ASEMA

UPVC PIPES & FITTINGS

Technical Manual

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Introduction

Al ASEMA pipes was established in 2019 to produce plastic pipes & fittings by materials UPVC, HDPE, PPR and PPH.

Since the company was formed, it has a steady growth with high quality standards to fulfill the requirements of its customers especially for high quality product for pipes &fittings according to The German standard DIN, British standard BSI, international standard ISO and Egyptian standard demands.
There's also the facility of manufacturing products with special specifications according to the customer requirements.

Al ASEMA's target is to become the major producer in the field of plastic pipes & fittings by having its factories equipped with new advanced, automated and up to date know how machineries which fulfill high production capacity with exceptionally high quality such as consistency in terms of dimensional accuracy, mechanical strength and surface finish.

Our target is to build a circle of trust for every client by providing the best quality service and price.

We apply the latest German technological innovations in our manufacturing process in addition to the usage of the best European and American materials such as Borealis, boroug,basell, shintech and Topilene

We have a well-trained quality assurance department that assures that our products meet the standards. Adding to that, Al ASEMA group gives a warranty on all our systems for 50 years.

1. UPVC material description

- UPVC raw materials are completely free from heavy metals. It is also environmental friendly and the same time preserves Its physical and thermal properties.

- UPVC material properties such as tensile strength and resistance To stress cracking are dependent on the amorphous structures.

- UPVC material molecule chains are not exclusively straight line, The degree of branching significantly affects the properties of the material, These are the parts of the structural make up responsibe for the strength of the material.

- UPVC material are mainly characterized by flame retardant properties because they contain achloride even in the absence of fire retardants, it has extremely high temperature, and it is less likely to be exposed to fire hazards.

- Due to the nature of the UPVC polymer chain formation, which is formed through the individual bonds of the carbon atoms, UPVC is characterizerd by its tremendous chemical resistance to other plastics used for general purposes, for example polyolefin.

2. Application Of UPVC pipes

1- Water networks:

UPVC pipes are used for potable water networks which is not affecting the water properties. In addition, the networks are totally safe and very secure from any leakage problems resulted from water hammering due to the joining methods using Jointed by rubber ring socket or solvent cement socket.

2- Sanitary and industrial drainage:

UPVC pipes are used for both Sanitary and industrial drainage due to their excellent chemical resistance for (Acids, Alkaline, salts ...etc) and their non-penetration nature, besides the network leakage free.

3- Irrigation systems:

UPVC pipes have high resistance for environmental conditions, especially ultraviolet rays. it is highly resistant to sunlight as raw materials containing UV are used. Same as UPVC pipes one considered the optimum choice for drip and sprinkler irrigation networks by using it underground.

4- Firefighting applications:

Fire fighting networks suffer from water due to sudden opening and closing valves therefore, UPVC pipes are suitable for these networks with their high resistance for water hammer.

5- Cable ducts (Electric and Telephone lines).

6- Supply lines under channel, railway lines and airport runway.

7- Sea water desalination and injection of oil wells.

8- Pipelines for crossing rivers.

3. Advantages of UPVC piping system

3.1 Corrosion resistance

Compared to the old metallic pipes, UPVC piping systems are corrosion free due to its material properties and thus, lesser exposed to contamination.

3.2 Chemical resistance

UPVC by nature is highly chemical resistant at a wide range of temperature and pressure. Due to its higher molecular weight, It resists most of the acids.

3.3 Mechanical and physical properties

- High tensile strength.
- High resistance for the internal hydraustatic pressure .
- High Impact Resistance.
- Low Thermal conductivity.
- Resistance to current strays.
- High durability.
- Light Weight.

3.4 Sound insulation

In comparison to the metallic pipes, the sound insulation qualities of UPVC pipe system related to water flow and hydraulic shock within a building reduces the noise transmission to a larger scope.

3.5 Flow performance

The inner surface finishing of UPVC products is sleek, smooth and with very low irregularities which conveys a significant reduction in pressure loss.

3.6 Ease of installation

One of the major attractions of UPVC products is its capability to be jointed by rubber ring socket or solvent cement socket, UPVC pipes and fittings are comparatively lighter in weight to the metallic pipes, consequently this would require a shorter time to establish a permanent connection/ joint in the piping system.

3.7 Long service life

UPVC piping systems are designed for a theoretical long service life of 50 years in application, subject to specific conditions.

3.8 Light weight

The light weight of UPVC pipes and fittings makes it easy for handling and installation in comparison to other materials.

3.9 Poor heat conductivity

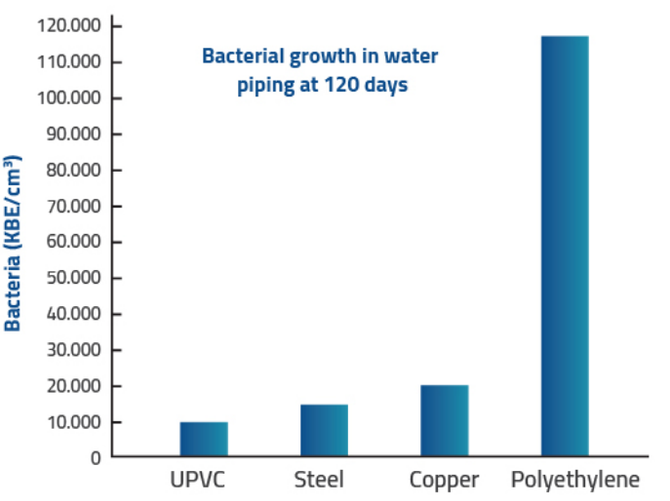
This is one of the most useful properties of UPVC that make it suitable for the applications where it necessary to secure absence of heat leakage either in or out, like HVAC application.

3.10 Non- toxic

This property is inherent from the fact that the UPVC material is inert so the water inside will always be clean and safe. this a big advantage when UPVC is compared to metal pipes for conveyance of potable water.

3.11 Low bacteria build up

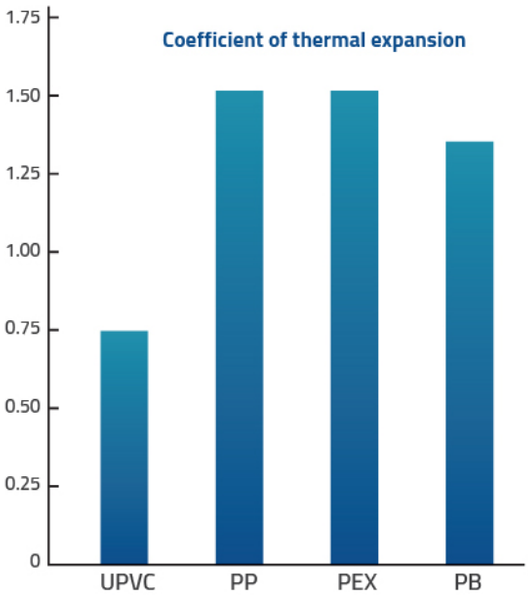
UPVC Piping supports the lowest bacterial growth compared with traditional piping materials



3.12 Lower Thermal Expansion Coefficient

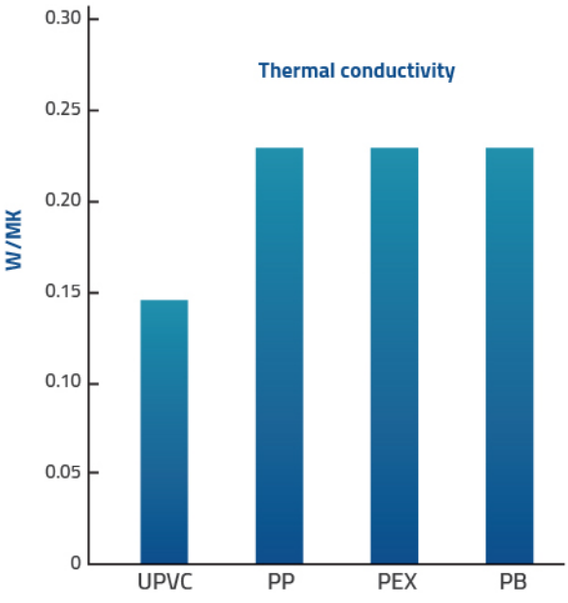
Less expansion of pipe when hot water runs

Less need for expansion loops, less “looping’



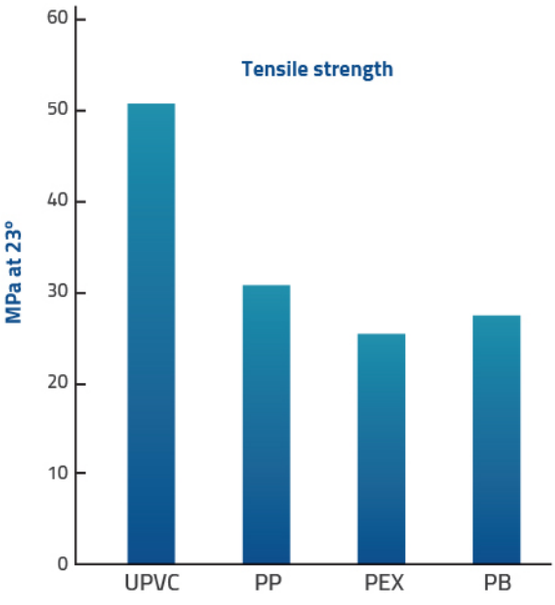
3.13 Lower thermal conductivity

Reduced heat losses .



3.14 Tough, Rigid Material

UPVC has a much higher strength / modulus than other thermoplastics used in plumbing applications.



4. Property comparisons of thermoplastic pipe

	UPVC	PPR	PEX	PB	CU
Tensile Strength (Mpa at 23°C)	50	30	25	27	>300
Cofficent of thermal expansion (x 10^{-4} K^{-1})	0.7	1.5	1.5	1.3	0.2
Thermal Conductivity (W/MK)	0.14	0.22	0.22	0.22	>400
LOI	45	18	17	18	
Oxygen Permeation (cm^3/m.day atm, at 70 °C)	(Not avilable) Similar to CPVC	(Not avilable) Similar to FB-PEX	13	16	(Not Available) insignificant

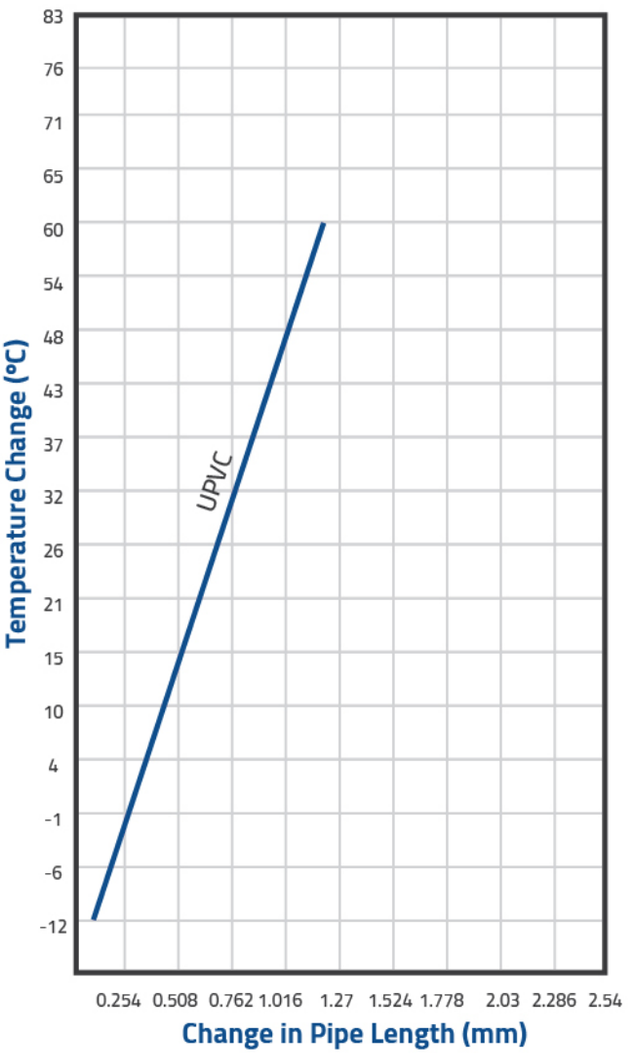
5. Expansion and contraction diagram

All piping products expand and contract with changes in temperature. Linear expansion and contraction of any pipe on the longitudinal axis relates to the coefficient of thermal expansion for the specific material used in the manufacturing of the product. Variation in pipe length due to thermal expansion or contraction depends on the coefficient of thermal expansion and the variation in temperature (T).
It should be noted that change in pipe diameter or wall thickness with piping material properties remaining constant does effect a change in rates of thermal expansion or contraction.

Approximate coefficients of thermal expansion for different pipe materials are presented below Expansion and contraction of PVC piping in response to change in temperature will vary slightly with changes in PVC compounds. However, these coefficients can be considered reasonably accurate.

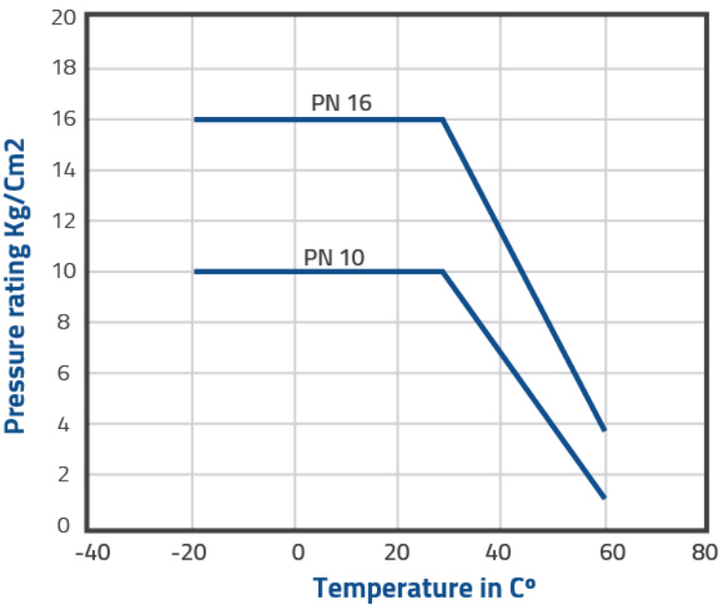
Coefficient of thermal expansion

Piping material	Cofficient of Linear Thermal Expansion (K^{-1})	Thermal Conductivity ($W.K^{-1}.M^{-1}$)
UPVC	0.8 X 10 $^{-4}$	0.16



6. Pressure - Temperature relationship

The service life of a pipe and fitting system is influencing by the relationship between the working temperature and the working pressure.



7. Application Standards

DIN 1187
Unplasticized Poly Vinyl Chloride UPVC , Drain Pipes.

DIN 1988
Drinking Water Supply Systems.

DIN 3441
Unplasticized Poly Vinyl Chloride UPVC , Valves.

DIN 4279
Testing of pressure pipelines for water by internal pressure.

DIN 4925
Threaded Unplasticized Poly Vinyl Chloride UPVC , Water well filter Pipes and casings.

DIN 8061
Unplasticized Poly Vinyl Chloride UPVC , General quality and testing.

DIN 8062
Unplasticized Poly Vinyl Chloride UPVC , Pipes (Dimensions)

DIN 8063
Pipe joint and fittings for Unplasticized Poly Vinyl Chloride UPVC, Pressure Pipe lines.

