CONTENTS

INTRODUCTION

Plastics and its characteristics: Plastics is a class of substance which is hard and tough. Plastics belong to a large family of polymers. The usage of plastics is widely accepted throughout the world because it is light in weight and has relatively higher strength than most metals and other materials. The use of plastic often reduces overall manufacturing as well as installation cost compared to other conventional materials.

Classification of Plastics

Plastics can be classified into two types (1) Thermoplastics and (2) Thermosets.

1. **Thermoplastics.**

   The characteristics of thermoplastics is that they get softened under heat and again get hardened when cooled. This process can be repeated several times without any appreciable loss in physical properties. Due to this reason thermoplastics are not subjected to chemical change by heating.

Thermoplastics	
Commodity plastics	Engineering plastics (Performance plastics)
LDPE	Polystyrene Co-Acrylonitrile (SAN)
HDPE	Acrylonitrile Butadiene Styrene (ABS)
Polypropylene (PP)	Polymethyl Methacrylaye (PMMA)
Polystyrene	Polybutylene Teraphthalate (PBT)
PVC, etc	Polyacetal
	Polycarbonate
	Polytetra flouro Ethylene (PTFE), etc

Polypropylene (PP) - This type of thermoplastic has an increasing crystallinity which is stabilized to higher temperature, from the polyolefin group. It has higher melting point. Polypropylene is in three different forms
Type 1- Polypropylene homopolymer (PP-H)
Type 2- polypropylene block polymer (PP-B) &
Type 3- polypropylene random copolymer (PP-r).

Polypropylene random copolymer (PP-r) - It is a modified copolymer with greater resistance to impact and the lower crystallinity prevents the forming of hair cracks in the internal surface of the pipe.
PPr is not subjected to any restriction for use with food stuffs, and so it can be used for applications involving edible substances. Because of its outstanding chemical resistance & high residential applications.

2. **Thermosetting Plastics**

This kind of plastics get softened by the application of heat and undergo all internal change which makes them hard and is resistant to any further application of heat.

BASIC MATERIAL

The basic material used for the production of KTP thermopipe system is polypropylene random Copolymer (PPr).

Why PPr Is Introduced for Potable Hot & Cold water systems?

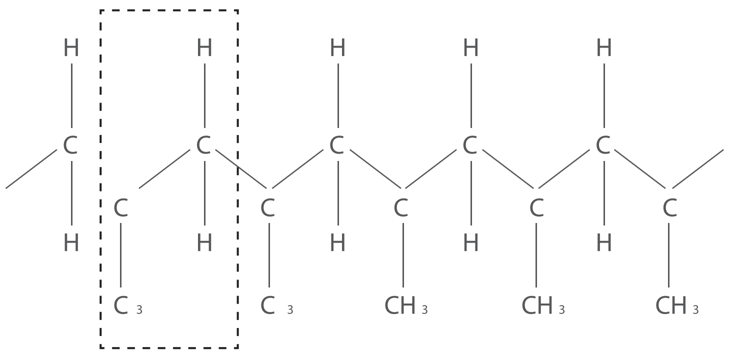
The compound PPr- has gained major relevance in the world market because of its remarkable properties of mechanical resistance, inert to chemical aggression impact strength, corrosion resistance and higher working temperature. PPr has the general properties of low density, good balance of stiffness to toughness, low tendency to stress cracking and it is easy to process and install.

Density	0.895 g/ cm3
Molecular weight	500000
Modulus of elasticity	800N/mm2
Expansion coefficient	0.15mm/mK
Thermal conductivity	0.24W/mK (at 20°C)

PPr is one of the thermoplastic material obtained by the polymerization of ethylene and propylene.

-P-P-P-E-P-PP-E-P-_ _ _-P-P-E-P-P-P
P= Propylene, E = Ethylene (Comonomer)

Isotactic polypropylene



ADVANTAGES

The most evident advantages which arise by comparing KTP PPr Pipes with the one made up of other traditional materials are..................

1. Corrosion Resistance

The pipe system such as galvanized steel used for industrial and household application suffers a serious drawback of corrosion which is either by chemical reaction or by atmospheric action. Corrosion results in the elimination of metal ions from corroded pipes which affects health.

KTP PPr Pipe system overcomes the above factor since it is 100% resistive against corrosion when the flow substances having pH valve between 1 to 14, ie. PPr pipe system can withstand acid and alkaline substances within a specified concentration and pressure & temperature range. PPr pipes will safely withstand when it is in contact with common building materials such as lime cement and mortar without any special precautions.

2. Frictional loss & Reduction in flow rate

The key factor which affects the flow of water in a pipe system is the coefficient of friction which directly influences the pressure loss and hence to the energy loss. Coefficient of friction is the surface finish characteristics, ie. whether the inside surface of the pipe is smooth or rough. Better smoothness of the pipe reduces frictional loss. PPr pipes has fine & smooth inside surface, frictional value is very low compared to other water conveying systems, which leads to better flow- characteristics such as smooth & uniform laminar flow with less energy loss and pressure head.

3. Low pressure loss

The PPr pipe is smooth and non porous which prevents lime scale formation and low pressure loss throughout the system.

4. Noise of flow

PPr pipe system has less noise of flow than metallic pipes.

5. Knocking and Water hammer

Knocking and water hammer in the pipe system mainly depends on the velocity of flow of water, the length of pipe, time taken to close the valve, & the elastic properties of the materials of pipe.

PPr has a very good elastic property and is to have a good balance of stiffness to toughness it can withstand more compared to metallic and PVC pipes. PPr pipes system reduces noise and vibration due to water hammer.

6. Thermal conductivity & condensation

Condensation of the water conveying system is based of the thermal conductivity of the pipe material.

PPr possess the coefficient of thermal conductivity equal to 0.24 W/mK, that means a very low thermal leakage, low condensation and less energy loss.

ADVANTAGES

7. Easy Installation

PPr pipes offers an easy installation methods for all conventional applications. PPr pipes and fittings are joined only by fusion, the system never faces any troubles throughout its life period. The further advantages of PPr pipe system is installations are quick and safe, high mechanical flexibility and is easy for repair and handling.

8. Life period

The life period for PPr pipes can be calculated in advance for any working pressure and working temperature within the specified limits. In theoretical and practical experience the life period for the PPr pipes with an operating pressure of 8 bar and max. working temperature of 70℃ exceeds more than 50years.

9. Drinking water Approval

KTP has achieved drinking water approval from Saudi Arabian Standard Organization. (SASO) & verified by 3rd party laboratory.

MECHANICAL AND THERMAL PROPERTIES

PROPERTY	TEST METHOD	UNIT	VALUE
Viscosity number Molecular weight average	ISO 1191 Solution viscosity C=0.001g/cm^3	Cm^3/g	420 500.00
Melt flow index	ISO 1133		
MFI 190/5	Condition 18	g/10min	'0.5
MFI 230/5	Condition 20	g/10min	15
MFI 250/2.16	Condition 12	g/10min	0.35
Density	ISO/R1183	g/cm^3	0.895
Melting Range	Polarization Microscope	°C	140-150
Tensile stress at yield	ISO/R 527	N/mm^2	21
Tensile strength at break	Speed D	N/mm^2	40
Elongation at break	Test specimen	%	800
Ball indentation hardness	ISO 2039 (H 358/30)	N/mm^2	40
Flexural stress at 5.5%	ISO 178	N/mm^2	20
Outer fibre strain	Test Piece 5.1		
Modulus of elasticity	ISO 178	N/mm^2	800
Shear Modulus	ISO 537		
-10°	Method A	N/mm^2	1100
0°		N/mm^2	770
10°		N/mm^2	500
20°		N/mm^2	370
30°		N/mm^2	300
40°		N/mm^2	240
50°		N/mm^2	180
60°		N/mm^2	140
Mechanical strength properties			
Determined by impact strength			
0°C	DIN 8078		No failure
Impact strength	ISO 179		
(Charpy) RT	Test specimen	KJ/m^2	No failure
°C		KJ/m^2	No failure
-10°C		KJ/m^2	No failure
Notched impact strength	ISO 179		
(Charpy) RT	Test specimen	KJ/m^2	25
°C		KJ/m^2	7
-20°C		KJ/m^2	3
Coefficient of linear thermal	VDE, 0304		
expansion	Part 1&4	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

LONG TERM BEHAVIOUR OF KTP PPR PIPES

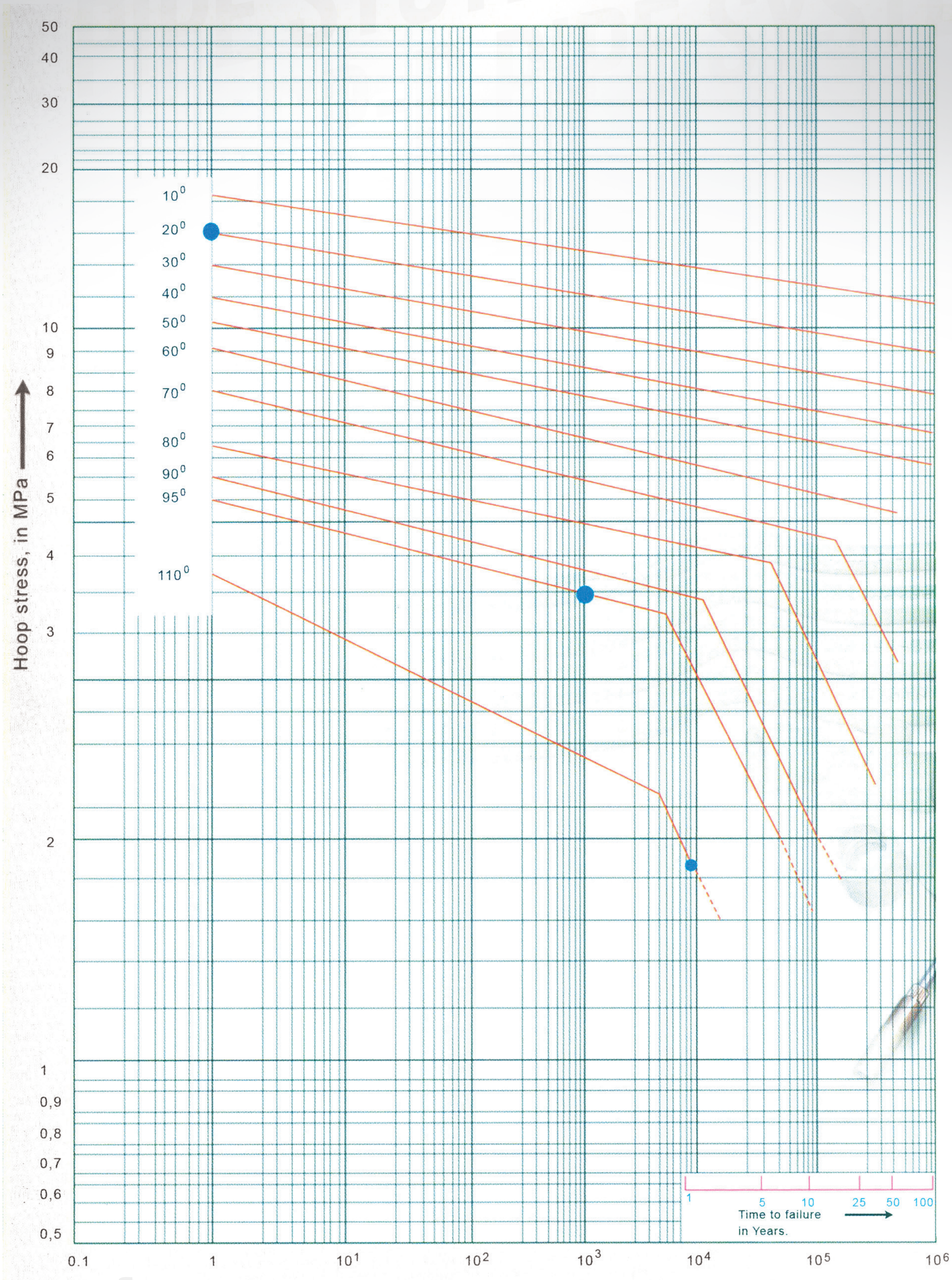


Figure 1 : Long-term behaviour of PP-R pipes

LIFE SPAN OF KTP Class 2/8 Bars PIPES

Life span of KTP Class 2/8 Bars Standard pipes.
Life span of KTP Pipes depends on the allowable pressure and, the specified working temperature. The following table-1 shows the life span of KTP class 2/8 bars standard Pipe.

Table -1

TEMPERATURE in °C	ALLOWABLE WORKING PRESSURE IN BAR	SERVICE LIFE IN YEARS
10	29.6	100
20	25.0	100
30	21.1	100
40	17.8	100
50	14.9	100
60	12.9	50
70	8.5	50
80	6.5	25

The life span of the pipe depends on the working temperature and pressure regardless of the dimension of pipe, under specified continuous duration of flow of water.

TECHNICAL SPECIFICATION

During the production of thermopipes and fittings, KTP is always one step ahead and comply with SASO standards and specifications. The general quality requirements and test condition is based on SASO ISO 15874.

The main factors which should be considered on designing and selection of networks are.

1. Working pressure & Creep rupture at different temperature

Various tests were carried out to determine the internal pressure resistance and creep rapture strength of the pipe material. Sample pieces of pipes were tested in accordance with SASO ISO 15874 using the following test conditions as shown in table- 2

Table-2

TEST TEMPERATURE in °C	CONTACT MEDIUM	PERIOD OF STRESSING IN HRS (MINIMUM TIME TO FAILURE)	PROOF STRESS σ_o in N/mm^2
20	Air or Water	1	16
95	Air or Water	1000	3.5
110	Air	8760	1.9

The proof pressure is calculated as p_e, $p = \dfrac{2S_{min}\,\sigma_o}{\bar{d} - S_{min}}$

$\bar{d}$ —mean outside diameter

Smin - minimum wall thickness

σ_o - Proof stress

The result of the test is that pipe shall neither burst nor leak during the prescribed period of stressing.

