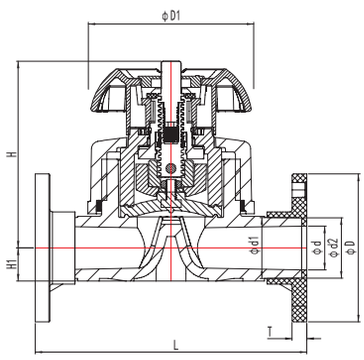
N0.	Name	Quantity	Material
01	Body(DIN)	1	PVC-U
02	Diaphragm	1	EPDM
03	Diaphragm water seal sleeve	1	PP
04	Hex bolt	1	Stainless steel 304
05	Hex nut	1	Stainless steel 304
06	Disc insert	1	Brass（H62)
07	Indicator stem(both insert)	1	PP
08	Cover	1	PP
09	Jump ring	1	Spring steel
10	Handwheel	1	PP/PA6
11	Body nut	1	PA6
12	Stem	1	Stainless steel 304
13	pins	1	Stainless steel 304
14	Stem screw insert	1	Brass（H62)
15	Stem screw	1	PPS
16	Disc	1	PPS
17	One Piece Flange	2	PVC-U
18	(DN65-DN150）Transparent cover	1	PC
19	(DN65-DN150）Handwheel	1	PA6
20	Flanged body	1	PVC-U



PRODUCT DATA
VALVES

PVC-U SOCKET DIAPHRAGM VALVE

NEW



Code	Size DN	Dimensions (mm)							
		D1	d1	d2	d	H1	H	T	L
503030100101	15(20)	65.00	20.30	19.95	20.10	14.00	90.00	16.50	124.00
503030100102	20(25)	65.00	25.30	24.95	25.10	18.00	102.00	19.00	144.00
503030100103	25(32)	93.50	32.30	31.90	32.10	21.00	119.00	22.50	154.00
503030100104	32(40)	93.50	40.35	39.90	40.15	26.00	126.00	26.50	174.00
503030100105	40(50)	121.00	50.35	49.90	50.15	33.00	139.00	31.50	194.00
503030100106	50(63)	121.00	63.40	62.90	63.20	39.00	172.00	36.70	234.00

Code	Size DN	Dimensions (mm)							
		D1	d1	d2	D	H1	H	T	L
503030100201	1/2"	65.00	21.54	21.23	21.34	14.00	90.00	23.22	124.00
503030100202	3/4"	65.00	26.87	26.57	26.67	18.00	102.00	26.40	144.00
503030100203	1"	93.50	33.66	33.27	33.40	21.00	119.00	29.57	154.00
503030100204	1-1/4"	93.50	42.42	42.04	42.16	26.00	126.00	32.75	174.00
503030100205	1-1/2"	121.00	48.56	48.11	48.26	33.00	139.00	35.93	194.00
503030100206	2"	121.00	60.63	60.17	60.33	39.00	172.00	39.10	234.00

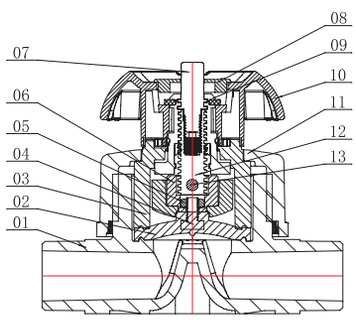
Valve Description

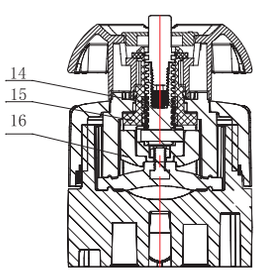
1. Material: PVC-U
2. Size: Size: DN15-50 1/ 2” -2”
3. Standard: DIN, ASTM
4. Connection: Socket
5. Color: body gray, bonnet yellow, handle black

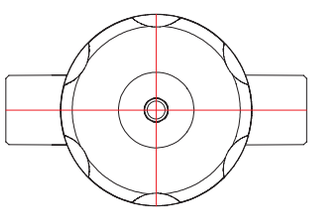
Product Features

1. Switch torque is small.
2. Simple economy.
3. The material is nano-modified to improve the pressure resistance and impact resistance of theproduct.
4. Thickened valve body for high compression resistance.
5. Factory 100% pressure test.
6. The body and seal are specially treated for better performance actuator performs 500,000 opening and closing tests.