DIN 16970
Adhesives for bonding pipe system UPVC , General quality and testing.

DIN 19531
Unplasticized Poly Vinyl Chloride UPVC , Pipes and fittings for discharge systems inside buildings.

DIN 19532
Unplasticized Poly Vinyl Chloride UPVC , Pipeline for drinking water supply.

DIN 19534
Unplasticized Poly Vinyl Chloride UPVC , Pipes and fittings for sewerage.

ISO 161/1
Thermoplastics pipes for the transport of fluids.

ISO 727
Fittings made from Unplasticized Poly Vinyl Chloride UPVC , Under pressure.

ISO 4422
pipes and fittings made from Unplasticized Poly Vinyl Chloride UPVC , for water supply.

ISO 15493
Plastics piping systems for industrial applications.

ES 848
Unplasticized Poly Vinyl Chloride UPVC , Pipeline for drinking water supply.

ES 1717
Unplasticized Poly Vinyl Chloride UPVC , Pipes and fittings for sewerage.

BS 3505
Unplasticized Poly Vinyl Chloride UPVC , Pressure pipes for cold potable water.

BS 3506
Unplasticized poly vinyl chloride upvc pipes for industial uses

BS 4660
Unplasticized Poly Vinyl Chloride UPVC , Pipes and fittings for drainage and sewerage.

ASTM D 1785
Poly Vinyl Chloride PVC pipes , Schedules 40,80 and 120.

ASTM D 2241
Poly Vinyl Chloride PVC Pressure rated pipes, SDR Series.

8.Material properties of UPVC

The material data table lists typical physical, mechanical and thermal characteristics of poly vinyl chloride (UPVC) material as follow:

Polymer Data	UPVC	Unit
Physical characteristics		
Denisty at (23°C)	1.42	g/cm3
Water absorption	1,04	Mg/cm2
Flammability	Self extinguishing	
Oxygen index	45	
Oxygen penetration	<1	cm^3/m.day.bar
Mechanical characteristics		
Ultimate tensile strength	500	Kg/cm2
Compressive strength	668	Kg/cm2
Flexural strength (rock well)	950	Kg/cm2
Modulus of Elasticity	$3x10^4$	Kg/cm2
Impact strength (charpy)	No break>%10	-
Shore hardness (Rockwell)	115	R
Thermal characteristics		
Softening point v.s.t. 5kg	>79° >76°	°c
Max.operating temperature	60	°c
Coefficient of thermal expansion	7.9×10^{-5}	cm/cm.°c
Specific Heat	0.25	Cal/g. °c
Thermal conductivity	0.13	Kcal/m.h. °c
Electrical characteristics		
Volume resistively	$>1X10^{14}$	Ohm.cm
Surface resistance	$1X10^{12}$	Ohm.
Power factor (at 106cycle)	3.3	
Dielectric Strength	>40	Kv/mm

Notes

- UPVC is a non-conductor for electricty and are not subjected to galvanic or electrolytic attack .
- Electric equipments should not be earthened to UPVC pipes .
- All the above-mentioned values at 23°c .

9.Chemical resistance of UPVC

The following tables illustrate the effect of some chemicals on UPVC pipes at different temperatures.

Name of chemical	Degree of resistance	
	23°c	60°c
A		
Acetaldehyde	NR	NR
Acetic acid%10	R	R
Acetic acid%20	R	R
Acetic anhydride	NR	NR
Acetone	NR	NR
Acetophenone	NR	NR
Acetyl Nitrile	NR	NR
Acrylic acid Ethyl ester	NR	NR
Acrylonitrile	NR	NR
Adipic105acid	R	R
Amyl alcohol	NR	NR
Alcohol Benzyl	NR	NR
Alcohol Ethyl	R	R
Alcohol Hexyl	R	R
Alcahol Isopropyl	R	R
Alcohol Methyl	R	R
Alcahol Propargyl	R	R
Alcohol Propyl	R	R
Allyl chloride	NR	NR
Alum Ammoinium	R	R
Alum. Chrome	R	R
Alum. Potassium	R	R
Aluminum chloride	R	R
Aluminum Floride	R	NR
Aluminum hydroxide	R	R
Aluminum nitrite	R	R
Aluminum oxychloride	R	R
Aluminum Sulfate	R	R
Ammonia gas	R	R
Ammonia (Aq%10)	R	NR
Ammonium acetate	R	R
Ammonium carbonate	R	R
Ammonium chloride	R	R
Ammonium fluoride %10	R	R
A.mmorlium nitrate	R	R
Ammonium persulphate	R	R
Ammonium phosphate	R	R
Ammonium sulphate	R	R
Ammonium thiocyanate	R	R
Amyl acetate	NR	NR
Amyl chloride	NR	NR

Name of chemical	Degree of resistance	
	23°c	60°c
Aniline	NR	NR
Aniline chiorohydrate	NR	NR
Aniline hydrochloride	NR	NR
Anthraquinone	R	R
Anthraquinone sulfonic acid	R	R
Antimony trichloride	R	R
Aromatic hydrocarbons	NR	NR
Arsenic acid	R	R
B		
Barium chloride	R	R
Barium hydroxide	R	R
Barium nitrate	R	#
Benzene. benzol	NR	NR
Benzene sulphonic acid	NR	NR
Benzoic acid	R	R
Borax	R	R
Boric acid	R	R
Brine acid	R	R
Bromic acid	R	R
Bromine (Uq.)	NR	NR
Bromine (yap%25)	R	R
Bromine water	R	R
Bromobenzene	NR	NR
Bromotoluene	NR	NR
Butadiene	R	R
Butyiacetate	NR	NR
Butyl alcohol	R	R
Butyl phthalate	NR	NR
Butylene	NR	NR
C		
Chloral hydrate	R	R
Chloric acid %20	R	R
Chlorinated solvents	NR	NR
Cadmium cyanide	R	R
Calcium acetate	R	R
Calcium bisulphate	R	R
Calcium carbonate	R	R
Calcium chloride	R	R
Calcium hydroxide	R	R
Calcium hypochlorite	R	R
Calcium nitrate	R	R
Calcium Oxide	R	R
Calcium sulphate	R	R

Name of chemical	Degree of resistance	
	23°c	60°c
Carbon dloxide.wet	R	R
Carbon dioxide dry	R	R
Chromic acid %50	NR	NR
Citric acid	R	R
Copper carbonate	R	R
Copper chloride	R	R
Copper cyanide	R	R
Copper fluoride	R	R
Copper nitrate	R	R
Copper sulphate	R	R
Cresol	NR	NR
Cupric sulphate	R	R
Cuprous chloride	R	R
Cyclohexane	NR	NR
Cyclohexanol	NR	NR
D		
Detergents	R	R
Detergent solution(Heavy duty)	R	R
Dextrin	R	R
Dextrose	R	R
Diazo salts	R	R
Dibutoxy ethyl phthalate	NR	NR
Dibutyl phthalate	NR	NR
Dibutyl sebacate	R	NR
Dichiorobenzene	NR	NR
Dichloroethylene	NR	NR
Diethylamine	NR	NR
Diglycolic acid	R	R
Dimethylamine	R	R
Dimethyl formamide	NR	NR
Dimethyl hydrazine	NR	NR
Dioctyl phthalate	NR	NR
Dioxane	NR	NR
Disodium phosphate	R	R
E		
Esters	NR	NR
Ethers	NR	NR
Ethyl acetate	NR	NR
Ethyl acetoacetate	NR	NR
Ethyl acrylate	NR	NR
Ethyl chloride	NR	NR
Ethyl chloroacetate	NR	NR
Ethyl ether	NR	NR
Ethylene bromide	NR	NR
Ethylene chloride	NR	NR
Ethylene chlorohydrin	NR	NR
Ethylene dichloride	NR	NR
Ethylene oxide	NR	NR
F		
Ferric acetate	R	NR

Name of chemical	Degree of resistance	
	23°c	60°c
Ferric chloride	R	R
Ferric hydroxide	R	R
Ferric nitrate	R	R
Ferric sulphate	R	R
Ferrous chloride	R	R
Ferrous hydroxide	R	R
Ferrous sulphate	R	R
Fluobric acid	R	R
Fluosilicic acid	R	R
Formaldehyde %35	R	R
Formaldehyde %37	R	R
Formaldehyde %50	R	R
Formic acid	R	NR
Freon F11-	R	R
Freon F12-	R	R
Freon F21-	NR	NR
FreonF113-	R	R
Fructose	R	R
Fruit Juices. Pulp	R	R
Furtural	NR	NR
G		
Gallic acid	R	R
Gelatin	R	R
Glycerin	R	R
Glycelin. glycerol	R	R
Glycolic acid	R	R
Glycols	R	R
Grape sugar	R	R
Green liquor. Paper	R	R
H		
Heptane		R
Hexane		
Hydrobromic acid. %20	R	R
Hydrocyanic acid	R	R
Hydrobromic acid %10	R	R
Hydrofluoric acid dil.	R	NR
Hydrofiuorrc acid %30	R	NR
Hydrofiuorrc acid %40	R	NR
Hydrofiuorrc acid %50	R	NR
Hydrofiuosillcic acid	R	R
Hydrogen	R	R
Hydrogen cyanide	R	NR
Hydrogen fluoride.anhyd	NR	NR
Hydrogen peroxide %50	R	R
Hydrogen peroxide %90		
Hydrogen phosphide	R	R
Hydrogen sulphide. dry	R	R
Hydrogen sulphide(aq. Sol.n)	R	R
Hydroquinone	R	R
Hydroxylamine sulphate	R	R

Name of chemical	Degree of resistance	
	23°c	60°c
Hypochlorous acid	R	R
Hydrazine	NR	NR
I		
Iodine	NR	NR
Iodine solution %10	NR	NR
Isopropyl ether	NR	NR
K		
Ketones	NR	NR
Kraft liquor	R	R
L		
Lactic acid %25	R	R
Lactic acid %80	R	R
Lard oil	R	R
Lauric acid	R	R
Lauryl chlolide	R	R
Lead acetate	R	R
Lead chlolide	R	R
Lead nitrate	R	R
Lead sulphate	R	R
Lime sulpher	R	R
Linseed oil	R	R
Liqueurs	R	R
Lithium bromide	R	R
Lithium sulphate	R	R
M		
Magnesium carbonate	R	R
Magnesium citrate	R	R
Magnesium hydroxide	R	R
Magnesium nitrate	R	R
Magnesium sulphate	R	R
Manganese sulphate	R	R
Maleic acid	R	R
Maleic acid	R	R
Mercuric chloride	R	R
Melcuric cyanide	R	R
Mercuric sulphate	R	R
Mercurous nitrate	R	R
Mercury	R	R
Methane	R	R
Methylene chlorobromlde	NR	NR
Methyl amine	NR	NR
Methyl bromide	NR	NR
Methyl cellosolve	NR	NR
Methyl chloride	NR	NR
Methyl chloroform	NR	NR
Methyl ethyl ketone	NR	NR
Methyl isobutyl ketone	NR	NR
Methylene bromide	NR	NR
Methylene chlorrde	NR	NR
Methylene iodine	NR	NR

Name of chemical	Degree of resistance	
	23°c	60°c
Milk	R	R
Mineral oil	R	R
Molasses	R	R
Monoethanol amine	NR	NR
Motor oil	R	R
N		
Naphtha	R	R
Naphthalene	NR	NR
Natural gas	R	R
Nickel acetate	R	#
Nickel chloride	R	R
Nickel nitrate	R	R
Nickel sulphate	R	R
Nicotine	R	R
Nicotinic acid	R	R
Nitlobenzene	NR	NR
Nitroglycerine	NR	NR
Nitrous acid %10	R	NR
Nitro glycol	NR	NR
O		
Oleic acid	R	R
Oleum	NR	NR
Oxalic acid	R	R
Oxalic acid %50	R	R
Oxygen gas	R	R
P		
Palmitic acid %10	R	R
Palmitic acid %70	R	NR
Paraffin	R	R
Peracetic acid %40	R	NR
Perchlonc acid %70	R	NR
Phenyl hydrazine	NR	NR
Phosgene liq.	NR	NR
Phosphonc acid %25	R	R
Phosphonc acid %50	R	R
Phosphonc acid %70	R	R
Phosphorus red	R	R
Phosphorus trichlorrde	NR	NR
Photographic solution	R	R
Picric acid	NR	NR
Potassium amyl xanthate	R	NR
Potassium bicarbonate	R	R
Potassium bicarbonate	R	R
Potassium borate	R	R
Potassium bromate	R	R
Potassium bromide	R	R
Potassium carbonate	R	R
Potassium chloride	R	R
Potassium chromate	R	R
Potassium chlorate	R	R

Name of chemical	Degree of resistance	
	23°c	60°c
Potassium cvanate	R	R
Potassium cyanide	R	R
Potassium cichromate	R	R
Potassium ethyl xanthate	R	NR
Potassium iodide	R	R
Potassium nitrate	R	R
Potassium perbmate	R	R
Potassium sulphate	R	R
Propane	R	R
Propylene dichloride	NR	NR
Propylene oxide	NR	NR
Pyridine	NR	NR
Pyrogailicia acid	R	R
S		
Salicylic acid	R	R
Salic ylaldehyde	NR	NR
Sea water	R	R
Silicone oil	R	R
Silver cyanide	R	NR
Silver nitrate	R	R
Silver sulphate	R	R
Soaps	R	R
Sodium acetate	R	R
Sodium arsenate	#	#
Sodium alum	R	R
Sodium benzoate	R	R
Sodium bilsulphate	R	R
Sodium bilsulphate	R	R
Sodium bisulphlte	R	R
Sodium bromide	R	R
Sodium carbonate	R	R
Sodium chlorate	R	R
Sodium chlorite	R	R
Sodium dichromate	R	R
Sodium ferricyanlde	NR	NR
Sodium fluoride	NR	NR
Sodium formate	NR	NR
Sodium nitrate	R	R
Sodium nitrite	R	R
Sodium perborate	R	R
Sodium perchlorate	R	R
Sodium peroxide	R	R
Sodium sulphate	R	R
Sodium sulphide	R	R
Sodium sulphite	R	R
Sodium thiosulphate	R	R
Sour crude oil	R	R
Stannic chloride	RR	R
Stannous sulphate	R	R

R: Reisitance
NR: No Reisitance

Name of chemical	Degree of resistance	
	23°c	60°c
Starch	R	R
Steam acid	NR	NR
Succinic acid	NR	NR
Sulfite liquor	R	R
Sulphur	R	R
Sulphur dioxide. Dry	R	R
Sulphur dioxide. Wet	R	R
Sulphur trioxide	R	R
Sulphorl acid %20	R	R
Sulphorl acid %50	R	R
Sulphorl acid %70	R	R
Sulphorl acid %95	NR	NR
Sulphorous acid	R	NR
T		
Tannic acid	R	NR
Tannic acid %30	R	R
Tannic liquors	NR	NR
Tartaric acid	R	R
TelaethydlOfurane	NR	NR
Tetra sod. Pyrophosphate	NR	NR
Tread cutting oils	R	R
Tributyl phosphate	NR	NR
Trichloroacetic acid	R	R
Trichloroethane	NR	NR
Trichlorpenthlene	NR	NR
Trithanoiamine	R	R
Trithylamine	R	R
Trithylpropane	R	R
Trisodium phosphate	R	R
Turpentine	R	R
U		
Urea	R	R
Urine	R	R
V		
Vaseline	R	R
Vinegar. white Vinyl	NR	NR
W		
Water. Demineralized	R	R
Water. disilled or flesh	R	R
Water. Potable	R	R
Water. Salt Water. Sea	R	R
Water. Sewage	R	R
Whiskey-	R	R
White liquor Wines	R	R
X		
X Xylene (Xylol) Z Zinc	NR	NR
Z		
Zinc chlolide	R	R
Zinc nitrate	R	R
Zinc sulphate	R	R

10.Transportation, packaging, handling and storage of UPVC pipes and fittings

10.1 Instructions for handling and storing

1-Avoid dropping, dragging or throwing the pipes on the ground while unloading them.