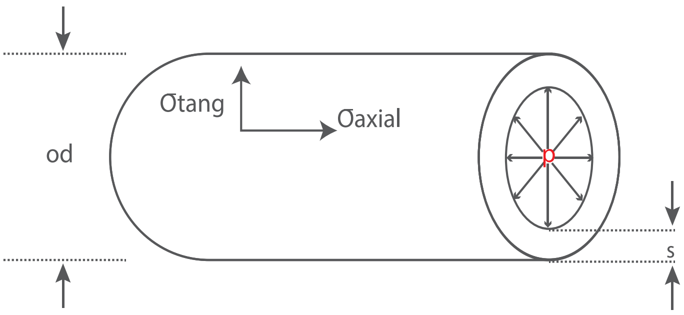
2. Pipe under Internal pressure

p = Internal pressure

dm= mean diameter

s = wall thickness

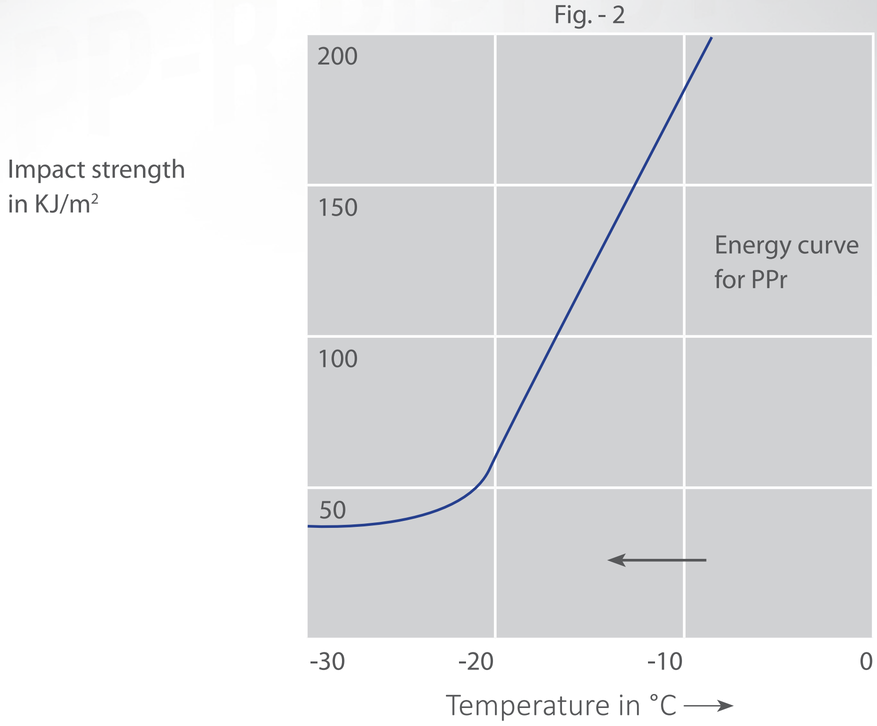
$\sigma_{tangential} = 2\ \sigma_{axial}$



TECHNICAL SPECIFICATION

The impact strength of PPr is more, compared to other plastic materials.
The impact resistance of PPr and the energy capacity is tested as per sample methods.
Impact resistance of unnotched specimens is tested at temperature of (0±1)°C.

Fig. - 2



EXPANSION FORCE

The expansion forces are subjected to the pipe dimension and variation in temperature irrespective of the length of pipe. The expansion will be compensated by corresponding supporting force. Due to this expansion compressive stress is developed. Pipe clamps will absorb this compressive stress.

$F = E \times A \times \alpha \times \Delta T$

E- Modulus of elasticity in N/m^2
A- Area of cross section of pipe in m^2
α- Specific Coefficient of thermal expansion in $K.^{-1}$
ΔT- Difference between service temperature and temperature during installation.

For KTP Class 2/8 Bars Standard pipe a = 0,15

Note

1. If the pipe is installed in brickwork or floor no compensation is necessary.
2. Pipes which are not installed in brickwork or floor compensating force should be provided.

TECHNICAL SPECIFICATION

LINEAR EXPANSION AND CALCULATION

If the pipes are installed outside the wall or floor. The liner expansion of the pipe should be considered at higher operating temperature. Due to increase in temperature all materials are subjected to an increase in volume.

The expansion of PPr pipes is more than that of metallic pipes, so compensation measures should be provided.

Calculation of linear expansion;

Linear expansion, $\Delta L = \alpha \times L \times \Delta T$

ΔT- Temperature difference between hot water and external temperature,

L- Pipe length in m

α- Linear expansion coefficient (mm/m K)

The linear expansion depends on length and temperature but is not influenced by the diameter of pipe. In cold water system the pipes practically do not undergo any linear expansion if only the installation temperature and that of operating temperature do not differ significantly to create ΔT.

Linear Expansion: KTP Class 28/ Bars Standard pipe

Table -3

Pipe Length (m)	TEMPERATURE DIFFERENCE ΔT (K)							
	10	20	30	40	50	60	70	80
0.1	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20
0.2	0.30	0.60	0.90	1.20	1.50	1.80	2.10	2.40
0.3	0.45	0.90	1.35	1.80	2.25	2.70	3.15	3.60
0.4	0.60	1.20	1.80	2.40	3.00	3.60	4.15	4.80
0.5	0.75	1.50	2.25	3.00	3.75	4.50	5.25	6.00
0.6	0.90	1.80	2.70	3.60	4.50	5.40	6.30	7.20
0.7	1.05	2.10	3.15	4.20	5.25	6.30	7.35	8.40
0.8	1.20	2.40	3.60	4.80	6.00	7.20	8.40	9.60
0.9	1.35	2.70	4.05	5.40	6.75	8.10	9.45	10.80
1.0	1.50	3.00	4.50	6.00	7.50	9.00	10.50	12.00
2.0	3.00	6.00	9.00	12.00	15.00	18.00	21.00	24.00
3.0	4.50	9.00	13.50	18.00	22.50	27.00	31.50	36.00
4.0	6.00	12.00	18.00	24.00	30.00	36.00	42.00	48.00
5.0	7.50	15.00	22.50	30.00	37.50	45.00	52.50	60.00
6.0	9.00	18.00	27.00	36.00	45.00	54.00	63.00	72.00
7.0	10.50	21.00	31.50	42.00	52.50	63.00	73.50	84.00
8.0	12.00	24.00	36.00	48.00	60.00	72.00	84.00	93.00
9.0	13.50	27.00	40.50	54.00	67.50	81.00	94.00	108.00
10.0	15.00	30.00	45.00	60.00	75.00	90.00	105.00	120.00

CALCULATION OF COMPENSATION WITH BENDING LEGS

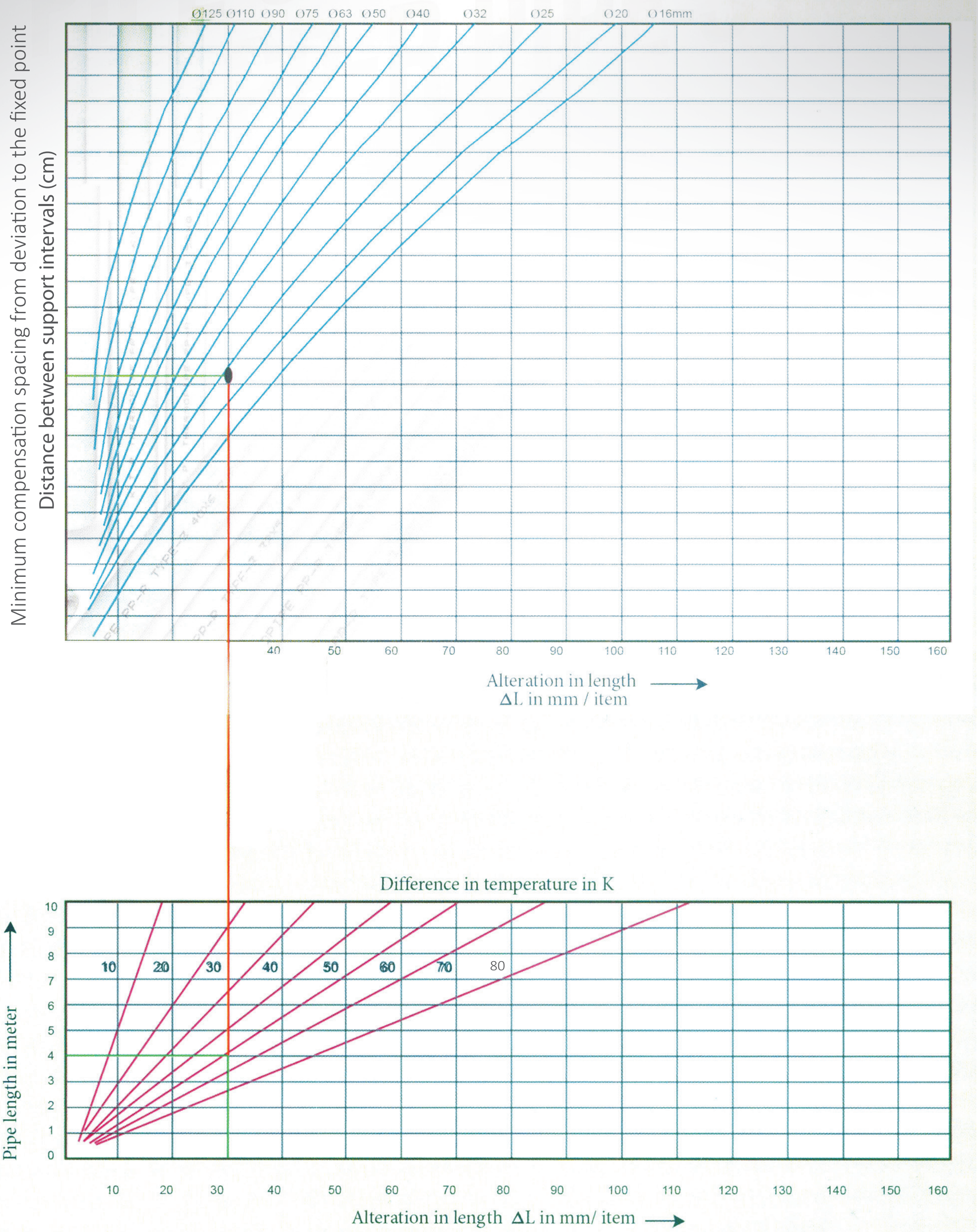


Fig - 5

INSTALLATION PRINCIPLES

Length between support intervals

Spacing between support intervals depend on the difference in temperature between installation temperature and operating temperature which based on pipe diameter (as shown in table-4) The following table shows the recommended support integrals for KTP Class 2/8 Bars Standard pipe.

Determination of minimum length of bending legs & Compensation with bending legs.

Table -4

Difference in Temperature	PIPE DIAMETER IN MM										
	16	20	25	32	40	50	63	75	90	110	125
Δt (K) Distance between support intervals in cm											
0	70	80	100	120	135	160	185	200	220	245	270
20	60	65	75	90	110	125	140	155	165	180	205
30	60	65	75	90	110	120	135	150	160	180	200
40	55	60	70	85	105	115	130	145	155	170	185
50	55	60	70	85	100	110	125	135	145	170	185
60	45	55	65	80	90	105	120	130	140	160	180
70	45	50	55	75	90	100	115	125	130	140	155
80	40	50	55	70	85	90	105	115	120	130	140

Thermal insulation for hot & cold water pipes

The thermal conductivity factor for KTP type- Class 2/8 Bars Standard pipe is 0.24 W/mK. This means that according to heat transfer is considered, the pipe and fittings offers a higher degree of self insulation compared to metallic pipe and fittings, (tables - 5) PPr cold water pipe lines eliminated almost completely the creation of condensation on the external surface of pipe lines.

Comparison of thermal conductivity

For cold water carrying system the insulation depends on the temperature of flow of water, room temperature, type of installation relative humidity and the condensation point. The thickness of insulation is based on the degree of condensation, thermal conductivity of insulating material and the threshold Δt above which the PPr pipe begins to form condensation.

Table -5

PP	0.24 W / mK
PE	0.35 W / mK
Steel	50 W / mK
Copper	400 W / mK

In hot water carrying system the thickness of insulation depends on the temperature of flow of water, type of installation, thermal leakage, OD of pipe and thermal conductivity of insulating material.

The table shows the minimum thickness of insulation required for KTP Class 2/8 Bars Standard pipe.

INSTALLATION PRINCIPLES

Required insulation thickness for hot water pipe lines as shown in Table-6

TABLE – 6

NORMAL WIDTH (t) OF PIPE LINES IN mm	UNCOVERED PIPE LINE	PIPE AND FITTINGS IN WALL OR CEILING PASSAGES, IN CROSS SECTIONS OF PIPE LINES AT PIPE CONNECTION. FOR CENTRAL PIPE NET DISTRIBUTORS & RADIATOR CONNECTING PIPES WITH MAXIMUM 8 M LENGTH
Up to t=20	20 mm	10 mm
from T=22 to 35	30 mm	15 mm
from t=40 to 100	equal to t	0.5 t
t is above 100	100 mm	50 mm

Minimum thickness of insulation for cold water lines shown in table –7

TABLE – 7

TYPE OF INSULATION	INSULATION THICKNESS
Open installation in non heated rooms	4 mm
Open installation in the heated rooms	9mm
Installation in ducts without neighboring hot water pipes	4mm
Installation in ducts with neighboring hot water pipes	13mm
Concealed installation, pipe chase risers	4mm
Installation in the walls nearing the hot water pipes	13mm
Installation on the concrete flooring	4mm

Condensation factor

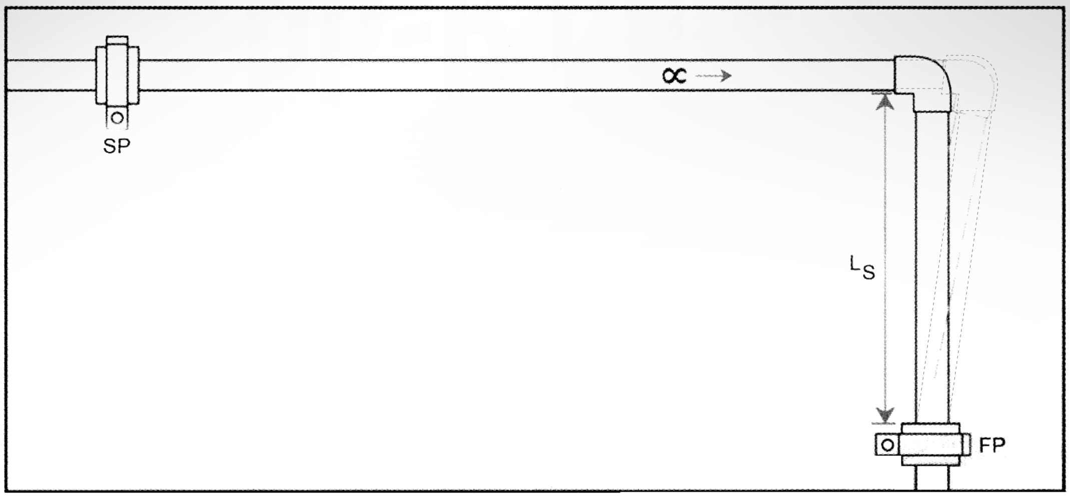
Following table- 8 shows the sensitivity threshold At above which KTP thermopipes begins to form condensation.

