TAGRO
تاجـــــــرو

TAGRO تاجـــــــرو

١٨ ب عمـــارات الشركـة السعـوديـة - أمـام الرقـابـة الإداريـة - مدينـة نصـر - القـاهـرة

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ABOUT TAGRO

Tagro is a leading company in the Egyptian market, importing thermoplastic piping system specialized on providing solutions to the house water transportation problems, specifically in plumbing, heating and sewage areas, committed to be updated to the Egyptian market by the technological developments in the piping system around the world.

Having a wide distributors network in Egypt governorates,tagro aim to bring tile ultimate satisfaction to its customers through its products and its service In order to 'reach the targeted service level to her customers on this wide geographical network, tagro has its customer service number for testing for free the installation of the pipes and filtering for any customer with the governorates.

Dedicated to supply products of the highest quality after having the approval of the Egyptian autnorities that the products helps to protect the environment and the human safety.

TAGRO

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CHRACTERISTICS

General

Raw Material

TAGRO PP-R pipes and fittings are manufactured from high quality, Polpropylene Random Co-polymer resins (PP-RType 3). Its phiysical and chemical properties make TAGRO a versatile piping system in a wide range of applications in different industries. Its advantages over PP types 1 or 2 and other thermoplastic pipes in the potable water industries are its high impact strength and resistance to high temperatures.

Mechanical & Thermal Properties

Property	Test Method	Unit	Value
ResinType		**Polypropylene, Random Copolymer**	
Density at 23°C	ISO 1183	g/cm³	0.9
Viscosity number	ISO 1628T3	cm³/g	420 ml/g
Melt Flow Rate			
MFI 190°C/5 kg	ISO 1133	g /10 min	0.5 - 0.7
MFI 230°C /2.16 kg	ISO 1133	g /10 min	0.3 -0.5
MFI 230°C /5 kg	ISO 1133	gb/10min	1.3-1.5
Melting temperature	ASTM 3418	°C	141
Softening point (vicat)	ASTM 01525	°C	133
Crystalline melting temp.	ASTM E794	°C	150 -154
Tensile Properties			
Tensile Stress at Yield	ISO 527	MPa	25
Tensile Strength at Break	ISO 527	MPa	40
Elongation at Break	ISO 527	%	>600
Tensile Modulus (23 °C)	ISO 527		850 MPa
Tensile Creep Modulus 1h	ISO 527	MPa	650
Tensile Creep Modulus 1000h	ISO 527	MPa	350
Flexural modulus (23°C)	ISO 178	MPa	850
Flexural stress at 3,5% deflection	ISO 178	MPa	20
Ball indentation hardness	ISO 2039 T1 (132N)	MPa	45
Shear Modulus			
-10°C	ISO 537 Method A	N/mm²	1100
0°C	ISO 537 Method A	N/mm²	770
10°C	ISO 537 Method A	N/mm²	500
20°C	ISO 537 Method A	N/mm²	370
30°C	ISO 537 Method A	N/mm²	300
40°C	ISO 537 Method A	N/mm²	240
50°C	ISO 537 Method A	N/mm²	180
60°C	ISO 537 Method A	N/mm²	140

Mechanical Strength Properties

Determined by Impact Strength at 0˚C	DIN 8078		no failure
Impact Strenght (Charpy)	ISO 179/1eU		
23°C		kj/m²	no failure
0°C		kj/m²	no failure
-10°C		kj/m²	no failure
Notched Impact Strenght (Charpy)	ISO 179/1eA		
23°C		kj/m²	20
0°C		kj/m²	4
-10 B44		kj/m²	3
Coefficient of Linear Thermal Expansion	DIN 53752	k-¹	1.5x10-4
Thermal Conductivity at 20°C	DIN 52612	W/mk	0.24
Specific Heat at 20°C	Adiabatic Calorimeter	kj/kg K	2.0
Specific Surface Resistivity	ASTM D257	Ohm	>10^14 Ohm

Application Areas

- Potable water, hot & cold water, chemical, irrigation
- Residental apartments, condominiums, public housing
- Industrial plants dealing with chemicals, food processing, semi conductors
- Hospitals
- Schools, laboratories and chemical sewerage
- Hotels & Resorts

Behavior of TAGRO According to DIN 8078 Under Long Term Hoop Stress

The service life of TAGRO depends on the internal hoop stress over time subject to the temperature

Hoop stress is given as follows:

$$\S = \frac{P \times (d-s)}{20 \times s}$$

where

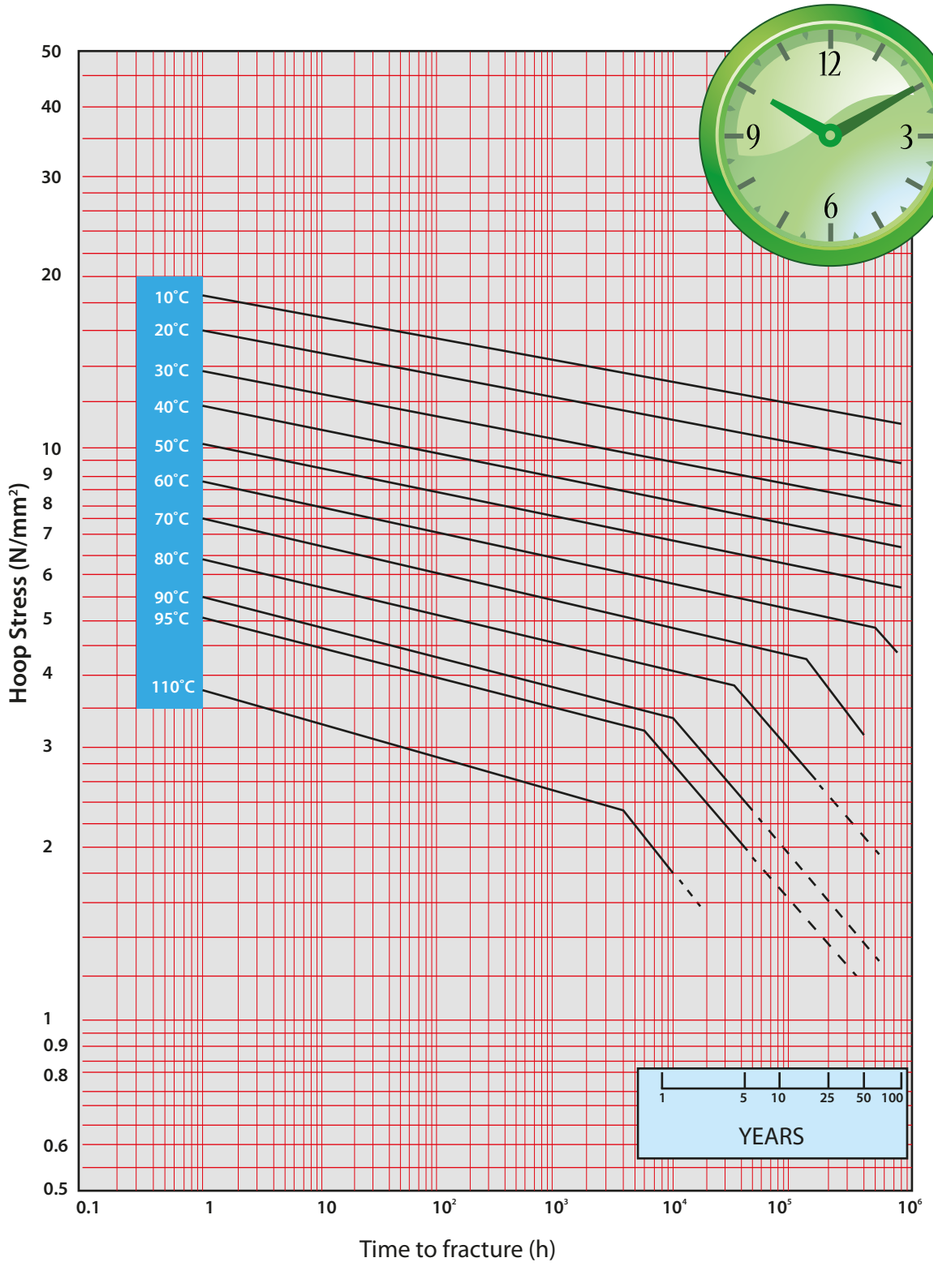
§ = Hoop stress (N/mm² or MPa)

P = Internal pressure (bar)

d = Outer diameter of pipe (mm)

s = Wall thickness of pipe (mm)

Time-Hoop Stress Graph



Permissible Operation Pressure

The following table provides more detailed information with regards to the permissible pressure of various pipe. pressure rating at various temperatures. These values are derived from the hoop stress chart and formula.

Under normal working pressures and conditions the aVerage service life of TAGRO pipes is projected to be 50 years or more.

Examples:
A PN 10 cold water pipe, transporting water at a temperature of 30˚C can last for more than 50 years under normal conditions with an operating pressure of 10.9 bars or 158 psi.

A PN 20 hot water pipe, transporting water at temperature of 70˚C can last for more than 50 years under normal conditions with an operating pressure of 8.5 bars or 123 psi.

SDR= Standart Dimension Ratio
(DiameterlWall Thickness Ratio)
SDR= d/s
(s= Pipes series index from ISO 4065)

Allowable operating pressures for PP-R pipes conveying water, safety factor (SF) = 1,5

Temperature	Service Life, Years	For Water Installations, According to DIN 8077:2208 Safety-Factor of 1.5				
		TAGRO Pipe SDR 11	TAGRO Pipe SDR 7.4	TAGRO Pipe SDR 6	TAGRO Composite Faster Pipe SDR 6	TAGRO Stable Pipe
		Nominal Pressure in Bars				
		PN 10 Cold Water	PN 16, Cold Water	PN 20, Hot & Cold Water		
		Permissible Working Pressure at Various Temperatures (bars)				
20˚C	1	15.0	23.7	29.9	29.9	37.7
	5	14.1	22.3	28.1	28.1	35.4
	10	13.7	21.7	27.4	27.4	34.5
	25	13.2	21.0	26.4	26.4	33.3
	50	12.9	20.4	25.7	25.7	32.4
	100	12.5	19.9	25.0	25.0	31.5
30˚C	1	12.7	20.2	25.4	25.4	32.0
	5	11.9	18.9	23.8	23.8	30.0
	10	11.6	18.4	23.2	23.2	29.2
	25	11.2	17.7	22.3	22.3	28.1
	50	10.9	17.2	21.7	21.7	27.4
	100	10.6	16.8	21.1	21.1	26.6
40˚C	1	10.8	17.1	21.6	21.6	27.2
	5	10.1	16.0	20.2	20.2	25.4
	10	9.8	15.5	19.6	19.6	24.7
	25	9.4	15.0	18.8	18.8	23.7
	50	9.2	14.5	18.3	18.3	23.1
	100	8.9	14.1	17.8	17.8	22.4
50˚C	1	9.1	14.5	18.2	18.2	23.1
	5	8.5	13.5	17.0	17.0	21.4
	10	8.2	13.1	16.5	16.5	20.8
	25	7.9	12.6	15.9	15.9	20.0
	50	7.7	12.2	15.4	15.4	19.4
	100	7.5	11.8	14.9	14.9	18.8
60˚C	1	7.7	12.2	15.4	15.4	19.4
	5	7.1	11.3	14.3	14.3	18.0
	10	6.9	11.0	13.9	13.9	17.5
	25	6.6	10.5	13.3	13.3	16.7
	50	6.4	10.2	12.9	12.9	16.2
70˚C	1	6.5	10.3	12.9	12.9	16.3
	5	6.0	9.5	12.0	12.0	15.1
	10	5.8	9.2	11.6	11.6	14.6
	25	5.0	8.0	10.0	10.0	12.7
	50	4.2	6.7	8.5	8.5	10.7
80˚C	1	5.4	8.6	10.8	10.8	13.7
	5	4.8	7.6	9.6	9.6	12.1
	10	4.0	6.4	8.1	8.1	10.2
	25	3.2	5.1	6.5	6.5	8.1
90˚C	1	3.8	6.1	7.6	7.6	9.6
	5	2.6	4.1	5.2	5.2	6.5
	(10)[a]	(2.2)	(3.4)	(4.3)	(4.3)	(5.5)