2-Avoid any metals to touch the pipes such as: chains wires, hooks or any sharp edegs.

3-Avoid exposing the pipes to direct sunrays.

4-The storing place must be away from any heating sources.

5-Storing must be on a flat ground (wood or plastic would be preferable), the height of storing the pipes shouldn't exceed 1.8 meters, pipes should be stored in a pyramidal shape or multi layers shape.

6-If different classes of pipes are kept in the same racks, then the thickness classes of the largest diameter must always be placed at bottom.

7-Pipes should be given adequate supports at all times.

8- Storing the pipes in wooden bundles would be preferable.

9- Keep always the pipe socket away from touching the ground or another pipe to avoid any deformation.

10.2 Instructions for transporting and unloading

1-The pipes must be transported on wooden walls in a pyramidal shape or in bundles.

2-The pipes are unloading by using a crane, avoid using metal belts touching the pipes.

3-pipes can be unloading by rolling them on wooden walls.

4-When loading pipes on to vehicles, care must be taken to avoid them coming into contact with any sharp corners to avoid the damage of the pipes.

5-Care being taken to ensure that pipes don't fall one upon another, nor on to any hard or uneven surfaces.

11. UPVC pipes and fittings dimensions

11.1 UPVC pipes dimensions

UPVC PRESSURE PIPES ACC. TO GERMAN STANDARD DIN 8061 / 8062

Nominal Outside Diameter (mm)	Socket Depth (mm)	2 bar		4 bar		6 bar		10 bar		16 bar	
		Wall Thickness (mm)	wt kg/mt	Wall Thickness (mm)	wt kg/mt	Wall Thickness (mm)	wt kg/mt	Wall Thickness (mm)	wt kg/mt	Wall Thickness (mm)	wt kg/mt
25	...	...	...	...	...	...	...	1.5	0.174	1.9	0.212
32	...	...	...	...	...	...	...	1.8	0.264	2.4	0.342
40	...	...	...	...	...	1.8	0.334	1.9	0.350	3.0	0.525
50	75	...	...	...	...	1.8	0.422	2.4	0.552	3.7	0.809
63	100	...	...	...	...	1.9	0.562	3.0	0.854	4.7	1.289
75	110	...	...	1.8	0.642	2.2	0.782	3.6	1.22	5.6	1.82
90	110	...	...	1.8	0.774	2.7	1.13	4.3	1.75	6.7	2.61
110	115	1.8	0.95	2.2	1.16	3.2	1.64	5.3	2.61	8.2	3.90
125	120	1.8	1.08	2.5	1.48	3.7	2.13	6.0	3.34	9.3	5.01
140	125	1.8	1.21	2.8	1.84	4.1	2.65	6.7	4.18	10.4	6.27
160	132	1.8	1.39	3.2	2.41	4.7	3.44	7.7	5.47	11.9	8.17
180	145	1.8	1.57	3.6	3.02	5.3	4.37	8.7	6.88	13.4	10.4
200	145	1.8	1.74	4.0	3.70	5.9	5.37	9.6	8.51	14.9	12.8
225	152	1.8	1.96	4.5	4.70	6.6	6.76	10.8	10.8	16.7	16.1
250	160	2.0	2.40	4.9	5.65	7.3	8.31	11.9	13.2	18.6	19.9
280	170	2.3	3.11	5.5	7.11	8.2	10.4	13.4	16.6	20.8	24.9
315	180	2.5	3.78	6.2	9.02	9.2	13.2	15.0	20.9	23.4	31.5
355	180	2.9	4.87	7.0	11.4	10.4	16.7	16.9	26.5	26.3	39.9
400	200	3.2	6.10	7.9	14.5	11.7	21.1	19.1	33.7	29.7	50.8
450	200	3.6	7.65	8.9	18.3	13.2	26.8	21.5	42.7	...	...
500	250	4.0	9.37	9.8	22.4	14.6	32.9	23.9	52.6	...	...
560	260	4.5	11.80	11.0	28.1	16.4	41.4	27.7	65.8	...	...
630	300	5.0	14.70	12.4	35.7	18.4	52.2	30.0	83.2	...	...
710	320	5.7	18.90	14.0	45.3	20.7	66.1	...	...	...	...
800	360	6.4	23.90	15.7	57.2	23.3	83.9	...	...	...	...

Notes

- The color D-gray or as the client request.
- Each pipe should be delivered with one rubber sealing ring.
- The standard length is 6 meter long with the socket or as the client request.

UPVC PIPES FOR DISCHARGE SYSTEMS INSIDE BUILDING ACC. TO DIN 19531

DN	Outside diameter (mm)	Wall thickness (mm)	Socket depth (mm)
40	40	1.8	47
50	50	1.8	48
70	75	1.8	55
100	110	2.2	76
125	125	2.5	82
150	160	3.2	100

UPVC PIPES FOR DRINKING WATER SUPPLY ACC. TO DIN 19532

Nominal size	Outside Diameter (mm)	PN 10		PN 16		Socket Depth (mm)	
		wall thickness (mm)	wt kg/mt	wall thickness (mm)	wt kg/mt	Rubber Ring	Solvent Cement
25	32	-	-	2.4	0.342	-	32
32	40	-	-	3.0	0,525	-	40
40	50	-	-	3.7	0.809	75	50
50	63	3.0	0.854	4.7	1.29	100	63
65	75	3.6	1.22	5.6	1.82	110	70
80	90	4.3	1.75	6.7	2.61	110	79
100	110	5.3	2.61	8.2	3.90	115	91
125	140	6.7	4.18	10.4	6.27	125	109
150	160	7.7	5.47	11.9	8.17	132	121
200	225	10.8	10.8	16.7	16.1	152	160
250	280	13.4	16.6	20.8	24.9	170	193
300	315	15.0	20.9	23.4	31.5	180	214
400	450	21.5	42.7	-	-	200	-

UPVC PIPES FOR SEWERAGE ACC. TO DIN19534

Nominal size DN	Outside diameter (mm)	Wall thickness (mm)	Socket depth (mm)	Weight Kg/mt
100	110	3.0	76	1.610
125	125	3.0	82	1.820
150	160	3.6	100	2.560
200	200	4.5	120	4.070
250	250	6.1	140	6.900
300	315	7.7	160	11.000
400	400	9.8	190	17.600
500	500	12.2	220	27.350
600	630	15.4	260	43.670

UPVC PRESSURE PIPES ACC. TO EGYPTIAN STANDARD ES848

Nominal Outside Diameter (mm)	PN 6		PN 8		PN 10		PN 12.5		PN 16		PN 25	
	Wall Thickness (mm)	wt kg/mt	Wall Thickness (mm)	wt kg/mt	Wall Thickness (mm)	wt kg/mt	Wall Thickness (mm)	wt kg/mt	Wall Thickness (mm)	wt kg/mt	Wall Thickness (mm)	wt kg/mt
25	...	...	...	...	...	...	1.5	0.170	1.9	0.212	2.8	0.294
32	...	...	...	...	1.6	0.264	1.9	0.277	2.4	0.342	3.6	0.294
40	...	...	1.6	0.291	1.9	0.350	2.4	0.437	3.0	0.525	4.5	0.750
50	...	...	2.0	0.422	2.4	0.552	3.0	0.683	3.7	0.809	5.6	1.16
63	1.9	0.562	2.5	0.717	3.0	0.854	3.8	1.09	4.7	1.29	7.1	2.04
75	2.2	0.782	2.9	0.990	3.6	1.22	4.5	1.54	5.6	1.82	8.4	2.60
90	2.7	1.13	3.5	1.43	4.3	1.75	5.4	2.21	6.7	2.61	10.1	4.14

Nominal Outside Diameter (mm)	PN 8		PN 12.5		PN 20		PN 25	
	Wall Thickness (mm)	wt kg/mt	Wall Thickness (mm)	wt kg/mt	Wall Thickness (mm)	wt kg/mt	Wall Thickness (mm)	wt kg/mt
110	3.4	1.70	5.3	2.61	8.1	3.90	10.0	5.00
125	3.9	2.21	6.0	3.34	9.2	5.01	11.4	6.48
140	4.3	2.74	6.7	4.18	10.3	6.27	12.7	8.09
160	4.9	3.57	7.7	5.47	11.8	8.17	14.6	10.63
180	5.5	4.51	8.6	6.88	13.3	10.4	16.4	13.40
200	6.2	5.64	9.6	8.51	14.7	12.8	18.2	16.57
225	6.9	7.06	10.8	10.8	16.6	16.1	...	...
250	7.7	8.76	11.9	13.2	18.4	19.9	...	...
280	8.6	10.96	13.4	16.6	20.6	24.9	...	...
315	9.7	13.91	15.0	20.9	23.2	31.5	...	...
355	10.9	17.62	16.9	26.5	26.1	39.9	...	...
400	12.3	22.40	19.1	33.7	29.4	50.8	...	...
450	13.8	28.27	21.5	42.7	33.1	67.82	...	...
500	15.3	34.83	23.9	52.6	36.8	83.77	...	...
560	17.2	43.85	26.7	65.8	...	...	...	...
630	19.3	55.36	30.0	83.2	...	...	...	...
710	21.3	68.1	...	...	...	...	...	...
800	24.5	88.22	...	...	...	...	...	...

UPVC PIPES FOR DRAINAGE AND SEWARAGE ACC. TO ES 1717

Nominal size	Outside Diameter (mm)	Socket depth (mm)	SN2 (SDR51)		SN4 (SDR41)		SN6 (SDR34)	
			Wall Thickness (mm)	wt kg/mt	Wall Thickness (mm)	wt kg/mt	Wall Thickness (mm)	wt kg/mt
110	110	58	-	-	3.2	1.64	3.2	1.64
125	125	61	-	-	3.2	1.82	3.7	2.13
160	160	74	3.2	2.41	4.0	2.91	4.7	3.44
200	200	90	3.9	3.70	4.9	4.46	5.9	5.37
250	250	125	4.9	5.65	6.2	7.06	7.3	8.31
315	315	132	6.2	9.02	7.7	11.11	9.2	13.2
355	355	136	7.0	11.40	8.7	14.06	10.4	16.7
400	400	150	7.9	14.50	9.8	17.8	11.7	21.1
450	450	155	8.8	18.30	11.0	22.53	13.2	26.8
500	500	160	9.8	22.40	12.3	28.00	14.6	32.9
630	630	188	12.3	35.70	15.4	43.94	18.4	52.2
710	710	210	13.9	45.30	17.4	55.56	-	-
800	800	220	15.7	57.20	19.6	70.57	-	-

UPVC PIPES FOR TELEPHONE DUCT ACC. TO T.C. 161 A

Nominal size	Outside diameter (mm)	Wall thickness (mm)	Socket depth (mm)
50	50	1.8	80
110	110	3.2	170

UPVC THREADED PIPES FOR SUPPLY AND IRRIGATION SYSTEMS

Nominal size (inch)	Outside diameter (mm)	Wall thickness (mm)	Weight Kg/mt
½"	21.2	2.6	0.226
¾"	26.6	3.0	0.320
1"	33.4	3.5	0.470
1 ¼"	42.1	3.75	0.630
1 ½"	48.1	4.3	0.815
2"	60.2	5.3	1.250

UPVC PRESSURE PIPES ACC. TO BS 3505

Nominal size (inch)	Outside diameter (mm)	9 bar Wall th. (mm)	12 bar Wall th. (mm)	15 bar Wall th. (mm)
½"	21.2	-	-	2.1
¾"	26.6	-	-	2.5
1"	33.4	-	-	2.7
1 ¼"	42.1	-	2.7	3.2
1 ½"	48.1	-	3.0	3.7
2"	60.2	3.0	3.7	4.5
3"	88.7	4.1	5.3	6.5
4"	114.1	5.2	6.8	8.3
5"	140.0	6.3	8.3	10.1
6"	168.0	7.5	9.9	12.1
8"	218.8	8.8	11.6	14.1

UPVC PRESSURE PIPES ACC. TO BS 3506
(FOR INDUSTRIAL USES)

Nominal size (inch)	Outside diameter (mm)	0 bar Wall th. (mm)	6 bar Wall th. (mm)	9 bar Wall th. (mm)	12 bar Wall th. (mm)	15 bar Wall th. (mm)
½"	21.2	-	-	-	-	1.7
¾"	26.6	-	-	-	-	1.9
1"	33.4	-	-	-	-	2.2
1 ¼"	42.1	-	-	-	2.2	2.7
1 ½"	28.1	1.8	-	-	2.5	3.1
2"	60.2	1.8	-	2.5	3.1	3.9
2 ½"	75.0	1.8	-	3.0	3.9	4.8
3"	88.7	1.8	2.9	3.5	4.6	5.7
4"	114.1	2.3	3.4	4.5	6.0	7.3
5"	140.0	2.6	3.8	5.6	7.3	9.0
6"	168.0	3.1	4.5	6.6	8.8	10.8
8"	218.8	3.1	5.3	7.8	10.3	12.6

UPVC PIPES FOR SOIL AND VENTILATION ACC. TO BS4514

Nominal size	Outside diameter (mm)	Wall thickness (mm)	Socket depth (mm)
82	82	3.2	55
110	110	3.2	66
160	160	3.2	82

UPVC PIPES FOR GROUND GRAVITY DRAINAGE AND SEWERAGE ACC. TO BS4660

Nominal size	Outside diameter (mm)	Wall thickness (mm)	Socket depth (mm)
110	110	3.2	66
160	160	4.1	82

UPVC PIPES FOR GRAVITY SEWERS ACC. TO BS 5481

Nominal size	Outside diameter (mm)	Wall thickness (mm)	Socket depth (mm)
200	200	4.9	99
250	250	6.1	134
315	315	7.7	144
355	355	8.7	149
400	400	9.8	155
450	450	11.0	166
500	500	12.2	178
560	560	13.7	192
630	630	15.4	209

UPVC PIPES ACC. TO ASTM D1785 (SCH 40,80)

Nominal size (mm)	Outside diameter (mm)	SCH 40		SCH 80		Socket depth (mm)
		Wall Thickness (mm)	PN Bar	Wall Thickness (mm)	PN Bar	
½"	21.34	2.77	41.4	3.73	58.6	25.2
¾"	26.67	2.87	33.1	3.91	47.6	31.6
1"	33.40	3.38	31.0	4.55	43.4	36.2
1 ¼"	42.16	3.56	25.5	4.85	35.9	44.65
1 ½"	48.26	3.68	22.8	5.08	32.4	50.9
2"	60.32	3.91	19.3	5.54	27.6	57.2
2 ½"	73.02	5.16	20.7	7.01	29.0	63.7
3"	88.9	5.49	17.9	7.62	25.5	82.7
4"	114.3	6.02	15.2	8.56	22.1	101.9
6"	168.28	7.11	12.4	10.97	19.3	153.0
8"	219.08	8.18	11.0	12.70	17.2	154.5