TABLE – 8

PIPE OUTSIDE DIAMETER Ø	Δt
20x3.4mm	7.2°C
25x4.2mm	7.4°C
32x5.4mm	8.0°C
40x6.7mm	8.5°C
50x8.3mm	10.0°C
63x10.5mm	10.5°C
75x12.52mm	10.8°C
90x15.0mm	11.0°C
110x18.3mm	11.5°C
125x20.8mm	12.0°C

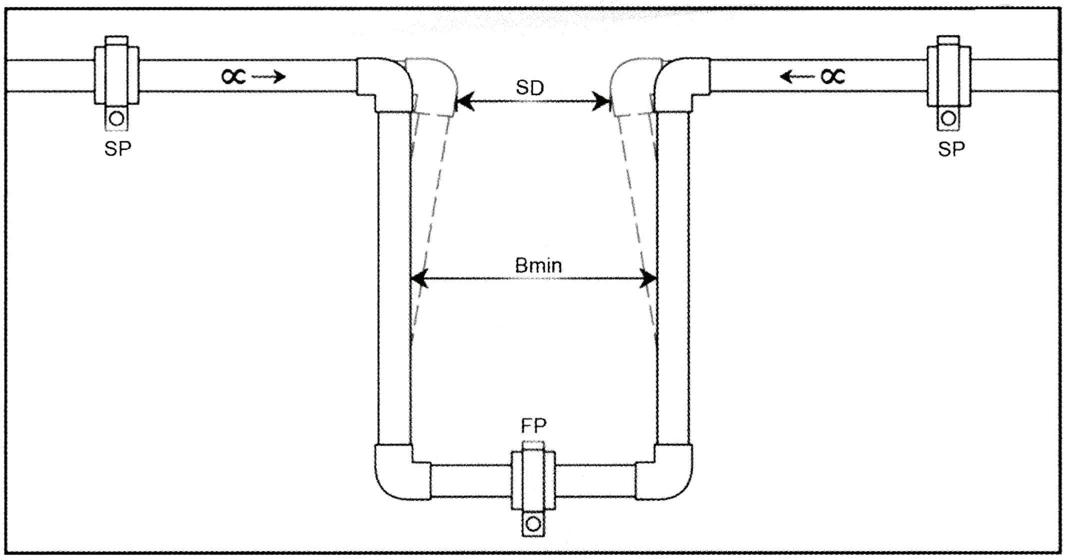
INSTALLATION BASED ON COMPENSATION

a . Bending Side

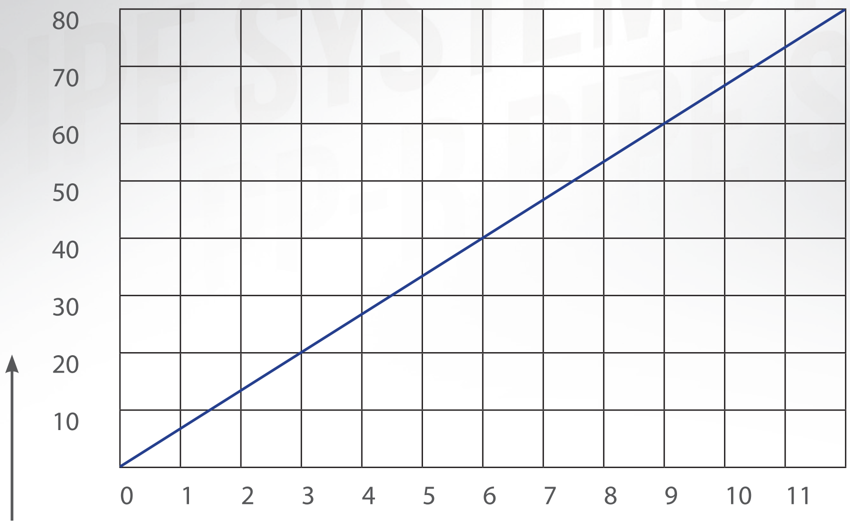


SP = Sliding Point
FP = Fixing Point

b. Expansion Loop



SP = Sliding Point
FP = Fixed Point



Difference
in temperature Δt

Δ mm/m
Fig- 4 (a)

Linear expansion, $\Delta L = \alpha \times L \times \Delta t$
Consider, pipe length of 4m ie. L = 4m
For KTP Class 2/8 Bars Standard pipe, α = 0.15 mm/mK
Δt = Difference between working temperature and installation.
Let, Working temperature = 70^{0}C
Installation temperature = 20^{0}C
then, ΔL = 30mm [as shown in fig-4 (a)]

Length of bending side, $L_S = k\sqrt{d \times \Delta L}$
ΔL - linear expansion
d- Outside diameter.
K=15 for KTP Class 2/8 Bars Standard pipe
(material specific constant)
ie, $Ls = 15\sqrt{25 \times 30}$
=410mm

The minimum pipe bend, Bmin = 2x ΔL + Safe distance.
ie, Bmin = (2x30+150) m
= 210 mm

INSTALLATION PRINCIPLES

Clamping devices:

Pipe clamping of PPr Pipes depends on the fastening material which should not damage the surface of pipe.

The ideal fastening material for KTP PPr pipes are rubber lined pipe clamp. The fixed points are selected in such a way that the forces of expansion should be neutralized by the clamping force. Furthermore the additional loads are absorbed by the clamping.

The selection of clamping depends on fixed point or sliding point as shown in fig-4

Fixed Point:

Fixed point clamps absorb the additional loads and act as supports for the pipe line. While selecting fixed points the linear expansion of pipe should be considered.

Sliding points:

Sliding point clamps allow axial movement of pipe without any damage. Sliding point clamps act as supports and does not allow deformation of pipe line. On installing a sliding support it has to be observed that the movements of the pipe lines are not hindered by filling installed next to them.

Calculation of linear expansion:

For finding the distance between clamps the following are to be calculated.

- linear expansion
- Length of bending side
- Breadth of expansion loop

Length of bending slide:

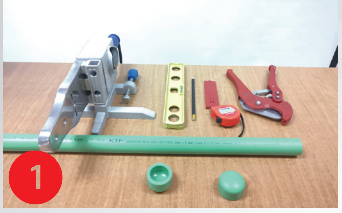
is the change in direction compensate linear expansion in pipe. Its value depends on the pipe outer diameter.

Breadth of Expansion loop:

Expansion loop is provided if the linear expansion can not be compensated by change in direction.

Consider Bmin is the minimum width of the expansion loop.

WELDING AND ASSEMBLING



Joining of KTP Pipes and fittings.

Reliability of KTP Pipe system depends on the joining of the pipe fitting as well as the material used and process quality. KTP Pipes and fittings can be joined either by socket welding. The efficiency of the joints is more, because (1) In PPr pipes and fittings no solvent is used, (2) The surface of pipe and fittings melted together and results a 100% molecular bond which can withstand the required operating conditions of pressure and temperature.

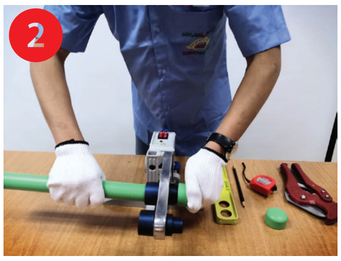
To make sure a better quality installation KTP recommends the following techniques for fusion welding .

1. Pipes are measured and cut to the required length. The cutting edge should be perpendicular to the axis of the pipe, The outer corner of the pipe is rounded off by a file and the inner corner is rounded off by using a knife. The surface of pipe and fitting to be joined should be cleaned and make sure that no inhomoginities are present. The socket depth of the welding distance should be marked to the end of the pipe. The welding depth measuring tool can also be used to mark the end of the pipe.

2. Welding machine is need to be plug to power source. Set the thermostat to a temperature of 260^{0}C.The red light is on during warming up, and when the light is off the welding machine is ready for welding. The pipe end and the socket of fitting are pushed to welding bushing in axial direction. Pipe and fitting should be heated at the same time. At the end of heating period, till the marked portion of pipe and the end of socket of fitting get melted, the pipe and fitting are removed from the bushing.

3. The pipe and fitting which are removed from the welding bushing and are quickly joined together in axial direction. During Joining, the pipe should not be turned around its axis in the socket of fitting. It is permitted to turn the pipe only a small degree (10º - 15º)in order to make co-axial direction.

4. After joining, the joined part should be kept for the required cooling time.



WELDING AND ASSEMBLING

Notes:

1. For each welding process, always make sure that the welding machine has required temperature(260°C)
2. Do not push the pipe on the welding bushing more faster than fitting. (Since for pipes, the melted material is coming out from the bushing and it is easier to push the pipe faster than fitting).
3. Any tests on the assembled parts should be done only after one hour of the last welding
4. Always make sure that welding bushing being used are KTP 's recommended types (Type-A).
5. After the whole welding process is finished, the welding machine is allowed to cool naturally.

The following table shows the recommended welding processing time for KTP Products

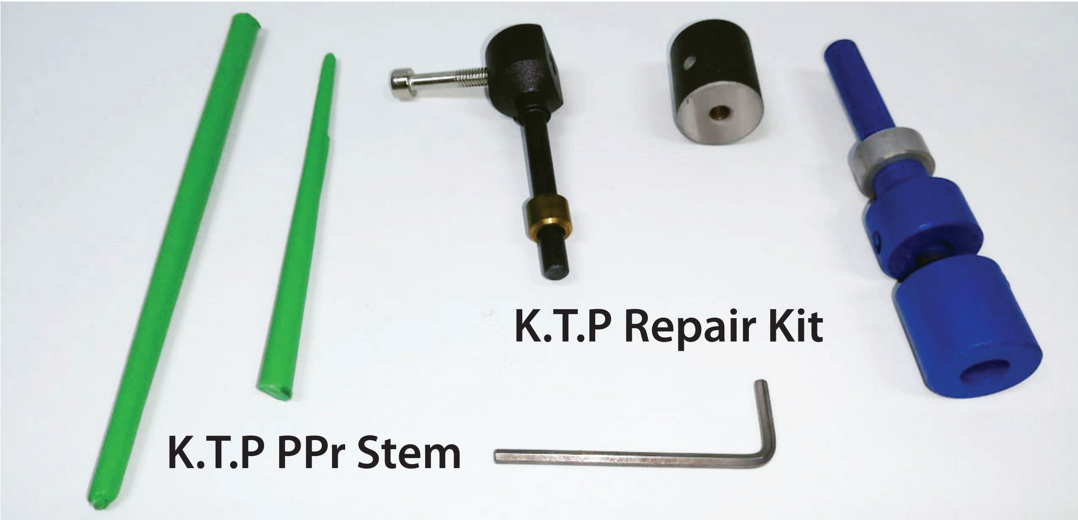
PIPE SIZE (mm)	HEATING TIME (sec).	JOINING TIME (sec).	COOLING TIME FOR JOINED PARTS (min).
Ø16mm	7	4	2
Ø 20mm	7	4	2
Ø 25mm	7	4	2
Ø 32mm	8	6	4
Ø 40mm	12	6	4
Ø 50mm	18	6	4
Ø 63mm	24	8	6
Ø 75mm	30	8	6
Ø90mm	40	8	6
Ø110mm	50	10	8
Ø125mm	60	10	8

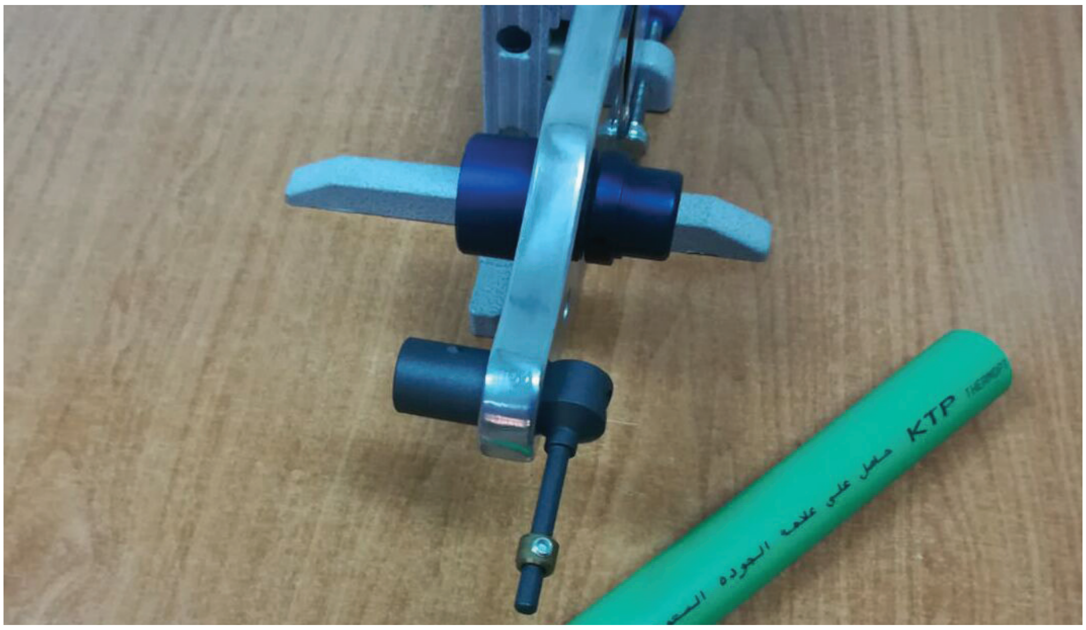
REPAIRING

Repairing a hole or damaged portion

During the installation of pipe wherein a damage has happened and the pipe is already fixed to wall, repair of the defective portion is possible by using KTP PPr stems. By doing this repair work, the properties or characteristics of the system will not be changed.

1. Make the required hole by drilling, which should be adequate for the stem dimension. The burr should be removed.
2. The drilled hole and stem is heated as same as that of usual welding procedure. Brass nose should be used for positioning the weld bushing
3. When the required heating time is finished, the stem is assembled to the melted hole and the exact length can be cut by using cutter.





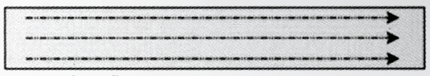
FLOW THROUGH PIPES

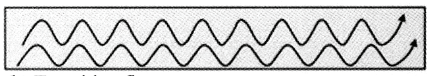
Flow Characteristics

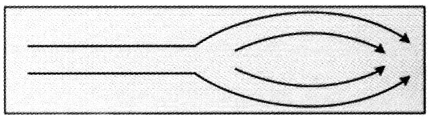
Flow through pipe is mainly due to laminar flow or by turbulent flow. In laminar flow fluid particles move along straight parallel path in layers such that the path of individual particles do not cross those of neighboring particles. Laminar flow is possible only at low velocity and the fluid is highly viscous. But when the velocity is increase or fluid is less viscous, the fluid particles do not move in straight paths which results a turbulent flow.