Hygiene & Health Concerns

Health is taken as a major concern during production of TAGRO pipes and fittings. Connection of pipes does not require additives such as cement solvent, fluxes or solder. To ensure the safety of TAGRO pipes and fittings for usage relating to human contact and consumption with potable water the following are strictly adhered to:

• DIN 1988 Part 2
- Drinking Water Supply Systems, Materials, Components, Appliances, Design and Installation

• SKZ -Hygiene Enstitute
- Test Certificate Based on Hygiene Enstitute recommendations for Materials in Contact with Drinking Water

• WRc
-Test Certificate
-Water Bylaws Scheme/WRc, Tests of Effect on Water Quality based on BS 6920

UV Resistance

TAGRO Products are produced with UV stabilisers. However, like all other piping systems including metals pipe works should not be left exposed under direct sunlight without insulating or protection from direct sunlight or UV radiation.

Fire Classification

TAGRO pipes and fittings comply and are classified under the requirements of the fire classification, B2 (Normally inflammable) according to DIN 4102. In case of a fire outbreak of temperature >800°C, under ideal conditions, with sufficient oxygen, only carbon dioxide and water vapour are produced as the raw material of Polypropylene Random Co-polymer is a hydrocarbon chain. Toxic fumes or dioxin will not be emitted.

Sound Insulation

Compared to metallic pipes, TAGRO does not need further insulation to decrease the decibel level when water flows at relatively high speeds. The reason is simply that metals transmit noises quicker and louder, whereas, plastics dampen the noises. Hence "whistling" and noises resulting from water hammer effect are largely reduced to non-existence.

Advantages of Using TAGRO

From the above properties of TAGRO systems and application areas, compared to other conventional metal or plastic piping systems TAGRO has the following advantages.

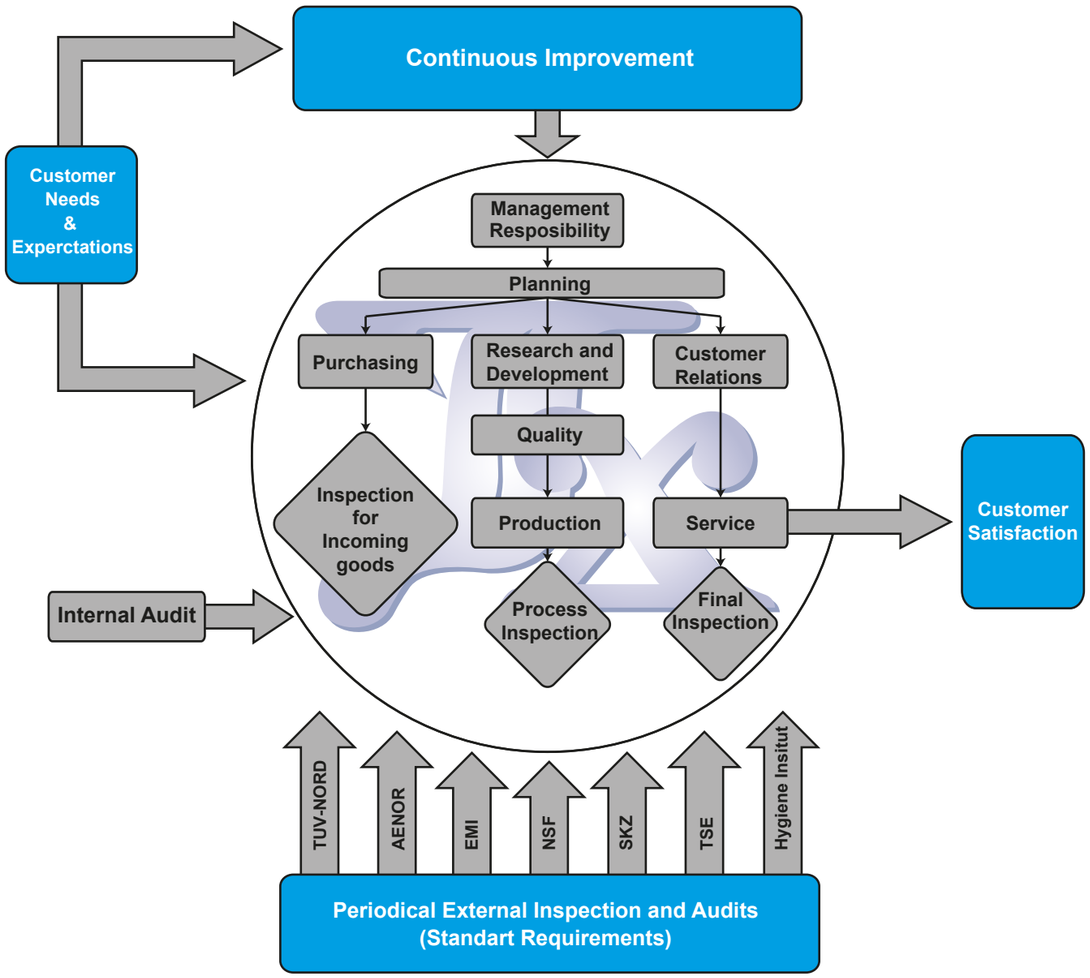
- Not detrimental to human health
- Rust and corrosion free
- Rupture free
- No scalling
- High resistance to acids and chlorides
- Noise free at high flow rates
- High pressure tolerances and rating
- Insulation is not necessary for interior applications
- Light weight
- Speed and ease of fusion technology
- Extensive savings in time and labour

QUALITY ASSURANCE

QUailty as the Strategic Focus

Quality process is an integral part of everything TAGRO does. Quality action teams of TAGRO throughout the world are continually working to improve products, processes and procedures to beter meet customer requirements.

We have learned and adapted many of the best practices of successful better quality management systems to create our own TAGRO Quality System. There is no end for quality. TAGRO Quality System is designed to be a cycle:



Quality is engineered into TAGRO products during the entire manufacturing process. The three phases of quality control involve the incoming raw material, the pipe production and the finished product. The combination of all three areas ensures that the final product will fulfill the requirements and meet the desired specificaions.

Internal Control

TAGRO pipes and fittings are periodically subjected to the following extensive test program according to the standarts

Material Characterization Tests

Testing the incoming resin is the first step in the quality control program. It is usually checked for contamination, melt index, density, DSC and 0IT Any resin that does not meet the raw material specifications is not used for the production.

Thermal Reversion Properties

Thermal properties of plastic materials are equa lly important as mechanical properties. Unlike metals, plastics are extremely sensitive to changes in temperature. This difference in the coefficient of thermal expansion develops internal stresses and stres concentrations in the polymer. Pipes are subjected to thermal stresses inside a thermostatic chamber with a continuous air circulation to observe shrinkage in accordance with DIN 8078, EN ISO 15874.

Color Measurement Test with Spectro color language. This new language lets you compare a measured color to a pre-established specification. And that enables you to control the color maintain it within acceptable tolerances at every step in your production process or supply chain.

Dimensional Tests

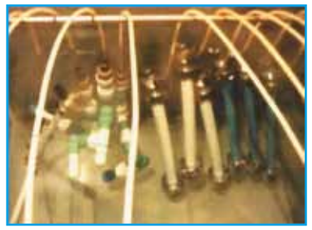
Pipe diameter, wall thickness, ovality and lenght of pipe are measured on a regular basis to insure compliance with standart requirements. The outside diameter wall thickness shall comply with the DIN 8077 and EN ISO 15874 specif ications.

Mechanical Tests

The mechanical properties, among all the properties of plastic materials, are often the most important properties because virtually all service conditions and majority of end-use applications involve some degree of mechanical loading,

Thermocycling Test

Thermocycling Testing determines the ability of parts to resist extremely low and extremely high temperatures, as well as their abi lity to withstand cyclical exposures to these temperature extremes,



Creep Strength Test (Short Term)

TAGRO Pipes are subjected to creep tests according to DIN 8078 that determins service life and that provides the required information about the mechanical characteristics of the pipe, The long-term burst strength of pipes is determined by subjecting the pipes to constant internal pressure and observing time to failure.

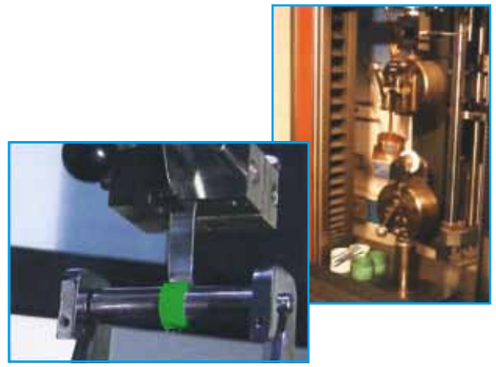
Thermal Stability Test (110˚C @ 8760 h)

A method for developing long-term hydrostatic design stresses, defined as the estimated ten sile stress in the wall of the pipe in the circumferential orientation due to internal hydrostatic pressure that can be applied continuously with a high degree of certainty that failure of the pipe will not occu r, for thermoplastic pipe materials is described,

The long-term performance of thermoplastic pipe materials is evaluated by stresses calculated for period 50 years

Impact Strength

Impact resistance is the ability of a material to resist breaking under a shock loading, Standard test specimens prepared from TAGRO pipes are subjected to a pendulum type impact type load in accordance with DIN 8078 and EN ISO 15874.



Peeling Strength Test

Peeling strenght is generally used to measure adhesive band strenght of a material for TAGRO Stable Pipes, Multilayer Pipes.

CERTIFICATE







PRODUCT RANGE

TAGRO Composite Faser Pipe

TAGRO Faser Pipe is the latest addition to the PP-R pipe range.