UPVC PIPES ACC. TO ASTM D2241 (SDR SERIES)

Nominal size (inch)	Outside diameter (mm)	SDR 64 (4.3 Bar)	SDR 41 (6.9 Bar)	SDR 32.5 (11 Bar)	SDR 26 (12.4 Bar)	SDR 21 (13.8 Bar)	SDR 17 (17.2 Bar)	SDR 13.5 (27.2 Bar)
		Wall thickness (mm)						
½"	21.34	-	-	-	-	-	-	-
¾"	26.67	-	-	-	-	1.5	1.6	1.6
1"	33.4	-	-	-	1.5	1.6	2.0	2.0
1¼"	42.16	-	-	1.5	1.6	2.0	2.5	2.5
1½"	48.26	-	-	1.5	1.9	2.3	2.8	3.1
2"	60.32	-	-	1.9	2.3	2.9	3.6	3.6
2½"	73.02	-	-	2.2	2.8	3.5	4.3	4.5
3"	88.9	-	2.2	2.7	3.4	4.2	5.2	5.4
4"	114.30	1.8	2.8	3.5	4.4	5.4	6.7	6.6
6"	168.28	2.6	4.1	5.2	6.5	8.0	9.9	8.5
8"	218.08	3.4	5.3	6.7	8.4	10.4	12.9	12.5

UPVC PIPES FOR DRAIN, WASTE AND VENT. ACC. TO ASTM D2665

Nominal size (inch)	Outside diameter (mm)	Wall thickness (mm)	Socket depth (mm)
1 ¼″	42.16	3.56	44.65
1 ½″	48.26	3.68	50.9
2″	60.32	3.91	57.2
3″	88.9	5.49	82.7
4″	114.3	6.02	101.9
6″	168.28	7.11	153.0
8″	219.08	8.18	154.5

UPVC PIPES FOR DRAIN , WASTE AND VENT. (WHITE COLOUR) METRIC AND INCH DIMENSIONS

Metric dimension (mm)	Inch diameter (inch)	Wall thickness (mm)		
48	1 ½″	2.5	3.7	3.9
60	2″	2.7	3.9	4.0
75	3″	3	4	5
110	4″	3	4	5
160	6″	3	4	5

Note

The pipe available in multi layers and single layer.

UPVC PIPE FOR WATER SUPPLY ACC. TO ISO 4422/EN 1452

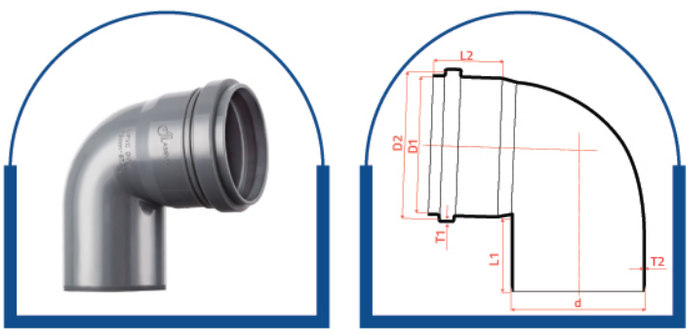
Nominal outside diameter (mm)	SDR 41 PN 5	SDR 34 PN 6	SDR 26 PN 8	SDR 21 PN 10	SDR 17 PN 12.5	SDR 13.6 PN 16	SDR 9 PN 25
	Wall thickness (mm)						
25	-	-	-	-	1.5	1.9	2.8
32	-	-	-	1.6	1.9	2.4	3.6
40	-	-	1.6	1.9	2.4	3	4.5
50	-	-	2	2.4	3	3.7	5.6
63	1.6	1.9	2.5	3	3.8	4.7	7.1
75	1.9	2.2	2.9	3.6	4.5	5.6	8.4
90	2.2	2.7	3.5	4.3	5.4	6.7	10.1

Nominal outside diameter (mm)	SDR 33 PN 8	SDR 26 PN 10	SDR 21 PN 12.5	SDR 17 PN 16	SDR 13.6 PN 20	SDR 11 PN 25
	Wall thickness (mm)					
110	3.4	4.2	5.3	6.6	8.1	10
125	3.9	4.8	6.0	7.4	9.2	11.4
140	4.3	5.4	6.7	8.3	10.3	12.7
160	4.9	6.2	7.7	9.5	11.8	14.6
180	5.5	6.9	8.6	10.7	13.3	16.4
200	6.2	7.7	9.6	11.9	14.7	18.2
225	6.9	8.6	10.8	13.4	16.6	-
250	7.7	9.6	11.9	14.8	18.4	-
280	8.6	10.8	13.4	16.6	20.6	-
315	9.7	12.1	15	18.7	23.2	-
355	10.9	13.6	16.9	21.1	26.1	-
400	12.3	15.3	19.1	23.7	29.4	-
450	13.8	17.2	21.5	26.7	33.1	-
500	15.3	19.1	23.9	29.7	36.8	-
560	17.2	21.4	26.7	-	-	-
630	19.3	24.1	30	-	-	-
710	21.8	27.6	-	-	-	-
800	24.5	30.6	-	-	-	-

11.2 UPVC Fittings Dimensions

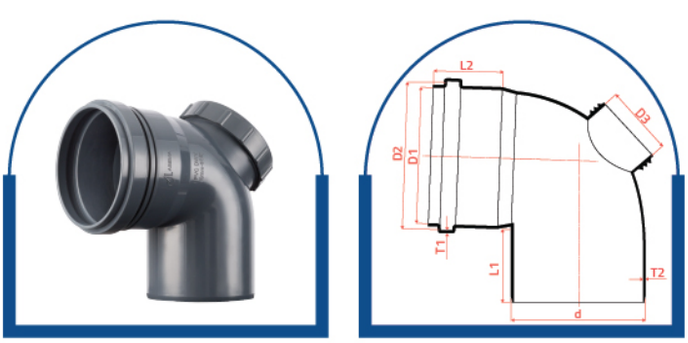
11.2.1 UPVC Rubber ring socket, Gray Colour

Elbow 90°



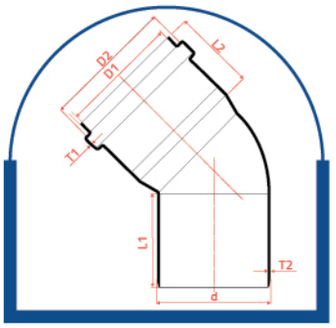
Size (mm)	d	D1	L1	T1	D2	L2	T2
40	40	40.3	36	2.9	49.6	30.8	3.2
50	50	51	56	3.25	60	48	3.25
75	75	76	60	3.25	85	55	3.25
110	110	111	75	3.8	121	68	4.2
160	160	161	88	4.7	176	68	5.0

Elbow 90° with access cap



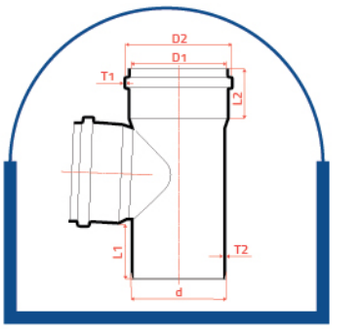
Size (mm)	d	D1	L1	T1	D2	L2	T2	D3
75	75	76.0	60	3.25	85	55	3.25	62
110	110	111.0	75	3.8	121.0	68	4.2	89
160	160	161	100	4.7	176.0	90	5.0	89

Elbow 45°



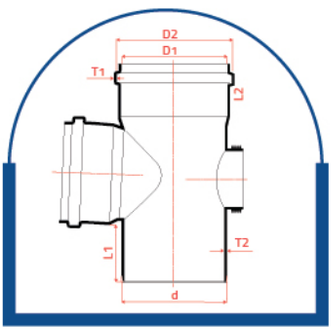
Size (mm)	d	D1	L1	T1	D2	L2	T2
40	40	40.3	36	2.9	46.6	30.8	3.2
50	50	51	56	3.25	60	48	3.25
75	75	76	60	3.25	85	55	3.25
110	110	111	75	3.8	121	68	4.2
160	160	161	88	4.7	176	68	5.0
200	200	201	105	4.7	225	83	5.0

Tee 90°



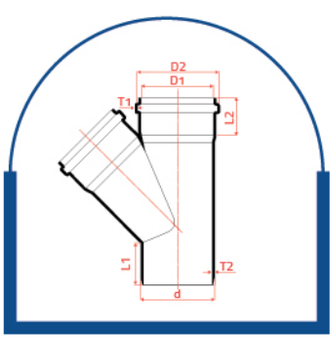
Size (mm)	d	D1	L1	T1	D2	L2	T2
40	40	40.3	36	2.9	49.5	30.8	3.2
50	50	51	56	3.25	60	48	3.25
75	75	76	60	3.25	85	55	3.25
110	110	111	75	3.8	121	68	4.2
160	160	161	88	4.7	176	68	5.0

Tee 90° with access cap



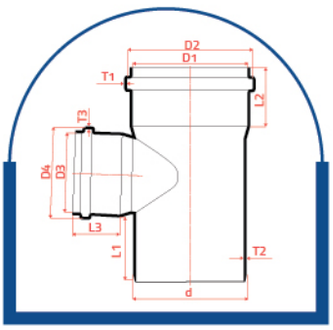
Size (mm)	d	D1	L1	T1	D2	L2	T2
75	75	76	60	3.25	85	55	3.25
110	110	111	75	3.8	121	68	4.2
160	160	161	88	4.7	176	68	5

Tee 45°



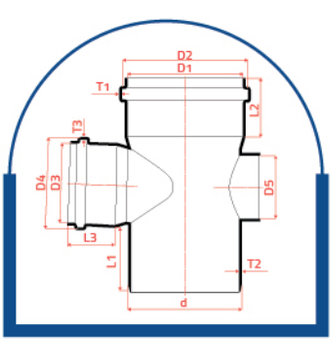
Size (mm)	d	D1	L1	T1	D2	L2	T2
50	50	51	56	3.25	60	48	3.25
75	75	76	60	3.25	85	55	3.25
110	110	111	75	3.8	121	68	4.2
160	160	161	88	4.7	176	68	5

Tee Reducer 90°



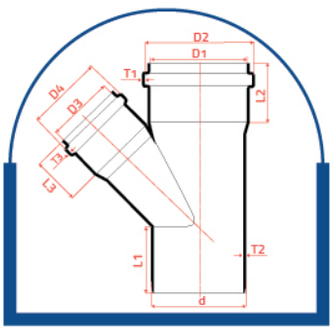
Size (mm)	d	D1	L1	T1	D2	L2	T2	D3	L3	T3	D4
75/50	75	76	60	3.25	85	55	3.25	51	48	3.25	60
110/50	110	111	75	3.25	121	68	4.2	51	48	3.25	60
110/75	110	111	75	3.25	121	68	4.2	76	55	3.25	85
160/110	160	161	88	3.8	176	68	5.0	111	68	3.8	121

Tee Reducer 90° With Access Cap



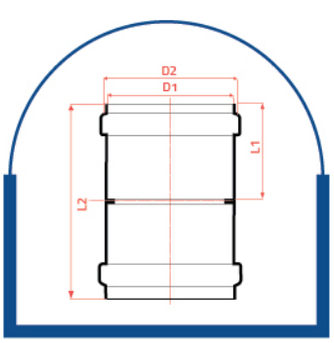
Size (mm)	d	D1	L1	T1	D2	L2	T2	D3	L3	T3	D4	D5
110/50	110	111	75	3.8	120.6	68	4.2	51	60	3.25	60	62
110/75	110	111	75	3.8	121	68	4.2	76	85	3.25	60	89
160/110	160	161	100	4.7	176	90	5	111	121	3.8	121	89

Tee Reducer 45°



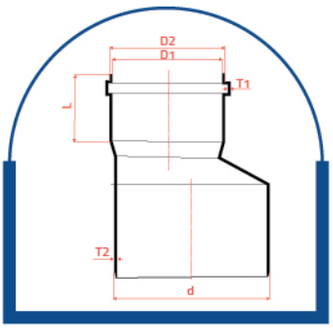
Size (mm)	d	D1	L1	T1	D2	L2	T2	D3	L3	T3	D4
75/50	75	76	60	3.25	85	55	3.25	51	48	3.25	60
110/50	110	111	75	3.8	121	68	3.8	51	48	3.25	60
110/75	110	111	75	3.8	121	68	3.8	76	55	3.25	85
160/110	160	161	88	4.2	176	68	4.7	111	68	3.8	121

Coupling



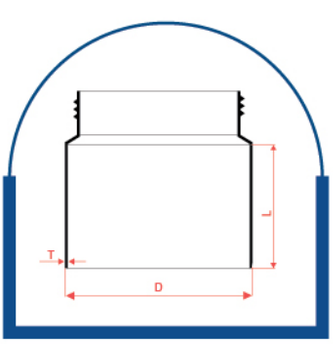
Size (mm)	D1	L1	D2	L2
50	51	56	60	116
75	76	60	85	123
110	111	75	121	153
160	161	88	176	182
200	201	105	225	216

Eccentric Socket Reducer



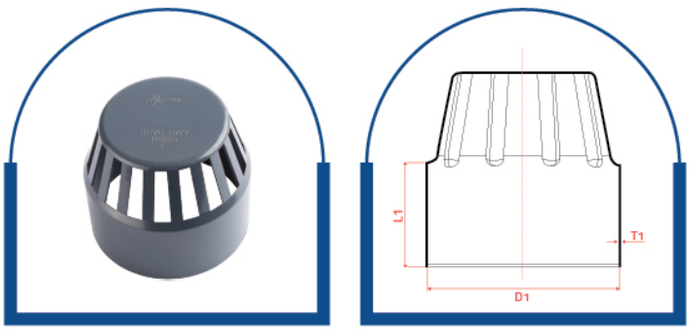
Size (mm)	d	D1	T1	D2	L	T2
50/40	50	40.3	2.9	49.6	30.8	3.25
75/50	75	51	3.25	60	48	3.25
110/50	110	51	3.25	60	48	3.8
110/75	110	76	3.25	85	55	3.8
160/110	160	111	3.8	121	68	5

Clean Out



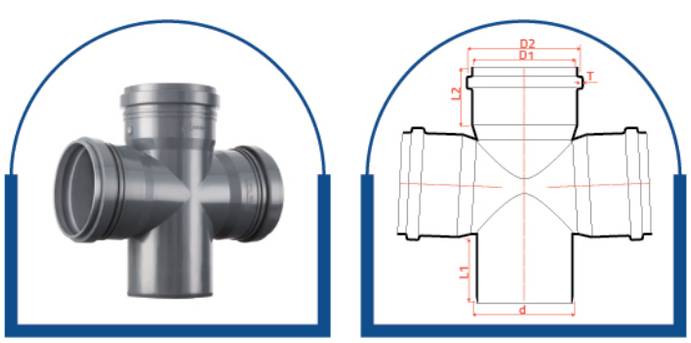
Size (mm)	D	L	T
75	75	60	3.25
110	110	75	4.2
160	160	88	5.0

