VIALLI GERMANY GmbH

BUILDING THE FUTURE ONE PIPE AT A TIME

PP-RCT PIPES & FITTINGS

VIALLI Gmbh München Germany

Pipes & Fittings

VIALLI, a renowned German brand specializing in plastic piping systems, is proudly manufactured by VIALLI Gmbh München Germany. With over 15 years of experience, we have consistently delivered top-quality products utilizing cutting-edge German technology that adheres to DIN Standards, utilizing only the highest quality materials.

Our commitment to excellence extends beyond borders as we export our products to Europe, various parts of Asia, and the Middle East. Our overarching vision is to broaden our reach and make this exceptional product accessible to as many regions as possible.

Our comprehensive range of products includes:

VIALLI PP-RC Pipes & Fittings, meticulously crafted in accordance with German DIN 8077 and DIN 8078 Standards. Our lineup includes PPR Stabi pipes with an aluminum layer and PPR Fiberglass Composite Pipes.

VIALLI PP-RCT Pipes & Fittings, similar to our standard PPR offerings, our PP-RCT Pipes and Fittings meet the stringent requirements of German DIN 8077 and DIN 8078 Standards. This range also encompasses PPR Stabi pipes with an aluminum layer and PP-RCT Fiberglass Composite Pipes.

VIALLI PEXa pipe & fittings products are engineered to meet the rigorous German standards of DIN 16892 and DIN 16893, ensuring the required Cross-link Degree for optimal performance.

At VIALLI, we prioritize the highest hygienic and quality standards. For more details and to explore our complete product catalogue, make sure to visit our website. Your satisfaction is our priority, and we look forward to serving you with excellence.

All of our products have undergone rigorous testing to ensure they meet the stringent Hygienic and Quality Test Requirements recommended by WRAS.

VIALLIPOLYPROPYLENE
PP-RCT Pipes & Fittings

Building on the success of VIALLI PP-RC, we introduce the latest generation of polypropylene material: VIALLIPP-RCT.

The polypropylene Random Copolymer (PP-RC) was developed with a special crystalline structure that exhibits an improved pressure rating at elevated pressure rating. It is called Polypropylene Random Crystalline Temperature (PP-RCT)

The crystalline structure is created through a special Nucleation process that enables the pipes and fittings to operate at higher pressure at elevated temperatures. Thanks to this structure the new generation of polypropylene (VIALLIPP-RCT) can be produced with higher compressive strength than PP-RC

- VIALLIPP-RCT pipes are produced with thinner walls for the same application, which means they have a higher flow capacity with a consistent diameter.
- VIALLIPP-RCT (polypropylene –Random- Copolymer Temperature resistant) with a modified Crystal structure (Beta Nucleated) increased temperature resistance RAL 6024 Traffic Green
- VIALLI PP-RCT is produced according to German DIN Standard (DIN 8077/ DIN 8078) and (DIN EN ISO 15874) and complies with the requirements of the KTW guideline of German Federal Environmental agency (U B A)
- VIALLI PP-RCT is produced by single Layer, Homogeneous pipe for high pressure and Temperatures with simultaneous high flow PN16 and PN20
- VIALLI PP-RCT is produced with Multi-Layer Composite Fiber Glass (PN25), and Multi-Layer Composite Aluminum Middle Layer (PN25)

MATERIAL

SPECIFICATION OF RAW MATERIAL USED IN PRODUCTION:

- PP-RCTStandard pipes& fittings are manufactured from Polypropylene Random copolymer with enhanced Crystalline structure and improved Temperature resistance.
- Brass inserts used in transition fittings is classified as CW617 (CuZn40Pb2) and suitable for drinking water installations.

PP-RCT (Polypropylene Random Crystalline Temperature).
Polypropylene random copolymer with special crystallinity by special " β nucleation" process providing an improved pressure resistance, especially at elevated temperatures.

- Special crystallinity structure – High degree of the Hexagonal for (β form).
- Improvement in long term strength 50% than regular PP-RC.
- Improved resistance to crack propagation.
- Lower wall thickness and higher hydraulic capacity.

Pipes of PP-RCT materials shows pressure resistance, according to ISO/TR 9080 with proven minimum required strength (MRS) of 11.5 Pa and Categorized Required Strength (CRS) of 5 MPa.

POLYPROPYLENE MATERIAL

Polypropylene is a thermoplastic material and belongs to the polyolefin groups.
PP is a semi- crystalline material. PP's mechanical properties, chemical resistance and specially relatively high heat deflection temperature have made PP, one of the most important material used in piping industry.

THE MAIN FOUR TYPES OF POLYPROPYLENE ARE:

- Polypropylene Homo Polymer (PP-H) (Type 1)– high internal pressure Resistance
- Polypropylene Block Co- Polymer (PP-B) (Type 2) – High impact strength especially at low temperature& low thermal endurance – Sewage Pipe System.
- Polypropylene Random Co-Polymer (PP-R) (Type 3) High internal Pressure Resistance at high Temperature& low e-modulus- Plumbing and sanitary application
- Polypropylene Random Crystalline (PP-RCT) High internal Pressure Resistance at elevated temperature – Hot water & Heating system

PP-RCT ADVANTAGES

- Improved long- term strength of PP-RCT material leads to a more economic set of dimensions of the pipe system.
- It enables designers to select thinner wall pipes and in some situations also smaller diameter pipe can be used.
- This results in higher hydraulic pipe capacity or the possibility to apply higher pressure than with standard PP-R.
- A higher range of working temperature for a given application HOT or COOL
- A life span of more than 50 years.
- PP-RCT is both safer and more economical (less man power required) to install.
- Create a homogeneous joint – welds are as strong or stronger than the pipe itself
- Welding time is significantly reduced compared to metal options.
- No noxious fumes are created by the welding process, making it ideal for enclosed spaces or building that will be applying for LEED certification.
- PPR-CT has an extremely high corrosion resistance – systems have a design life span of more than 50 years, with no corrosion during this entire period.
- Compared to PP-R piping systems, PP-RCT may allow for a thinner walled pipe in the same application, increasing flow capacity.
- PP-RCT is a natural insulating material, while metallic pipes are naturally conductive.
- In certain application, the insulation value provided by the pipe wall alone may prove sufficient to avoid condensation or retain the desired water temperature.
- Low noise, the absorption properties and elasticity of this material soften noise and vibration caused by the water flow and water hammer effect.

QUALITY ASSURANCE

INCOMING MATERIAL INSPECTION

Approved quality raw material is used by the manufacturer of the PP-RCT pipe system. The incoming raw material quality is ensured by the inspections and testing.