N0.	Name	Quantity	Material
01	Body(DIN)	1	PVC-U
02	Diaphragm	1	EPDM
03	Diaphragm water seal sleeve	1	PP
04	Hex bolt	1	Stainless steel 304
05	Hex nut	1	Stainless steel 304
06	Disc insert	1	Brass (H62)
07	Indicator stem(both insert)	1	PP
08	Cover	1	PP
09	Jump ring	1	Spring steel
10	Handwheel	1	PP/PA6
11	Body nut	1	PA6
12	Stem	1	Stainless steel 304
13	pins	1	Stainless steel 304
14	Stem screw insert	1	Brass（H62)
15	Stem screw	1	PPS
16	Disc	1	PPS



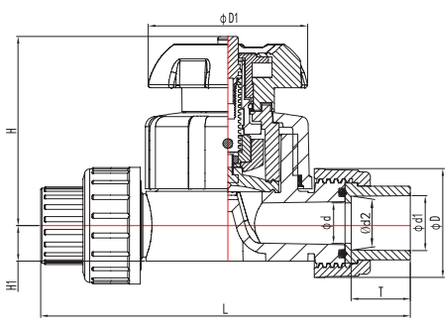




PRODUCT DATA
VALVES

PVC-U TRUE UNION DIAPHRAGM VALVE

NEW



Code	Size DN	Dimensions (mm)								
		D	D1	d1	d2	d	H1	H	T	L
501010100301	15(20)	46.50	65.00	20.30	19.95	16.00	14.00	90.00	16.50	128.00
501010100302	20(25)	53.50	65.00	25.30	24.95	20.00	18.00	102.00	19.00	152.00
501010100303	25(32)	64.00	93.50	32.30	31.90	26.00	21.00	119.00	22.50	166.00
501010100304	32(40)	74.50	93.50	40.35	39.90	34.00	26.00	126.00	26.50	192.00
501010100305	40(50)	85.00	121.00	50.35	49.90	43.00	33.00	139.00	31.50	222.00
501010100306	50(63)	100.00	121.00	63.40	62.90	56.00	39.00	172.00	36.70	266.00

Code	Size DN	Dimensions (mm)								
		D	D1	d1	d2	d	H1	H	T	T
501010100401	1/2"	46.50	65.00	21.54	21.23	16.00	14.00	90.00	23.22	141.00
501010100402	3/4"	53.50	65.00	26.87	26.57	20.00	18.00	102.00	26.40	166.80
501010100403	1"	64.00	93.50	33.66	33.27	26.00	21.00	119.00	29.57	180.00
501010100404	1-1/4"	74.50	93.50	42.42	42.04	34.00	26.00	126.00	32.75	204.00
501010100405	1-1/2"	85.00	121.00	48.56	48.11	43.00	33.00	139.00	35.93	231.00
501010100406	2"	100.00	121.00	60.63	60.17	56.00	39.00	172.00	39.10	272.00

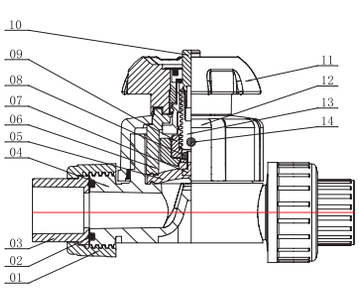
Valve Description

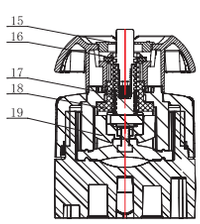
1. Material: PVC-U
2. Size: DN15-50 1/ 2" -2"
3. Standard: DIN, ASTM
4. Connection: Socket
5. Color: body gray, bonnet yellow, handle black

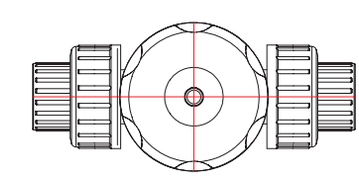
Product Features

1. Switch torque is small.
2. Parts can be replaced, simple & economical.
3. The material is nano-modified to improve the pressure resistance and impact resistance of theproduct.
4. Thickened valve body for high compression resistance.
5. Valve factory 100% pressure test.