Air Vent



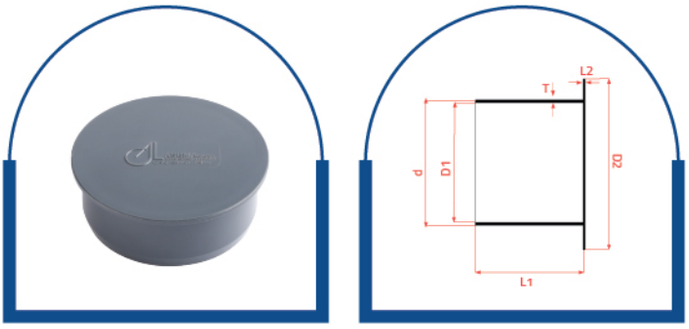
Size (mm)	D1	L1	T1
75	75.8	50	3.25
110	110.8	68	4.2

Double Branch 90°



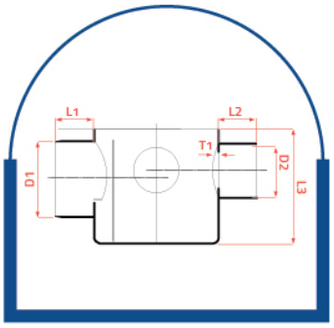
Size (mm)	d	D1	D2	L1	L2	T
110/110	110	111	115.8	75	68	3.8

End Plug



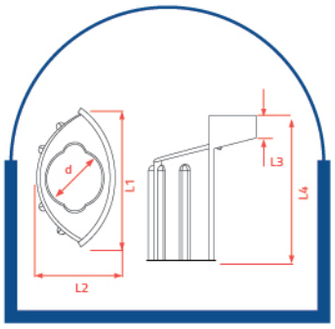
Size (mm)	d	D1	D2	L1	L2	T
50	50	44	55	30	3.2	3.2
75	75	68	80	35	3.2	3.2
110	110	104	121	39	3.2	3.2
160	160	152	176	50	4.0	4.0
200	200	190	221	62	5	5

Floor Trap

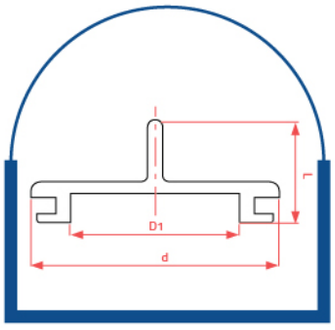


Size (mm)	D1	L1	T1	D2	L2	L3
75/50	75	39.7	3.3	50.3	39	111

Part 1



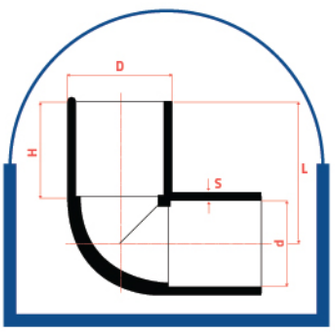
Part 2



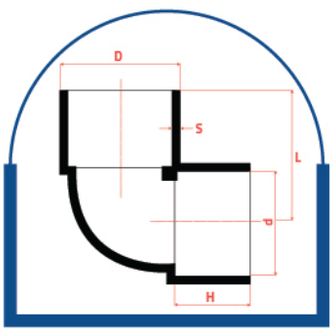
Size (mm)	d	D1	L	L1	L2	L3	L4
Part 1	36.8	-	-	88.8	49.2	9.1	70.3
Part 2	46	31.4	19	-	-	-	-

11.2.2 UPVC Solvent cement socket, White colour metric system

Elbow 90°



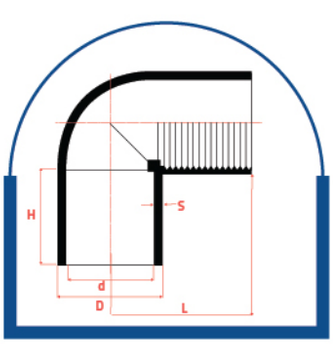
Type A



Type B

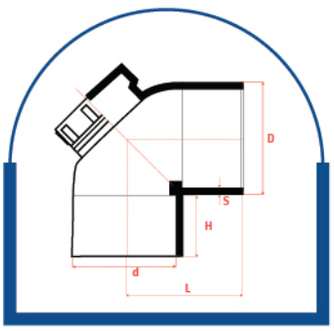
Size (mm)d	D	H	S	L	Type
50	55	32	2.7	58	A
63	69	38	3.0	70	A
75	84	45	4.5	85	B
110	121	51	5.5	97	B
160	172	70	6.0	150	B

Elbow 90° F.Th x Sj

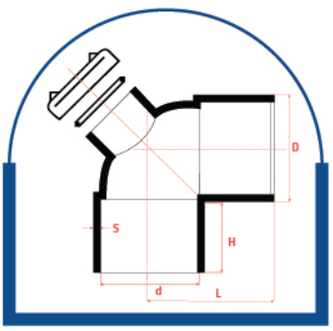


Size (mm)d	D	S	H	L
50 - 1½	55	2.7	32	58
50 - 1¼	55	2.7	32	58

Elbow 90° with access cap



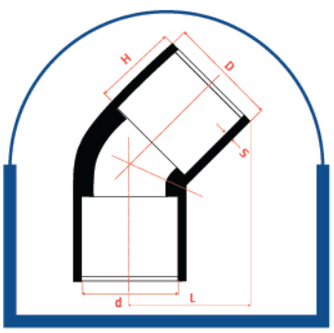
Type A



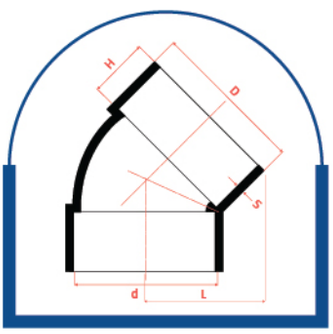
Type B

Size (mm)d	D	H	S	L	Type
63	69	38	3.0	70	A
75	84	45	4.5	85	B
110	121	51	5.5	97	B
160	172	70	6.0	150	B

Elbow 45°



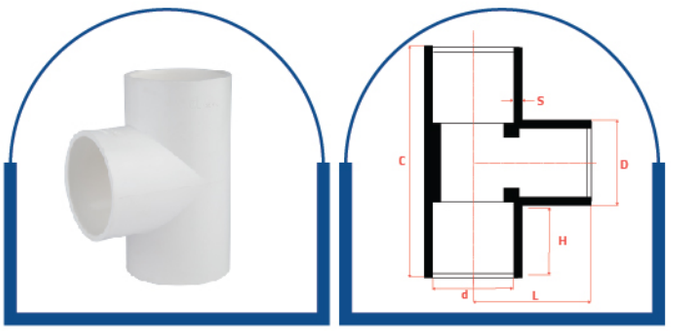
Type A



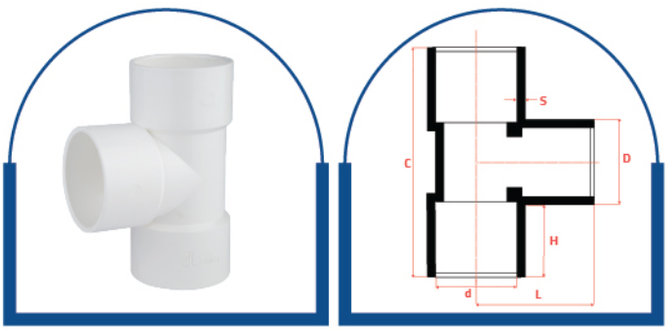
Type B

Size (mm)d	D	H	S	L	Type
50	55	32	2.7	54	A
63	69	38	3.0	62	A
75	84	45	4.5	80	B
110	121	51	5.5	100	B
160	172	70	6.0	155	B

Tee 90°



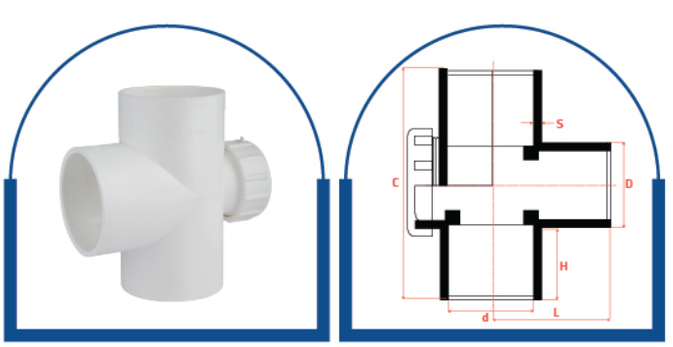
Type A



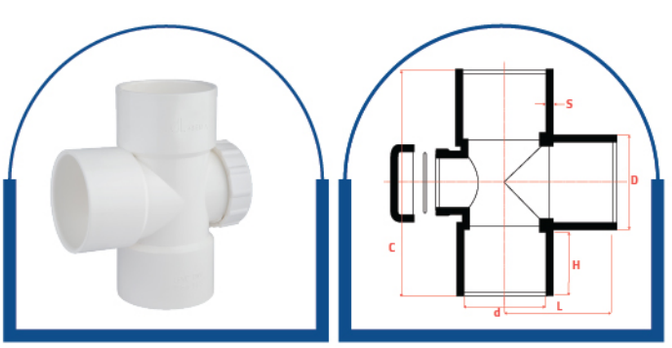
Type B

Size (mm)d	D	H	S	C	L	Type
50	55	32	2.7	115	58	A
63	69	38	3.0	142	70	A
75	84	45	4.5	175	89	B
110	121	51	5.5	224	97	B
160	172	70	6.0	312	150	B

Tee 90° with access cap



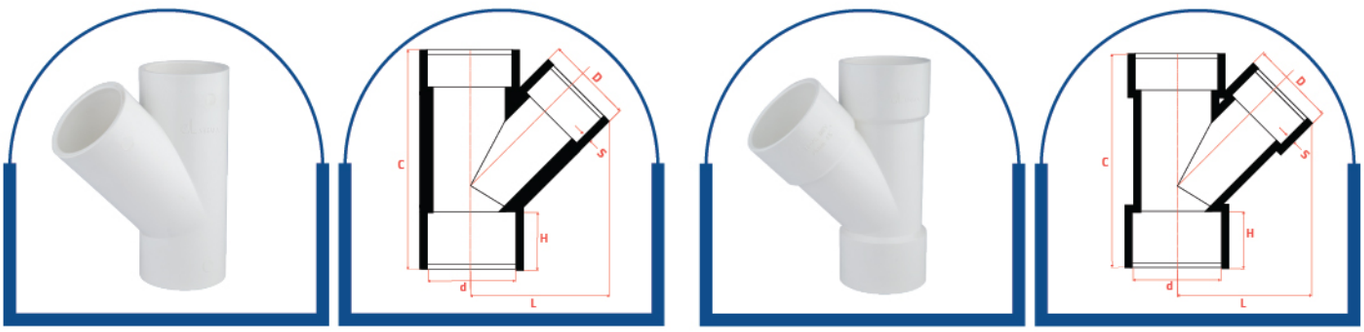
Type A



Type B

Size (mm)d	D	H	S	C	L	Type
63	69	38	3.0	142	70	A
75	80	45	4.5	175	85	B
110	121	51	5.5	224	97	B
160	172	70	6.0	312	150	B

Tee 45°

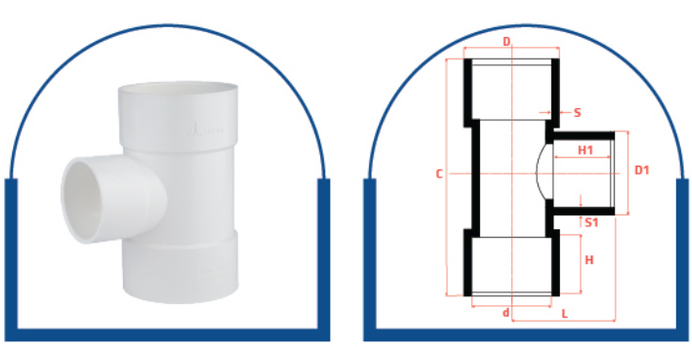


Type A

Type B

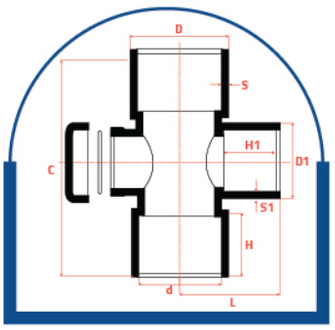
Size (mm)d	D	H	S	C	L	Type
50	55	32	2.7	140	54	A
63	69	38	3.0	170	62	A
75	84	45	4.5	240	80	B
110	121	51	5.5	270	100	B
160	172	70	6.0	410	155	B

Tee Reducer 90°



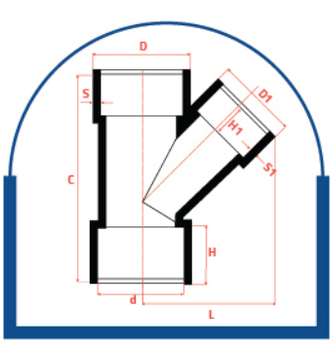
Size d (mm)	D	D1	H	H1	S	S1	C	L
75 mm/2"	84	69	45	38	4.5	3.0	185	70
110 mm/2"	121	69	51	38	5.5	3.0	195	90
110/50 mm	121	55	51	32	5.5	2.7	190	90
110/63 mm	121	69	51	38	5.5	3.0	195	90
110/75 mm	121	84	51	45	5.5	4.5	210	90
160/110 mm	172	121	70	51	6.0	5.5	280	150

Tee Reducer 90° with access cap



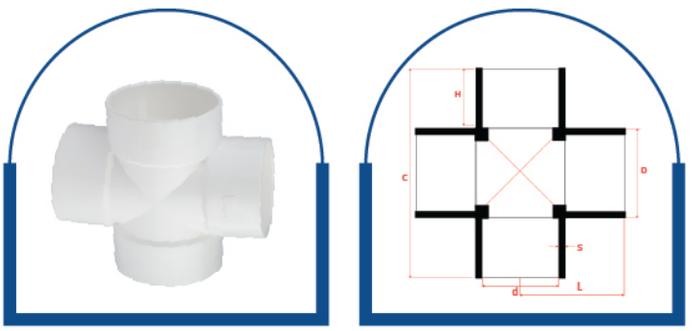
Size (mm)d	D	D1	H	H1	S	S1	C	L
75 mm/2"	84	69	45	38	4.5	3.0	185	70
110 mm/2"	121	69	51	38	5.5	3.0	195	90
110/50 mm	121	55	51	32	5.5	2.7	190	90
110/63 mm	121	69	51	38	5.5	3.0	195	90
110/75 mm	121	84	51	45	5.5	4.5	210	90
160/110 mm	172	121	70	51	6.0	5.5	280	150