It is composite pipe consisting of 3 Layers, with 20% glass fiber/PP-R sanwiched between PPR material in the inner layer and on the suface layer i.e. PP-R/GF/PP-R.

Faser pipes are used for chiled and hot water reticulation systems.

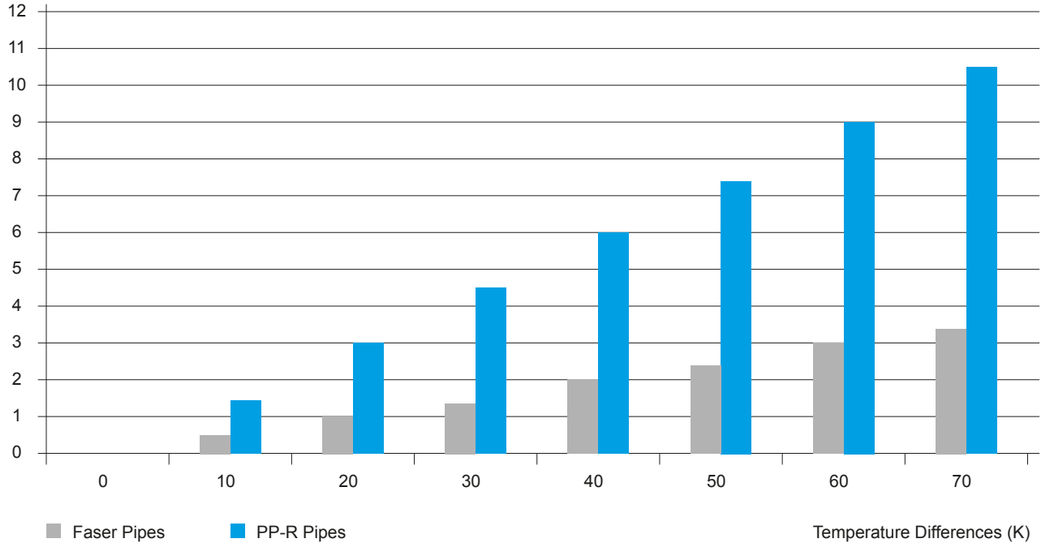
Linear Expansion

Compared to normal PP-R pipes, Faser Pipes have a much lower extension when transporting hot water.
As such, Faser pipes remain relatively straight at high temperatures. Pipe supports can be minimized.

Linear Expansion Comparison

Linear Expansion of PP-R and Faser Pipes

Linear Expansion Comparison (m/mm)



Cofficient of linear thermal expasion of TAGRO faser pipes is 0.04 mm/mk
Cofficient of linear thermal expasion of TAGRO mono pipes is 0.15 mm/mk

Pipes & Fittings

PIPES

Permissible Operating Pressure

Compared to normal PP-R pipes, Faser pipes has better and longer projected life span at higher temperatures and pressure.

Maximum operational pressures for pipes consisting of PP-R 80 for water with Safety Factor (SF) = 1.25 (acc. to DIN 8077:2007-5

Heating Period	Temperature (˚C)	Years of Operating	PN 16 SDR 7.4 (bar)	PN 20 SDR 6 (bar)
Continuously	70	50	8.1	10.2
Continuous working at 70˚C including 60 days per year with	75	45	8.1	10.2
	80	40	7.8	9.8
	85	35	7.1	8.9
	90	30	6.3	7.6
Continuous working at 70˚C including 90 days per year with	75	45	7.3	9.9
	80	37.5	7.0	9.1
	85	32.5	6.2	8.0
	90	25	5.7	7.3

PN 10 (SDR 11) COLD WATER PIPE

TAGRO PN 10 (SDR 11) Pipes are suitable for cold water installations and low pressure systems.

OD x THICKNESS (mm)	m / PACK
32 x 2.9	100
40 x 3.7	60
50 x 4.6	40
63 x 5.8	28
75 x 6.8	20
90 x 8.2	12
110 x 10.0	8
125 x 11.4	4
160 x 14.6	4

PN 16 (SDR 7.4) COLD WATER PIPE

TAGRO PN 16 (SDR 7.4) Pipes are used for cold water installations & higher pressure systems.

OD x THICKNESS (mm)	m / PACK
32 x 4.4	100
40 x 5.5	60
50 x 6.9	40
63 x 8.6	28
75 x 10.3	20
90 x 12.3	12
110 x 15.1	8
125 x 17.1	4
160 x 21.9	4

PN 20 (SDR 6) HOT & COLD WATER PIPE

TAGRO PN 20 (SDR 6) Pipes are used for both Hot & cold water installations & higher pressure systems.

OD x THICKNESS (mm)	m / PACK
20 x 3.4	100
25 x 4.2	100
32 x 5.4	100
40 x 6.7	60
50 x 8.3	40
63 x 12.5	28
75 x 12.5	20
90 x 15.0	12
110 x 18.3	8
125 x 20.8	4
160 x 26.6	8

SDR 6 COMPOSITE FASER FOR HOT & COLD WATER

TAGRO Composite Faser Pipes are preffered mainly for exposed pipe installation thanks to the low linear expension rate and reinfoced structure.

OD x THICKNESS (mm)	m / PACK
20 x 3.4	100
25 x 4.2	100
32 x 5.4	60
40 x 6.7	40
50 x 8.3	20
63 x 10.5	20
75 x 12.5	12
90 x 15.0	12
110 x 18.3	8

PN 20 STABLE MULTILAYER PIPE WITH ALUMINIUM FOR HOT & COLD WATER

TAGRO Stable Pipes are preferred mainly for exposed pipe installation thanks to the low linear expansion rate and rainforced structure.

OD x THICKNSS + OUTER LAYER (mm)	m / PACK
20 x 3.4	100
25 x 4.2	100
32 x 5.4	60
40 x 6.7	60
50 x 8.3	40
63 x 10.5	28
75 x 12.5	20
90 x 15.0	12
110 x 18.3	8

FITTINGS

SOCKET

TAGRO Sockets are used to join two pipes.

SIZE (mm)	PCS / PACK
20	280
25	180
32	119
40	75
50	36
63	16
75	16
90	7
110	4
125	1
160	1

90˚ ELBOW

TAGRO Elbows are used where the pipeline makes curve of 90˚.

SIZE (mm)	PCS / PACK
20	200
25	125
32	75
40	40
50	24
63	10
75	5
90	2
110	2
125	1
160	1

45˚ ELBOW

TAGRO Elbows are used where the pipeline makes curve of 45˚.

SIZE (mm)	PCS / PACK
20	200
25	120
32	75
40	48
50	25
63	12
75	5
90	3
110	2
125	1
160	1

T-PART

TAGRO T Part are used to join branches on the main pipeline.

SIZE (mm)	PCS / PACK
20	150
25	75
32	48
40	36
50	12
63	8
75	4
90	2
110	1
125	1
160	1

REDUCER

TAGRO Reducers are used for joining bigger size pipeline to smaller size pipelines.

SIZE (mm)	PCS / PACK	Socket size to be used (mm)
25 / 20	250	25
32 / 20	180	32
32 / 25	120	32
40 / 20	100	40
40 / 25	100	40
40 / 32	105	40
50 / 20	60	50
50 / 25	60	50
50 / 32	60	50
50 / 40	60	63
63 / 20	48	63
63 / 25	40	63
63 / 32	40	63
63 / 40	30	63
63 / 50	36	63
75 / 40	16	75
75 / 50	16	75
75/ 63	16	75
90 / 50	12	90
90 / 63	12	90
90 / 75	12	90
110 / 75	6	110
110 / 90	6	110
125 / 110	1	125
160 / 110	1	160

UNEQUAL T

TAGRO Unequal T Parts used for both joining branches on pipelines and for transitions to different dimeters like reducer parts.

SIZE (mm)	PCS / PACK
25 x 20 x 25	75
32 x 20 x 32	50
32 x 25 x 32	48
40 x 20 x 40	36
40 x 25 x 40	36
40 x 32 x 40	30
50 x 20 x 50	15
50 x 25 x 50	15
50 x 32 x 50	15
50 x 40 x 50	12
63 x 20 x 63	8
63 x 25 x 63	8
63 x 32 x 63	8
63 x 40 x 63	8
63 x 50 x 63	8
75 x 20 x 75	5
75 x 25 x 75	5
75 x 32 x 75	5
75 x 40 x 75	5
75 x 50 x 75	4
75 x 63 x 75	4
90 x 40 x 90	3
90 x 50 x 90	3
90 x 63 x 90	2
90 x 75 x 90	2
110 x 50 x 110	2
110 x 63 x 110	2
110 x 75 x 110	2
110 x 90 x 110	2

CROSS

SIZE (mm)	PCS / PACK
20	105
25	60
32	32
40	20

CAP

TAGRO Caps are used as a stopper at the pipeline ends.

SIZE (mm)	PCS / PACK
20	350
25	270
32	150
40	90
50	50
63	24
75	16
90	9
110	4

LONG THREADED CAP

SIZE (mm)	PCS / PACK
20	100
25	100

FLANGE

TAGRO Flanges are used for joining big size pipes to each other and for transition of TAGRO pipelines to other pipe sysyems (copper, steel, PVC, Pb etc.) without any plastic or metal thraded parts. Moreover, the joint could be separated easily when required.

SIZE (mm)	PCS / PACK
63	24
75	20
90	10
110	8

SLEEVE

TAGRO Sleeves are used to fix the pipelines on ground or walls.

SIZE (mm)	PCS / PACK
20	400
25	300
32	200

PIPE BRIDGE

TAGRO Pipe Bridges are used where a pipeline has to pass over the other pipeline.

SIZE (mm)	PCS / PACK
20	50
25	40
32	25

C BRIDGE

SIZE (mm)	PCS / PACK
20	50
25	40

DOUBLE STABLE UNDER PLASTER ELBOW

SIZE (mm)	PCS / PACK
20 X 1/2	20
25 X 1/2	20

ADAPTOR FEMALE

TAGRO Female Adaptors are used as transition parts between TAGRO and metal pipelines. These fittings are preferred mostly for permanent joints.

SIZE (mm)	PCS / PACK
20 X 1/2	180
25 X 1/2	120
25 X 3/4	105
32 X 1	48

ADAPTOR MALE

TAGRO Male Adaptors are used in transition of TAGRO pipeline to metal threaded parts and pipelines. These fittings are preferred mostly for permanent joints.

SIZE (mm)	PCS / PACK
20 X 1/2	140
25 X 1/2	120
25 X 3/4	90
32 X 1	54

HEXAGONAL FEMALE ADAPTOR

TAGRO Hexagonal Female Adaptors are used as transition parts between TAGRO and metal pipelines. These fittings are preferred mostly for permanent joints.

SIZE (mm)	PCS / PACK
32 x 1	40
40 x 1 1/4	25
50 x 1 1/2	16
63 x 2	12
75 x 2 1/2	6
90 x 3	1
110 x 4	1

HEXAGONAL MALE ADAPTOR

TAGRO Hexagonal Male Adaptors are used as transition of TAGRO pipeline to metal threaded parts and pipelines. These fittings are preferred mostly for permanent joints.