PRODUCT MONITORING

The process control setup will ensure the dimensional correctness of the items produced and maintain consistent product quality by comparing standard data of the injection molding machines and extrusion with the specifications. Regular online checks of production runs are carried out.

QUALITY CONTROL & FINAL INSPECTION

Continuous in-process inspections are carried out at regular intervals to monitor the process. The following tests and procedures are conducted before the products are released from the warehouse after inspection.

- Visual appearance and surface finish.
- Dimensional accuracy.
- Internal pressure test.
- Impact test.
- Heat reservation test.

PRODUCTION STANDARDS OF VIALLI PP-RCT PIPES AND FITTINGS

Standard	Concern Production
DIN 8076	Standard for Testing metal threaded joints
DIN 8077	Polypropylene Pipes. Dimensions
DIN 8078	Polypropylene Pipes, General Quality Requirements & Testing
DIN 16962	Pipe joints and elements for Polypropylene Pressure Pipes
DIN 1988	Drinking Water Supply Systems, Materials, Components, Appliances Design and installation
DIN 16928	Pipe joints & Elements for Pipes, Laying-General Directions
DIN 2999	Standard for fittings with threaded metallic inserts
EN ISO-15874	Plastics piping system for hot and cold water installations – Polypropylene (PP)
BS 6700	Design, Installation, Testing and Maintenance of Services Supplying Water for Domestic use with in buildings and their Cartilages
DVS 2207	Welding of Thermoplastics
DVS 2208	Welding Machines and Devices for Thermoplastics

PP-RCT PROPERTIES

MECHANICAL PROPERTIES

	PROPERTY	Standard	Unit	PP-RCT
Mechanical Properties	MRF 190/5	ISO 1183	G/10min	0.5
	MRF 230/2.16	-	-	0.24 – 0.36
	MFI range	ISO1872/1873	-	T003
	Elongation at break	ISO 527	%	>300
	Flexural strength (3.5% flexural stress)	ISO 178	MPa	23
	Modulus of elasticity	ISO 527	MPa	900
Thermal Properties	Thermal conductivity at 20°C	DIN 52612	W/(m x K)	0.24
	Specific heat at 20°C	-	kJ / Kg K	2.0
Electrical Properties	Specific volume resistance	VDE 0303	OHM cm	-
	Specific surface resistance	VDE 0303	OHM	>1013
	Relative dielectric constant at 1 MHz	DIN 53483	-	23
Other Properties	Physiologically non - toxic	EEC 90/128	-	Yes
	FDA	-	-	Yes

PHYSICAL PROPERTIES

PROPERTY		Test Method	Unit	Value
Density		ISO 1183	g/cm^3	0.905
Melt flow rate	230°C, 2.16 kg 190 °C, 5.0 Kg	ISO 1183	G/10min	0.25 0.45
Tensile stress at yield	Yeild point	ISO 527	MPa	25
Elongation at yeild		ISO 527	%	10
Flexural Modulus		ISO 527	MPa	900
Charpy Impact Strength	23°C 0°C	ISO 179	KJ/m^2	40 4
Coefficient of thermal expansion (0°C /70°C)		DIN 53752	K^{-1}	1.5×10^4

CLASSIFICATIONS

Pipe systems are typically used for domestic hot & cold water supply such as:

- Drinking water – fresh water up to 25°C temp. for Drinking and cooking.
- Hot tap water – Heated Drinking water up to a temperature 60°C.
- Sanitary application – Drinking water quality is not needed, like Flush system, washing & irrigation.

Wrong choice of piping material may cause failure of installation and have a quantitative influence on the quality of water which we consume. Vialli PP-RCT follow the standard of EN ISO 15874 classifies the service condition for hot and cold water application.

CLASS OF APPLICATION ACCORDING TO EN ISO 15874-1

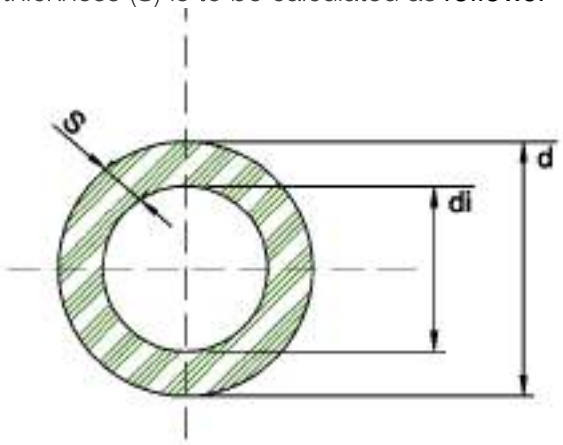
- Class 1 (Supply of hot water of 60°C, service life 50 years).
- Class 2 (Supply of 70°C, service life 50 years).
- Class 4 (Floor Heating, low temperature heaters service life 50 years, assuming (in total for the entire life time) 2.5 years at the operating temperature of 20°C, 20 years at operating temperature of 40°C, 25 years at the operation rating temperature of 60°C, 2.5 years at the operating temperature of 70°C.
- Class 5 (High temperature heaters, service life 50 years, out of which (in total for the entire length of service life) 14 years at the operating temperature of 20°C, 25 years at the operating temperature of 60°C, 10 years at the operating temperature of 80°C, 1 year at operating temperature 90°C). Maximum operating pressure (4,6,8,10bar) corresponding to the application class is calculated and assigned for each material and pipe series S.

PIPES ARE MARKED ACCORDING TO EN ISO 1574 BY CODE “S”

Relationship between older PN pressure class marking, Series S & SDR
Pipe Series – S dimensionless number related to the nominal outside diameter of a pipe and its wall thickness on the basis of this number, wall thickness (S) is to be calculated as follows:

$$s = \frac{d}{2s + 1}$$

PN = Nominal Pressure
S = Pipe Series
SDR = Standard Dimension Ratio
D = External diameter of pipe
s= Wall thickness of pipe



Pipe Series (S)							
20	26	12.5	8.3	5	3.2	2.5	2

PN	S	SDR
10	5	11
12.5	4	9
16	3.2	7.4
20	2.5	6
25	2	5

The VIALLI PP-RCT is a new type of material and the PN designation has not been implemented.

We designate the PP-RC tubes as PN for historical reasons (it used to be the former designation for the pressurized product range) although the values no longer correspond to definition above.

The lowest design coefficient according to “PN”, the standards EN ISO 1574 and DIN 8077 no longer specify the pipe classification.