A laminar flow changes to turbulent flow when (1) velocity is increased or (2) Pipe diameter is increased or (3) the viscosity of fluid is increased, the transition from laminar to turbulent flow is also depends on the quantity (Vd/v).

[V-flow velocity, d-pipe I.D and v- be the kinematic viscosity of fluid]. The above dimension less quantity is the Reynolds number which decides whether the flow is laminar or turbulent. If the Reynolds No. is less than 2000. the flow is said to be laminar and if the Reynolds No. is more than 4000 the flow is turbulent. If Reynolds No. lies between 2000 to 4000 the flow will change from laminar to turbulent.


(a) Laminar flow


(b) Transition flow


(c) Turbulent flow

Loss Of Energy In Pipes

When a fluid is flowing through a pipe, the fluid particles experience some resistance, due to which some of the energy of fluid is lost. This loss of energy is classified as:

Energy Losses

1. Major Energy Losses

This is due to friction on pipe wall

2. Minor Energy Losses

(a) Due to sudden expansion
(b) Sudden contraction of pipe
(a) Bend in pipe
(a) Pipe fitting
(a) An obstruction in pipe

FLOW THROUGH PIPES

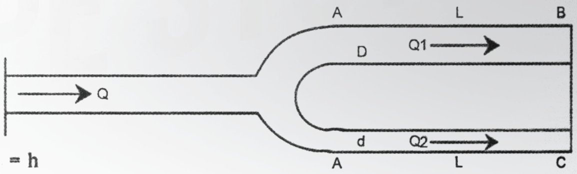
Head loss when pipes connected in parallel and series.

If h and H- be the corresponding head loss when pipes are connected in parallel and series accordingly.

When pipes are connected in parallel loss of head h is same and flow rate, $Q = Q_1 + Q_2$

Loss of head in each pipe = frictional head loss = h

Pipes connected in parallel



Pipes connected in parallel

For pipe AB, $h = \dfrac{4\,f\,L_1\,V_1^2}{2g\,D}$

For pipe AC, $h = \dfrac{4\,f\,L_2\,V_2^2}{2g\,d}$

Assume for parallel pipes. $L_1 = L_2 = L$

But by continuity equation for fluid flow through pipes, $Q_1 = A_1 V_1$ and $Q_2 = A_2 V_2$

[A_1 &A_2 Cross sectional area of pipe AB and AC

V_1 and V_2 be corresponding velocities]

Then for pipe AB, $h = \dfrac{32\,f\,LQ_1^2}{\pi^2 D^5 g}$

for pipe AC, $h = \dfrac{32\,f\,LQ_2^2}{\pi^2 d^5 g}$

$\therefore \dfrac{Q_1^2}{D^5} = \dfrac{Q_2^2}{d^5}$ ie, $\dfrac{Q_1}{Q_2} = \sqrt{D^5 / d^5}$

If D=2d,then $\dfrac{Q_1}{Q_2} = 5.657$

But $Q = Q_1 + Q_2$

$\therefore Q_1 = 0.85\,Q$ and $Q_2 = 0.15Q$

When pipes are connected in series

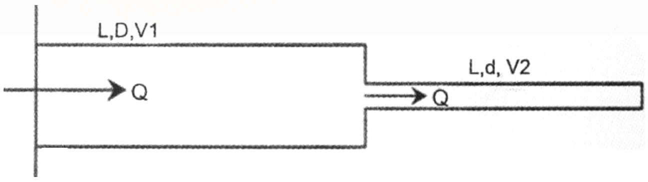
$Q = Q_1 = Q_2$ and Assume $L_1 = L_2$

Total head loss due to friction

$H = \dfrac{4\,f\,L_1\,V_1^2}{2g\,D} + \dfrac{4\,f\,L_2\,V_2^2}{2g\,d}$

$= \dfrac{32\,fLQ^2}{\pi^2 D^5 g} + \dfrac{32\,fLQ^2}{\pi^2 d^5 g}$

But $h / Q_1^2 = \dfrac{32\,f\,L}{\pi^2 D^5 g}$ & $h / Q_2^2 = \dfrac{32\,f\,L}{\pi^2 d^5 g}$



ie, $H = \dfrac{h \times Q^2}{Q_1^2} + \dfrac{h \times Q^2}{Q_2^2}$

H/h = 45.8 [where $Q_1 = 0.85Q$ & $Q_2 = 0.15Q$]

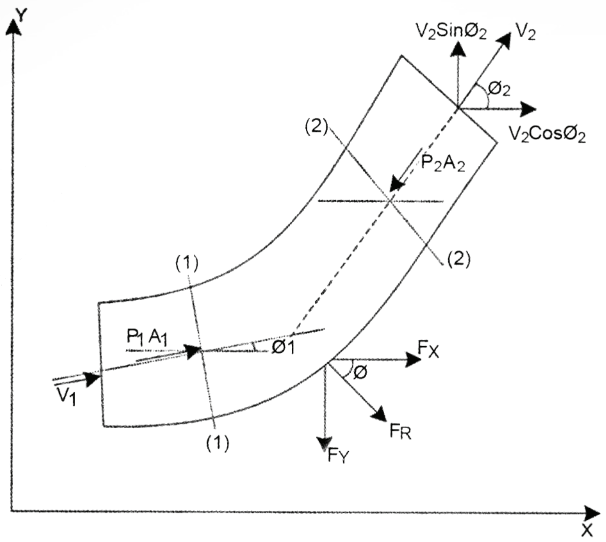
FLOW THROUGH PIPES

Force exerted by a flowing fluid on a pipe bend.

When fluid flows through pipe, it exerted some force towards pipe bend.

Let Fx and Fy be the component of the forces exerted by the flowing fluid in X and Y directions respectively.

Let V_1, P_1 & A_1 be the velocity, pressure intensity, and area of cross section of pipe at section (1)



V_2, P_2 & A_2 be the corresponding values at section (2).

The net dynamic force acting by the fluid in X- direction,

$P_2 A_2 \sin Ø_2$

$$F_{DX} = \frac{WQ}{g}\left[V_1 \cos Ø_1 - V_2 \cos Ø_2\right]$$

The net dynamic force acting by the fluid in Y- direction,

$$F_{DY} = \frac{WQ}{g}\left[V_1 \sin Ø_1 - V_2 \sin Ø_2\right]$$

The net Static force acting by the fluid in X-direction and Y- direction are,

$F_{SX} = P_1 A_1 \cos Ø_1 - P_2 A_2 \cos Ø_2$ and

$F_{SY} = P_1 A_1 \sin Ø_1 - P_2 A_2 \sin Ø_2$

Total force acts on the bend in X- direction,

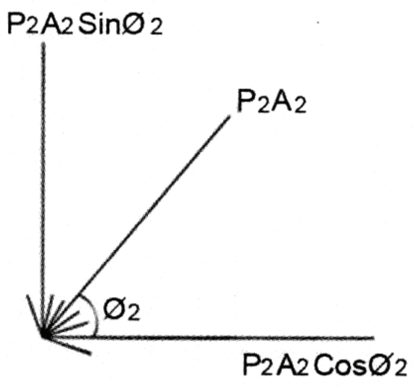
$Fx = F_{DX} + F_{SX}$

Total force acts on the bend in

Y-direction $Fy = F_{DY} + F_{SY}$

The resultant Forces acts by the fluid on pipe-bend, $F_R = \sqrt{Fx^2 + Fy^2}$

The angle made by the resultant force with the horizontal direction, $Ø = \tan^{-1} \frac{Fy}{Fx}$



CHEMICAL RESISTANCE OF KTP THERMOPIPE

The behaviour of the pipes and pipe fittings toward flow substances depends on the particular nature and type of plastics, the design of fittings, the manufacturing conditions and on the other hand the nature of flow substance. The duration of the action, temperature and mechanical stresses acting at the same time and other type of influences which additionally have an effect determine the behavior.

The chemical resistance indicates the gradual change in behavior of the material of the pipe wall towards the action of the flow substances. Various actions may occur when the flow substances come into contact with the material of the pipe wall such as absorption of the liquid (swelling),extraction of soluble constituents of the material (shrinkage) and reactions(hydrolysis or oxidation) which in certain circumstances may cause changes in properties of the pipe and pipe fitting material.

The behavior of pipe and pipe fitting material towards the flow substances may be classified as.

1. Resistant (R)- Material generally evaluated as suitable.
2. Conditionally resistant (C) - The suitability of the material for the particular application can be investigated.
3. Not resistant (NR)- The material is generally evaluated as unsuitable
4. No data on the chemical resistance are available

FLOW SUBSTANCE	CONTENT %	BEHAVIOR AT DIFFERENT TEMPERATURE		
		20 °C	60 °C	100 °C
Waste gases/gas mixture				
– containing hydrogen fluoride	Traces	R	R	-
– Containing CO2	any	R	R	-
– Containing CO	any	R	R	-
– Contain hydrochloric acid	any	R	R	-
Caustic soda	up to 60%	R	R	R
Formic acid, aqueous	10%	R	R	c
Formic acid, aqueous	85%	R	c	NR
Ammonia				
– Liquid	TR	TR	-	-
– Gaseous	TR	R	R	-
Ammonia solution	GL	R	R	-
Ammonia chloride	GL	R	R	-
Ammonium nitrate	GL	R	R	R
Benzene	TR	C	NR	NR
Beer	H	R	R	R
Bleaching liquor (sodium hypochlorite)	20%	c	c	NR

CHEMICAL RESISTANCE OF KTP THERMOPIPE

FLOW SUBSTANCE	CONTENT %	BEHAVIOR AT DIFFERENT TEMPERATURE		
		20 °C	60 °C	100 °C
Borax	L	R	R	-
Borax acid	GL	R	R	R
All type of spirits	H	R	R	-
Calcium Carbonate	GL	R	R	R
Calcium chloride	GL	R	R	R
Drinking water (chlorinated)	TR	R	R	R
Magnesium chloride.	GL	R	R	R
Magnesium hydroxide carbonate	GL	R	R	R
Magnesium salts	GL	R	R	-
Magnesium sulphate	GL	R	R	R
Sea water	H	R	R	R
Milk	H	R	R	R
Mineral water	H	R	R	R
Naphtha	H	R	NR	NR
Sodium acetate	GL	R	R	R
Sodium carbonate, aqueous	50%	R	R	C
Sodium Chloride	VL	R	R	R
Sodium dichromate	GL	R	R	R
Sodium bicarbonate	GL	R	R	R
Sodium bisulphate	GL	R	R	-
Sodium bisulphite	L	R	-	-
Sodium nitrate	GL	R	R	-
Sodium hydroxide solution	Up to 60%	R	R	R
Mercury	TR	R	R	-
Hydrochloric acid, aqueous	Up to 20%	R	R	-
Sulphuric acid, aqueous	10%	R	R	R
Silicone oil	TR	R	R	R
Detergents	VL	R	R	R
Water (pure)	H	R	R	R
Citric acid	VL	R	R	R
Wine vinegar, table vinegar	H	R	R	R
Sugar syrup	H	R	R	-

Note:

VL- aqueous solution, weight content is less than 10%

L- aqueous solution, weight content is greater than 10%

GL- Saturated aqueous solution (at 20 ºC)

TR- Flow substance is at least technically pure

H- Commercially available composition

PRESSURE LOSSES

PRESSURE DIFFERENCE BETWEEN TWO POINTS.

1. Pressure difference when the fluid flow is downwards.

If water flow at a rate of 1 lit/sec through a 25 mm OD pipe and at a point P if the pipe enlarges to 40 mm. OD, then there will be a loss in energy due to sudden enlargement. By neglecting the fictional loss between the point Q and R and if the gauge pressure at point Q is 2 bar, then:

Flow Velocity at V_Q = 4.62 m / sec. and V_R = 1.8 m / sec

From energy equation of fluid flow.

$$\frac{P_Q}{w} + \frac{V_Q^2}{2g} + Z_Q = \frac{P_R}{w} + \frac{V_R^2}{2g} + Z_R + \frac{(V_Q - V_R)^2}{2g}$$

If Z_Q = 2m, then difference in datum $Z_Q - Z_R$ = 2m

$\frac{(V_Q - V_R)^2}{2g}$ is the energy loss due to sudden expansion

P_R is found as 2.25 bar.

2. Pressure difference what the fluid flow- is upwards

When the fluid flow is upwards, energy loss is due to sudden contraction of pipe diameters.

If the gauge pressure at Q is assume to be 2 bar

$$\frac{P_R}{w} + \frac{V_R^2}{2g} + Z_R = \frac{P_Q}{w} + \frac{V_Q^2}{2g} + Z_Q + \frac{V_Q^2}{2g}[(1/Cc)-1]^2$$

P_R is found as 2.33 bar.

Recommended maximum speed for KTP Class 2/8 Bars Standard pipe.

For trot water (at temperature 70^0C- 80^0C)- 3m/sec

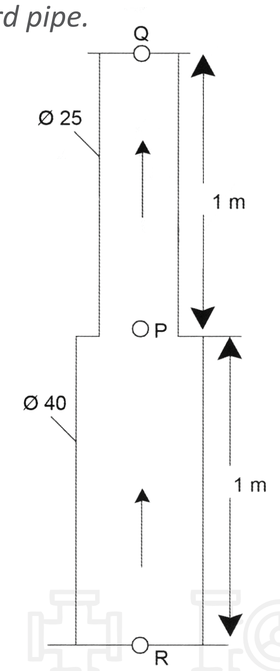
For cold water – 5m/sec.

Energy loss due to sudden contraction

$$= \frac{V_Q^2}{2g}[(1/Cc)-1]^2$$

Cc- Coefficient of contraction

(value of Cc is between 0.60 and 0.65)



PRODUCT RANGE

KTP COMPOSITE PIPES

K.T.P. PPr - Al - PPr Black Pipe

- Reduce thermal expansion and expansion coefficient.
- Protects PPr Piping from UV Radiation
- Linear expansion coefficient only 25% compared with normal PPr
- Greater Impact and rupture resistance.
- Higher rigidity.
- Inner layer of composite satisfies with SASO ISO 15874, DIN8077, DIN8078 and ISO-21003 standards.
- Fittings used for installation are similar to single layer PPr pipes.
- KTP Class 2/8 Bars Standard pipe Schedule shall be maintained during manufacturing.
- PPr and aluminium outer layers can be easily peeled off either manual or mechanical means by using Aluminium peeling tools.

K.T.P. PPr - FG - PPr Pipe

- Composite of PPr-Fiber Glass- PPr increases stiffness of pipe.
- Lower linear expansion.
- High impact and rupture resistance at varying temperature.
- Improve combined properties of PPr and Fiber glass by strengthen the composite and resist higher internal pressure.
- Manufactured as per standard specification of DIN8077, DIN8078.
- Outside diameter and combined wall thickness as similar to the normal pipe schedule.
- Welding and joining with fittings as similar to normal PPr pipe.