N0.	Name	Quantity	Material
01	Faucet nut	1	PVC-U
02	O-ring	1	EPDM
03	Faucet(DIN)	1	PVC-U
04	Body(DIN)	1	PVC-U
05	Diaphragm	1	EPDM
06	Diaphragm water seal sleeve	1	PP
07	Hex bolt	1	Stainless steel 304
08	Hex nut	1	Stainless steel 304
09	Disc insert	1	Brass (H62)
10	Indicator stem(both insert)	1	PP
11	Handwheel	1	PP/PA6
12	Body nut	1	PA6
13	Stem	1	Stainless steel 304
14	pins	1	Stainless steel 304
15	Cover	1	PP
16	Jump ring	1	Spring steel
17	Stem screw insert	2	Brass (H62)
18	Stem screw	1	PPS
19	Disc	1	PPS



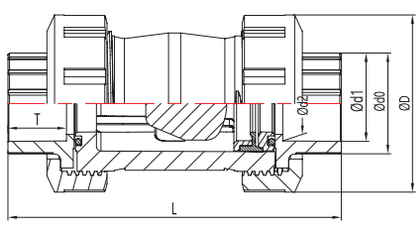




PRODUCT DATA
VALVES

PVC-U SOCKET TRUE UNION CHECK VALVE

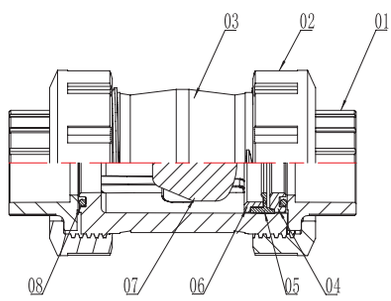
NEW



Code	Size DN	Dimensions (mm)						Nominal Pressure PN(kg/cm²)
		D	d0	d1	d2	T	L	
503010100101	15(20)	51.50	27.40	20.30	19.95	17.00	95.80	PN10
503010100102	20(25)	59.00	32.70	25.30	24.95	19.50	109.60	PN10
503010100103	25(32)	70.00	41.30	32.30	31.90	23.00	123.10	PN10
503010100104	32(40)	85.40	49.60	40.35	39.90	27.00	150.00	PN10
503010100105	40(50)	98.90	60.20	50.35	49.90	32.00	161.20	PN10
503010100106	50(63)	122.20	76.00	63.40	62.90	38.50	186.00	PN10
503010100107	65(75)	158.60	89.60	75.40	74.90	44.50	236.00	PN10
503010100108	80(90)	192.10	105.40	90.50	89.90	52.00	255.00	PN10
503010100109	100(110)	223.60	128.40	110.60	109.90	62.00	298.60	PN10

Code	Size DN	Dimensions (mm)					
		D	d0	d1	d2	T	L
503010100201	1/2"	51.50	27.40	21.54	21.23	23.30	108.40
503010100202	3/4"	59.00	32.70	26.87	26.57	26.50	123.60
503010100203	1"	70.00	41.30	33.66	33.27	29.70	136.50
503010100204	1-1/4"	85.40	49.60	42.42	42.04	32.90	161.80
503010100205	1-1/2"	98.90	60.20	48.56	48.11	36.10	169.40
503010100206	2"	122.20	76.00	60.63	60.17	39.30	187.60
503010100207	2-1/2"	158.60	89.60	73.38	72.85	45.70	237.20
503010100208	3"	192.10	105.40	89.31	88.70	48.90	248.80
503010100209	4"	223.60	128.40	114.76	114.07	58.40	291.40

N0.	Name	Quantity	Material
01	Faucet	2	PVC-U
02	Nut	2	PVC-U
03	Body	1	PVC-U
04	Washer	1	PVC-U
05	Rubber ring	1	EPDM/FPM
06	Location Ring	1	PVC-U
07	Ball	1	PVC-U
08	O-Ring	2	EPDM/FPM



Valve Description

1. Material: PVC-U
2. Size: DN15-100 1/ 2” -4”
3. Standard: DIN, ASTM
4. Connection: Socket
5. Color: Dark Gray

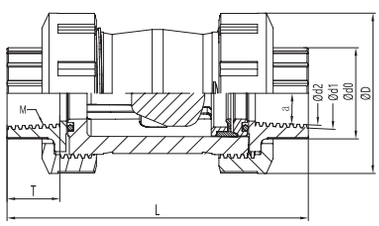
Product Features

1. Simple economy.
2. The material is nano-modified to improve the pressure resistance and impact resistance of theproduct.
3. Thickened valve body for high compression resistance.
4. Valve factory 100% pressure test.
5. The body and seal are specially treated for better performance actuator performs 500,000 opening and closing tests