Tee Reducer 45°



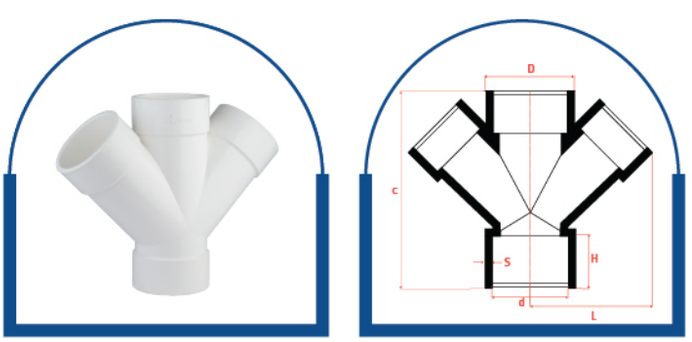
Size (mm)d	D	D1	H	H1	S	S1	C	L
110 mm/2"	121	69	45	38	5.5	3.0	230	100
110/50 mm	121	55	51	32	5.5	2.7	230	180
110/63 mm	121	69	51	38	5.5	3.0	230	100
110/75 mm	121	84	51	45	5.5	4.5	270	105
160/110 mm	172	121	70	51	6.0	5.5	350	145

Double Branch 90°



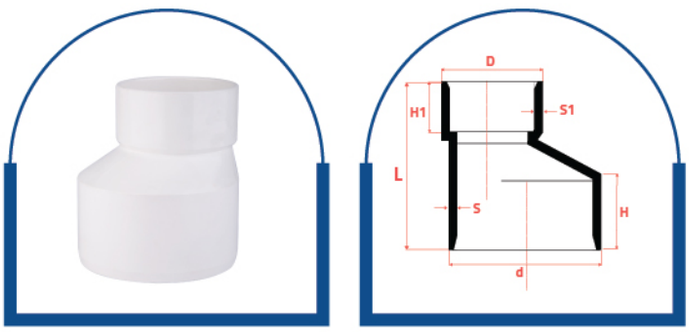
Size d(mm)	D	H	S	C	L
75	84	45	4.5	175	85
110	121	51	5.3	224	97

Double Branch 45°



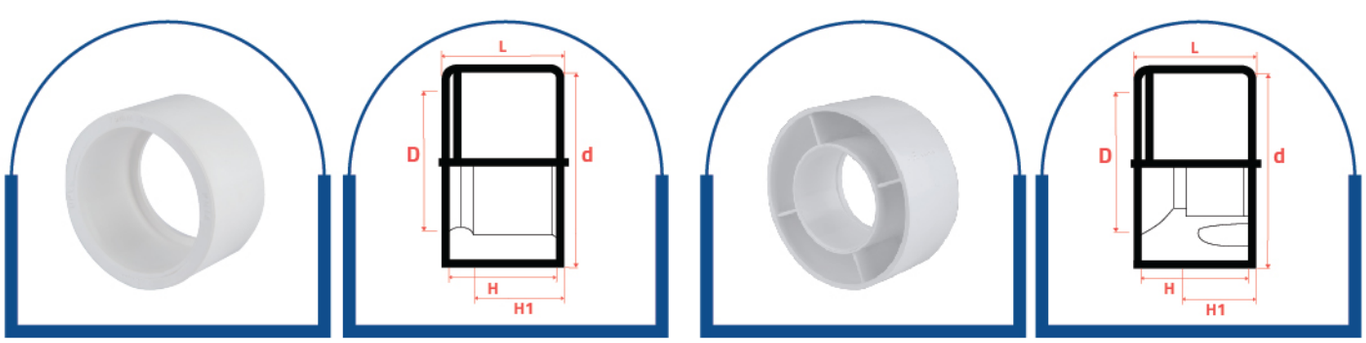
Size (mm)d	D	H	S	C	L
110	121	51	5.5	310	195

Eccentric Socket Reducer



Size (mm)d	D	H	H1	S	S1	L
110 mm/2"	69	51	38	5.5	3.0	119
110/50 mm	55	51	32	5.5	2.7	118
110/63 mm	69	51	38	5.5	3.0	119
110/75 mm	84	51	45	5.5	4.5	125
160/110 mm	121	70	51	6.0	5.5	155

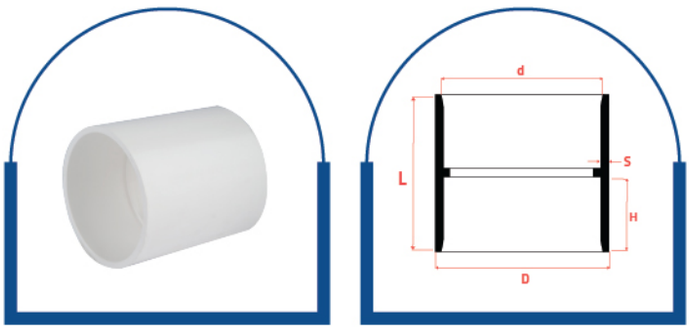
Reducing Bushes



Type A Type B

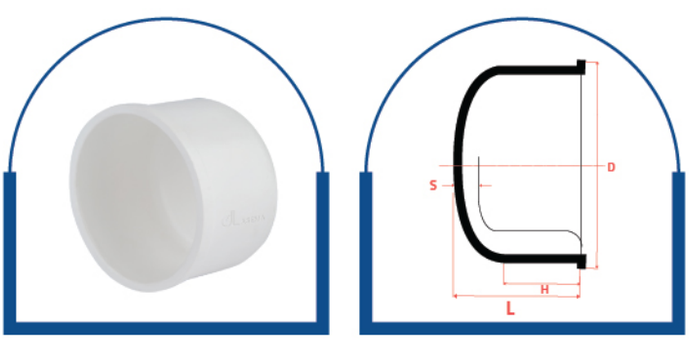
Size (mm)d	D	H	H1	L	Type
63/50	50	38	32	43	A
75/50	50	45	32	49	B
75/63	63	45	38	49	A
75 mm/2"	60	45	38	49	A
110/50	50	51	32	56	B
110/63	63	51	38	56	B
110 mm/2"	60	51	38	56	B
110/75	75	51	45	56	B
160/110	110	70	51	76	B

Coupling



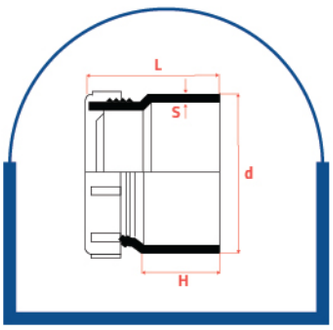
Size (mm)d	D	H	S	L
50	55	32	2.7	68
63	69	38	3.0	81
75	84	45	4.5	100
110	121	51	5.5	107
160	172	70	6.0	145

End Cap



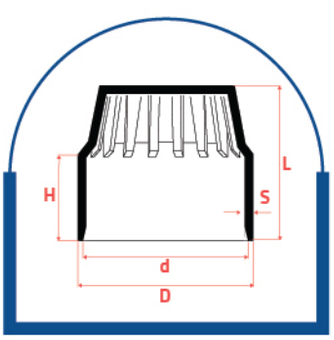
Size (mm)d	D	H	S	L
50	57	32	3	38
63	71	38	3	45
75	90	45	4.5	56
110	125	51	5.5	85
160	188	70	6.0	110

Clean Out



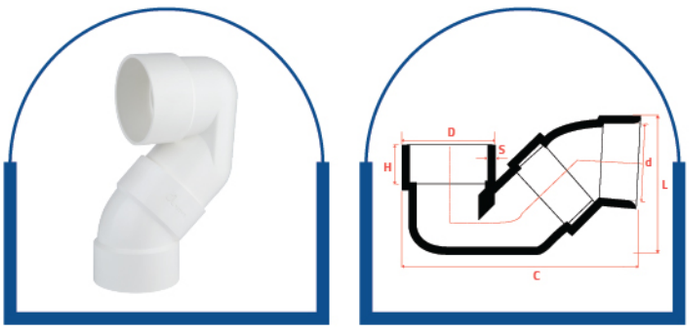
Size (mm)d	H	S	L
50	32	2.7	60
63	38	3.0	69
75	45	4.5	78
110	51	5.5	90
160	70	6.0	110

Air Vent



Size (mm)d	D	H	S	L
75	84	45	4.5	75
110	120	51	5.5	88

Syphon



Size (mm)d	D	H	S	C	L
110	121	51	5.5	330	215

Floor Trap

Size (mm)d	d1	D	H	H1	S	L	A
2"/1 1/2"	48	68	38	32	4.5	100	110
2"/2"	60	68	38	38	4.5	100	110
75mm/1 1/2"	75	84	45	32	4.5	100	110
75mm/2"	75	84	45	38	4.5	70	110
75/50mm	75	84	45	32	4.5	70	110

11.2.3 UPVC Solvent cement socket, White colour ASTM system

Elbow 90°

Size	1	2	3	4	5
Normal size (inch)	1 1/2	2	3	4	6

Elbow 90° With Access Cap

Size	1	2	3	4
Normal size (inch)	2	3	4	6

Elbow 45°

Size	1	2	3	4	5
Normal size (inch)	1 1/2	2	3	4	6

Tee 90°

Size	1	2	3	4	5
Normal size (inch)	1 1/2	2	3	4	6

Tee 90° With Access Cap

Size	1	2	3	4
Normal size (inch)	2	3	4	6

Tee Reducer 90°

Size	1	2	3	4
Normal size (inch)	3/2	4/2	4/3	6/4

Tee Reducer With Access Cap

Size	1	2	3	4
Normal size (inch)	3/2	4/2	4/3	6/4

Tee 45°

Size	1	2	3	4	5
Normal size (inch)	1 1/2	2	3	4	6

Tee Reducer 45°

Size	1	2	3
Normal size (inch)	4/2	4/3	6/4

Double Branch 90°

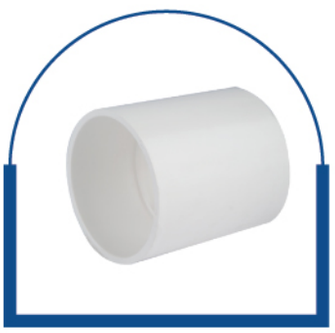
Size	1
Normal size (inch)	4

Air Vent

Size	1	2
Normal size (inch)	3	4

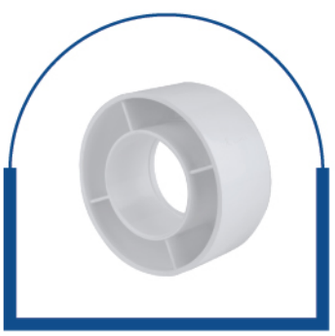
Coupling

Size	1	2	3	4	5
Normal size (inch)	1 1/2	2	3	4	6



Reducing Bush

Size	1	2	3	4	5
Normal size (inch)	2/ 1/2	3/2	4/2	4/3	6/4



Clean Out

Size	1	2	3	4	5
Normal size (inch)	1 1/2	2	3	4	6

Syphon

Size	1
Normal size (inch)	4

End Cap

Size	1	2	3	4	5
Normal size (inch)	1 1/2	2	3	4	6

Coupling F.Th x Sj

Size	1	2
Normal size (inch)	1 1/2 / 1 1/2	1 1/2 / 1 1/4

Elbow F.Th x Sj

Size	1	2
Normal size (inch)	1 1/2 / 1 1/2	1 1/2 / 1 1/4

Floor Trap

Size	1	2	3	4	5	6
Normal size (inch)	3/1 1/2	3/2	2/1 1/2	2/2	2/1 1/2	1 1/2/1 1/2
Height (cm)	10	10	10	10	7	7

12. Quality Control

12.1 Lab Equipment and tests

Al ASEMA has built a modern and efficient Laboratory with hight performance Equipments from European suptigers supliers to cover the pressure test, charpy impact tensile tests in order to accept raw materials it is very important to carry out density and fluidity test on polypropylene deliveries.

Product dimensional Test of dimensional variation Test after heat exposure.

Microscope check about the homogeneity of the modified material. Temperature and pressure resistance tests as follow:

- Tensile strength tests
- Heat resistance test
- Melt flow index
- Density Control
- Shock tests

The audit quality manager checks all the results and give the approval to proceed with the production.

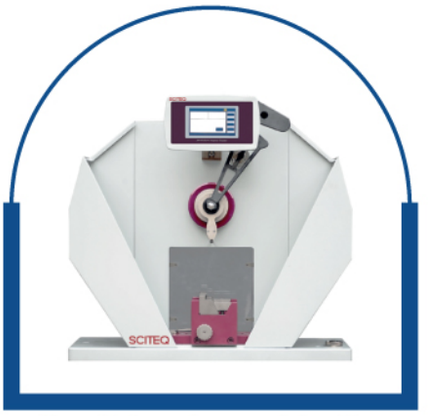
Melt flow index

12.2 Laboratory equipment's for pipes and fittings

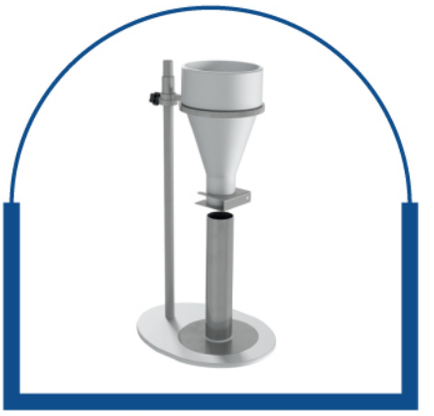
Al ASEMA pipes laboratory has all equipment which covers all the tests of raw materials, production process and final product listed as follow:

1-Melt flow index tester.
2-Sieve analysis tester.
3-Burst pressure tester.
4-Heat stability tester.
5-Bulk density tester.
6-Falling impact tester.
7-Pendulum impact tester.
8-Vicat tester.
9-Chemical effect tester.
10-Hydrostatic pressure tester.
11-Oven (Heat reversion) tester.
12-Tensile strength tester.
13-Compresion tester.
14-Water absorption tests.

Melt flow rate tester



Pendulum impact tester



Bulk density

Hydrostatic pressure tester

Tensile tester

Weighting tester

Burst pressure tester

12.3 System control procedure

The production of a quality-controlled pipe systems demands the supervision, regulation and control of all work operations. All results and processes have to be documented this requires:

- Test and acceptance of incoming goods: raw materials tests before processing stage.
- Process control.
- In process inspection and test: during the production process.
- Final inspection and test: dimension control, surface finish, melt flow index, OIT measurement, heat reversion test, carbon black content, pressure test, tensile test.

12.4 Raw material testes

1-Melt flow rate test acc. To ISO 1133.
2-Density test acc. To ISO 1183.
3-Sieve analysis test.
4- Heat stability test.

12.5 The tests during production processes

1-Visual inspection acc. To DIN 8060 & DIN 8061, ES 848 & ES 1717.
2-Dimensional measuring acc. To DIN 8060 & DIN 8061, ES 848 & ES 1717.
a-Wall thickness. b-Outside diameter c-Ovality.
3-Tensile strength at yield acc. To ISO 527.
4-Falling impact test.
5-Heat reversion test .
6-Hydrostatic pressure test (long term).

12.6 The pressure test at site

In case of testing the pipeline at site, we must do the steps as follow:

1- Maximum pipeline length in the beginning is about 500 meters and not exceeds 1000 meters, thin must also cover the pipeline.
2- We must cover pipeline by soft soil.
3- Discharge the pipeline from the air by installing air valves before the testing.
4- Use water until this process is also performed to clean the line from the dust various materials inside as a result of drilling.
5- The pressure test at site is equal to one and half times of allowable working pressure for period of not less than half an hour at 20 C.