K.T.P. PPr - PE PIPE

- Increase life period of pipe when installed and outdoor exposure.
- Protect PPr Piping from UV radiation.
- Inner layer of composite satisfies with DIN8077, DIN8078 standards and the composite satisfies according to SASO ISO 15874 standards.
- Fittings used for installation are similar to single layer PPr pipes.
- KTP Class 2/8 Bars Standard pipe Schedule shall be maintained during manufacturing.
- PE outer layer can be easily peel off at the melting area while welding and Joining with fittings.

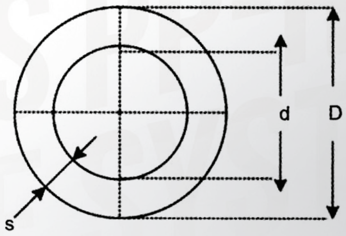
K.T.P. PPr - FG - PPr - PE PIPE

- Composite of PPr-Fiberglass-PPr increases the stiffness of pipes and PE protects the pipe from UV radiation.
- Lower Linear expansion.
- High impact and rupture resistance at varying temperatures.
- Improve combined properties of PPr and Fiberglass by strengthening the composite and resist higher internal pressure.
- Manufactured as per standard specification of SASO-ISO-15874,DIN 8077 and ISO 21003.
- Outside diameter and combined wall thickness are similar to the normal pipe schedule.
- PE outer layer can be easily peel-off at the melting area prior to the melting and welding with fittings.

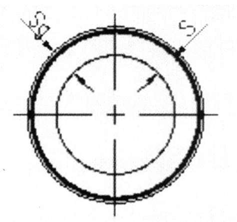
PRODUCT RANGE

K.T.P. PPr - PIPES

Nominal pressure	- Class 2/8 bar
Std : dimension ratio	- 6
Std : Reference	- SASO-ISO 15874
KTP standard colour	- Green

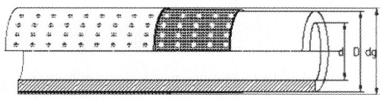


PIPE SIZE	OUTSIDE DIAMETER (D) mm	WALL THICKNESS (S) mm	INTERNAL DIAMETER (d) mm	WEIGHT Kg/m
20 mm	20.0	3.40-4.00	13.20	0.172
25 mm	25.0	4.20-4.90	16.60	0.266
32 mm	32.0	5.40-6.20	21.20	0.434
40 mm	40.0	6.70-7.60	26.60	0.671
50 mm	50.0	8.30-9.40	33.40	1.040
S3 mm	63.0	10.50-11.80	42.00	1.650
75 mm	75.0	12.50-14.00	50.00	2.340
90 mm	90.0	15.00-16.70	60.00	3.360
110 mm	110.0	18.30-20.40	73.40	5.010
125 mm	125.0	20.80-23.10	83.40	6.470
160 mm	160.0	26.60-29.40	106.70	10.60



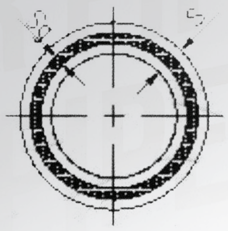
K.T.P. PPr - Al - PPr Black Pipe

ISO 15874



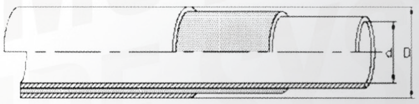
PIPE SIZE	NOMINAL DIAMETER (D)in mm	OUTER DIAMETER (dg) in mm	INTERNAL DIAMETER (d) in mm	NOMINAL THICKNESS (S) in mm	TOTAL THICKNESS (Sg) in mm
Ø 20	20.00	21.80	13.20	3.40-4.00	4.30-4.90
Ø 25	25.00	27.00	16.60	4.20-4.90	5.20-5.90
Ø 32	32.00	34.00	21.20	5.40-6.20	6.40-7.20
Ø 40	40.00	42.20	26.60	6.70-7.60	7.80-8.70
Ø 50	50.00	52.20	33.40	8.30-9.40	9.40-10.50
Ø 63	63.00	65.40	42.00	10.50-11.80	11.70-13.00

PRODUCT RANGE

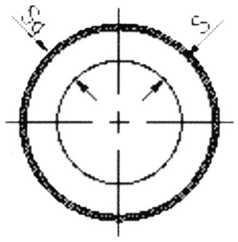


K.T.P. PPr - FG - PPr Pipe

DIN 8077/8078 DIN 53769

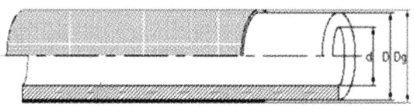


PIPE SIZE	NOMINAL DIAMETER (D)in mm	INTERNAL DIAMETER (d) in mm	NOMINAL THICKNESS (S) in mm	FG THICKNESS (Sg) in mm
Ø 20	20.00	13.20	3.40-4.00	1.33
Ø 25	25.00	16.60	4.20-4.90	1.40
Ø 32	32.00	21.20	5.40-6.20	1.80
Ø 40	40.00	26.60	6.70-7.60	2.23
Ø 50	50.00	33.40	8.30-9.40	2.76
Ø 63	63.00	42.00	10.50-11.80	2.43

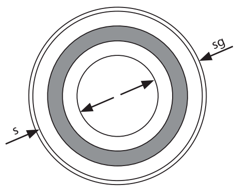


K.T.P. PPr - PE PIPE

DIN 8077/8078, ISO 15874

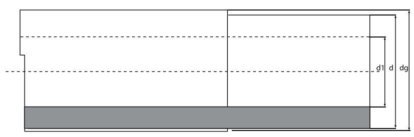


PIPE SIZE	NOMINAL DIAMETER (D)in mm	OUTER DIAMETER (Dg) in mm	INTERNAL DIAMETER (d) in mm	NOMINAL THICKNESS (S) in mm	TOTAL THICKNESS (Sg) in mm
Ø 20	20.00	21.80	13.20	3.40-4.00	4.30-4.90
Ø 25	25.00	27.00	16.60	4.20-4.90	5.20-5.90
Ø 32	32.00	34.00	21.20	5.40-6.20	6.40-7.20
Ø 40	40.00	42.20	26.60	6.70-7.60	7.80-8.70
Ø 50	50.00	52.20	33.40	8.30-9.40	9.40-10.50
Ø 63	63.00	65.40	42.00	10.50-11.80	11.70-13.00
Ø 75	75.00	77.40	50.00	12.50-14.00	13.70.15.50
Ø 90	90.00	93.00	60.00	15.00-16.80	16.50-18.30
Ø 110	110.00	113.60	73.40	18.30-20.40	20.20-22.00

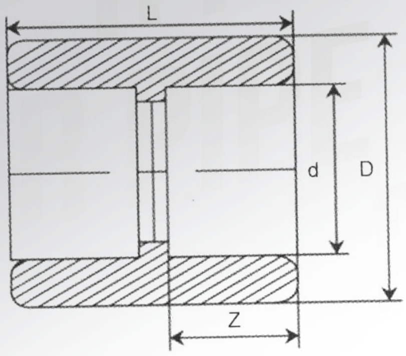


K.T.P. PPr - FG- PPr - PE PIPE

DIN 8077/8078, DIN 53769



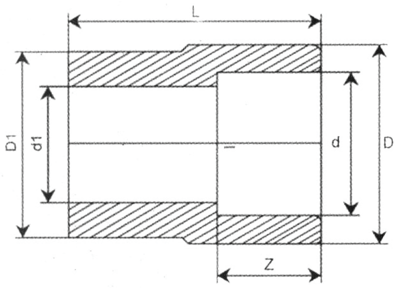
PIPE		DIAMETER	WALL THICKNESS	INTERNAL DIAMETER	TOTAL DIAMETER	TOTAL WALL THICKNESS	WEIGHT	
Dimension	Packing (Pcs./Pack)	d	s	d1	dg	sg	kg/m	kg/4m
		mm	mm	mm	mm	mm		
20mm	25	20.00	3.40	13.20	20.44	3.62	0.195	0.779
25mm	20	25.00	4.20	16.60	25.56	4.48	0.307	1.226
32mm	10	32.00	5.40	21.20	32.48	5.64	0.483	1.932
40mm	8	40.00	6.70	26.60	40.56	6.98	0.762	3.046
50mm	5	50.00	8.30	33.40	50.48	8.54	1.232	4.927
63mm	3	63.00	10.50	42.00	63.48	10.74	1.830	7.320



K.T.P COUPLING

Ref : acc. to DIN 16962, SASO-ISO 15874

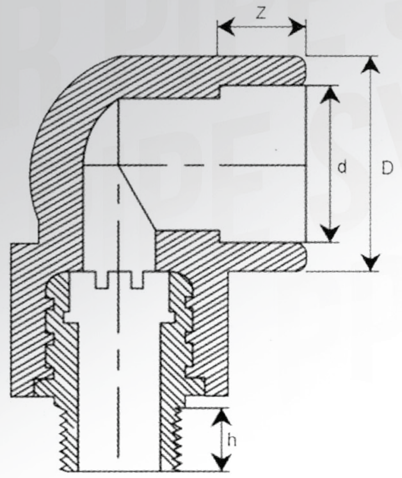
ITEM	D (In mm)	d (In mm)	L (In mm)	Z (In mm)
Ø 20	29.00	19.00	31.00	14.50
Ø 25	34.00	24.00	39.00	16.00
Ø 32	42.00	31.00	43.00	18.00
Ø 40	52.00	39.00	49.00	20.50
Ø 50	67.00	49.00	53.00	23.50
Ø 63	83.00	62.00	60.00	27.50
Ø 75	100.00	74.00	68.00	30.00
Ø 90	120.00	89.00	78.00	33.00
Ø 110	146.00	109.00	88.00	37.00
Ø 125	168.00	124.00	96.00	40.00



K.T.P REDUCER (Bush Type)

Ref : acc. to DIN, 16962, SASO-ISO 15874

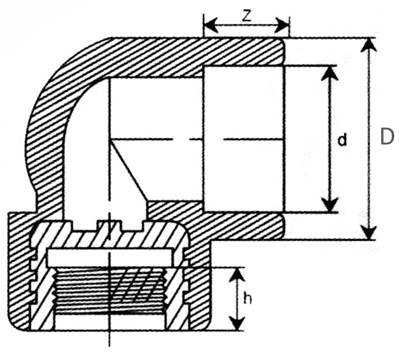
ITEM	d (In mm)	D (In mm)	d1 (In mm)	D1 (In mm)	Z (In mm)	L (In mm)
Ø 25/20	19.00	29.00	16.00	25.00	14.50	35.00
Ø 32/20	21.00	32.00	19.00	29.00	14.50	42.00
Ø 32/25	24.00	34.00	19.00	32.00	16.00	44.00
Ø 40/20	26.00	40.00	19.00	29.00	14.50	50.00
Ø 40/25	26.00	40.00	24.00	35.00	16.00	50.00
Ø 40/32	31.00	43.00	24.00	40.00	22.00	53.00
Ø 50/25	33.00	50.00	24.00	34.00	16.00	55.00
Ø 50/32	30.00	50.00	31.00	43.00	19.00	55.00
Ø 50/40	39.00	54.00	30.00	50.00	21.00	55.00
Ø 63/25	42.00	63.00	24.00	35.00	16.00	65.00
Ø 63/32	42.00	63.00	31.00	43.00	18.00	65.00
Ø 63/40	39.00	55.00	42.00	63.00	20.50	65.00
Ø 63/50	49.00	68.00	42.00	63.00	23.50	65.00
Ø 75/40	39.00	52.00	50.00	75.00	20.50	64.00
Ø 75/50	49.00	67.00	50.00	75.00	23.50	67.00
Ø 75/63	62.00	84.00	50.00	75.00	27.50	68.80
Ø 90/32	31.00	43.00	60.50	90.00	18.00	78.00
Ø 90/40	39.00	52.00	60.50	90.00	18.00	71.00
Ø 90/50	49.00	67.00	60.50	90.00	18.00	74.00
Ø 90/63	62.00	84.00	60.00	90.00	27.50	76.20
Ø 90/75	74.00	100.00	60.00	90.00	30.00	76.20
Ø 110/90	89.00	119.00	74.00	110.00	33.00	86.60
Ø 125/63	62.00	84.00	85.00	125.00	27.50	94.70
Ø 125/75	74.00	100.00	85.00	125.00	33.00	94.70
Ø 125/90	89.00	119.00	85.00	125.00	33.00	94.70
Ø 125/110	109.00	146.00	84.00	125.00	37.00	103.00



K.T.P 90° ELBOW WITH MALE INSERT

Ref: acc. to DIN 16962, SASO-ISO 15874

ITEM	d (In mm)	D (In mm)	Z (In mm)	h (In mm)
Ø 20×1/2"	19.00	29.00	14.50	13.00
Ø 25×1/2"	24.00	34.00	16.00	13.00
Ø 25×3/4"	24.00	34.00	16.00	14.00
Ø 32×3/4"	31.00	42.00	18.00	14.00
Ø 32×1"	31.00	42.00	18.00	20.00



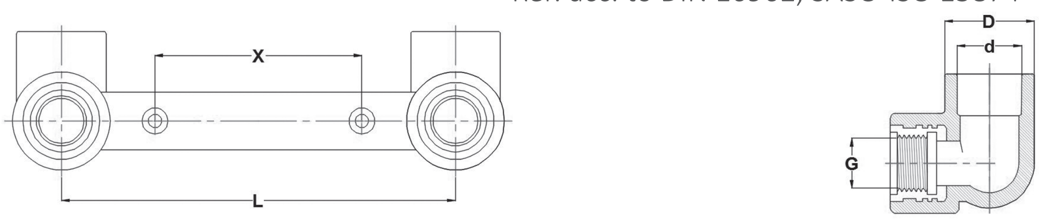
K.T.P 90° ELBOW WITH FEMALE INSERT

Ref: acc. to DIN 16962, SASO-ISO 15874

ITEM	d (In mm)	D (In mm)	Z (In mm)	h (In mm)
Ø 20x1/2"	19.00	29.00	14.50	13.00
Ø 25x1/2"	24.00	34.00	16.00	13.00
Ø 25x3/4"	24.00	34.00	16.00	14.00
Ø 32x3/4"	31.00	42.00	18.00	14.00
Ø 32x1"	31.00	42.00	18.00	20.00

K.T.P MIXER MANIFOLD FEMALE

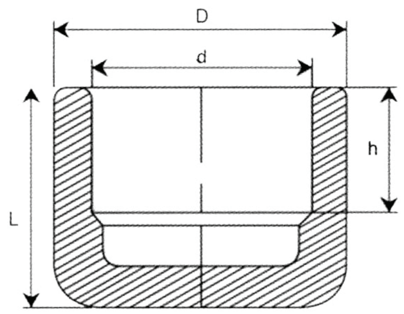
Ref: acc. to DIN 16962, SASO-ISO 15874



ITEM	L (mm)	X (mm)	G (in)	D (mm)	d (mm)
Ø 25 x 1/2"	150.00	79.00	1/2"	Ø 34.00	Ø 24.50