OPERATING CONDITIONS

Recommended pipe SDR for PP-RC and PP-RCT for application Class 1 (hot water supply 60°C) & Class 2 (hot water supply 70°C)

Operating Pressure	Class 1 (60°C)		Class 2 (70°C)	
	PP-R	PP-RCT	PP-R	PP-RCT
4 bar	SDR 11	SDR 13.6	SDR 11	SDR 13.6
6 bar	SDR 11	SDR 11	SDR 7.4	SDR 11
8 bar	SDR 7.4	SDR 9	SDR 6	SDR 9
10 bar	SDR 6	SDR 7.4	SDR 5	SDR 7.4

Recommended pipe SDR for PP-R and PP-RCT for application Class 4 (under floor heating & low temperature radiators) & Class 5 (High temperature radiators)

Operating Pressure	Class 4 (60°C)		Class 5 (70°C)	
	PP-R	PP-RCT	PP-R	PP-RCT
4 bar	SDR 11	SDR 13.6	SDR 11	SDR 13.6
6 bar	SDR 11	SDR 11	SDR 7.4	SDR 9
8 bar	SDR 7.4	SDR 9	SDR 5	SDR 7.4
10 bar	SDR 6	SDR 7.4	-	SDR 6

Classification of service conditions (EN ISO 15874-1)

AC	T_D	OT	T_{max}	Time at T_{max}	T_{mal}	Time at T_{mal}	Typical field of application
	°C	Years	°C	Years	°C	h	
1	60	49	80	1	95	100	Hot water supply 60°C
2	70	49	80	1	95	100	Hot water supply 70°C
4	20 40 60	2.5 20 25	70	2.5	100	100	Under Floor heating and low temp. radiators
6	20 60 80	14 25 10	90	1	100	100	High temp rediators
	20	50	-	-	-	-	Cold water supply

LEGEND		OT	Operation Time
AC	Application class	T_{max}	Maximum Temperature
T_D	Design Temperature	T_{mal}	Failure Temperature

MATERIAL STRENGTH & RESISTANCE (LIFE CYCLE)

One of the most important properties of a polymer material used for hot and cold water pressure pipes is its resistance to internal pressure at different temperatures.
Also creep behavior is an important factor to take consideration for plastic pipe system.

Stress details for PP-R and PP-RCT

Application class	Design stress for PP-R		Design stress for PP-RCT	
	Mpa	Bar	Mpa	Bar
1	3.90	30.9	3.63	36.3
2	2.13	21.3	3.40	34.0
4	3.30	33.0	3.67	36.7
5	1.90	19.0	2.92	29.2
20°C / 50 years	6.93	69.3	8.24	82.3

Safety Factor & Design Stress

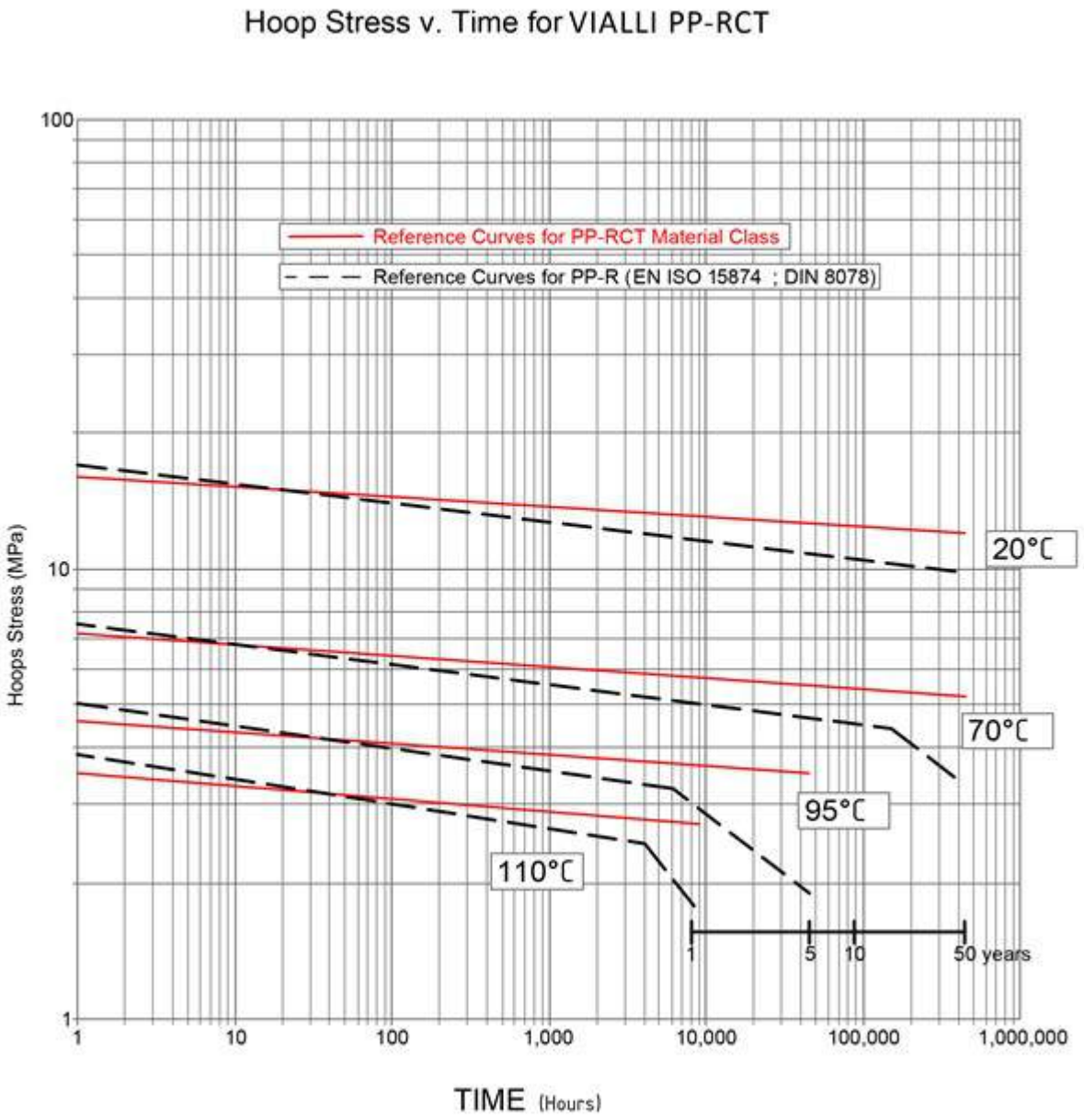
Temperature	Safety Factor (SF)	
°C	PP-R	PP-RCT
T_D	1.5	1.5
T_{max}	1.3	1.3
T_{mal}	1.0	1.0
T_{cold}	1.4	1.4