The pressure reduction factor versus temperature up to 40 C , applicable to 50 years life time as follow:

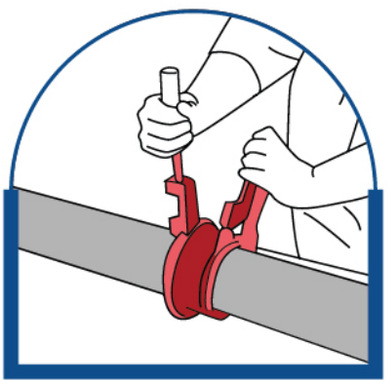
Temperature	20 C	25 C	30 C	35 C	40 C
Factor	1.0	0.93	0.87	0.80	0.74

13. Installation Instructions

13.1 Push fit (Rubber ring socket) pipes and fittings

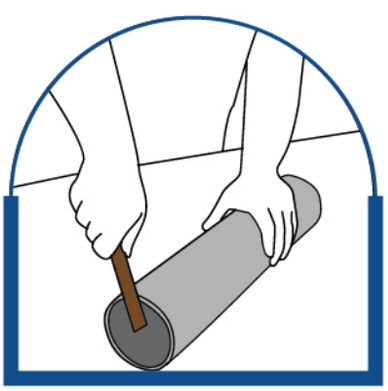
1- Cutting

Pipe must be squarely cut to allow for proper interfacing of the pipe end and the fitting socket bottom.
This can be accomplished with a miter box saw.



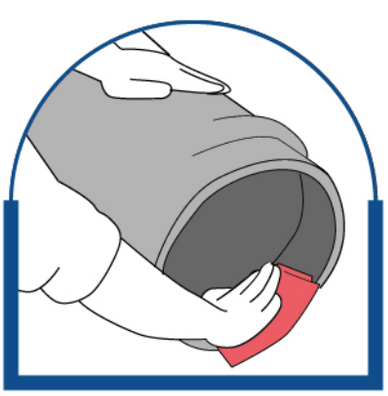
2- Deburring

Use a file to remove burrs from the end of the pipe. A sligh chamfer of about 15° should be added to the end to permit easier insertion of the pipe into the fitting.
Failure to chamfer the edge of the pipe may remove the sealing element from the groove, causing the joint to leak.



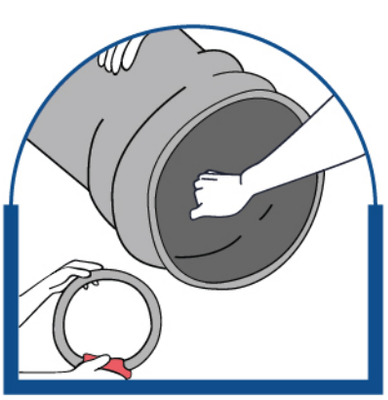
3- Clean up

Clean the rubber ring, the inside of the socket and the groove for the ring.
Clean the pipe spigot also.



4- Preparing the rubber ring

Check the condition and quality of the factory pre-installed sealing element.
Wet the rubber ring with clean water. Squeeze it to a heart shape, then let it snap into the groove, and check alignment.

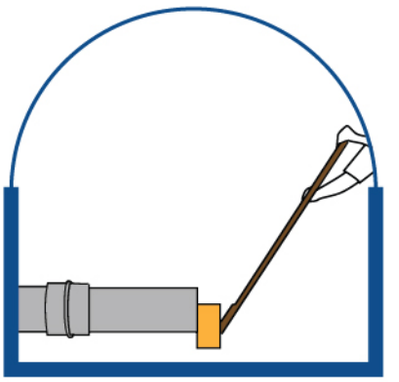


5- Preparing the pipe end

The pipe end with 15° chamfer must be cleaned and coated with AL ASEMA lubricant before pushing into the socket.

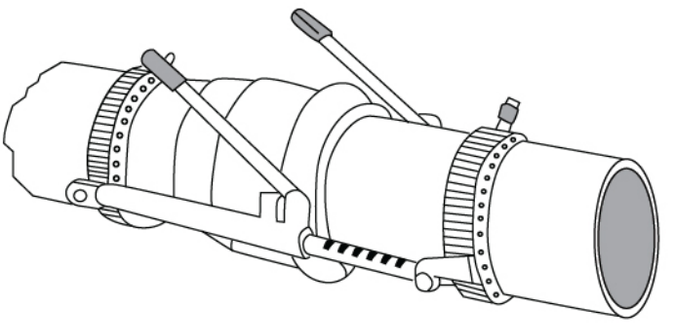
6- Assembly the push fit socket

Push together, an insertion device may be used for larger dimensions.
When inserting, the ring seal must be free of lubricant center up the spigot end of the pipe and push until the pipe end reaches the end of the socket.



Jointing Clamps

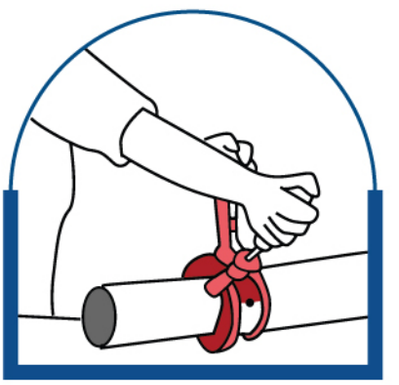
Jointing Clamps may be used for ease of assembly. The Clamps are available in three sizes, one for pipes
90mm to 160mm O.D. ,the 2nd for 200mm to 280mm O.D and 3rd for 315mm to 400mm O.D .



13.2 Solvent welding of UPVC pipes and fittings

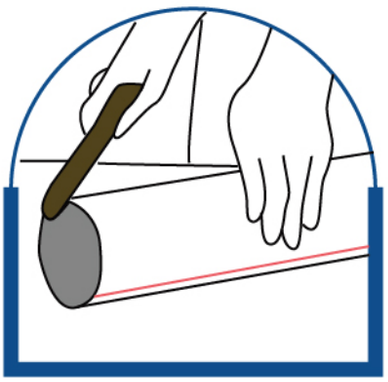
1- Cutting

Pipe must be squarely cut to allow for proper interfacing of the pipe end and the fitting socket bottom.
This can be accomplished with a miter box saw.



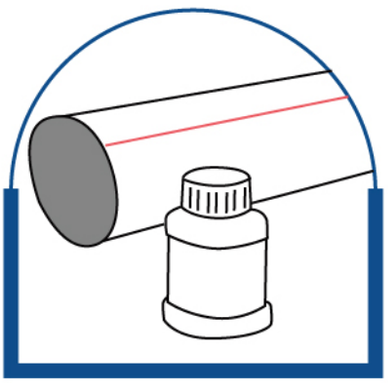
2- Deburring

Use file to remove burrs from the end of pipe. A sligh chamfer of about 15° should be added to the end to permit easier insertion of the pipe into the fitting.
Failure to chamfer the edge of the pipe may remove the cement from socket, causing the joint to leak.



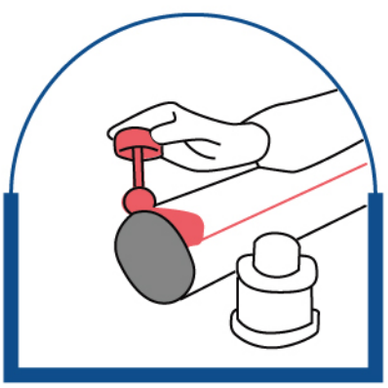
3- Inspection and cleaning

Visually inspect the inside of the pipe and fitting sockets and remove all dirt, grease or moisture with a clean dry rag. Measure the fitting socket depth and mark this distance on the pipe O.D. Clean the surface of the pipe and fitting socket by using a cleaner.



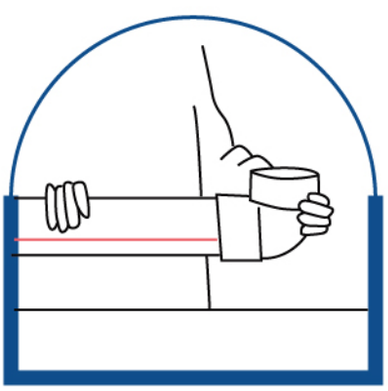
4- Application of solvent cement

Apply the solvent cement eventually and quickly around the outside surface of the pipe at a distance which is a little greater than the depth of the fitting socket. Apply a light coat of cement eventually around the inside of the fitting socket.



5- Joint assembly

Immediately insert the pipe into the socket up to the entry mark, align pipe and socket, hold in position for a few seconds.



6- Clean up

Remove all excess cement from around the pipe and fitting with a dry cotton rag. This must be done while the cement is still soft.

7- After jointing

Joints should not be moved or distributed for 10-15 minutes then the jointed pipe may be handled with care allow 4 hours if the jointed pipe lengths are to be laid in a trench.

8- Testing

Allow 8 hours to elapse before applying working pressure or 24 hours for test pressure with pipe sizes up to 50 mm, it is possible to reduce this time.
Allow 1 hour for each 3.5 atmospheres of pressure.

Precautions

- Brushes must be clean and dry before commencing solvent welding. Brushes must be thoroughly cleaned after use by washing out with cleaning fluid.
- Do not dilute solvent adhesive with cleaning fluid.
- Use Solvent adhesive and cleaning fluid in a well ventilated area.
- Keep away from naked flames and do not smoke. Always replace lids of containers, in any event, attention is drawn to the instructions printed on the containers.
- When laying continuous runs of pipe, joints may be made quicker than the setting times advised above. The joint will not be disturbed with long lengths, providing that the pipe is not twisted of the previously made joint lifted out of place.
- Close the open tin solvent cement when not in use.

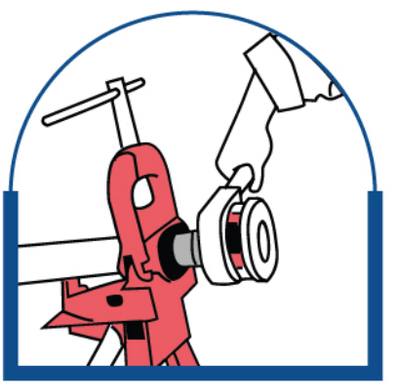
Consumption of cleaner and solvent (NO.- OF JOINT/KG)

Dia./mm	Cleaner-Kg	Solvent Cement-Kg
20	340	170
25	300	150
32	200	125
40	140	90
50	110	60
63	75	55
75	70	45
90	55	25
110	50	12
125	47	10
140	45	8
160	40	5
200	30	4
225	20	3.5
250	15	3
280	12	2.5
315	10	2

13.3 Threaded connections

1- Cutting and deburring

UPVC pipe should be cut square and smooth for easy and accurate threading. Amitter box or similar guide should be used when sawing is done by hand. Burrs should be removed inside and outside by using a file.

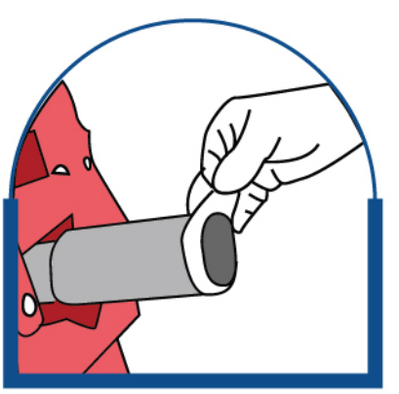


2- Threading

Threading UPVC pipe can easily be accomplished using a standard hand pipe stock or power threading machine. Cutting dies should be clean and sharp. A cutting lubricant such as a soap and water solution should be used while the threads are being cut to avoid the increment of the temperature of pipes.

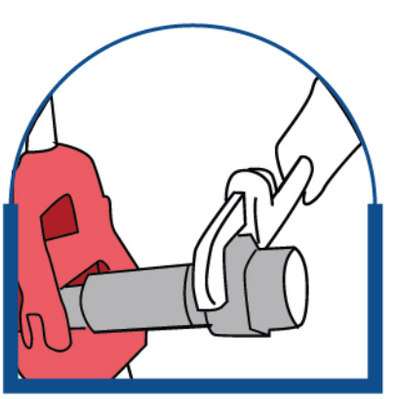
3- Preparing the threaded pipe

The threads should be cleaned by brushing away cuttings and ribbons, After cleaning, apply TEFLON tap around the entire length of threads, the tape should slightly overlap itself going in the same direction as the threads.



4- Assembly of threaded joints

Screw the threaded fitting onto the pipe. Screwed fittings should be started carefully and hand tightened. Fittings should be screwed on until hand tight with an additional 1 to 1.5 turn more by using a strap wrench.



Precautions

Never apply solvent cement to threaded pipes of threaded fittings.

13.4 Flanged joints

Full face flanges are available from 1/2" to 6" and 25mm to 160mm.
Stub flanges are available from 2" to 12" and in metric sizes from 25mm to 450mm.
The correct galvanized mild steel backing ring and rubber gasket must be used with both types.
Flange bolting procedure The following procedure is recommended for installing UPVC flanges:

1. Inspect flange faces and ensure that they are clean and undamaged.

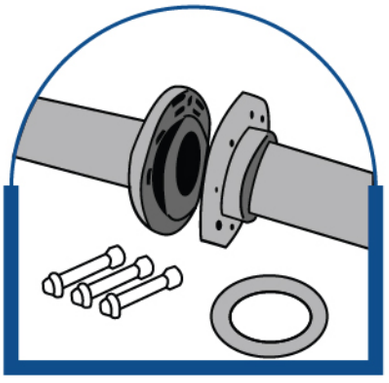
2. Check to make sure that correct backing ring and rubber gaskets have been supplied.

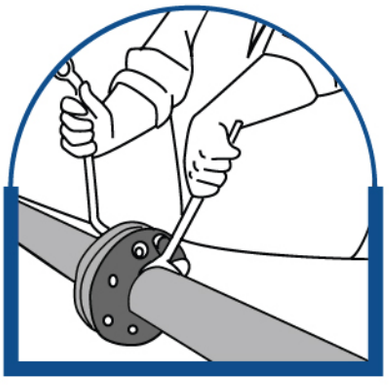
3. Loosely assemble flanges. Ensure that flanges and bolt holes align and that the flange faces are parallel.
Ensure that the gasket is correctly positioned between the flanges.

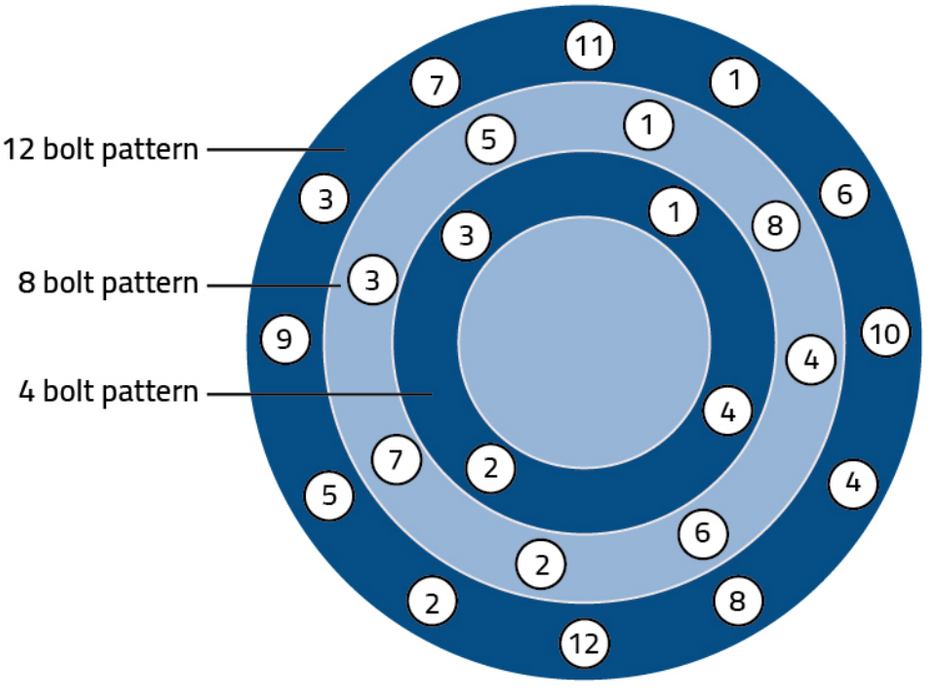
4. Ensure that the appropriate sized washer are placed under both bolt heads and nuts.