SIZE (mm)	PCS / PACK
32 x 1	36
40 x 1 1/4	24
50 x 1 1/2	16
63 x 2	12
75 x 2 1/2	8
90 x 3	1
110 x 4	1

T-PART FEMALE

TAGRO Female T parts are used in joints between TAGRO pipelines and metal threaded parts.

SIZE (mm)	PCS / PACK
20 X 1/2 X 20	90
20 X 3/4 X 20	60
25 X 1/2 X 25	60
25 X 3/4 X 25	50
32 X 3/4 X 32	32
32 X 1 X 32	32

T-PART MALE

TAGRO Male T parts are used in joints between TAGRO pipelines and metal threaded parts.

SIZE (mm)	PCS / PACK
20 X 1/2 X 20	75
25 X 1/2 X 25	60
25 X 3/4 X 25	48
32 X 1 X 32	28

WALL CONNECTION ELBOW

TAGRO Wall Connection Elbows with their additional back parts are used to fasten the pipelines to the wall.

SIZE (mm)	PCS / PACK
20 X 1/2	75
25 X 1/2	68

ELBOW FEMALE

TAGRO Famale Elbows are used in transition between TAGRO pipeline and metal threaded parts (batery,tap,etc.)

SIZE (mm)	PCS / PACK
20 X 1/2	120
25 X 1/2	90
25 X 3/4	60
32 X 3/4	40
32 X 1	30

ELBOW MALE

TAGRO Male Elbows are used in transition between TAGRO pipeline and metal threaded parts (Batery, tap, etc.)

SIZE (mm)	PCS / PACK
20 X 1/2	105
25 X 1/2	80
25 X 3/4	60
32 X 1	24

UNION FEMALE

TAGRO Female Unions are used in transition between fixed TAGRO and metal pipelines. These fittings are preferred mainly for the installations in which temporarily renovation of the intermediate parts (valves, batteries, etc.) is required.

SIZE (mm)	PCS / PACK
20 X 1/2	160
25 X 3/4	90
32 X 1	60
40 X 1 1/4	30
50 X 1 1/2	16
63 X 2	10

UNION MALE

TAGRO Male Unions are used in transition between fixed TAGRO and metal pipelines. These fittings are preferred mainly for the installations in which temporarily renovation of the intermediate parts (valves, batteries, etc.) is required.

SIZE (mm)	PCS / PACK
20 X 1/2	120
25 X 3/4	80
32 X 1	48
40 X 1 1/4	24
50 X 1 1/2	12
63 X 2	10

PP-R BRASS UNION BALL VALVE

TAGRO Composite Faser Pipes are preffered mainly for exposed pipe installation thanks to the low linear expension rate and reinforced structure.

SIZE (mm)	PCS / PACK
20	45
25	24
32	18
40	6
50	4
63	2

VALVE

TAGRO Valves are used as turn on/off and flow regulating units in pipelines.

SIZE (mm)	PCS / PACK
20 X 1/2	24
25 X 3/4	25
32 X 1	16

CHROMIUM VALVE LONG

TAGRO Chromium Valve Long are used as turn on/off and flow regulating units in pipelines.

SIZE (mm)	PCS / PACK
20 X 1/2	20
25 X 3/4	20
32 X 1	16

PLASTIC BALL VALVE

TAGRO Ball Valves are preferrd for a more practical usage with their handles to regulate the water flow.

SIZE (mm)	PCS / PACK
20	40
25	32
32	18
40	6
50	4
63	2
75	1

FUSION WELDING MACHINES

FUSION WELDING MACHINES are used for joining the pipes and fittings with socket fusion method. Desktop Welding Kits are recommended for the pipe sizes over 50 mm.

TYPE	PCS / PACK
1500w/220v	1
2000w/220v	1

WELDING ADAPTOR

Welding Adaptors are used for heating the pipe ends and fittings to be welded.

SIZE (mm)	PCS / PACK
20	50
25	50
32	50
40	40
50	30
63	20
75	10
90	4
110	2
125	1
160	1

ALUMINIUM FOIL SHAVER

Aluminium Foil Shavers are used to remove the outer PP-R layer and aluminium foil of the TAGRO Stable Pipes tips to be welded.

SIZE (mm)	PCS / PACK
20-25	1
32-40	1
40-50	1
50-63	1
63-75	1
75-90	1
90-110	1

CUTTERS & BLADES

Cutter are used to shorten the pipes to the required length.

SIZE (mm)	PCS / PACK
20 - 40	1
40 - 63	1

WATER LEVELLER

TYPE	PCS / PACK
WATER LEVELLER	1
WATER LEVELLER STRAIGHT EDGE	1
WATER LEVELLER SET BLUE	1

Welding Depth, Heating, Welding and Cooling Time

The table below provides the necessary information for a good welding joint for various TAGRO pipe and fitting sizes. (It also applies to stable pipes.)

Pipe Diameter (mm)	Welding Depth (mm)	Heating Time (sec.)	Welding Time (sec.)	Cooling Time (min.)
20	14.0	5	4	2
25	15.0	7	4	2
32	16.5	8	6	4
40	18.0	12	6	4
50	20.0	18	6	4
63	24.0	24	8	6
75	26.0	30	8	8
90	29.0	40	8	8
110	32.5	50	10	8

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TAGRO UPVC Pipes and Fittings for plumbing systems are manufactured according to the ASTM standard

CERTIFICATE

THE ADVANTAGES OF UPVC PIPES SYSTEM

The group of materials known as unplasticized PVC is one of the most important developments of the last few decades as it reduces the cost and improves the reliability of pipeline installations. The properties can be varied by small additions of modifying agents which have definite and controlled mechanical properties. they can be fabricated to close dimensional tolerances, light without being weak and Rigid without being brittle.

Furthermore, these materials can be converted into pipes and fittings by vary direct processes of extrusion or injection moulding even though these processes demand heavy elaborate machinery and very precise process.

The principal reason for the great economy of TAGRO pipes is not so much their cost. per meter as delivered to site but rather the dramatic reduction in installation costs which can be achieved by intelligent exploitation of their light weight. Higher availability in longer lengths. Their easy of jointing and their immunity from corrosion. These characteristics are of even greater importance to engineers now that the need to carry out water supply and sewerage schemes. Industrial plant installation. etc. at minimum cost and maximum reliability.

NON - CORROSION

UPVC pipes resist corrosion caused by acid, alkalis, oils, moisture and the media inside and outside the pipe.

NON -TOXIC

UPVC pipes are entirely non-toxic. It will not affect the taste, Smell or color of water or liquid no react with any liquid to cause precipitation.

LOW FLOW LOSSES

UPVC pipes have a mirror, smooth surface which minimize resistance and impede the build up of deposits and corrosive scales.

MECHANICAL STRENGTH

UPVC pipes have great tensile strength yet they are flexible enough to win stand displacement in the pipe line. They will not dent or flatten under pressure.

LIGHT WEIGHT

UPVC pipes are incredibly light. Their specific weight is one fifth of steel pipe this cuts down transportation costs and facilitates the installation of pipe and reduces cost.

EASY OF INSTALLATION .

UPVC pipes are quick and easy to install, with a complete range of fittings using solvent cement or rubber joints are leakproof UPVC pipes can be cut easily for installation.

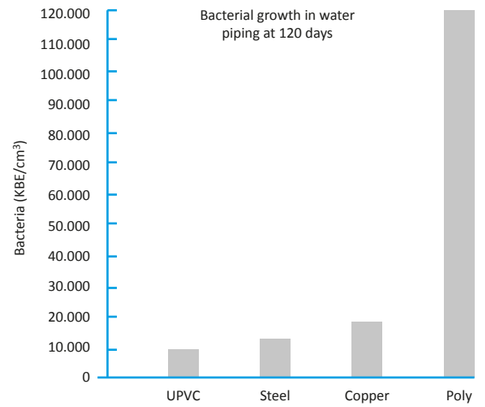
EASY OF MAINTENANCE

UPVC pipes can be quickly repaired with a minimum of complication or cost.

THE ADVANTAGE OF UPVC PIPES SYSTEM

LOW BACTERIA BUILD UP

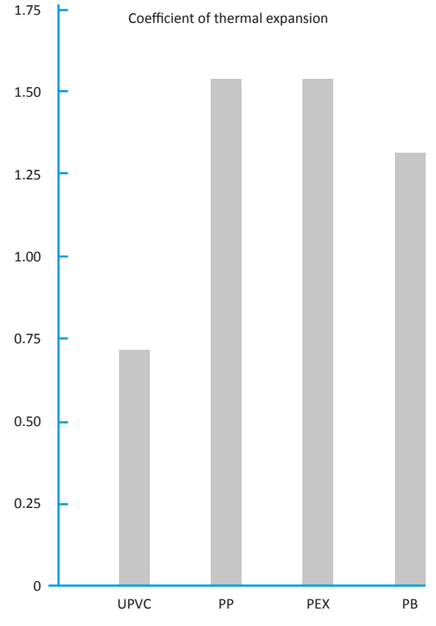
UPVC piping supports the lowest bacterial growth compared with traditional piping materials.



LOWER THERMAL EXPANSION COEFFICIENT

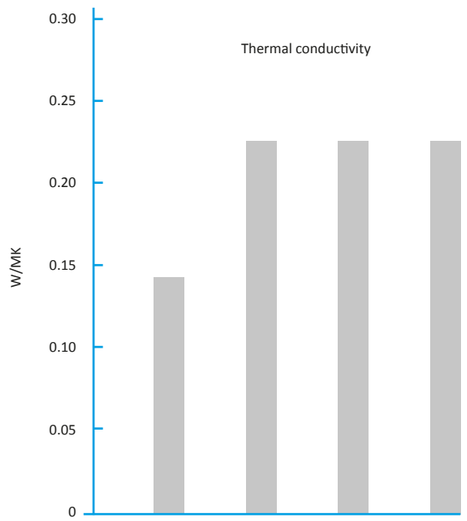
Less expansion of pipe when hot water runs