PRODUCT DATA
VALVES

PVC-U THREADED TRUE UNION CHECK VALVE

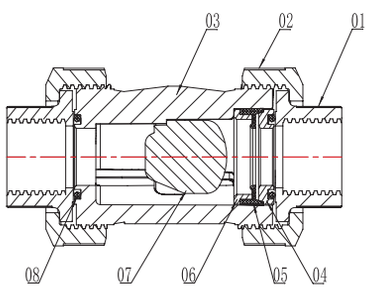
NEW



Code	Size DN	Dimensions (mm)								Nominal Pressure PN(kg/cm²)
		D	d0	d1	d2	T	L	Tr	s	
503010100101	15(20)	51.50	27.40	20.95	18.63	17.00	95.80	1/2"	3.58	PN10
503010100102	20(25)	59.00	32.70	26.44	24.12	19.50	109.58	3/4"	3.58	PN10
503010100103	25(32)	70.00	41.30	33.25	30.29	23.00	123.10	1"	3.58	PN10
503010100104	32(40)	85.40	49.60	41.91	38.95	27.00	147.50	1-1/4"	3.58	PN10
503010100105	40(50)	98.90	60.20	47.80	44.85	32.00	159.50	1-1/2"	3.58	PN10
503010100106	50(63)	122.20	76.00	59.61	56.66	38.50	184.80	2"	3.58	PN10
503010100107	65(75)	158.60	89.60	75.18	74.23	44.50	233.50	2-1/2"	3.58	PN10
503010100108	80(90)	192.10	105.40	87.88	84.93	52.00	255.00	3"	3.58	PN10
503010100109	100(110)	223.60	128.40	113.03	110.07	62.00	297.50	4"	3.58	PN10

Code	Size DN	Dimensions (mm)								Nominal Pressure PN(kg/cm²)
		D	d0	d1	d2	T	L	Tr	s	
503010100201	1/2"	51.50	27.40	20.95	18.63	17.00	95.80	1/2"	3.58	PN10
503010100202	3/4"	59.00	32.70	26.44	24.12	19.50	109.58	3/4"	3.58	PN10
503010100203	1"	70.00	41.30	33.25	30.29	23.00	123.10	1"	3.58	PN10
503010100204	1-1/4"	85.40	49.60	41.91	38.95	27.00	147.50	1-1/4"	3.58	PN10
503010100205	1-1/2"	98.90	60.20	47.80	44.85	32.00	159.50	1-1/2"	3.58	PN10
503010100206	2"	122.20	76.00	59.61	56.66	38.50	184.80	2"	3.58	PN10
503010100207	2-1/2"	158.60	89.60	75.18	74.23	44.50	233.50	2-1/2"	3.58	PN10
503010100208	3"	192.10	105.40	87.88	84.93	52.00	255.00	3"	3.58	PN10
503010100209	4"	223.60	128.40	113.03	110.07	62.00	297.50	4"	3.58	PN10

N0.	Name	Quantity	Material
01	Faucet	2	PVC-U
02	Nut	2	PVC-U
03	Body	1	PVC-U
04	Washer	1	PVC-U
05	Rubber ring	1	EPDM
06	Location Ring	1	PVC-U
07	Ball	1	PVC-U
08	O-Ring	2	EPDM



Valve Description

1. Material: PVC-U
2. Size: DN15-100 1/ 2” -4”
3. Standard: DIN, ASTM
4. Connection: Threaded
5. Color: Dark Gray

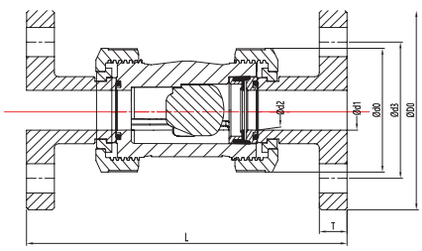
Product Features

1. Simple economy.
2. The material is nano-modified to improve the pressure resistance and impact resistance of theproduct.
3. Thickened valve body for high compression resistance.
4. Valve factory 100% pressure test.
5. The body and seal are specially treated for better performance actuator performs 500,000 opening and closing tests