$T_{D=}$ Design Temperature
$T_{max=}$ Max Temperature
$T_{mal=}$ FailureTemperature
$T_{cold=}$ Cold water

Safety Factor & Design Stress

Temperature		Time Years	Required long term strength PP-R		Required long term strength PP-RCT	
			Mpa	Bar	Mpa	Bar
20°C	68°F	50	9.7	97	11.5	115
60°C	140°F	50	4.9	49	6.1	61
70°C	158°F	50	3.2	32	5.1	51
95°C	203°F	5	1.9	19	3.3	33
110°C	230°F	1	1.9	19	2.6	26

ISOTHERMAL MECHANICAL STRENGTH GRAPHIC FOR PP-RCT



TYPES OF VIALLI PP-RCT PIPES

PP-RCT

- 0.15 Thermal Expansion
- Cold and Hot Water Distribution

PP-RCT with Aluminum Layer

- 3X Less Thermal Expansion (0.045)
- No Need to Shave before Welding
- Cold and Hot Water Distribution

PP-RCT with Glass Fiber Layer

- 3X Less Thermal Expansion (0.05)
- No Need to Shave before Welding
- Cold and Hot Water Distribution

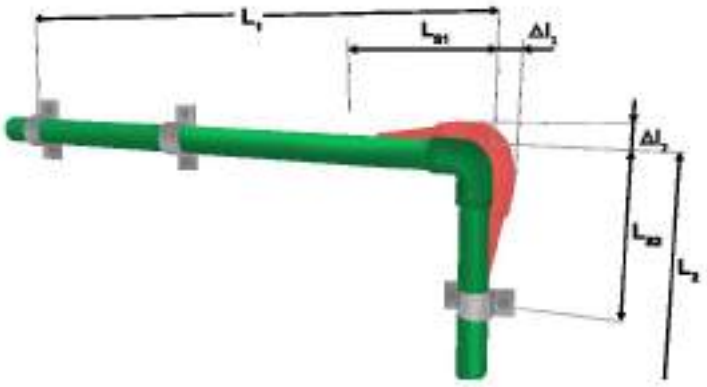
THERMAL LINEAR EXPANSION

Longitudinal expansivity and contractivity

The difference of temperature during installation and under service conditions, i.e., a medium flow through the system at a different temperature to that prevailing during the installation period, results in linear changes – expansion or contraction (Δ)

ΔL = α x L x ΔT

ΔL = length change (mm)
α = Coefficient of thermal longitudinal expansion [mm/m°C] for PP-RCT design purposes α= 0.15 for Multilayer Fiber α= 0.045 – 0.05
L = Design distance of fixed points in the line (m)
ΔT=installation and service temperature

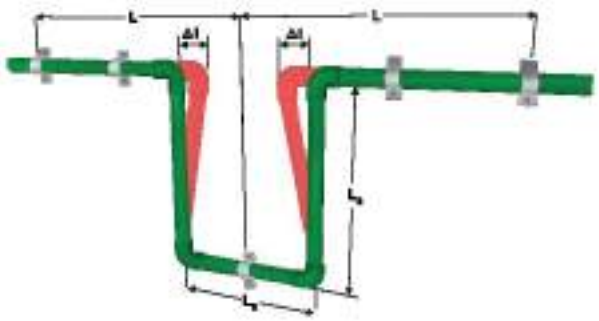


$$Ls = k.\sqrt{d.\Delta L[mm]}$$

Ls = Compensatory length
K= Material Constant for PPR (K =20)
d = Outer Diameter of piping (mm)
Δl = longitudinal change (mm) calculated for the previous formula (ΔL = α .L .ΔT)

U – COMPENSATOR

A suitable method for compensating for piping deflection in the direction perpendicular to the original route involves leaving a free compensatory length (designated as "L"). This compensatory length (L) is strategically placed to ensure that significant additional pressure and tensile stress do not arise within the piping wall. The compensatory length (LK) depends on factors such as the calculated lengthening or shortening of the route, the material used, and the diameter of the piping. In the case of polypropylene, flexibility of the material is utilized for compensating for longitudinal changes. In addition to compensation at bends, "U" compensators and loop compensators are also employed.



PB =Fixed point
Ku=Sliding point
L =Calculating length of the piping
Ls = Compensatory length
Δl = longitudinal change (mm) calculated for the previous formula (ΔL = α .L . ΔT)
Lk = Width of the compensator

L_k = 2. ΔL + 150 [mm] and also L_k≥ 10.D

Lk =With of the compensator
d = Outer Diameter of piping (mm)
Δl = longitudinal change (mm)

THERMAL LINEAR EXPANSION

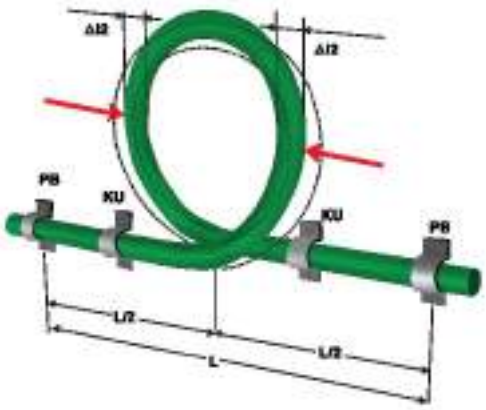
The value of the longitudinal change and the value of the compensatory length can also be read from the graphs.

Table for installation of a loop compensator

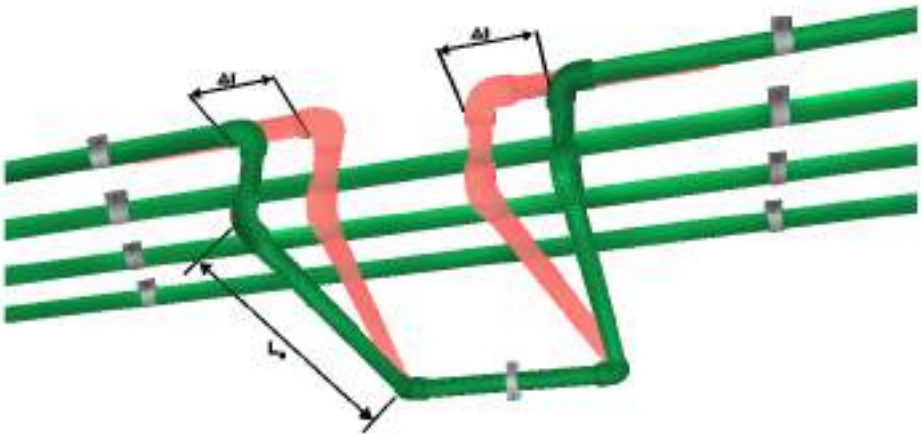
Piping diameter (mm)	Fixed points distance L (m)	
	Faser, Stabi	PPR and PP-RCT
16	24	8
20	27	9
25	30	10
32	36	12
40	42	14