Less need for expansion loops, less “looping



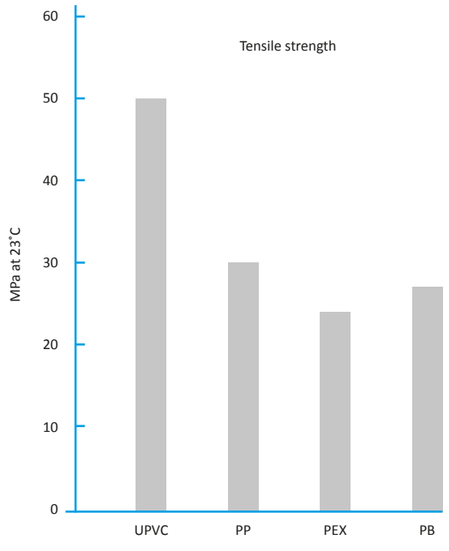
LOWER THERMAL CONDUCTIVITY

Reduces heat losses

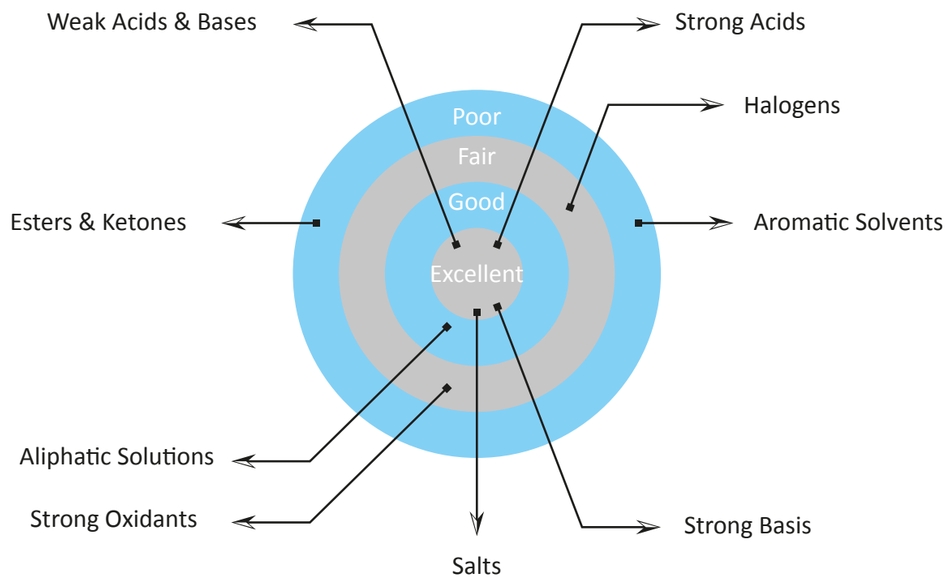


TOUGH, RIGID MATERIAL

UPVC has a much higher strength/modules than other thermoplastic used in plumbing applications.



UPVC EXCELLENT CHEMICALS RESISTANCE



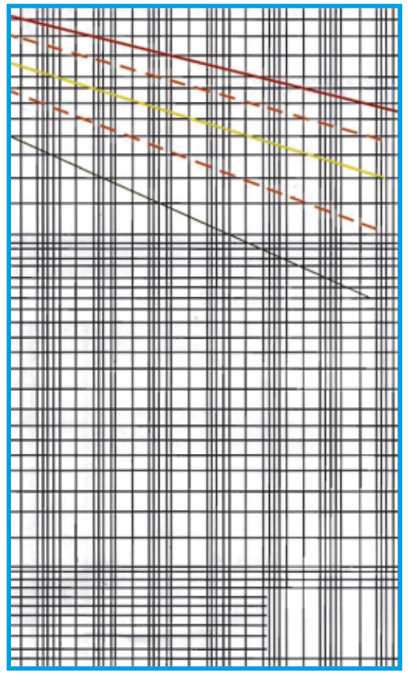
PROPERTY COMPARISONS OF THERMOPLASTIC PIPE

	UPVC	PPR	PEX	PB	CU
Tensile strength (MPa At 23˚C)	50	30	25	27	>300
Coefficient of thermal expansion (X10 K)	0.7	1.5	1.5	1.3	0.2
Thermal conductivity (W/MK)	0.14	0.22	0.22	0.22	
LOI	45	18	17	18	>400
Oxygen Permeation (cm/m.day.atm) (at 70˚C)	(not available) similar to CPVC	(not available) similar to PB-PEX	13	16	(not available) insignificant

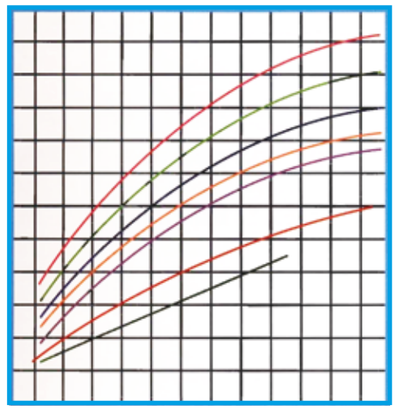
UPVC PIPES & FITTINGS DIAGRAMS

PIPES

Behaviour of UPVC pipes under long-term stressing

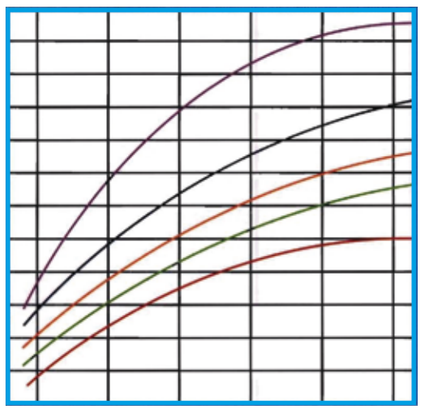


FITTINGS



Strain, as a percentage ⟶

Stress-strain diagram for UPVC at 20˚C



Strain, as a percentage ⟶

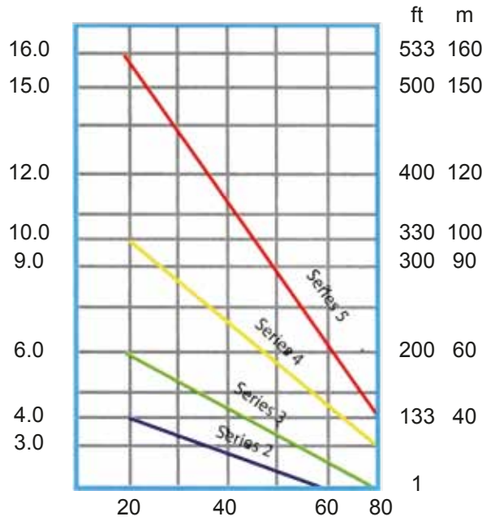
Stress-strain diagram for UPVC at 60˚C

When UPVC pressure pipe operates at temperature other than the temperature at which the pipe is rated (20˚C - OR 23˚C) pressure rating should be established on thermal design factors.

EXAMPLES GIVEN BEIOW ARE GUIDANCE ONLY.

PRESSURE TEMP. RELATIONSHIP

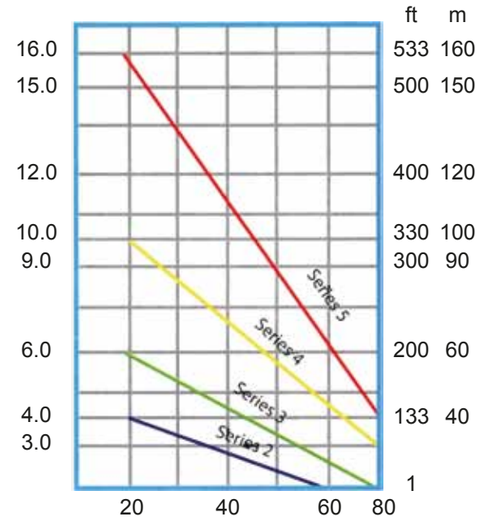
Ambient Variable Internal Temp. 20˚C



AMBIENT TEMPERATURE OF 40˚C
required working pressure of 6.S bar rated pipe
use a 10 bar rated pipe.

PRESSURE TEMP. REIATIONSHIP

Internal Variable Internal Temp. 20˚C



Required Working pressure of 7.0 bars
use with a liquid temperature of 40˚C
therefore a 10 bar rated pipe to be used.

MATERIAL PROPERTIES

MATERIAL

Unplasticized Polyvinyl Chloride (UPVC)

GENERAL PROPERTIES	UPVC VALUE	UNITS
Density	1.38	g/cm^3
Water absorption	<4	mg/cm^2
Flammability	Self extinguishing	
Mechanical Properties		
Ultimate Tensile Strength	492	Kg/cm^2
Compressive Strength	668	Kg/cm^2
Flexural Strength	950	Kg/cm^2
Modulus of Elasticity	$2.7x10^4$	Kg/cm^2
Impact Strength (Charpy)	No Break>10%	
Shore Hardness (Rockwell)	115	R
Thermal Properties		
Softening Point		
v.s.t. 5 Kg	Pipes ≥79˚ Fittings >76˚	˚C
Max. Operating temperature	60	˚C
Coefficient of Thermal Expansion	$3.0\ x10^{-5}$	In/In/˚F
Specific Heat	0.25	Cal/g. ˚C
Thermal Conductivity	0.13	Kcal/m.h. ˚C
Electrical Properties		
Volume Resistively	$>10^{14}$	Ohm.cm
Surface Resistance	$>10^{12}$	Ohm
Dielectric Strength	>40	Kv/mm
Power Factor (at 10^6cycle)	3.3	

UPVC are non-conductor or electricity and are not subjected to galvanic or electrolytic attack.
Note: All the above-mentioned valves at 20˚C.

UPVC CHEMICAL RESISTANCE

R: Recommended for use **NR: Not Recommened** **#: Not Available** ***: Check with factory**

CHEMICALS	UPVC 23˚C	UPVC 60˚C	CHEMICALS	UPVC 23˚C	UPVC 60˚C	CHEMICALS	UPVC 23˚C	UPVC 60˚C
A.cetaldehyde	NR	NR	Aluminum hydroxide	R	R	Aqua regia	*	NR
Acetamide	#	#	Aluminum nitrite	R	R	Aromatic hydrocarbons	NR	NR
Acetic acid10%	R	R	Aluminum oxychloride	R	R	Arsenic acid	R	R
Acetic acid20%	R	R	Aluminum Sulfate	R	R	Aryl sulphoilic acid	R	R
Acetic acid50%	R	*	Ammonia gas	R	R	Barium carbonate	R	R
Acetic acld80%	R	*	Ammonia (Aq.10%)	R	NR	Barium chloride	R	R
Acetic acid glacial	*	NR	Ammonia Liq.	NR	NR	Barium hydroxide	R	R
Acetic anhydride	NR	NR	Ammonium acetate	R	R	Barium nitrate	R	#
Acetone	NR	NR	Ammonium benzoate	#	#	Barium sulphate	R	R
Acetophenone	NR	NR	Ammonium bifloride	R	R	Barium sulphide	R	R
Acetyl Chioride	#	#	Ammonium bisulPhide	R	R	Butyl phenol	R	NR
Acetylene	*	*	Ammonium carbonate	R	R	Butyl stearate	R	#
Acetyl Nitrile	NR	NR	Ammonium chloride	R	R	Butyne diol	R	NR
Acrylic acid Ethyl ester	NR	NR	Ammonium citrate	#	#	Butyric acid	R	NR
Acrylonitrile	NR	NR	Ammonium dichromate	R	#	Butane	R	R
Adipic 105 acid	R	R	Ammonium fluoride 10%	R	R	Beer	R	R
Allyl alcohol	*	*	Ammonium fluoride 25%	R	*	Beer sugar liquors	R	R
Amyl alcohol	NR	NR	Ammonium hydroxide	R	*	Benzaldhyde	NR	NR
Alcohol Benzyle	NR	NR	Ammonium metaphosphate	R	R	Benzalkonium chloride	NR	NR
Alcohol 1ry Butyl	R	R	Ammonium nitrate	R	R	Benzene	NR	NR
Alcohol 2ry Butyl	R	NR	Ammonium persulphate	R	R	Benzene. benzol	NR	NR
Aleohol.dlacetone	#	#	Ammonium phosphate	R	R	Benzene sulphonlc acid	NR	NR
Alcohol Ethyl	R	R	Ammonium sulphamate	#	#	Benzoic acid	R	R
Alcohol Hexyl	R	R	Ammoniurn sulphate	R	R	Bismuth carbonate	R	R
Alcahol Isopropyl	R	R	Ammonium SUlphide	R	#	Black liquor	R	R
Alcahol Methyl	R	R	Ammonium thiocyanate	R	R	Bleach household	R	R
Alcahol Propargyl	R	R	Ammonium tartrate	#	#	Bleach 12.5% active CI2	R	R
Alcahol Propyl	R	R	Amyl acetate	NR	NR	Bleach 5.5% active CI2	R	R
Allyl chloride	NR	NR	Amyl chloride	NR	NR	Borax	R	R
Alum	R	R	Aniline	NR	NR	Boric acid	R	R
Alum Ammoinium	R	R	Aniline chlorohydrate	NR	NR	Brine acid (sat.)	#	#
Alum. Chrome	R	R	Aniline hydrochloride	NR	NR	Brine acid	R	#
Alum. Potassium	R	R	Anthraquinone	R	R	Bromic acid	R	R
Aluminum Chloride	R	R	Anthraquinone sulfonic acid	R	R	Bromine (Lid.)	NR	NR
Aluminum Floride	R	NR	Antimony trichloride	R	R	Bromine (vap. 25%)	R	R