PRODUCT DATA
VALVES

PVC-U FLANG TRUE UNION CHECK VALVE

NEW



Code	Size DN	Dimensions (mm)							Nominal Pressure PN(kg/cm²)
		D0	d0	d1	d2	d3	T	L	
503010300101	15(20)	95.00	51.50	20.30	19.95	65.00	13.00	141.60	PN10
503010300102	20(25)	105.00	59.00	25.30	24.95	75.00	14.00	171.50	PN10
503010300103	25(32)	115.00	70.00	32.30	31.90	85.00	15.00	188.50	PN10
503010300104	32(40)	140.00	85.40	40.35	39.90	100.00	15.00	187.50	PN10
503010300105	40(50)	150.00	98.90	50.35	49.90	110.00	17.00	215.00	PN10
503010300106	50(63)	165.00	122.20	63.40	62.90	125.00	17.00	235.00	PN10
503010300107	65(75)	185.00	158.60	75.40	74.90	145.00	18.00	288.50	PN10
503010300108	80(90)	200.00	192.10	90.50	89.90	160.00	18.00	310.00	PN10
503010300109	100(110)	220.00	223.60	110.60	109.90	180.00	18.00	375.00	PN10

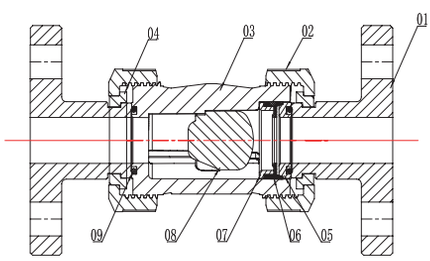
Valve Description

1. Material: PVC-U
2. Size: DN15-100
3. Standard: DIN
4. Connection: Flanged
5. Color: Dark Gray

Product Features

1. Simple economy.
2. The material is nano-modified to improve the pressure resistance and impact resistance of theproduct.
3. Thickened valve body for high compression resistance.
4. Valve factory 100% pressure test.
5. The body and seal are specially treated for better performance actuator performs 500,000 opening and closing tests.

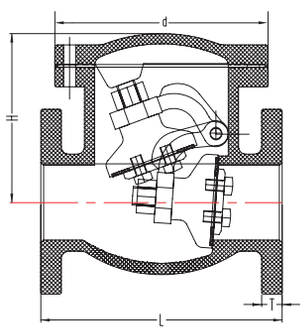
N0.	Name	Quantity	Material
01	Flange	2	PVC-U
02	Nut	2	PVC-U
03	Body	1	PVC-U
04	Clamp Ring	2	PVC-U
05	Washer	1	PVC-U
06	Rubber Ring	1	EPDM
07	Located Ring	1	PVC-U
08	Ball	1	PVC-U
09	O-ring	2	EPDM

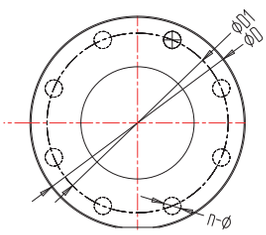


PRODUCT DATA
VALVES

PVC-U SWING SPRING CHECK VALVE

NEW

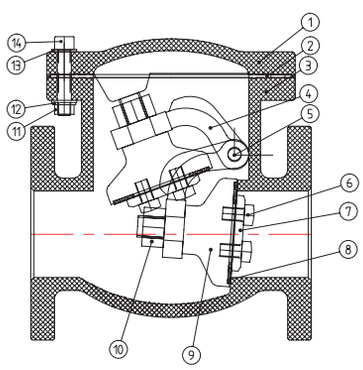




Code	Size DN	Dimensions (mm)							Nominal Pressure PN(kg/cm²)
		D	D1	L	T	H	d	n-Φe	
503010300201	15	100	65	140	15	93	87	4-Φ14	PN10
503010300202	20	100	75	140	15	93	87	4-Φ14	PN10
503010300203	25	120	85	160	15	117	130	4-Φ18	PN10
503010300204	32	140	100	180	19	137	146	4-Φ18	PN10
503010300205	40	140	110	180	19	137	146	4-Φ18	PN8
503010300206	50	165	125	200	20	156	167	4-Φ18	PN8
503010300207	65	185	145	240	22	170.2	203	4-Φ18	PN8
503010300208	80	200	160	260	22	181	230	8-Φ18	PN5
503010300209	100	224	180	300	24	216	278	8-Φ18	PN5
503010300210	125	254	210	300	24	216	278	8-Φ18	PN5
503010300211	150	285	240	400	26	286	394	8-Φ23	PN5
503010300212	200	324	295	500	30	336	476	8-Φ23	PN3