K.T.P END CAP

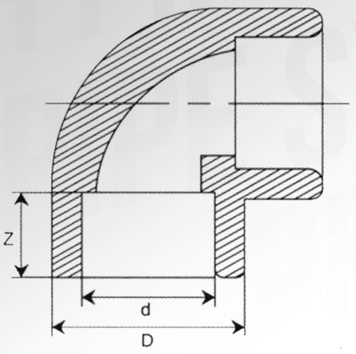
Ref: acc. to DIN 16962, SASO-ISO 15874



ITEM	d (In mm)	D (In mm)	h (In mm)	L (In mm)
Ø 20	19.00	29.00	14.50	26.00
Ø 25	24.00	34.00	16.00	26.00
Ø 32	31.00	43.00	18.00	31.50
Ø 40	39.00	53.00	20.50	34.00
Ø 50	49.00	69.00	23.50	39.00
Ø 63	62.00	86.00	27.50	46.00
Ø 75	74.00	100.00	30.00	56.30
Ø 90	89.00	120.00	33.00	67.20
Ø 110	109.00	146.00	37.00	78.00
Ø 125	124.00	168.00	40.00	85.70

K.T.P 90º ELBOW

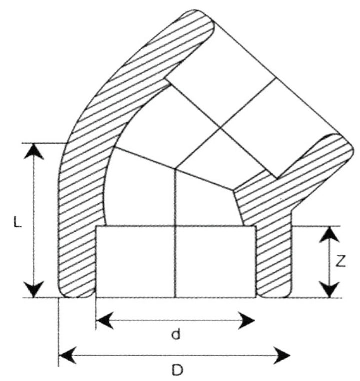
Ref: acc. to DIN 16962, SASO-ISO 15874



ITEM	d (In mm)	D (In mm)	z (In mm)
Ø 20	19.00	29.00	14.50
Ø 25	24.00	34.00	16.00
Ø 32	31.00	43.00	18.00
Ø 40	39.00	53.00	20.50
Ø 50	49.00	69.00	23.50
Ø 63	62.00	86.00	27.50
Ø 75	74.00	100.00	30.00
Ø 90	89.00	120.00	33.00
Ø 110	109.00	146.00	37.00
Ø 125	124.00	168.00	40.00

K.T.P 45º ELBOW

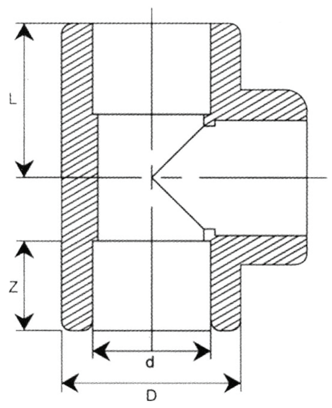
Ref: acc. to DIN 16962, SASO-ISO 15874



ITEM	d (In mm)	D (In mm)	Z (In mm)	L (In mm)
Ø 20	19.00	29.00	14.50	18.00
Ø 25	24.00	34.00	16.00	21.00
Ø 32	31.00	43.00	18.00	26.00
Ø 40	39.00	53.00	20.50	29.00
Ø 50	49.00	69.00	23.50	35.00
Ø 63	62.00	86.00	27.50	42.00
Ø 75	74.00	100.00	30.00	46.00
Ø 90	89.00	120.00	33.00	53.00
Ø 110	109.00	146.00	37.00	60.00
Ø 125	124.00	168.00	40.00	67.00

K.T.P TEE

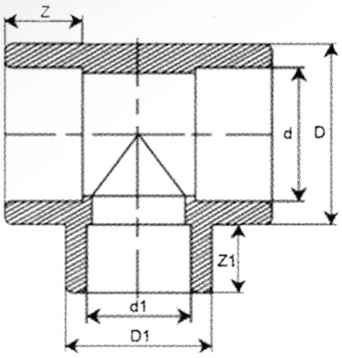
Ref: acc. to DIN 16962, SASO-ISO 15874



ITEM	d (In mm)	D (In mm)	Z (In mm)	L (In mm)
Ø 20	19.00	29.00	14.50	25.50
Ø 25	24.00	34.00	16.00	31.00
Ø 32	31.00	43.00	18.00	35.00
Ø 40	39.00	53.00	20.50	42.00
Ø 50	49.00	69.00	23.50	50.00
Ø 63	62.00	86.00	27.50	60.50
Ø 75	74.00	100.00	30.00	68.00
Ø 90	89.00	120.00	33.00	80.00
Ø 110	109.00	146.00	37.00	92.00
Ø 125	124.00	168.00	40.00	116.00

K.T.P TEE REDUCER

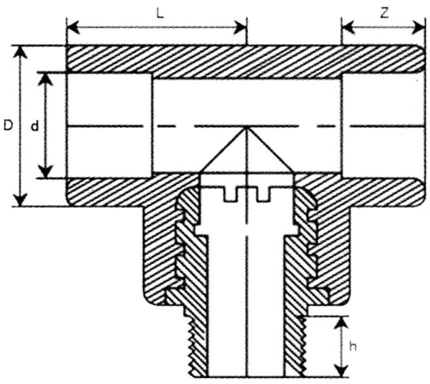
Ref: acc. to DIN 16962, SASO-ISO 15874



ITEM	d (In mm)	D (In mm)	d1 (In mm)	D1 (In mm)	Z (In mm)	Z1 (In mm)
Ø 25/20	24.00	34.00	19.00	29.00	16.00	14.50
Ø 32/20	31.00	42.00	19.00	29.00	18.00	14.50
Ø 32/25	31.00	42.00	24.00	34.00	18.00	16.00
Ø 40/25	39.00	52.00	24.00	34.00	20.50	16.00
Ø 40/32	39.00	52.00	31.00	42.00	20.50	18.00
Ø 50/25	49.00	67.00	24.00	34.00	23.50	16.00
Ø 50/32	49.00	67.00	31.00	42.00	23.50	18.00
Ø 50/40	49.00	67.00	39.00	52.00	23.50	20.50
Ø 63/25	62.00	84.00	24.00	34.00	27.50	16.00
Ø 63/32	62.00	84.00	31.00	42.00	27.50	18.00
Ø 63/40	62.00	84.00	39.00	52.00	27.50	20.50
Ø 63/50	62.00	84.00	49.00	67.00	27.50	23.50
Ø 75/32	74.00	100.00	31.00	52.00	30.00	18.00
Ø 75/40	74.00	100.00	39.00	52.00	30.00	20.50
Ø 75/63	74.00	100.00	62.00	84.00	30.00	27.50
Ø 90/32	89.00	120.00	31.00	52.00	33.00	18.00
Ø 90/40	89.00	120.00	39.00	52.00	33.00	20.50
Ø 90/50	89.00	120.00	49.00	84.00	33.00	23.50
Ø 90/63	89.00	120.00	62.00	84.00	33.00	27.50
Ø 90/75	89.00	120.00	74.00	100.00	33.00	30.00
Ø 110/63	109.00	146.00	62.00	84.00	37.00	27.50
Ø 110/75	109.00	146.00	74.00	100.00	37.00	30.00
Ø 110/90	109.00	146.00	89.00	120.00	37.00	33.00
Ø 125/63	124.00	168.00	62.00	84.00	40.00	27.50
Ø 125/75	124.00	168.00	74.00	100.00	40.00	30.00
Ø 125/90	124.00	168.00	89.00	120.00	40.00	33.00

K.T.P TEE WITH MALE INSERT

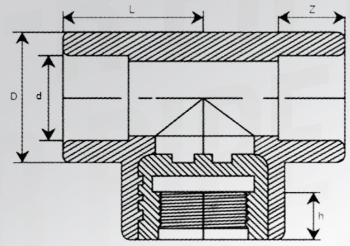
Ref: acc. to DIN 16962, SASO-ISO 15874



ITEM	d (In mm)	D (In mm)	Z (In mm)	L (In mm)	h (In mm)
Ø 20x1/2"	19.00	29.00	14.50	25.50	13.00
Ø 25x1/2"	24.00	34.00	16.00	31.00	13.00
Ø 25x3/4"	24.00	34.00	16.00	31.00	14.00
Ø 32x3/4"	31.00	42.00	18.00	35.00	14.00
Ø 32x1"	31.00	42.00	18.00	35.00	20.50

K.T.P TEE WITH FEMALE INSERT

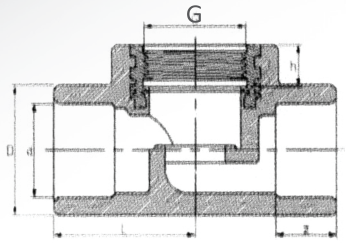
Ref: acc. to DIN 16962, SASO-ISO 15874



ITEM	d (In mm)	D (In mm)	Z (In mm)	L (In mm)	h (In mm)
Ø 20x1/2"	19.00	29.00	14.50	25.50	17.00
Ø 25x1/2"	24.00	34.00	16.00	31.00	17.00
Ø 25x3/4"	24.00	34.00	16.00	31.00	17.00
Ø 32x3/4"	31.00	42.00	18.00	35.00	17.00
Ø 32x1"	31.00	42.00	18.00	35.00	22.00

K.T.P TEE -VALVE

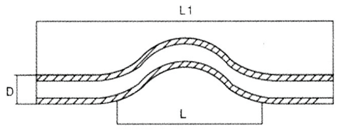
Ref: acc. to DIN 16962, SASO-ISO 15874



ITEM	d (In mm)	D (In mm)	Z (In mm)	L (In mm)	h (In mm)	G (In Inch)
Ø 20	19.00	34.00	14.50	43.50	11.00	3/4
Ø 25	24.00	34.00	16.00	37.00	11.00	3/4
Ø 32	31.00	43.00	18.00	49.00	33.00	1

K.T.P CROSS OVER

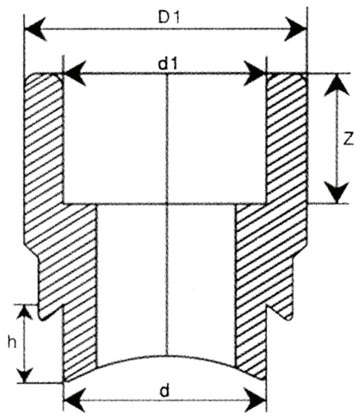
Ref: acc. to DIN 16962, SASO-ISO 15874



ITEM	D (In mm)	L1 (In mm)	L (In mm)
Ø 20	20.00	354.00	190.00
Ø 25	25.00	357.00	210.00
Ø 32	32.00	357.00	210.00

K.T.P SADDLE

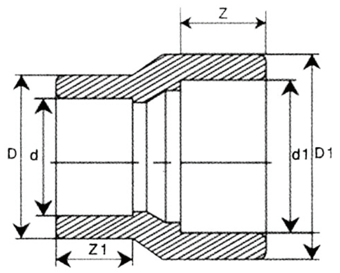
Ref: acc. to DIN 16962, SASO-ISO 15874



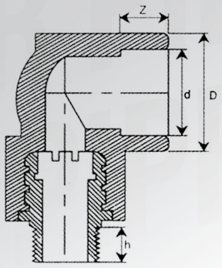
ITEM	d (In mm)	d1 (In mm)	D1 (In mm)	Z (In mm)	h (In mm)
Ø 50/25	25.00	24.00	34.00	16.00	8.30
Ø 63/25	25.00	24.00	34.00	16.00	10.50
Ø 50/32	32.00	31.00	43.00	18.00	8.30
Ø 63/32	32.00	31.00	43.00	18.00	10.50
Ø 75/32	32.00	31.00	43.00	18.00	12.50
Ø 90/32	32.00	31.00	43.00	18.00	15.00
Ø 90/40	40.00	39.00	52.00	20.50	13.00
Ø 110/32	32.00	31.00	43.00	18.00	18.30
Ø 125/32	32.00	31.00	43.00	18.00	20.80

K.T.P REDUCER (Coupler type)

Ref: acc. to DIN 16962, SASO-ISO 15874



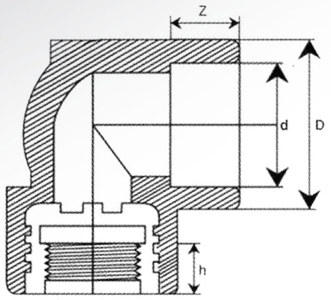
ITEM	d (In mm)	D (In mm)	d1 (In mm)	D1 (In mm)	Z (In mm)	Z1 (In mm)
Ø 25/20	19.00	29.00	24.00	34.00	16.00	14.50
Ø 32/25	24.00	34.00	31.00	42.00	18.00	16.00



K.T.P 90° ELBOW WITH MALE INSERT AND DOUBLE FIXING BRACKET

Ref: acc. to DIN 16962 SASO-ISO 15874

ITEM	d (In mm)	D (In mm)	Z (In mm)	h (In mm)
Ø 20x1/2"	19.00	29.00	14.50	13.00
Ø 25x1/2"	24.00	34.00	16.00	14.00



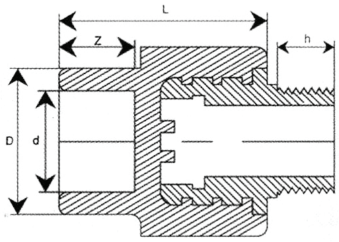
K.T.P 90° ELBOW WITH FEMALE INSERT AND DOUBLE FIXING BRACKET

Ref: acc. to DIN 16962 SASO-ISO 15874

ITEM	d (In mm)	D (In mm)	Z (In mm)	h (In mm)
Ø 20x1/2"	19.00	29.00	14.50	13.00
Ø 25x1/2"	24.00	34.00	16.00	14.00

K.T.P. ADAPTER WITH MALE INSERT

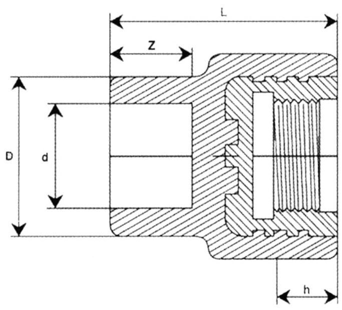
Ref: acc. to DIN 16962, SASO-ISO 15874



ITEM	d (In mm)	D (In mm)	Z (In mm)	L (In mm)	h (In mm)
Ø 20x1/2"	19.00	29.00	14.50	41.00	13.00
Ø 20x3/4"	19.00	29.00	14.50	41.00	14.00
Ø 25x1/2"	24.00	34.00	16.00	42.00	13.00
Ø 25x3/4"	24.00	34.00	16.00	41.00	14.00
Ø 32x3/4"	31.00	42.00	18.00	43.00	14.00
Ø 32x1"	31.00	42.00	18.00	44.00	20.00
Ø 40x11/4"	39.00	52.00	20.50	46.00	20.00
Ø 50x11/2"	49.00	67.00	23.50	51.00	20.00
Ø 63x2"	62.00	83.00	27.50	57.00	23.00
Ø 75x21/2"	74.00	100.00	3000	58.00	28.00
Ø 90x3"	89.00	120.00	33.00	60.00	30.00
Ø 110x4"	109.00	146.00	37.00	86.00	33.00
Ø 125x41/2"	124.00	168.00	40.00	95.00	37.00