Loop compensator LC

PB = Fixed point
Ku= Sliding point
L = Calculating length of the piping
Ls = Compensatory length
Lk = Width of the compensator



An example of compensation by changing the route adapted to the building structure



"U" Compensator

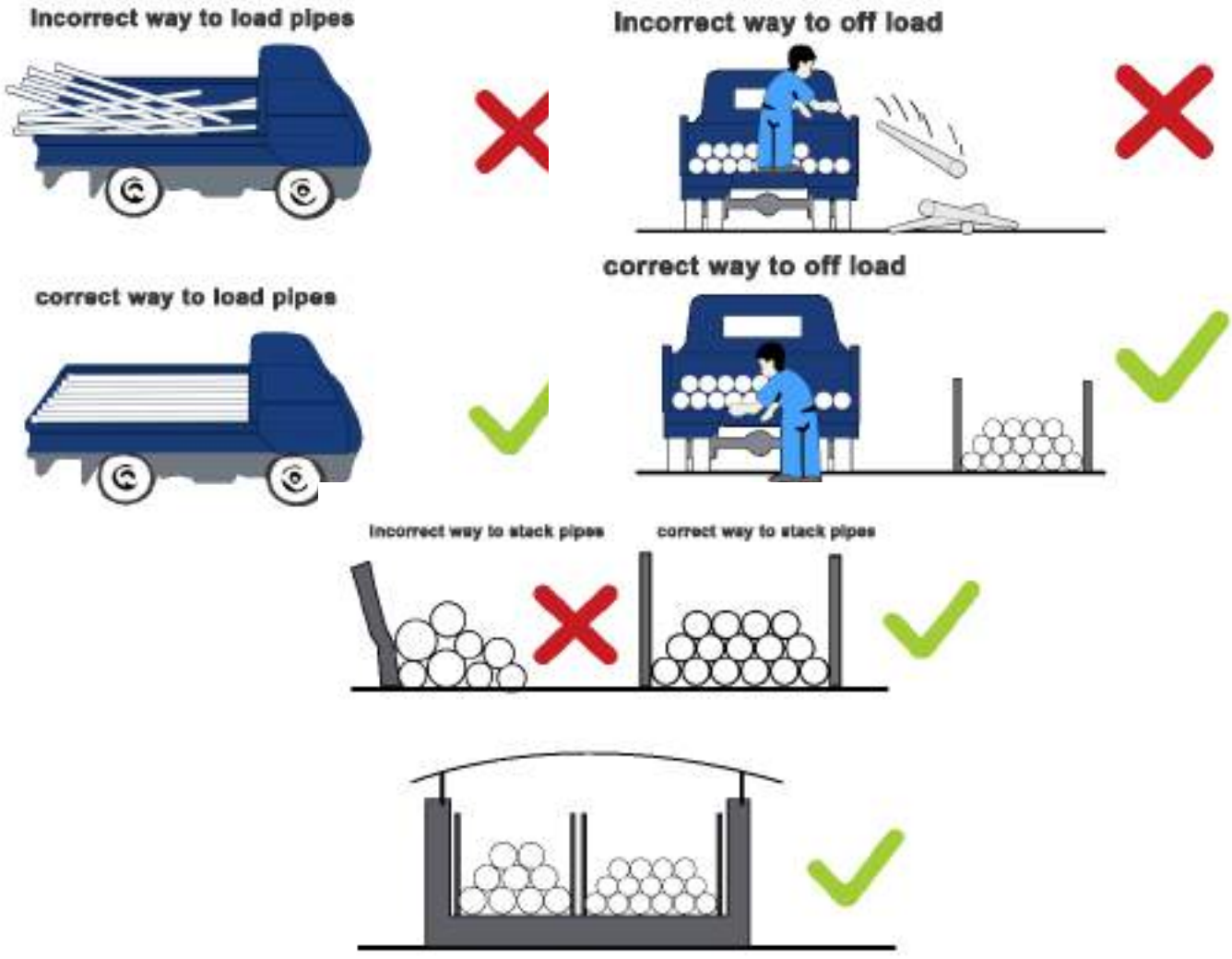
Calculated free length L means the length without any fixed support or suspension which could impede the dilatation. Free length L should not exceed the maximum distance of supports according to the piping diameter and the temperature of the medium.

HANDLING GUIDE

Because of the material properties of polypropylene, the pipes and fittings can be stored for a long under temperatures. The storage of pipes and fittings must be in accordance with the following conditions:

- The pipes should be supported along their full length.
- Bending of the pipes to be avoided.
- The material becomes sensitive to impact at low temperatures and in particular at temperature below 0°C, for this reason knocks and similar impacts are to be avoided under these conditions.
- High – polymer materials are sensitive to U.V radiation, for this reason the M.P.I material should also be protected against the effects of UV radiation.

ON SITE STORAGE AND HANDLING



ASSEMBLY AND INSTALLATION

GENERAL

Only components not damage or contaminated either during storage of transport, may be used for installation works.

A minimum temperature level for plastic piping installation is with regard to welding, +5°C. at lower temperatures it is difficult to provide working conditions for high quality pipe joints.

Components of plastic piping system must be protected against damage during transport and installation.

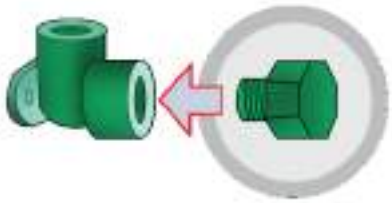
Pipe bending should be done at +15°C for pipes of diameter range 16-32mm minimum bending radius equals to eight diameters (D).

Components must not be exposed to naked flames.

Pipeline cross over's should be made with used of components specially designed for this purpose.

Threaded fittings must be used for screw type joints. Threads should never be cut directly into plastic components. Threads are sealed with a special PTFE tape or sealing compound.

Brazing of soldering of metal fittings should not take place close to joint between metal plastic systems because of potential hazard of heat transfer to the fitting.



It is recommended to use plastic plugs for blanking elbows or wall mounting groups (plastic plugs are designated only for temporary use). For long term blanking has to be plug with metal thread.

WELDING & FUSION

VIALLI offers widest range of joining options of any PP-RCT product line with two primary joining methods and a complete range of fittings sizes. VIALLI can be joined by socket fusion and butt fusion.