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R: Recommended for use **NR:** Not Recommened **#:** Not Available ***:** Check with factory

CHEMICALS	UPVC 23˚C	UPVC 60˚C	CHEMICALS	UPVC 23˚C	UPVC 60˚C	CHEMICALS	UPVC 23˚C	UPVC 60˚C
Bromine water	R	R	Carbon dioxide dry	R	R	Cyclohexanone	NR	NR
Bromobenzene	NR	NR	Carbon disulphide	NR	NR	Desocyephedrlne hydrochloride	R	R
Bromotoluene	NR	NR	Carbon monoxide	R	R	Detergents	R	R
Butadiene	R	R	Carbon tetrachloride	NR	NR	Detergent solutlon(Heavy duty)	R	R
Butylacetate	NR	NR	Carbonic acid	R	R	Dextrin	R	R
Butyl alcohol	R	R	Caster oil	R	R	Dextrose		R
Butyl Cellosolve	R	#	Caustic potash	R	R	Diazo salts	R	R
Butyl phthalate		NR	Cellosolve	R	NR	Dibutoxy ethyl phthalate	NR	NR
Butylene	NR	NR	Cellosolve acetate	R	#	Dibutyl phthalate	NR	NR
Cadmium acetate	#	#	Cellosolve acetate	R	#	Dibutyl sebacate	R	NR
Chloral hydrate	R	R	Chloracetic acid	R	NR	Dichlorobenzene	NR	NR
Chloramines	R	#	Chlorine gas wet	NR	NR	Dichloroethylene	NR	NR
Chloric acid 20%	R	R	Chlorine (Liq)	NR	NR	Diesel fuels	*	NR
Chlorinated solvents	NR	NR	Chlorine water (Sat.)	R	R	Diethylamine	NR	NR
Chlorine Gas Dry	NR	NR	Chloracetic acid	R	NR	Diethyl cellosolve	#	#
Cadmium chloride	#	#	Chloroacetyl chloride	R	#	Dlethyl ether	R	#
Cadmium cyanide	R	R	Chlorobenzene	NR	NR	Diglycolic acid	R	R
Cadmium sulphate	#	#	Chlorobenzyl chloride	NR	NR	Dimethylamine	R	R
Caffeine citrate	R	R	Chloroform	NR	NR	Dimethyl formamide	NR	NR
Calcium acetate	#	#	Chloropicrin	NR	NR	Dimethyl hydrazine	NR	NR
Calcium bisulphide	#	#	Chlorosulphonic acid	R	NR	Dioctyl phthalate	NR	NR
Calcium bisulphate	R	R	Chromic acid 10%	R	R	Dioxane	NR	NR
Calcium carbonate	R	R	Chromic acid 30%	R	*	Dioxane .1,4	NR	NR
Calcium chlorate	R	R	Chromic acid 40%	R	*	Disodium phosphate	R	R
Calcium chloride	R	R	Chromic acid 50%	NR	NR	Dis. Water	R	R
Calcium hydroxide	R	R	Chromium nitrate	#	#	Divinylbenzene	NR	NR
Calcium hypochlorite	R	R	Citric acid	R	R	Epsom salt	R	#
Calcium nitrate	R	R	Citric acid 10%	#	#	Esters	NR	NR
Calcium Oxide	R	R	Croton aldehyde	NR	NR	Ethanol	#	#
Calcium sulphate	R	R	Crude oil	R	*	Ethers	NR	NR
Camphor crystals	R	#	Cupric fluoride	R	R	Ethyl acetate	NR	NR
Cane sugar liqluors	R	R	Cupric sulphate	R	R	Ethyl acetoacetate	NR	NR
Carbitol	R	#	Cuprous chloride	R	R	Ethyl acrylate	NR	NR
Caprylic acid	#	#	Cyclohexane	NR	NR	Ethyl chloride	NR	NR
Carbon dloxide.wet	R	R	Cyclohexanol	NR	NR	Ethyl chloroacetate	NR	NR

R: Recommended for use **NR:** Not Recommened **#:** Not Available ***:** Check with factory

CHEMICALS	UPVC 23˚C	UPVC 60˚C	CHEMICALS	UPVC 23˚C	UPVC 60˚C	CHEMICALS	UPVC 23˚C	UPVC 60˚C
Ethyl ether	NR	NR	Furtural	NR	NR	Hydrogen sulphide, dry	R	R
Ethylene bromide	NR	NR	Gallic acid	R	R	Hydrogen sulphlde(aq. Sol.n)	R	R
Ethylene chloride	NR	NR	Gas. Natural	R	R	Hydroquinone	R	R
Ethylene chlorohydrin	NR	NR	Gasoline. leaded	*	NR	Hydroxylamine sulphate	R	R
Ethylene diamine	#	#	Gasoline. Unleaded	*	NR	Hypochlorous acid	R	R
Ethylene dichloride	NR	NR	Gasoline. Sour	*	NR	Hydrazine	NR	NR
Ethylene glyeol	R	*	Gelatin	R	R	Iodine	NR	NR
Ethylene oxide	NR	NR	Gin	#	#	Iodine solution 10%	NR	NR
Fatty acid	R	R	Glucose	R	R	Isopropanol	*	*
Ferric acetate	R	NR	Glycerin	R	R	Isopropyl ether	NR	NR
Ferric chloride	R	R	Glycelin. glycerol	R	R	Isoodane	#	#
Ferric hydroxide	R	R	Glvcolic acid	R	R	Jet fuel. J P-4	*	NR
Ferric nitrate	R	R	Glycols	R	R	Jet fuel. J P-5	*	NR
Ferric sulphate	R	R	Grape sugar	R	R	Kerosene	R	*
Ferrous chloride	R	R	Green liquor. Paper	R	R	Ketones	NR	NR
Ferrous hydroxide	R	R	Heptane	R	R	Kraft liquor	R	R
Ferrous nitrate	R	#	Hexane	R	*	Lactic acid 25%	R	R
Ferrous sulphate	R	R	Hydrobromic acid. 20%	R	R	Lactic acid 80%	R	R
Fish soluble	R	R	Hydrobromic acid 50%	R	R	Lard oil	R	R
Fluorine gas. Wet	NR	NR	Hydrobromic acid 18%	R	*	Lauric acid	R	R
Fluobric acid	R	R	Hydrobromic acid conc20%	R	*	Lauryl chlolide	R	R
Fluosilicic acid	R	R	Hydrocyanic acid	R	R	Lead acetate	R	R
Formaldehyde 35%	R	R	Hydrobromic acid 10%	R	R	Lead chlolide	R	R
Formaldehyde 37%	R	R	Hydrofluoric acid dil.	R	NR	Lead nitrate	R	R
Formaldehyde 50%	R	R	Hydrofluoric acid 30%	R	NR	Lead sulphate	R	R
Formic acid	R	NR	Hydrofluoric acid 40%	R	NR	Lemon oil	#	#
Formic acid (anhydrous)	#	#	Hydrofluoric acid 50%	R	NR	Ligroin	#	#
Freon F-11	R	R	Hydro fluosilicic acid	R	R	Lime sulpher	R	R
Freon F-12	R	R	Hydrogen	R	R	Liolic acid	R	R
Freon F-21	NR	NR	Hydrogen cyanide	R	NR	Linoleic oil	R	R
Freon F-22	NR	NR	Hydrogen fluoride.anhyd	NR	NR	Linseed oil	R	R
Freon F-113	R	R	Hydrogen peroxide 30%	R	#	Linseed oil blue	#	#
Freon F-114	R	R	Hydrogen peroxide 50%	R	R	Liqueurs	R	R
Fructose	R	R	Hydrogen peroxide 90%	*	*	Lithium bromide	R	R
Fruit juices. Pulp	R	R	Hydrogen phosphide	R	R	Lithium sulphate	R	R

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R: Recommended for use **NR:** Not Recommened **#:** Not Available ***:** Check with factory