5. Tighten the nuts and bolts in a diagonally opposite sequence (see below) to ensure even loading around the flange and to avoid distortion. It is recommended that the nuts and bolts be tightened as uniformly as possible progressively from a finger tight start.

6. Repeat as necessary until recommended torque value at all bolts is achieved.







Flange Bolt Thightening Pattern
(Tighten bolts evenly; follow numerical sequence)

Tightening torques for flange bolts in UPVC piping systems

Recommended Torque Values (Nm)

Size	Torque
20	15
25	15
32	15
40	20
50	30
63	35
75	40
90	40

Size	Torque
110	40
125	50
140	50
160	60
200	70
225	70
250	80
315	100

Warnings

1- Do not over-torque flange bolts.
2-Use the proper bolt tightening sequence.
3- Make sure the system is in proper alignment.
4- Flat washers must be used under every nut and bolt head.

13.5 Above ground installion

Pressure installations

Ring Seal Joints should not be used on above ground installations unless all the joints are anchored against end thrust.

Protection of pipelines

UPVC pipelines must be protected from direct sunlight and external heat.

Support of fittings, heavy valves etc.

Where plastic pipelines incorprate metal valves or other heavy fittings it is essential to support the valve directly rather than allow their weight to be carried by the plastic pipe.
for the same reason it is usually advisable to the fix pipe supports on either side of flanged connections

Pipe bracket supports

For light duty and small pipe sizes, plastic pipe support brackets are suitable.
For heavier duty installations matching formed metal pipe supports should be used with cork or P.E. liner for fixed points.

Pipe bracket Spacing

Plastic pipelines need to be supported at specific intervals. These intervals will depend on the specific gravity of the material being conveyed, the temperatures of the liquid and the enviromtent and the pipe wall thickness and type of plastic used.
Some defiection may be allowed between brackets and at changes of direction. The average deflection between centres should be up to maximum of 2.5 mm.

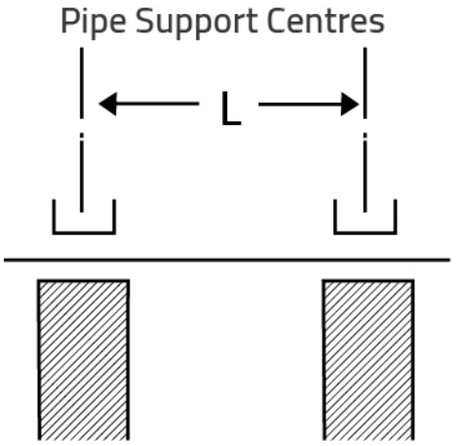
Pipe bracket spacing in the case of specific gravity = 1 as well as for gases

UPVC pipes (PN)	d mm	Pipe support centres L in cm at			
		20°C	30°C	40°C	50°C
PN10	20	85	70	50	Continious
	25	90	75	55	45
	32	100	85	65	50
	40	110	100	80	60
	50	125	115	95	70
	63	140	130	110	85
	75	150	140	120	95
	90	165	155	135	105
PN6 should be reduced by 10%	110	185	175	155	120
	140	215	205	185	160
	160	225	215	200	170
	200	240	225	215	185
	225	250	240	225	200
	250	260	250	240	205
	280	270	260	250	215
PN16 should be increased by 10%	315	280	270	260	225
	355	290	275	265	230
	400	300	280	270	235
	450	310	285	275	240
	500	320	290	280	245

S.G	Factor
1.25	0.90
1.50	0.83
1.75	0.77
2.00	0.70

For vertical installations, the above support distances may be increased by 30% (Multiply the values given by the table.

For Fluids with a specific gravity exceeding 1 mltiplying by the factors shown.



13.6 Below ground installion

Steps of installation

1- As with all pipe jointing, cleanliness of prime importance, and pipes, specially spigot ends, should be supported clear of the ground to prevent dirt being smeared on with the lubricant.
Placing the pipes on blocks also reduces friction and conspequently facilitates the making of the joint.
These blocks must be removed before backfilling and every care must be taken to ensure that the pipe is not bedded on submerged rock.

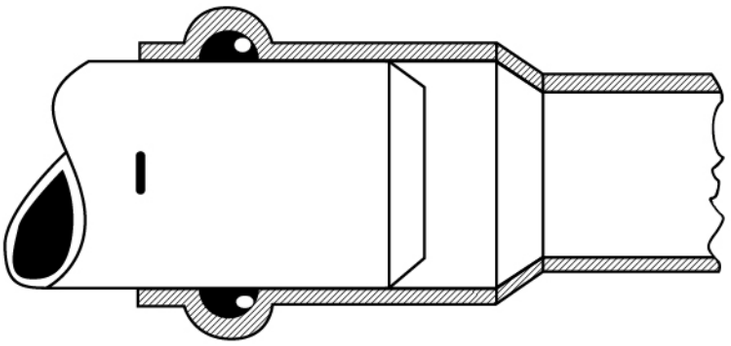
2- The pipeline should be tested initially after a few joints (certainly not more than 500 meters) to ensure that they have been made correctly, and subsequently at convenient intervals, preferably not exceeding 1000 meters.

3- All changes of direction must be anchored . Concrete thrust blocks are sutiable but the unit should only be haunched and a flexable membrane interposed between the concrete and the unit, to protect it against damage by abrasion.

4- Before testing, the line must be backfilled leaving the joints exposed, if the joints must be covered, it is useful to mark their position.

5- The pipe should be marked so that the spigot enters the socket to within 13 to 25 mm of the bottom of the socket dimension. The depth of chamfer should be one third the wall thickness.

Expansion Gap
13 to 25 mm
according to size



6- Never cut the leg of a Ring Seal Joint bend. Some distortion of the shape may occur during processing which might case a leak.

7- Laying

It is very important when laying UPVC pipes for gravity drainage to ensure that the pipe is laid in accordance with the recommendations made on the following pages.

8- Excavation

The trench should not be opened too far in advance of pipe laying and should be backfilled as soon as possible. The width of the trench at the crown of the pipe should be as narrow as practicable but not less than the outside diameter of the pipe plus 300 mm to allow proper compaction of the sidefill, 225mm above the crown of the pipe, the trench may be any convenient width.

The inherent flexibility of uPVC drainage pipe can be used to advantage but care must be taken to ensure that the bed of the trench will support the pipeline adequately so as to prevent localised loss of gradient or bridging. Projections must be removed to avoid point loading of the pipe.

9- Material for Bedding and Sidefilling

Some soils, as excavated from the trench (such as free drainage coarse sand, gravel, loam and soil of a friable nature) may be suitable for use as sidefill material, but they must be capable of being compacted sufficiently to provide adequate support for the pipe (see note following for test for suitability). Soils such as hard chalk which break up when wet, and clay should not be used immediately around the pipe for bedding, sidefill or backfill, unless a rotary type excavator has been used.

Should the material excavated from the trench be unsuitable. Granular material is very satisfactory as it requires little compaction once placed.

10- Bedding and Sidefilling

With flexible pipes it is of great importance that the sidefill should be very firmly compacted between the sides of the pipe and the soil sides of the trench. Any trench sheeting should be partially withdrawn to allow this to be done.

Before backfilling, any levelling pegs or temporary packing should be removed. The thickness of the bedding under the barrel of the pipe should be not less than 1/3 of the diameter, and a minimum of 100mm thick. In every soft or wet conditions, or where the bottom of the trench is very irregular, this thickness should be increased as necessary to give a suitable bed.

The bedding should be thoroughly compacted in layers not more than 150mm thick to give a uniform bed, true to gradient, on which the pipe may be laid. Pipes should be laid directly on this bedding. Bricks or other hard materials must not be placed under the pipes for temporary support. Further bedding material should be placed around the pipe and be thoroughly compacted in 75mm layers by careful tamping up to the crown of the pipe, eliminating all cavities under the two lower quadrants of the pipe.

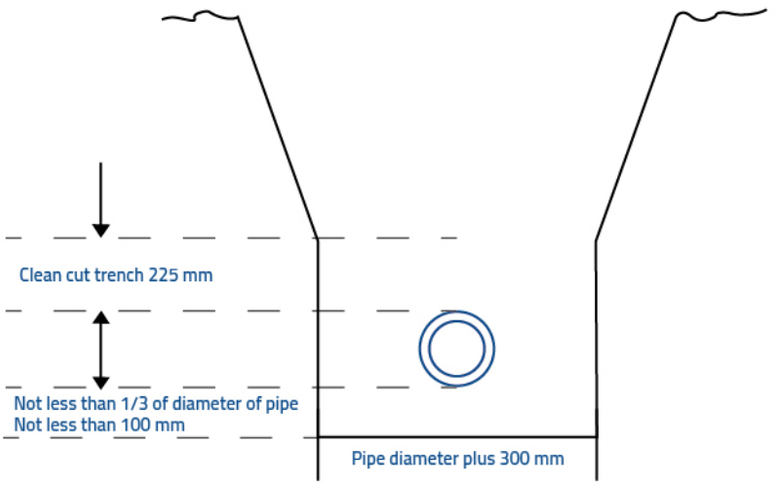
The same material should then be placed over the crown of the pipe for not less than 2/3 of the diameter, with a minimum height of 100mm and a maximum of 300mm and be thoroughly compacted.
The process of filling and tamping should proceed equally on either side of the pipe, so as to maintain an equal pressure on both sides.

11- Backfilling

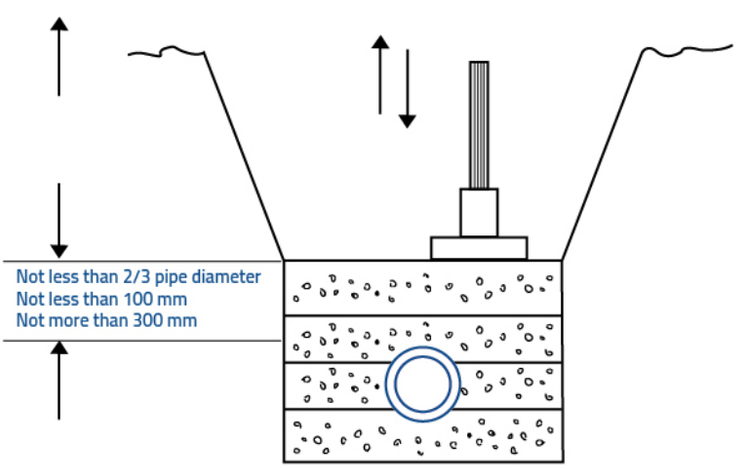
Normal filling of the trench should then proceed in layers not exceeding 300mm in thickness, each layer being well rammed. Heavy mechanical rammers should not be used until the fill has reached a depth of 300mm above the top of the pipe. Special consideration and selection of back filling material will be necessary if the risk of surface subsidence is an important consideration, for example under roads.

13.7 The trench preparation and Backfilling

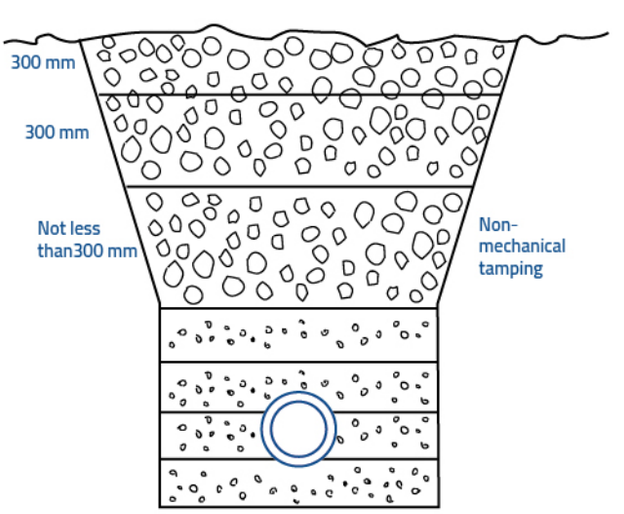
Trench Preparation



Comparing Layers of Backfill (even tamping in 75 mm layers up to top of clean out trench.)



Normal Filling - (Layers of 300 mm tamped by non-mechanical rammers). Until over 300 mm from level has been reached.



When pipe lines are layed in hot climatic conditions. it is advisable to fill the pipe with cold water to bring the pipe lengths to normal contracted dimension. Check the joints in the case of dry jointed or ring seal joints to ensure that socket insertion depth is satisfactory.

14. Caution

UPVC plastic piping systems will give excellent, maintenance free performance over many years of use when the application and system designs is correct for the product and installation is properly done. It is most important to know the physical properties and limitations of PVC plastic pipes when selecting the system for their use. These points should be taken into consideration in order to avoid problems caused by misapplication or poor installation.

Impact resistance is lower than for metals therefore plastic pipe must be protected from contact with hard and pointed objects.

Expansion and contraction is greater that for metals. This can cause breaks and leaking joints if system design is not flexible to allow for movement.

Temperature pressure relationship has to be taken into consideration. The pressure rating (tensile strength) of UPVC decreases as temperature increases.

Extremes of heat and cold can cause failure. Allowing liquids to freeze inside of PVC can cause the pipe and / or the joints to crack. Heat beyond design limits can cause failures.

Certain chemicals, especially petroleum distillates and derivatives, can cause failure. Every chemical should be verified and approved in the manufactures chemical resistance chart.

Non-liquid transport is not recommended. Compressed air or gasses can surge to high pressures and cause failures which could endanger personnel.

Protection from sunlight: UPVC pipe compounds normally do not provide extended protection from |the ultraviolet rays of the sun. Therefore. Unless the material has been specially formulated to provide protection. The product must be protected from sunlight or some damage may occur after years of exposure, otherwise you must use UV stabilizer during the production process.

Water hammering (surge) in a PVC system can cause pipe, fittings, and valves to burst. Safe guards should be designed into the system to prevent excessive surge pressures. Liquid velocities should not exceed five feet per second maximum. Always bleed all trapped air from the system before testing and start up.

Trenches for buried pipe should be free of rocks and debris that can rupture the pipe. Backfilling and top loading should be watched very carefully.

In every case installation procedures should be carefully read followed. It is very important to know the reputation and abilities of your installation crew or contractor. Professional engineering design of the system and close supervision of the assembly-installation procedures are recommended. Any questions concerning the application or installation or PVC piping products should be directed to the supplier, manufacturer or consultant.

Notes

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