SOCKET FUSION

VIALLI offers socket fusion for full pressure joining with a full range of fittings in ½ inch through 5 inch sizes, joints can be made using hand held tools, and in large sizes with bench-style tools for maximum effectiveness.

BUTT FUSION

VIALLI offers butt fusion with long spigot fittings staring at 2 inch through 24 inch. Butt fusion is often a more fabrication friendly technique compared to socket fusion in sizes of 2 inch through 5 inch, and customer can take advantage of this feature of the VIALLI system.

WELDING & FUSION

VIALLI welding is performed according to the below guidelines. In this process pipes and fittings are welded overlapping. The end of the pipes and fittings are heated using a welding device and subsequently connected.

VIALLI Welding devices and tools

- Make sure that the welding tools lie flat against the heating element.
- Do not use pliers or other unsuitable tools so as not to damage the coating of the welding tools.
- The required welding temperature for processing the VIALLI PP-RCT system is 206°C.
- Warning: the first welding should not be done until five minutes after welding temperature has been reach.
- VIALLI welding devices and tools are to be protected from impurities.
- Burned on particles can lead to incorrect welding connections.
- Tools may be cleaned with non-fibrous, coarse paper towels.
- The welding tools must always be kept dry. If necessary, dry them with a clean non fibrous cloth.
- Damage and soiled welding tools must be replaced, since only clean, properly functioning tools can produce clean and proper connections.

GUIDELINES

Minimum times for socket welding of PP pipeline segments at an outdoor temperature of 20°C and moderate air movement in case of outdoor tempreature of under 5°C, heat up tmies must be doubled.

1	2	3	4	5
External pipe Dia. mm	**Insert depth mm**	**Heating period Sec.**	**Processing period sec.**	**Cooling period Mins.**
20	14	5	3	
25	15	7	3	
32	16.5	8	4	2
40	18	12	6	4
50	20	18	7	
			9	
63	24	24	8	6
75	26	30	10	8
90	32	40	10	8
110	38.5	50	15	10
125	40	55	17	12
160	43	65	20	14
200	46	72	25	17
250	50	78	27	20

CHEMICAL RESISTANCE

Definitions, symbols and abbrevations

The criteria of classification, definitions, symbols and abbrevatins adopted in this document are as follows:

S= Satisfactory

The chemical resistance of polypropylene exposed to the action of a fluid is classified as satisfactory when the results of the test are acknowledge to be satisfactory by the majority of the countries participating in the evaluation.

L= Limited

The chemical resistance of polypropylene exposed to the action of a fluid is classified as limited when the results of test are acknowledged to be limited by the majority of the countries participating in the evaluation.

Also classified as limited is the resistance to the action of chemical fluids for which judgments “S” and “NS” or “L” are pronounced to an equal extent.

NS= Not satisfactory

The chemical resistance of a polypropylene exposed to the action of a fluid as classifie as “not satisfactory” when the results of test are acknowledges to be not satisfactory by the majority of the countries participating in the evaluation.

Also classified as “Not satisfactory” are materials for which judgments “L” and “NS” are pronounced to an equal extent

Sat. sol Sutured= aqueous solution, prepared at 20°C Sol Aqueous solution at a concentration higher than 10% but not saturated
Dil.sol = Dilute aqueous solution at a concentration equal to lower 10%.
Work.sol = Aqueous solution having the usual concentration for industrial use.

Solution concentration reported in the text are expressed as a percentage by mass. The aqueous solutions id sparingly soluble chemicals are considered, as far as chemical action towards polypropylene is concerned, as saturated solutions. In general, common chemical names are used in this document.

The evaluation of chemical resistance of polypropylene is base on PP not subjected to mechanical stress. Polypropylene subjected to mechanical stress may behave different and show different results.

CHEMICAL RESISTANCE

VIALLI piping systems are suitable for a wide variety of process piping applications. However, before determining the suitability of a VIALLI piping system for conveying chemicals under pressure, it is crucial to verify that the material is appropriate for use and that the piping system can withstand the chemicals under the concurrent pressure, temperature, and other loads it will encounter.

The chemical resistance table provided in this section offers a general guideline for assessing the suitability of VIALLI PP-RCT piping systems. However, chemical resistance depends on numerous specific factors, including the concentration of the chemicals, temperatures, concurrent temperature, pressure, and other internal and external loads applied to the system. Consideration should also be given to factors such as the duration of application (continuous vs. intermittent), steady vs. cyclic loading, the presence of other chemicals mixed with the chemical in question, and compliance with relevant design codes.

While these charts can serve as a general guideline for determining resistance, it is highly recommended to contact the factory for further guidance on any chemical application involving VIALLI. Ultimately, the final determination should be made by the engineer in charge of the project or another representative of the owner.

Prior to considering VIALLI for any chemical application, consult the factory for the full recommendation base on the complete conditions of the application. Do not rely solely on the recommendation shown in the chart a suitability is based on additional factors including but not limited to pressure, temperature, duration and whether there are any mixtures of chemicals involved.

When considering the installation of VIALLI PP-RCT materials that are connected to an existing copper piping system, do not install the PP-RCT material in application involving elevated temperatures with aggressive water applications if the velocity of the water in the copper piping exceeds 10ft / second, this can result in the release of copper ions which can result in potential stress cracking in PP piping.

HEAT LOSS / GAIN

VIALLI pipe material is renowned for its excellent insulation characteristics due to its low thermal conductivity value. In contrast, competing metal pipes such as copper, steel, and stainless steel are considered poor insulators. Metal pipe materials are actually known as conductors of heat. By comparing the heat loss/gain charts of bare VIALLI pipe to those of metal pipes, the thermal advantages offered by VIALLI pipe become evident. With a 50°F delta temperature difference across the pipe, the heat loss/gain of metal pipes is significantly higher compared to that of VIALLI pipe.

There are two terms commonly used to describe heat loss within a pipe: K-Factor and R-value. The K-factor, also known as thermal conductivity, measures the number of BTUs per hour passing through a one-inch thick, one-square-foot section of material with a 1°F temperature difference between the two surfaces. A lower K-factor indicates that the material is more suitable for insulation. Typical pipe insulation has a K-factor in the range of 0.021 BTU/hr-ft-°F at 75°F. In contrast, the K-factor of steel is 31 BTU/hr-ft-°F at 75°F, and copper has a K-factor of 227 BTU/hr-ft-°F at 75°F. These values are considerably higher than VIALLI pipe, which has a K-Factor of 0.22 W/m·K at 68°F.

The National Commercial & Industrial Insulation Standards Manual defines the R-value as "A measure of the ability to retard heat flow rather than transmit heat." In terms of R-value, the better insulator is the material with the highest R-value.