CHEMICALS	UPVC 23˚C	UPVC 60˚C	CHEMICALS	UPVC 23˚C	UPVC 60˚C	CHEMICALS	UPVC 23˚C	UPVC 60˚C
Lubricating oil ASTM#1	R	R	Methylene iodine	NR	NR	Oxalic acid 20%	#	#
Lubricating oil ASTM#2	R	R	Methyl Isobutyl carbinol	#	#	Oxalic acid 50%	R	R
Lubricating oil ASTM#3	R	R	Mineral oil	R	R	Oxygen gas	R	R
Machine oil	R	R	Milk	R	R	Ozone	#	#
Magnesium carbonate	R	R	Molasses	R	R	Palmitic acid	#	#
Magnesium chloride	R	R	Monoethanol amine	NR	NR	Palmitic acid 10%	R	R
Magnesium citrate	R	R	Motor oil	R	R	Palmitic acid 70%	R	NR
Magnesium hydroxide	R	R	Naphtha	R	R	Paraffin	R	R
Magnesium nitrate	R	R	Naphthalene	NR	NR	Peanut oil	#	#
Magnesium sulphate	R	R	Natural gas	R	R	Peracetic acid 40%	R	NR
Manganese sulphate	R	R	Nickel acetate	R	#	Perchlonc acid 10%	R	*
Maleic acid	R	R	Nickel chloride	R	R	Perchlonc acid 70%	R	NR
Maleic acid 50%	#	#	Nickel nitrate	R	R	Perphosphate	R	#
Malelc acid	R	R	Nickel sulphate	R	R	Petroleum oils. Sour	R	*
Mercuric chloride	R	R	Nicotine	R	R	Petroleum Oils. Refined	R	R
Melcuric cyanide	R	R	Nicotinic acid	R	R	Phenol	*	NR
Mercuric sulphate	R	R	Nitric acid 10%	R	*	Phenyl hydrazine	NR	NR
Mercurous nitrate	R	R	Nitric acid 20%	R	*	Phenyl hydrazine hydrochloride	*	NR
Mercury	R	R	Nitric acid 30%	R	*	Phosgene Liq.	NR	NR
Methane	R	R	NItric acid 40%	R	*	Phosgene Gas	R	*
Methanol	*	NR	Nitric acid 50%	R	*	Phosphonic acid 10%	R	R
Methylene chlorobromide	NR	NR	Nitric acid 70%	R	NR	Phosphonic acid 25%	R	R
Methoxyethyl oleate	R	#	Nitric acid 100%	NR	R	Phosphonic acid 50%	R	R
Methoxyethyl amine	NR	NR	Nitlobenzene	NR	NR	Phosphonic acid 70%	R	R
Methyl bromide	NR	NR	Nitroglycerine	NR	NR	Phosphonic acid 85%	R	R
Methyl cellosolve	NR	NR	Nitrous acid 10%	R	NR	Phosphorus yellow	R	*
Methyl chloride	NR	NR	Nitrous oxide	R	*	Phosphorus red	R	R
Methyl chloroform	NR	NR	Nitro glycol	NR	NR	Phosphorus Pentoxide	R	*
Methyl ethyl ketone	NR	NR	1-octanol	#	#	Phosphorus trichloride	NR	NR
Methyl isobutyl ketone	NR	NR	Oils Vegetable	*	*	Photographic solution	R	R
Methyl methacrylate	R	#	Oils Sour crude	#	#	Picric acid	NR	NR
Methyl sulphate	R	*	Oleic acid	R	R	Plating solution brass	R	*
Methyl sulphoric acid	R	R	Oleum	NR	NR	Plating solution cadmium	R	*
Methylene bromide	NR	NR	Olive oil	#	#	Plating solution chrome	R	*
Methylene chloride	NR	NR	Oxalic acid	R	R	Plating solution copper	R	*

R: Recommended for use **NR:** Not Recommened **#:** Not Available ***:** Check with factory

CHEMICALS	UPVC 23˚C	UPVC 60˚C	CHEMICALS	UPVC 23˚C	UPVC 60˚C	CHEMICALS	UPVC 23˚C	UPVC 60˚C
Plating solution gold	R	*	Potassium perchlorate sat	R	R	Sodium chlorite	NR	NR
Plating solution lead	R	*	Potassium pennenganate sat	R	R	Sodium cyanide	R	*
Plating solution nickel	R	*	Potassium permenganate 25%	#	#	Sodium dichromate	R	R
Platmg solution rhodlwn	R	*	Potassium persulphate sat	R	R	Sodium ferrlcyanlde	NR	NR
Plating solution silver	R	*	Potassium phosphate	#	#	Sodium ferrocyanide	NR	NR
Plating solution tin	R	*	Potassium sulphate	R	R	Sodium fluoride	NR	NR
Plating solution zinc	R	*	Propane	R	R	Sodium formate	NR	NR
Polyethylene glycol	*	*	Propylene dichloride	NR	NR	Sodium hydroxide 10%	NR	NR
Potash	R	R	Propylene glycol	*	*	Sodium hydroxide 15%	R	R
Potassium alum	R	R	Propylene oxide	NR	NR	Sodium hydroxide 25%	R	*
Potassium aluminum sulphate	R	#	Pyridine	NR	NR	Sodium hydroxide 30%	R	*
Potassium amyl xanthate	R	NR	Pyrogallicla acid	R	R	Sodium hydroxide 50%	R	*
Potassium bicarbonate	R	R	Salicylic acid	R	R	Sodium hydroxide 70%	R	*
Potassium bicarbonate	R	R	Sallc ylaldehyde	NR	NR	Sodium hypochlorite 15%	R	*
Potassium blsulphate	R	R	Sea water	R	R	Sodium hypochlorite	R	#
Potassium borate	R	R	Slenic acid	R	R	Sodium Iodide	#	#
Potassium bromate	R	R	Silicic acid	R	R	Sodium metaphosphate	R	#
Potassium bromide	R	R	Silicone oil	R	NR	Sodium nitrate	R	R
Potassium carbonate	R	R	Silver cyanide	R	R	Sodium nitrite	R	R
Potassium chlorate.(Aq.)	R	R	Sliver nitrate	R	R	Sodium palmitrate sol.n 5%	#	#
Potassium chloride	R	R	Silver sulphate	R	R	Sodium perborate	R	R
Potassium chromate	R	R	Soaps	R	R	Sodium perchlorate	R	R
Potassium chlorate	R	R	Sodium acetate	R	R	Sodium peroxide	R	R
Potassium cyanide	R	R	Sodium arsenate	#	#	Sodium phosphate. alk	R	#
Potassium cyanate	R	R	Sodium alurn	R	R	Sodium phosphate. acidic	R	#
Potassium clchromate	R	R	Sodium benzoate	R	R	Sodium phosphate neutlal	R	#
Potassium ethyl xanthate	R	NR	Sodium bicarbonate	R	R	Sodium silicate	#	#
Potassium ferricyanide	R	R	Sodium bichromate	R	R	Sodium sulphate	R	R
potassium ferro yandel	R	R	Sodium bilsulphate	R	R	Sodium sulphide	R	R
Potassium fluoride	R	R	Sodium bisulphlte	R	R	Sodium sulphite	R	R
Potassium hydroxide	R	R	Sodium borate	R	#	Sodium thiosulphate	R	R
Potassium hypochlorite	R	#	Sodium bromide	R	R	Sour crude oil	R	R
Potassium iodide	R	#	Sodium carbonate	R	R	Stannic chloride	R	R
Potassium nitrate	R	R	Sodium chlorate	R	#	Stannous chloride	R	R
Potassium perbmate	R	R	Sodium chloride	R	R	Stannous sulphate	*	*

R: Recommended for use **NR:** Not Recommened **#:** Not Available ***:** Check with factory

CHEMICALS	UPVC 23˚C	UPVC 60˚C	CHEMICALS	UPVC 23˚C	UPVC 60˚C	CHEMICALS	UPVC 23˚C	UPVC 60˚C
Starch	R	R	Tetraethyl lead	R	*	Water. Salt	R	R
Steanc acid	R	R	Teraethydrodfurane	NR	NR	Water. sea	R	R
Stoddards solvent	NR	NR	TelaethydlOfurane	NR	NR	Water. Sewage	R	R
Strontium chloride	*	*	Tetra sod. Pyrophosphate	R	R	Whiskey	R	R
Succinic acid	R	R	Thionyl chloride	NR	NR	White liquor	R	R
Sulphamic acid	NR	NR	Tread cutting oils	R	#	Wines	R	R
Sulphated detergent	#	#	Tirpineol	*	*	Xylene (Xylol)	NR	NR
Sulphate liquors	#	#	Titanium tetrachloride	*	NR	Zinc acetate	R	R
Sulfite liquor	R	R	Toluene	NR	NR	Zinc chlolide	R	R
Sulphur	R	R	Toluene toluol	NR	NR	Zinc nitrate	R	R
Sulphur chloride	#	#	Tomato Juice	R		Zinc sulphate	R	R
Sulphur dioxide. dry	R	R	Transformel oil	R	R			
Sulphur dioxide. wet	R	*	Transformer oil DTE/30	#	#			
Sulphur trioxide	R	*	Trlbutyl phosphate	NR	NR			
Sulphur trioxide. gas	R	R	Tributyl citrate	R	#			
Sulphorl acid 10%	R	R	Trichloroacetic acid	R	R			
Sulphorl acid 20%	R	R	Trichloroethane	NR	NR			
Sulphorl acid 30%	R	R	Trichlorpenthlene	NR	NR			
Sulphorl acid 50%	R	R	Trithanolamine	R	*			
Sulphorl acid 60%	R	R	Trithylamine	R	R			
Sulphorl acid 70%	R	R	Trithylpropane	R	NR			
Sulphorl acid 80%	R	*	Trisodium phosphate	R	R			
Sulphorl acid 90%	R	*	Turpentine	R	R			
Sulphorl acid 93.5%	*	NR	Urea	R	R			
Sulphorl acid 94%	*	NR	Urine	R	R			
Sulphorl acid 95%	NR	NR	Vaseline	NR	NR			
Sulphorl acid 96%	NR	NR	Vegetables oils	*	*			
Sulphorl acid 98%	NR	NR	Vinegar	R	R			
Sulphorl acid 100%	R	NR	Vinegar. white	#	#			
Sulphorous acid	R	NR	Viny1 acetate	NR	NR			
Tannic acid	R	NR	Water	R	R			
Tannic acid 30%	R	R	Water. acid mine	R	R			
Tannic liquors	R	R	Water. demineralized	R	R			
Tar	NR	NR	Water. disilled or flesh	R	R			
Tartaric acid	R	R	Water. Salt	R	R			

SOLVENT WELDING UPVC PIPES AND FITTINGS

CUTTING

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

DEBURRING

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

INSPECTION AND CLEANING

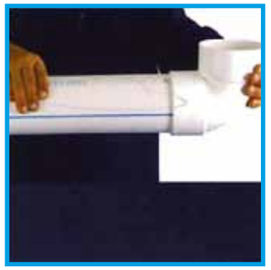
Visually inspect the inside of the pipe and fittings sockets and remove all dirt, grease or moisture with a clean dry rag. Measure the fittings socket depth and mark this distanceon the pipe OD.clean the surface of the pipe and fitting socket by using a cleaner.

APPLICATION OF SOLVENT CEMENT

Apply the solvent cement evenly and quickly around the outside of the pipe at a width a little greater than the depth of the fitting socket. Apply a light coat of cement evenly around the inside of the fitting socket.

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.



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.

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.

TESTING

Allow 8 hours to elapse before applying working pressure or 24 hours for tests 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.

IMPORTANT NOTICE

Close the open tin of solvent cement when not in use, do not work near a naked flame and not mix. Cleaning fluid with the solvent cement.

CONSUMPTION OF CLEANER AND SOLVENT CEMENT (NO. - OF JOINTS PER KG)

Dia./mm	Cleaner-joints/kg	Solvent Cement-joint/kg
16	400	200
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

Brushes must be clean and dry before commencing solvent welding Brushes must be thoroughly cleaned after use by washing out in 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 continues runs of pipes, 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 or the previously made joint lifted out of place.