K.T.P. ADAPTER WITH FFMALE F INSERT

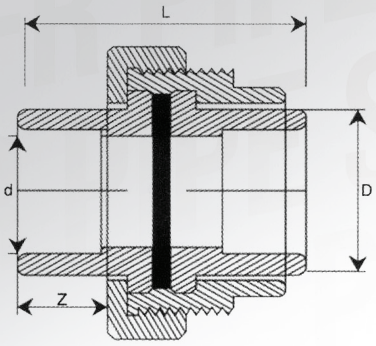
Ref: acc. to DIN 16962, SASO-ISO 15874



ITEM	d (In mm)	D (In mm)	Z (In mm)	L (In mm)	h (In mm)
Ø 20x1/2"	19.00	29.00	14.50	41.00	13.00
Ø 20x3/4"	19.00	29.00	14.50	41.00	14.00
Ø 25x1/2"	24.00	34.00	16.00	42.00	13.00
Ø 25x3/4"	24.00	34.00	16.00	41.00	14.00
Ø 32x3/4"	31.00	42.00	18.00	43.00	14.00
Ø 32x1"	31.00	42.00	18.00	44.00	20.00
Ø 40x11/4"	39.00	52.00	20.50	46.00	20.00
Ø 50x11/2"	49.00	67.00	23.50	51.00	20.00
Ø 63x2"	62.00	83.00	27.50	57.00	23.00
Ø 75x21/2"	74.00	100.00	30.00	58.00	28.00
Ø 90x3"	89.00	120.00	33.00	60.00	30.00
Ø 110x4"	109.00	146.00	37.00	86.00	33.00

K.T.P UNION JOINT SHORT NECK

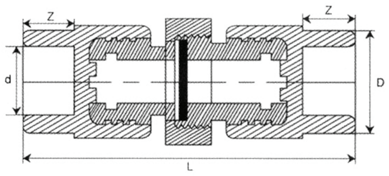
Ref: acc. to DIN 16962, ISO 15874



ITEM	d (In mm)	D (In mm)	Z (In mm)	L (In mm)
Ø 20	19.00	29.00	14.50	48.00
Ø 25	24.00	34.00	16.00	55.00
Ø 32	31.00	43.00	18.00	72.00
Ø 40	39.00	52.00	20.50	75.00
Ø 50	49.00	67.00	23.50	86.00
Ø 63	62.00	84.00	27.50	105.00

K.T.P UNION JOINT LONG NECK

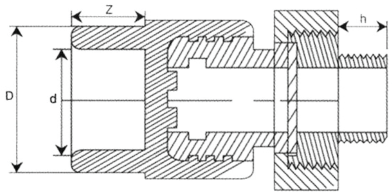
Ref: acc. to DIN 16962, ISO 15874



ITEM	d (In mm)	D (In mm)	Z (In mm)	L (In mm)
Ø 20	19.00	29.00	14.50	118.00
Ø 25	24.00	34.00	16.00	120.00
Ø 32	31.00	43.00	18.00	150.00
Ø 40	39.00	52.00	20.50	158.00
Ø 50	49.00	67.00	23.50	156.00
Ø 63	62.00	84.00	27.50	180.00

K.T.P UNION JOINT LONG NECK MALE

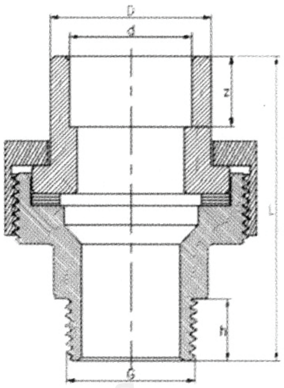
Ref: acc. to DIN 16962, ISO 15874



ITEM	d (In mm)	D (In mm)	Z (In mm)	h (In mm)
Ø 20x1/2"	19.00	29.00	14.50	13.00
Ø 25x1/2"	24.00	34.00	16.00	13.00
Ø 32x1"	31.00	43.00	18.00	20.00
Ø 40x11/4"	39.00	52.00	20.50	20.00
Ø 50x11/2"	49.00	67.00	23.50	20.00
Ø 63x2"	62.00	84.00	27.50	23.00

K.T.P. UNION ADAPTER -MALE

Ref: acc. to DIN 16962, ISO 15874

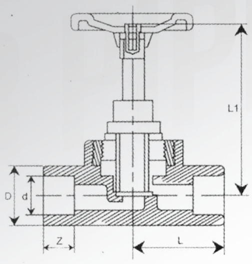


ITEM	d (In mm)	D (In mm)	z (In mm)	G (In Inch)	h (In mm)	L (In mm)
Ø 20	19.00	29.00	14.50	1/2	13.00	56.60
Ø 25	24.00	34.00	16.00	3/4	15.00	65.30
Ø 32	31.00	43.00	18.00	1	16.00	78.00
Ø 40	39.00	52.00	20.50	1 1/4	18.00	85.40
Ø 50	49.00	67.00	23.50	1 1/2	19.00	97.00
Ø 63	62.00	84.00	27.50	2	23.00	114.20

K.T.P VALVES

K.T.P GLOBE VALVE SET

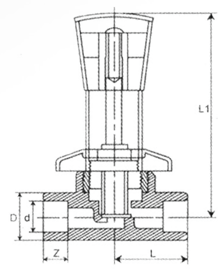
Ref: acc. to DIN 16962, ISO 15874



ITEM	d (In mm)	D (In mm)	Z (In mm)	L (In mm)	L1 (In mm)
Ø 20	19.00	34.00	14.50	44.00	67.00
Ø 25	24.05	34.00	16.00	44.00	67.00
Ø 32	31.00	43.00	18.00	49.00	77.00

K.T.P CONCEALED NORMAL VALVE SET

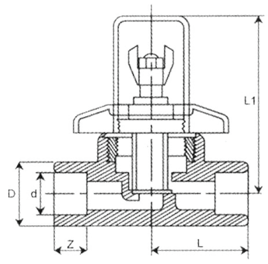
WITH CHROMED UPPER PART
Ref: acc. to DIN 16962, ISO 15874



ITEM	d (In mm)	D (In mm)	Z (In mm)	L (In mm)	L1 (In mm)
Ø 20	19.00	34.00	14.50	44.00	126.50
Ø 25	24.00	34.00	16.00	44.00	126.50
Ø 32	31.00	43.00	18.00	49.00	126.50

K.T.P CLOSED COVER VALVE SET

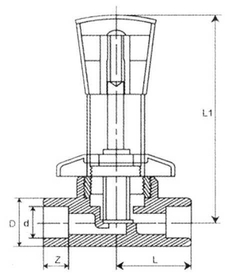
WITH CHROMED UPPER PART
Ref: acc. to DIN 16962, ISO 15874



ITEM	d (In mm)	D (In mm)	Z (In mm)	L (In mm)	L1 (In mm)
Ø 20	19.00	34.00	14.50	44.00	92.00
Ø 25	24.00	34.00	16.00	44.00	92.00
Ø 32	31.00	43.00	18.00	49.00	104.00

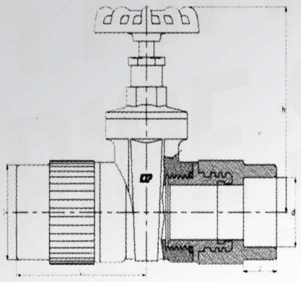
CONCEALED K.T.P. VALVE SET

WITH CHROMED UPPER PART
Ref: acc. to DIN 16962, ISO 15874



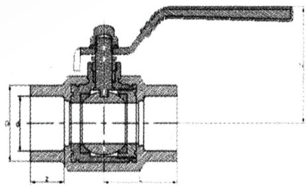
ITEM	d (In mm)	D (In mm)	Z (In mm)	L (In mm)	L1 (In mm)
Ø 20	19.00	34.00	14.50	44.00	126.50
Ø 25	24.00	34.00	16.00	44.00	126.50
Ø 32	31.00	43.00	18.00	49.00	126.50

K.T.P. GALE VALVE SET



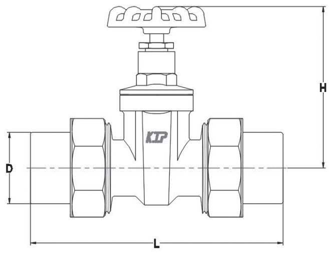
ITEM	d (In mm)	D (In mm)	z (In mm)	L (In mm)	h (In mm)
Ø 32	31.00	43.00	18.00	70.00	92.20
Ø 40	39.00	52.00	20.50	80.50	113.60
Ø 50	49.00	67.00	23.50	90.50	124.20
Ø 63	62.00	84.00	27.50	101.00	156.20
Ø 75	74.00	100.00	30.00	125.50	200.40
Ø 90	89.00	120.00	33.00	138.00	232.00
Ø 110	109.00	146.00	37.00	162.00	281.00

K.T.P. BALL VALVE SET



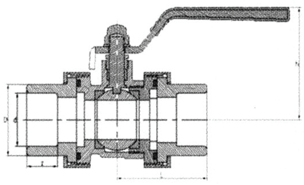
ITEM	d (In mm)	D (In mm)	z (In mm)	L (In mm)	h (In mm)
Ø 25	24.00	34.00	16.00	35.00	51.00
Ø 32	31.00	43.00	18.00	72.50	52.00

K.T.P. UNION GATE VALVE SET



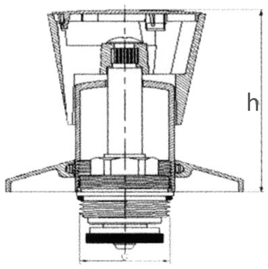
ITEM	L (MM)	H (MM)	D (MM)
Ø 32	149.00	93.00	Ø 41.00

K.T.P. UNION BALL VALVE SET



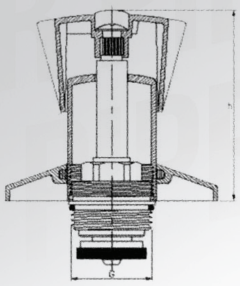
ITEM	d (In mm)	D (In mm)	z (In mm)	L (In mm)	h (In mm)
Ø 20	19.00	27.50	14.50	37.50	49.00
Ø 25	24.00	34.00	16.00	47.00	52.00
Ø 32	31.00	4300	18.00	59.50	56.00

CONCEALED K.T.P. VALVE UPPER PART



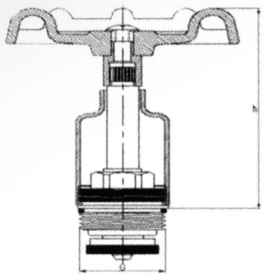
ITEM	G (In inch)	h (In mm)
Ø 20	3/4	74.00
Ø 25	3/4	74.00
Ø 32	1	74.00

PRODUCT RANGE



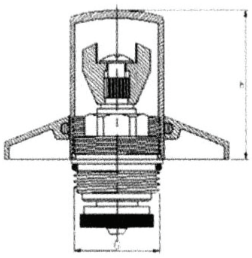
K.T.P. CONCEALED NORMAL VALVE UPPER PART

ITEM	G (In inch)	h (In mm)
Ø 20	3/4	68.00
Ø 25	3/4	68.00
Ø 32	1	68.00



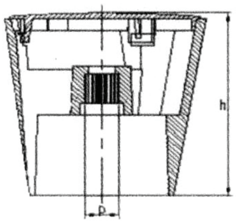
K.T.P. GLOBE VALVE UPPER PART

ITEM	G (In inch)	h (In mm)
Ø 20	3/4	85.00
Ø 25	3/4	85.00
Ø 32	1	85.00



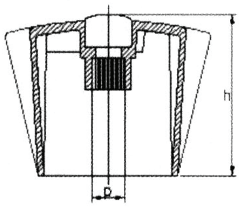
K.T.P. CONCEALED CLOSED COVER VALVE UPPER PART

ITEM	G (In inch)	h (In mm)
Ø 20	3/4	44.00
Ø 25	3/4	44.00
Ø 32	1	44.00



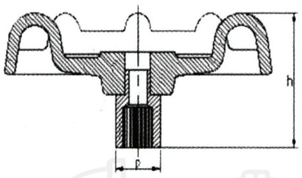
CONCEALED K.T.P. VALVE HANDLE

ITEM	p (In mm)	h (In mm)
Ø 20	Ø 7.80x18Slots	46.00
Ø 25	Ø 7.80x18Slots	46.00
Ø 32	Ø 7.80x18Slots	46.00



K.T.P. CONCEALED NORMAL VALVE HANDLE

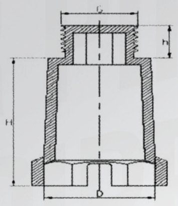
ITEM	P (In mm)	h (In mm)
Ø 20	Ø 7.80X18Slots	36.50
Ø 25	Ø 7.80X18Slots	36.50
Ø 32	Ø 7.80X18Slots	36.50



K.T.P. GLOBE VALVE HANDLE

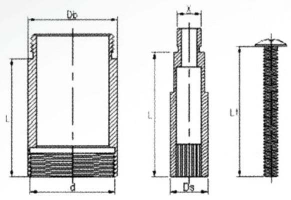
ITEM	p (In mm)	h (In mm)
Ø 20	Ø 7.80X18Slots	33.00
Ø 25	Ø 7.80X18Slots	33.00
Ø 32	Ø 7.80X18Slots	33.00

PRODUCT RANGE



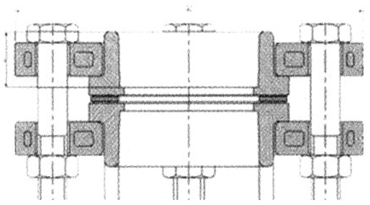
K.T.P. PLUG WITH RUBBER O-RING

ITEM	G (In inch)	D (In mm)	h (In mm)	H (In mm)
1/2"	1/2"	30.00	13.00	52.00



K.T.P. EXTENSION FOR VALVE

ITEM	d (In mm)	Db (In mm)	Ds (In mm)	L (In mm)	X (In mm)	Lt (In inch)
3cm	27x19TPI	Ø 28.60	Ø 12.00	30.00	Ø 7.80x18Slots	3/16x1.50
4cm	27x19TPI	Ø 28.60	Ø 12.00	40.00	Ø 7.80x18Slots	3/16x2.00
5cm	27x19TPI	Ø 28.60	Ø 12.00	50.00	Ø 7.80x18Slots	3/16x2.50



K.T.P. FLANGE

ITEM	d (In mm)	D (In mm)	z (In mm)	D1 (In mm)
Ø 75	74.00	90.00	30.00	185.00
Ø 90	89.00	109.00	33.00	200.00
Ø 110	109.00	131.00	37.00	220.00
Ø 125	124.00	147.00	40.00	230.00

CERTIFICATES

Saudi Arabian Oil Company
Purchasing Department
C-D-144, North Park 1
Dhahran 31311, Saudi Arabia

Tel: (966-3) 874-0323
Fax: (966-3) 874-0015

ارامكو السعودية
Saudi Aramco

July 23, 2000

IDG-330-00

Mr. Adib K. Al-Koblan
General Manager
Al-Koblan Thermo Pipe Factory
P. O. Box 157
Riyadh 11411

Fax: 01-476-2389

Dear Sir:

We are pleased to inform you that your company is now included in the Saudi Aramco Supplier Information System, under Vendor Code DK-6405-01 for the following product(s), provided your company continues to meet relevant Saudi Arabian and Saudi Aramco standards:

C C CODE	PRODUCT
010048	Pipe: Polypropylene; Any Type, Any Size
030014	Fitting: Pipe; Polypropylene; Any Type, Any Size

This approval, however, should not be construed as a commitment by Saudi Aramco to purchase from you, but your company will have the opportunity along with other approved sources to respond to requests for submitting proposals in accordance with Saudi Aramco's established policies and procedures.