For flat insulation geometry, the relationship between R-value and K-factor is shown in the first equation below. For cylindrical pipe geometry with equivalent thickness, use the equation shown in the middle box below to determine the R-value, as the outer surface area of the insulation is proportionately greater than the inner surface area. The equivalent thickness represents the insulation thickness of a flat surface that would equal the heat flux at the outer surface of a cylindrical geometry. The relationship between R-value and K-factor for pipe insulation is shown in the equation at the bottom.

R- Value Equations

$$\text{R} - \text{Value} = \frac{\text{Thickness (inches)}}{\text{k} - \text{factor(BTU inch/(hrft}^2\text{f)}}$$

$$\text{R} - \text{Value} = \frac{\text{Equivalent Thickness (inches)}}{\text{k} - \text{factor(BTU inch/(hrft}^2\text{f)}}$$

r_2 = Outer Radius, r_1 = Inner Radius

$$\text{Equivalent Thickness} = r_2 x \ln\left(\frac{r_2}{r_1}\right)$$

INSULATION

For thermal, technical, physical, and mechanical reasons, usage of plastic threaded coupling is not permissible in sanitary engineering. Plastic threaded couplings may be used, for instance, in provisional distribution systems

INSULATION

While hot water piping systems and heating systems are insulated to prevent heat loss, cold water pipes are insulated to prevent heat gain and pipe condensation. Insulation of cold water systems is necessary because health regulations require that drinking water temperatures remain below 20°C. Similarly, hot water temperatures must be kept below the upper limit specified by safety standards to prevent scalding, and these temperature limits also help control bacterial growth. In addition to specialized technical solutions like thermal sterilization, maintaining proper circulation and keeping hot water at the required temperature level are crucial for protecting against bacteria such as Legionella pneumophila.

The thickness and type of insulation layers are determined based on the thermal resistance of the chosen insulation system, air humidity in the area of the piping system, and the temperature difference between the room (air) and the flowing water.

The entire piping system, including fittings and valves, must be insulated. It is essential to maintain a minimum insulation layer thickness along both the pipe diameter and the length of the pipeline. This means that insulation types that are cut lengthwise and wrapped around the pipes must be securely sealed after installation, using methods such as adhesives, clamps, or sealing tape.

MINIMUM THERMAL INSULATION LAYER

Example:

Placement / routing of pipes	Insulation layer thickness • = 0.040 W/mK
Freely laid pipes in unheated areas (basement areas for example)	4mm
Freely laid pipes in heated areas	9mm
Pipes in crawlways without concurrently running hot water lines	4mm
Pipes in crawlways with concurrently running hot water lines	13mm
Independently running under plaster pipes (in channels)	4mm
Under plaster pipes (in chanels) running in parallel w/ hot water lines	13mm
Pipes cast over with concrete	4mm

Note:

•The thickness values must be re-calculated for other thermal characteristic.

•High demanding system (such as in bathroom, bathtub, washing machines, etc.) heat loss in plastic pipes with flowing water can be up to 20% smaller than in metal ones. Another 15% can be save by thorough insulation. In systems with small and /or short-time demand, where pipes are not regularly heated to operating temperatures, the savings will be smaller (only 10%) although up to 20% can be expected at peak demand.

•The insulation layer thickness for hot water systems usually ranges between 9 and 15mm at the value of thermal resistance •=0.040 W/mK

FLOW RATE vs. VELOCITY

Pipe diameter is a critical factor in the proper design of the VIALLI pipe system. It is recommended to maintain an average flow velocity of 8 feet per second (fps). This ensures energy-efficient pumping, control of noise generation, and the mitigation of water hammer effects on the piping system. Once pipe sizes have been determined, the following equations can be used to calculate the system pressure drop and select the pump motor horsepower.

When determining the frictional pressure loss across a system, it is advisable to incorporate a 20% safety factor. This factor accounts for pipe aging, non-smooth welds, and manufacturing tolerances.

LEGEND

L	Length of pipe and / or equivalent of pipe fitting (ft)	**μ**	Absolute viscosity of liquid in pipe, (lb_{Mass} / ft-s)
D	Inside diameter of pipe, (ft)	**v**	Kinematic viscosity of fluid of liquid in pipe, (ft^2/s)
V	Average flow velocity with in pipe, (ft/s)	**Re**	Reynolds number
g	32.174, Gravitational constant, (ft/s^2)	**p**	Density of liquid in pipe, (lb_{Mass} / ft-s)
f	Friction factor	**Q**	Volumetric flow, (gpm)
ε	2.2966E-05, Absolute roughness of polypropylene pipe, (feet)	**C**	Valve manufacturer's flow coefficient

The **Reynolds number** allows the friction factor to be determined. Depending on how large or small the Reynolds number will determine which equation should be used to calculate the friction factor.

$$\mathrm{Re}\frac{p.D.V}{\mu} = \frac{V.D}{v}$$

For Reynolds Number >4000, the flow condition is considered to be turbulent flow condition. For turbulent flow conditions use the **Colebrook equation** to calculate the friction factor.

$$\frac{1}{\sqrt{f}} = -2.\log_{10}\left(\frac{e}{3.7D} + \frac{2.51}{Re\sqrt{f}}\right)$$

A moody diagram can be used to determine the friction factor as well. It can be used to determine the friction factor in laminar flow conditions, or turbulent flow conditions. Transitional flow conditions, or turbulent flow conditions. To use moody diagram first calculate the Reynolds number and a relative roughness number. Use these numbers with moody diagram to determine the friction factor. An equation for relative roughness is shown below.

$$\text{Relative Roughness} = \frac{e}{D}$$

VIALLI PP-RCT PRODUCTS

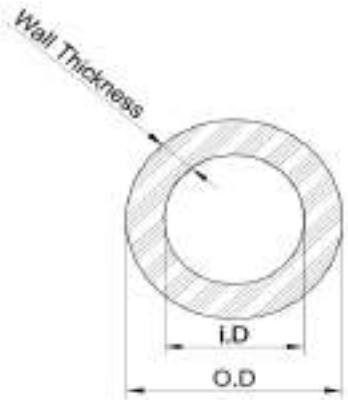
1.) VIALLI PP-RCT Pipes Single Layer SDR 9 SDR 11

Description:

PP-RCT Pressure pipe, Homogeneous pipe for high pressures and high temperature with simultaneous high flow.