UPVC PIPES ACCORDING TO (ASTM) D-1785 (SCH40)

Technical data of TAGRO UPVC Pipes for plumbing systems (DWV)

Nominal Size (mm)	Outside Die (mm)	Thickness (mm)
50	48.26	2.5
50	48.26	3.7
60	60.34	2.7
60	60.34	3.9
75	75	3
75	75	4
110	110	3
110	110	4
110	110	5
160	160	3
160	160	4
160	160	5

MULTILAYERS PIPES

المواسير المتعددة الطبقات

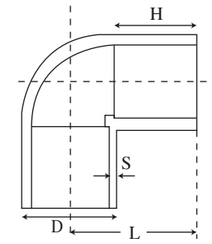
- طول الماسورة ٦ أمتار أو حسب طلب العميل.
- اللون أبيض يحتوى على خط أزرق.

Nominal Size (mm)	Outside Die (mm)	Thickness (mm)
110	110	3
110	110	4
160	160	3
160	160	4

TECHNICAL DATA OF TAGRO UPVC FITTINGS FOR PLUMBING SYSTEMS (DWV)

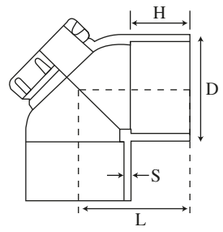
According to ASTM - D2466 & D3311 (Sch 40)

ELBOW 90˚



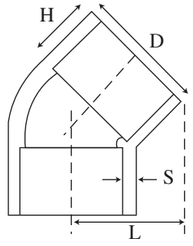
D (mm)	S (mm)	H (mm)	PACK
50	2.5	32	60
60	2.5	38	50
75	4.5	45	35
110	6	51	25
160	6	70	6

ELBOW ACCESS CAP



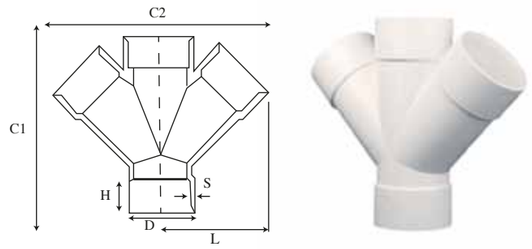
D (mm)	S (mm)	H (mm)	PACK
60	2.5	38	24
75	4.5	45	20
110	6	51	10
160	6	70	6

ELBOW 45˚



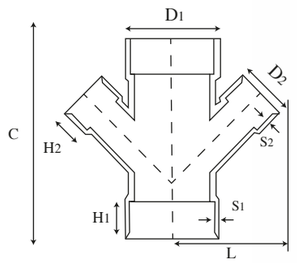
D (mm)	S (mm)	H (mm)	PACK
50	2.5	32	70
60	2.5	38	40
75	4.5	45	30
110	6	52	15
160	6	70	8

DOUBLE BRANCH TEE 45°



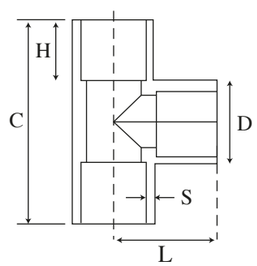
D (mm)	S (mm)	H (mm)	PACK
110	8.2	52	12

DOUBLE BRANCH RED 45°



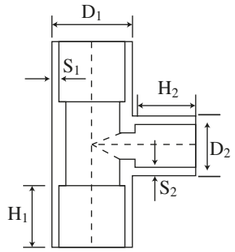
D (mm)	S1	S2	H1	H2	PACK
110/60	8	5.5	52	38	16
110/75	8	13	52	45	16

TEE 90°



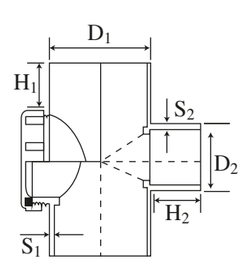
D (mm)	S (mm)	H (mm)	PACK
50	2.5	31	50
60	2.5	38	30
75	4.7	45	16
110	6	52	16
160	6	70	5

TEE RED. 90°



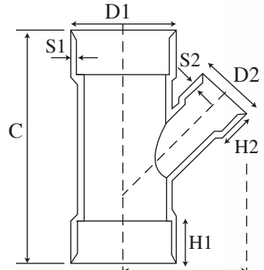
D (mm)	S1	S2	H1	H2	PACK
75/60	4.5	5	45	38	30
110/60	6	3.5	52	38	16
110/75	6	4.7	52	45	16
160/110	6	6	70	52	16

TEE RED. W/CAP



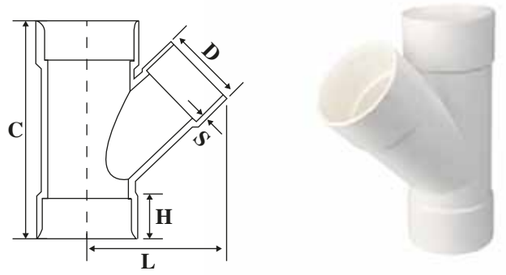
D (mm)	S1	S2	H1	H2	PACK
75/60	4.5	5	45	38	30
110/60	6	3.5	52	38	12
110/75	6	4.7	52	45	12
160/110	6	6	70	52	12

TEE RED. 45°



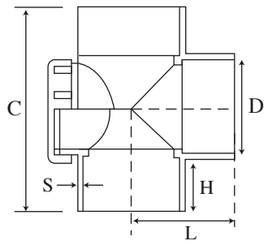
D (mm)	S1	S2	H1	H2	PACK
110/50	8	10	52	32	16
110/60	8	4	52	38	16
110/75	8	13	52	45	16
160/110	10.3	8.5	75	52	16

TEE 45°



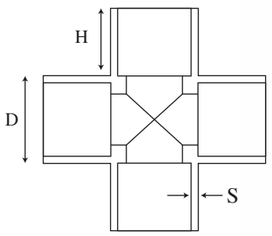
D (mm)	S (mm)	H (mm)	PACK
50	3.6	32	60
60	3.7	38	35
75	4.7	45	25
110	6	51	25
160	10.3	74	3

TEE ACCESS CAP



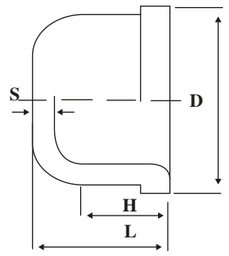
D (mm)	S (mm)	H (mm)	PACK
60	2.5	38	30
75	4.7	45	16
110	6	52	12
160	6	70	4

DOUBLE BRANCH 90°



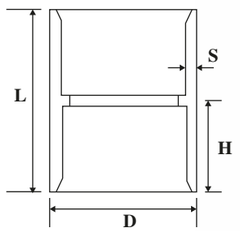
D (mm)	S (mm)	H (mm)	PACK
75	4.5	45	30
110	5.3	51	12

END CAP



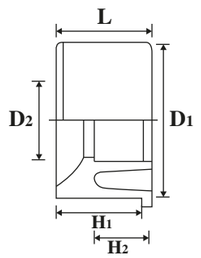
D (mm)	S (mm)	H (mm)	PACK
50	5	32	100
60	4.5	38	100
75	7	44	100
110	7	61	72
160	8.5	86	50

COUPLING



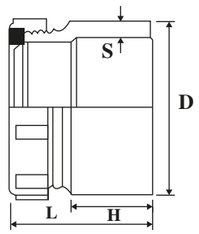
D (mm)	S (mm)	H (mm)	PACK
50	5.5	32	100
60	6.5	39	72
75	4.5	45	48
110	5.5	52	30
160	6	70	18

REDUCING BUSH



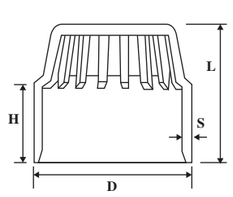
D (mm)	H1	H2	PACK
60/50	38	31	140
75/50	44	31	140
75/60	44	38	140
110/50	52	38	96
110/60	52	38	96
110/75	52	45	96
160/110	70	52	12

CLEAN OUT



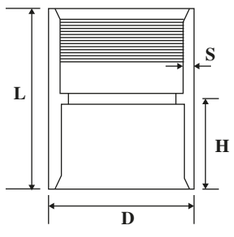
D (mm)	S (mm)	H (mm)	PACK
50	5	35	60
60	4.5	40	50
75	5	44	35
110	5	53	25
160	6	79	6

AIR VENT



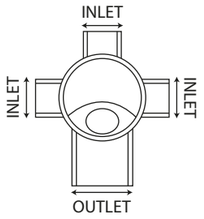
D (mm)	S (mm)	H (mm)	PACK
75	3	45	50
110	4	52	36

COUPLING THREADED



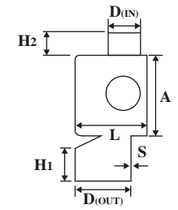
D (mm)	Thread	S (mm)	H (mm)	PACK
50	1.5”	4	30	60

FLOOR TRAP



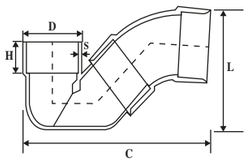
D (mm)	S1	S2	H1	H2	PACK
60/50	4	4	48	34	35
60/60	4	4	48	34	30
75/50	4	2.5	47	34	12
75/60	4	4.5	47	38	12

FLOOR TRAP



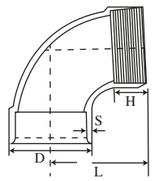
D (mm)	S1	S2	H1	H2	PACK
60/50	4	4	48	34	35
60/60	4	4	48	34	30
75/50	4	2.5	47	34	12

SYPHON



D (mm)	S (mm)	H (mm)	PACK
110	6	52	12

ELBOW THREADED 90˚



D (mm)	Thread	S (mm)	H (mm)	PACK
50	1.5”	3	32	60

Transport, Storage and Handling

Pipes

on trucks the 6 Mt long pipes must be fully supported on loading area. Avoid loading at the same time with sharp objects, pipes should not be throw or dragged along the ground.

Pipes should be given adequate support at all times. Pipes should not be stacked in large piles, especially in warm temperature conditions the lower layers may distort, resulting in difficulties in jointing and pipe alignment. Any pipe with ends prepared for jointing (sockets and spigot joints, A joints, etc.) should be stacked in layers with sockets and the possibility of imparting a permanent set to the pipes .

For long-term storage, pipe racks should provide continuous support, but if is this not possible timber of at least 3 in. (75mm) bearing width at spacing not greater than 3 ft.(915mm) centers for pipe sizes 160mm and above, should be placed beneath the pipes and at 6 ft. (1.8m) centres at the side, if the stacks are rectangular. This spacing apply to pipe size 160mm and above. Closer supports will be requierd for sizes below 160mm in such pipe racks. Pipes may be stored not more than seven layers ,or 6 ft. (1.8m) high, which ever is the lesser. but if different classes of pipe have kept in the same racks, than the thickness classes of largest diameter must always be placed at bottom.

Certificate of Warranty