We would like to thank you for your interest in Saudi Aramco, and take this opportunity to reiterate that it is Saudi Aramco's policy to encourage the use of nationally manufactured materials.

For further information or assistance, please contact Mr. Khalid I. Al-Mandeel on (03)-874-0325.

With kind regards.

Sincerely yours,
ASHOK K. MARWAH, Supervisor
Supplier Support Unit/Supplier Support Division

الهيئة السعودية للمواصفات والمقاييس والجودة
Saudi Standards, Metrology and Quality Org.

شهادة ترخيص باستعمال علامة الجودة

License For Use of The Quality Mark

License No:	١-٠٠٠٠٠٠١٠١٠١٥٦٥٤٢-١٤٣٧	رقـــم الترخيص:
SASO certifies that:		تشهد الهيئة السعودية للمواصفات والمقاييس والجودة بأنها رخصت
	شركة مصنع القبلان للأنابيب الحرارية	لـ :
Address :	الرياض – المدينة الصناعية الثانية	العنوان :
Grant the right to use SASO quality mark on a following product:		باستعمال علامة الجودة على منتجاتها التالية:

وصلات أنابيب البلاستيك لتجهيزات الماء البارد والساخن – بولي بربيلين ، صنف A(Class2 / 8bar) ، للمقاسات التالية:-
(٢٠،٢٥،٣٢،٤٠،٥٠،٦٣،٧٥،٩٠،١١٠)مم ، علامة تجارية (K.T.P) فقط.

After fulfilling the required requirements according to the normative documents :

بعد استيفائها للمتطلبات اللازمة وفق المراجع القياسية التالية:

SASO GSO ISO 15874 part 1,3/2014

Date of issue :	١٤٣٩/٠٣/١٥هـ	بداية تاريخ المنح:
Date of renewal :	٠٠٠٠/٠٠/٠٠هـ	تاريخ التجديد :
Date of expiry :	١٤٤٢/٠٣/١٤هـ	تاريخ الإنتهاء :

نائب المحافظ للمطابقة والجودة
Vice-Governor for Conformity & Quality

الإدارة العامة لمنح الشهادات
الهيئة السعودية للمواصفات والمقاييس والجودة
Saudi Standards, Metrology and Quality Org.

تم منح هذا الترخيص وفقاً لتنظيم الهيئة السعودية للمواصفات والمقاييس والجودة
الصادر بقرار مجلس الوزراء رقم ٢١٦ وتاريخ ١٤٣١/٠٦/١٧هـ

This license is granted according to the regulation of Saudi Standards, Metrology and Quality Organization that was issued based on the Council of Ministers' Resolution No. 216 dated 31-05-2010

تخضع هذه الشهادة خلال مدة سريانها للأنظمة واللوائح ذات العلاقة في المملكة العربية السعودية وأي تعليمات أو تعديلات تصدرها الهيئة.

This certificate is subject to during the period of validity of the rules and regulations relevant in the Kingdom of Saudi Arabia and any instructions or amendments issued by the commission.

www.saso.gov.sa

QMS-F-10-10
Issue#4 Date 06 / 02/1434 ص.ب ٣٤٣٧ الرياض ١١٤٧١ المملكة العربية السعودية هاتف : ١٤٥٢٠٠٠٠ ٩٦٦+ فاكس : ١٤٥٢٠٠٨٦ ٩٦٦+
Rev#3 Date 09/ 08/1437 P.O.Box 3437 Riyadh 11471 KSA Tel : +966 14520000 Fax : +966 14520086

CERTIFICATES

علامة الجودة
SASO
QUALITY MARK

SASO

الهيئة السعودية للمواصفات والمقاييس والجودة
Saudi Standards, Metrology and Quality Org.

شهادة ترخيص باستعمال علامة الجودة

License For Use of The Quality Mark

License No: ١-٠٠٠٠٠٠١٠١٠١٥٦٥٤٢٢٤٥٦٥٢-١٤٣٧ رقـــم الترخيص:

SASO certifies that: تشهد الهيئة السعودية للمواصفات والمقاييس والجودة بأنها رخصت

لـ : شركة مصنع القبلان للأنابيب الحرارية

Address : الرياض – المدينة الصناعية الثانية – المرحلة الثالثة العنوان :

Grant the right to use SASO quality mark on a following product: باستعمال علامة الجودة على منتجاتها التالية:

أنابيب البلاستيك لتجهيزات المياه الباردة والساخنة – بولي بروبلين صنف A(Class2/8bar) للمقاسات التالية :- (٢٠، ٢٥، ٣٢، ٤٠ ، ٥٠ ، ٦٣ ، ٧٥ ، ٩٠ ، ١١٠ ، ١٢٥)مم ، علامة تجارية (KTP Thermopipe) فقط.

After fulfilling the required requirements according to the normative documents : بعد استيفائها للمتطلبات اللازمة وفق المراجع القياسية التالية:

SASO ISO 15874 Part 1,2/2014

Date of issue :	١٤٢٧/١٢/٠١هـ	بداية تاريخ المنح:
Date of renewal :	١٤٣٨/٠٨/١٥هـ	تاريخ التجديد :
Date of expiry :	١٤٤١/٠٨/١٤هـ	تاريخ الإنتهاء :

نائب المحافظ للمطابقة والجودة
Vice-Governor for Conformity & Quality

الإدارة العامة لمنح الشهادات
SASO
الهيئة السعودية للمواصفات والمقاييس والجودة
Saudi Standards, Metrology and Quality Org.

تم منح هذا الترخيص وفقاً لتنظيم الهيئة السعودية للمواصفات والمقاييس والجودة الصادر بقرار مجلس الوزراء رقم ٢١٦ وتاريخ ١٤٣١/٠٦/١٧هـ

This license is granted according to the regulation of Saudi Standards, Metrology and Quality Organization that was issued based on the Council of Ministers' Resolution No. 216 dated 31-05-2010

تخضع هذه الشهادة خلال مدة سريانها للأنظمة واللوائح ذات العلاقة في المملكة العربية السعودية وأي تعليمات أو تعديلات تصدرها الهيئة.

This certificate is subject to during the period of validity of the rules and regulations relevant in the Kingdom of Saudi Arabia and any instructions or amendments issued by the commission

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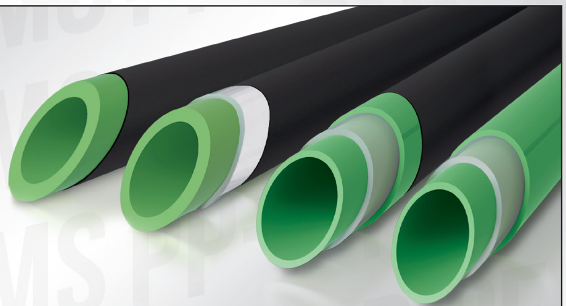
QMS-F-10-10
Issue#4 Date 06 / 02/1434 ص.ب ٣٤٢٧ الرياض ١١٤٧١ المملكة العربية السعودية هاتف : ١٤٥٢٠٠٠٠ ٩٦٦+ فاكس : ١٤٥٢٠٠٨٦ ٩٦٦+
Rev# 3 Date 09/ 08/1437 P.O.Box 3437 Riyadh 11471 KSA Tel : +966 14520000 Fax : +966 14520086



شركة مصنع القبلان للأنابيب الحرارية
AL KOBLAN Thermopipe Factory Co.
ISO 9001-2015 Certified Company

ضمان لمدة ١٥ سنة

__ / __ / ٢٠٢ م

منتجات مصنع أنابيب (KTP) الحرارية مضمونة من قبلنا لمدة (١٥) سنة وذلك في الحالات الآتية :

(١) الضمان للمستهلك النهائي لمدة (١٥) سنة من تاريخ الشراء ضد أي عيوب في التصنيع سواء في المادة الخام أو جودة التصنيع . والمقصود . بالكلمة جودة هي جميع ما حددته المواصفات الألمانية المتعلقة بصناعة الأنابيب الحرارية سواء للأكواع أو الأنابيب أو الوصلات النحاسية.

(٢) منتجات (KTP) الحرارية منتجة للمطابقة مع المواصفات الألمانية رقم DIN 8077 – DIN 8078 و السعودية رقم SASO-ISO 15874 فيما يخص الأنابيب، الأكواع، الوصلات النحاسية.

(٣) الضمان يشمل فقط استبدال جميع القطع والتي يثبت العيب منها وبدون أسعار إضافية مثل أجور الشحن أو التركيب أو خلافه وساري لجميع مناطق المملكة العربية السعودية.

(٤) هذا الضمان لا يتعارض مع اللوائح والأنظمة المعمول بها في المملكة العربية السعودية وفي حالة وجود تعارض فالأنظمة الحكومية هي التي يتم الأخذ بها

(٥) الضمان لا يشمل المنتجات التي تضررت بسبب سوء التنفيذ أو الأستخدام أو المناولة مثل أستخدام المنتجات الداخلية في تمديدات خارجية ومعرضة للشمس. أو منتجات تعرضت للتلف أثناء المناولة مثل تشققات الأنابيب أثناء النقل وخلافه.

مصنع أنابيب (KTP) الحرارية

الختم

SASO Intertek UKAS

P.O.Box: 157
Riyadh 11411

Kingdom of Saudi Arabia
www.alkoblan.com.sa

Riyadh
Tel.: 011 4760663
011 4767962
011 4724676
Fax: 011 4762389
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Jeddah
Tel.: 012 6659845
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Email: jsale@alkoblan.com.sa

Dammam
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013 8473422
Fax: 013 8473644
Email: dammsale@alkoblan.com.sa

Toll Free Number: 92 0002216 - Customer Service No. 800 3060600

بسم الله الرحمن الرحيم

المملكة العربية السعودية
وزارة الأشغال العامة والإسكان
وكالة الأشغال العامة
الإدارة العامة للمختبرات
المختبر المركزي

الرقم ....
التاريخ ....
الموافق ....
المرفقات ....

قطر أسمى ٢٥ ، سمك ٤,٢ مم

اللون	أخضر							
الفحص الظاهري	أ- الأنابيب مستقيمة ذات لون متجانس . ب – السطح الداخلي والخارجي ناعم ونظيف وخالي من الشقوق والشروخ والثقوب والتجعدات ذات الحواف الحادة .							
القطر الخارجي	٢٥	٢٥,١	٢٥	٢٥,٠٥	٢٥,٠٥	٢٥,١	المتوسط	٢٥,٠٥
السمك	٤,٣	٤,٤٥	٤,٥	٤,٥	٤,٤٥	٤,٥	المتوسط	٤,٤٥
الاستدارة	٠,٤٠%							
التغير بالحرارة (عند ١٣٥° م لمدة ساعتين)	+١ % لم يحدث تلين أو تقشر							
وزن المتر الطولي	٠,٢٥٩ كجم							
الوزن النوعي	٠,٩١							
المقاومة للزحف	————							
المقاومة للصدم (عند ٥٠ جول)	لم يحدث تكسر للعينة							

القائم بالاختبار	المشرف	مدير المختبر
م/ مقبل العنزي	د/ محمد المغاوري الزفتاوي	م/ عبدالله بن محمد الغمرو

ف/ حماد الغامدي

١٣٩١

٦

العنوان
وزارة الاشغال العامة والاسكان
شارع المعذر - الرياض

الهاتف
٤٠٥٨٣٠٠
٤٠٣٨٨٨٨

ص.ب ٥٦٠٩٥

الرمز البريدي
١١٥٥٤

CERTIFICATES

intertek
Total Quality. Assured.

CERTIFICATE
OF REGISTRATION

This is to certify that the management system of:

ALKOBLAN Thermopipe Factory Co.

Main Site: Omer Bin Abdulaziz Road, Malaz, Riyadh, Kingdom of Saudi Arabia, PO Box 157, Riyadh 11411, Kingdom of Saudi Arabia

Additional Site: Al Koblan Thermopipe Factory Co. - Manufacturing Site, Street #71, corner Street #216, 2nd Industrial Area, Riyadh, Kingdom of Saudi Arabia

has been registered by Intertek as conforming to the requirements of:

ISO 9001:2015

The management system is applicable to:

Design, Manufacture and Sales Service of Plastic Pipes and its associated fitting products

Certificate Number:
QMS 27069

Initial Certification Date:
06 April 2010

Date of Certification Decision:
21 December 2018

Issuing Date:
21 December 2018

Valid Until:
09 January 2022

UKAS MANAGEMENT SYSTEMS
014

Calin Moldovean
President, Business Assurance

Intertek Certification Limited, 10A Victory Park, Victory Road, Derby DE24 8ZF, United Kingdom

Intertek Certification Limited is a UKAS accredited body under schedule of accreditation no. 014.

In the issuance of this certificate, Intertek assumes no liability to any party other than to the Client, and then only in accordance with the agreed upon Certification Agreement. This certificate's validity is subject to the organization maintaining their system in accordance with Intertek's requirements for systems certification. Validity may be confirmed via email at certificate.validation@intertek.com or by scanning the code to the right with a smartphone. The certificate remains the property of Intertek, to whom it must be returned upon request.