Code	Size DN	Dimensions (mm)							Nominal Pressure PN(kg/cm²)
		D	D1	L	T	H	d	n-Φe	
503010300301	1/2"	100	60	140	15	93	87	4-Φ16	PN10
503010300302	3/4"	100	70	140	15	93	87	4-Φ16	PN10
503010300303	1"	120	79	160	15	117	130	4-Φ16	PN10
503010300304	1-1/4"	140	88.9	180	19	137	146	4-Φ16	PN10
503010300305	1-1/2"	140	98	180	19	137	146	4-Φ16	PN8
503010300306	2"	165	121	200	20	156	167	4-Φ19	PN8
503010300307	2-1/2"	185	140	240	22	170.2	203	4-Φ19	PN8
503010300308	3"	200	152	260	22	181	230	4-Φ19	PN5
503010300309	4"	224	191	300	24	216	278	8-Φ19	PN5
503010300310	5"	254	216	300	24	216	278	8-Φ22	PN5
503010300311	6"	285	241	400	26	286	394	8-Φ22	PN5
503010300312	8"	324	298	500	30	336	476	8-Φ22	PN3

N0.	Name	Quantity	Material
01	End Cover	1	PVC-U
02	1 Gasket 1	1	EPDM
03	Body	1	PVC-U
04	Hinge	1	PVC-U
05	Pin	1	PTFE
06	Hexagon Bolt	1—4	PVC-U
07	Coverplate	1	PVC-U
08	2 Gasket 2	1	EPDM
09	Flap	1	PVC-U
10	Nut	1	PVC-U
11	Hexagon Nut	8—12	Stainless steel 304
12	Spring Washer	8—12	Stainless steel 304
13	Plain Washer	16—24	Stainless steel 304
14	Hexagon Bolt	8—12	Stainless steel 304



Valve Description

1. Material: PVC-U
2. Size: DN15-200 1/ 2” -8”
3. Standard: DIN, ASTM
4. Connection: Flanged
5. Color: Dark Gray

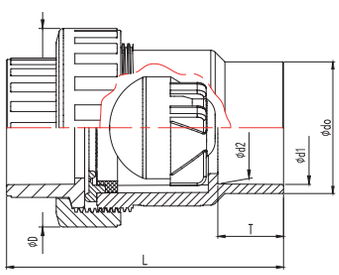
Product Features

1. Simple economy.
2. The material is nano-modified to improve the pressure resistance and impact resistance of theproduct.
3. Thickened valve body for high compression resistance.
4. Valve factory 100% pressure test.
5. The body and seal are specially treated for better performance actuator performs 500,000 opening and closing tests

PRODUCT DATA
VALVES

PVC-U SINGLE UNION CHECK VALVE

NEW



Code	Size DN	Dimensions (mm)						Nominal Pressure PN(kg/cm²)	Minimum Opening Pressure PN(kg/cm²)
		D	d0	d1	d2	T	L		
503010100301	15(20)	47.00	26.90	20.30	19.95	16.50	77.50	PN10	0.1 5-0.3
503010100302	20(25)	53.90	32.50	25.30	24.95	19.00	94.50	PN10	0.15-0.3
503010100303	25(32)	67.00	40.30	32.30	31 .90	22.50	111.00	PN10	0.15-0.3
503010100304	32(40)	78.50	49.40	40.35	39.90	26.50	129.00	PN10	0.1 5-0.3
503010100305	40(50)	93.20	61.60	50.35	49.90	31.50	143.00	PN10	0.1 5-0.3
503010100306	50(63)	110.60	73.40	63.40	62.90	36.70	154.70	PN10	0.15-0.3
503010100307	65(75)	130.60	89.60	75.40	74.90	44.00	185.40	PN10	0.1 5-0.3
503010100308	80(90)	148.40	105.50	90.50	89.90	51.50	21 3.70	PN10	0.15-0.3
503010100309	100(110)	173.40	126.50	110.60	109.90	61.50	238.40	PN10	0.15-0.3

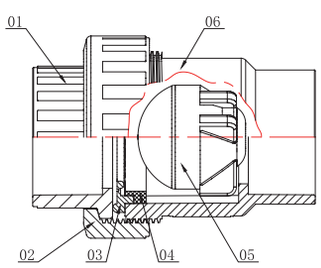
Valve Description

1. Material: PVC-U
2. Size: DN15-100
3. Standard: DIN
4. Connection: Socket
5. Color: Dark Gray

Product Features

1. Meet drinking water standards.
2. Solid inner ball, good water stop effect.
3. Parts can be replaced, simple and economical.
4. The material is nano-modified to improve the pressure resistance and impact resistance of the product.
5. Thickened valve body for high compression resistance.
6. Valve factory 100% pressure test.

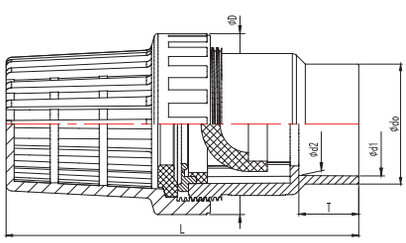
N0.	Name	Quantity	Material
01	Faucet	1	PVC-U
02	Nut	1	PVC-U
03	Rubber Ring	1	EPDM
04	Located Ring	1	PVC-U
05	Ball	1	PVC-U
06	Body	1	PVC-U



PRODUCT DATA
VALVES

PVC-U SINGLE UNION BOTTOM VALVE

NEW



Code	Size DN	Dimensions (mm)						Nominal Pressure PN(kg/cm²)	Minimum Opening Pressure PN(kg/cm²)
		D	d0	d1	d2	T	L		
503010100401	15(20)	47.00	27.90	20.30	19.96	16.50	113.00	PN10	0.15-0.3
503010100402	20(25)	53.90	32.50	25.30	24.95	19.00	132.40	PN10	0.15-0.3
503010100403	25(32)	67.00	40.30	32.30	31.90	22.50	145.70	PN10	0.15-0.3
503010100404	32(40)	78.50	49.30	40.35	39.90	26.50	177.40	PN10	0.15-0.3
503010100405	40(50)	93.00	61.60	50.35	49.90	31.50	201.60	PN10	0.15-0.3
503010100406	50(63)	110.60	74.00	63.40	62.90	36.70	215.80	PN10	0.15-0.3

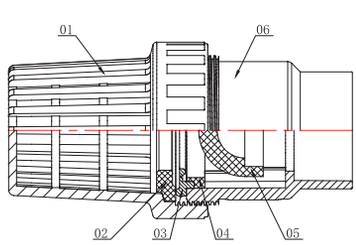
Valve Description

1. Material: PVC-U
2. Size: DN15-50
3. Standard: DIN
4. Connection: Socket
5. Color: Dark Gray

Product Features

1. Meet drinking water standards.
2. U-shaped inner ball, good water stop effect.
3. Parts can be replaced, simple and economical.
4. The material is nano-modified to improve the pressure resistance and impact resistance of the product.
5. Thickened valve body for high compression resistance.
6. Valve factory 100% pressure test.

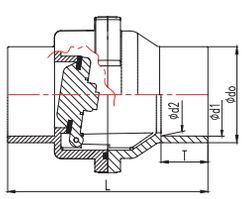
N0.	Name	Quantity	Material
01	Wash Enclosure	1	PVC-U
02	Washer	1	PVC-U
03	Ring	1	EPDM
04	Located Ring	1	PVC-U
05	Ball	1	PVC-U
06	Body	2	PVC-U

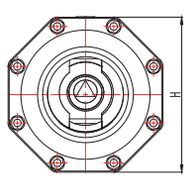


PRODUCT DATA
VALVES

PVC-U SWINGING CHECK VALVE

NEW





Code	Size DN	Dimensions (mm)						Nominal Pressure PN(kg/cm²)	Minimum Opening Pressure PN(kg/cm²)
		d0	d1	d2	T	L	H		
503010100501	65(75)	88.20	75.40	74.90	43.70	207.10	169.00	PN6	0.15-0.3
503010100502	80(90)	104.60	90.50	89.90	51.20	218.70	169.00	PN6	0.15-0.3
503010100503	100(110)	125.40	110.60	109.90	61.20	268.00	206.00	PN6	0.15-0.3
503010100504	De125(125)	145.50	125.70	124.90	68.70	283.00	206.00	PN6	0.15-0.3
503010100505	125(140)	164.00	140.75	139.90	76.30	369.30	285.00	PN6	0.15-0.3
503010100506	150(160)	186.00	160.80	159.90	87.00	390.00	285.00	PN6	0.15-0.3

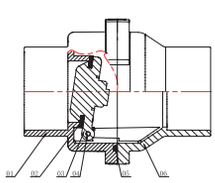
Valve Description

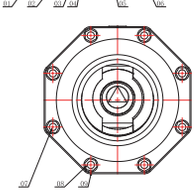
1. Material: PVC-U
2. Size: DN65-150
3. Standard: DIN
4. Connection: Socket
5. Color: Dark Gray

Product Features

1. Meet drinking water standards.
2. Parts can be replaced, simple and economical.
3. The material is nano-modified to improve the pressure resistance and impact resistance of the product.
4. Thickened valve body for high compression resistance.
5. Valve factory 100% pressure test.

N0.	Name	Quantity	Material
01	Body	1	PVC-U
02	Ring1	1	EPDM
03	Trap	1	PVC-U
04	Ring2	1	EPDM
05	Cover	1	PVC-U
06	Bolt	8	Stainless steel
07	Nut	8	Stainless steel
08	Gasket	8	Stainless steel

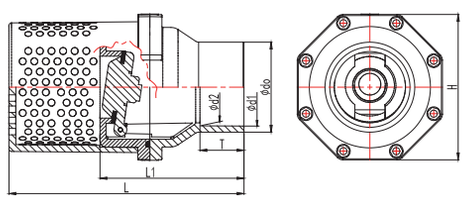




PRODUCT DATA
VALVES

PVC-U SWINGING BOTTOM VALVE

NEW



Code	Size DN	Dimensions (mm)							Nominal Pressure PN(kg/cm²)	Minimum Opening Pressure PN(kg/cm²)
		d0	d1	d2	T	L1	L	H		
503010100601	65(75)	88.20	75.40	74.90	43.70	160.00	266.00	169.00	PN6	0.15-0.3
503010100602	80(90)	104.60	90.50	89.90	51.20	167.50	273.50	169.00	PN6	0.15-0.3
503010100603	100(110)	125.40	110.60	109.90	61.20	218.00	379.00	206.00	PN6	0.15-0.3
503010100604	De125(125)	145.50	125.70	124.90	68.70	215.50	386.50	206.00	PN6	0.15-0.3
503010100605	125(140)	164.00	140.75	139.90	76.30	294.80	496.30	285.00	PN6	0.15-0.3
503010100606	150(160)	186.00	160.80	159.90	87.00	304.50	505.80	285.00	PN6	0.15-0.3

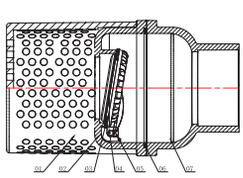
Valve Description

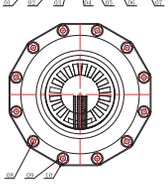
1. Material: PVC-U
2. Size: DN65-150
3. Standard: DIN
4. Connection: Socket
5. Color: Dark Gray

Product Features

1. Meet drinking water standards.
2. Parts can be replaced, simple and economical.
3. The material is nano-modified to improve the pressure resistance and impact resistance of the product.
4. Thickened valve body for high compression resistance.
5. Valve factory 100% pressure test.

N0.	Name	Quantity	Material
01	Drain Body	1	PVC-U
02	Body	1	PVC-U
03	Ring1	1	EPDM
04	Trap	1	PVC-U
05	Fixed Block	2	PVC-U
06	Ring2	1	EPDM
07	Cover	1	PVC-U
08	Sit Bolt	12	Stainless steel
09	Nut	12	Stainless steel
10	Gasket	12	Stainless steel

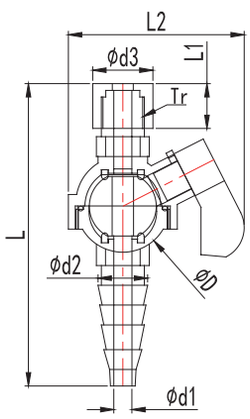




PRODUCT DATA
VALVES

PVC-U SAMPLING VALVE

NEW



Code	Size DN	Dimensions (mm)							
		D	d1	d2	d3	L	L1	L2	Tr
503010100701	1/4"	28.50	5.50	15.00	20.00	94.00	16.00	53.50	1/4"

N0.	Name	Quantity	Material
01	Nut	1	PVC-U
02	Body	1	PVC-U
03	Ring	1	EPDM
04	Ball	1	PVC-U
05	Ring	1	EPDM
06	Ring	1	EPDM
07	Nozzle	1	PVC-U
08	Lever	1	PVC-U