Material:

PP-RCT (Polypropylene Random-Copolymer Temperature Resistant) with modified crystalline structure (beta nucleated) and increased temperature resistance



Geometric Properties:

Outside Diameter and wall thickness according to DIN 8077 and DIN EN ISO 15874

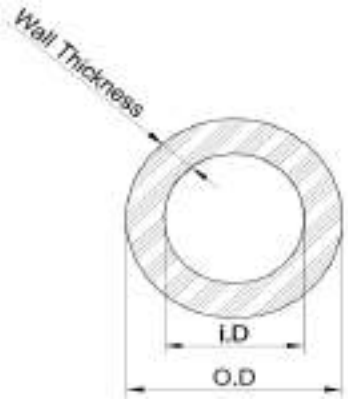
Type:

Suitable for socket welding, butt-welding according DVS 2207, Welding Equipment according to DVS 2208

Properties:

Good resistance to chemicals
Corrosion resistance
Excellent processing capability

Size (O.D)	i.D	SDR	Wall Thickness	CODE
20mm	15.4mm	9	2.3mm	VPPRCT2016
25mm	19.4mm	9	2.8mm	VPPRCT2516
32mm	26.2mm	11	2.9mm	VPPRCT3216
40mm	32.6mm	11	3.7mm	VPPRCT4016
50mm	40.8mm	11	4.6mm	VPPRCT5016
63mm	51.4mm	11	5.8mm	VPPRCT6316
75mm	61.4mm	11	6.8mm	VPPRCT7516
90mm	73.6mm	11	8.2mm	VPPRCT9016
110mm	90.0mm	11	10.0mm	VPPRCT11016
160mm	130.8mm	11	14.6mm	VPPRCT16016
200mm	163.3mm	11	18.2mm	VPPRCT20016
250mm	204.6mm	11	22.7mm	VPPRCT25016



2.) VIALLI PP-RCT Pipes Single Layer SDR 7.4

Description:

PP-RCT Pressure pipe, Homogeneous pipe for high pressures and high temperature with simultaneous high flow.

Material:

PP-RCT (Polypropylene Random-Copolymer Temperature Resistant) with modified crystalline structure (beta nucleated) and increased temperature resistance

Geometric Properties:

Outside Diameter and wall thickness according to DIN 8077 and DIN EN ISO 15874

Type:

Suitable for socket welding, butt-welding according DVS 2207, Welding Equipment according to DVS 2208

Properties:

Good resistance to chemicals
Corrosion resistance
Excellent processing capability

Size (O.D)	i.D	SDR	Wall Thickness	CODE
20mm	14.4mm	7.4	2.8mm	VPPRCT20
25mm	18.0mm	7.4	3.5mm	VPPRCT25
32mm	23.2mm	7.4	4.4mm	VPPRCT32
40mm	29.0mm	7.4	5.5mm	VPPRCT40
50mm	36.2mm	7.4	6.9mm	VPPRCT50
63mm	45.8mm	7.4	8.6mm	VPPRCT63
75mm	54.4mm	7.4	10.3mm	VPPRCT75
90mm	65.4mm	7.4	12.3mm	VPPRCT90
110mm	79.8mm	7.4	15.1mm	VPPRCT110

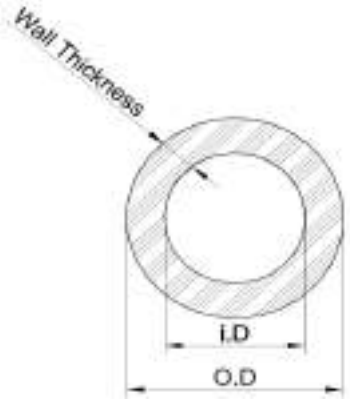
3.) VIALLI PP-RCT Pipes Multi Layer Aluminum Composite SDR 7.4 , SDR 9

Description:

PP-RCT Pressure pipe, multi-layer with Aluminum -middle-layer for reduce axial expansion

Material:

PP-RCT(Polypropylene Random-Copolymer Temperature Resistant) with modified crystalline structure (beta nucleated) and increased temperature resistance



Geometric Properties:

Outside Diameter and wall thickness according to DIN 8077 and DIN EN ISO 15874

Type:

Suitable for socket welding, butt-welding according DVS 2207, Welding Equipment according to DVS 2208

Properties:

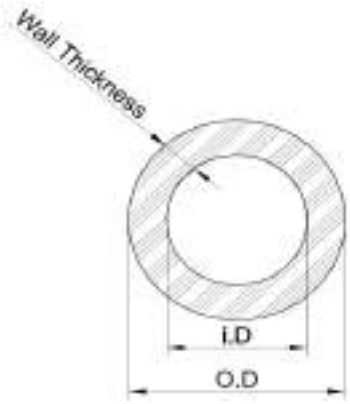
Good resistance to chemicals
Corrosion resistance
Excellent processing capability

Size (O.D)	i.D	SDR	Wall Thickness	CODE
20mm	14.4mm	7.4	2.8mm	VPPRCT20AU
25mm	19.4mm	9	2.8mm	VPPRCT25AU
32mm	24.8mm	9	3.6mm	VPPRCT32AU
40mm	31.0mm	9	4.5mm	VPPRCT40AU
50mm	38.8mm	9	5.6mm	VPPRCT50AU
63mm	48.8mm	9	7.1mm	VPPRCT63AU
75mm	58.2mm	9	8.4mm	VPPRCT75AU
90mm	65.4mm	7.4	12.3mm	VPPRCT90AU
110mm	79.8mm	7.4	15.1mm	VPPRCT110AU

4.) VIALLI PP-RCT Pipes Multi Layer Fiber Glass SDR 7.4 , SDR 11

Description:
PP-RCT Pressure pipe, multi-layer, with fiber Glass-middle-layer for reduce axial expansion.

Material:
PP-RCT (Polypropylene Random-Copolymer Temperature Resistant) with modified crystalline structure (beta nucleated) and increased temperature resistance



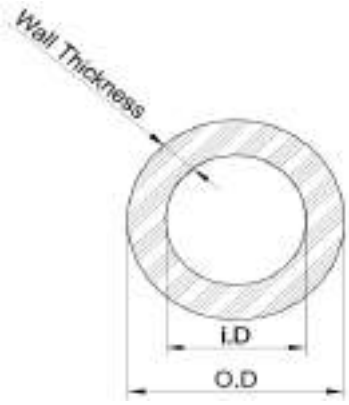
Geometric Properties:
Outside Diameter and wall thickness according to DIN 8077 and DIN EN ISO 15874

Type:
Suitable for socket welding, butt-welding according DVS 2207, Welding Equipment according to DVS 2208

Properties:
High resistance to chemicals
Corrosion resistance
Excellent processing capability

Size (O.D)	i.D	SDR	Wall Thickness	CODE
20mm	14.4mm	7.4	2.8mm	VPPRCT20FG
25mm	18.0mm	7.4	3.5mm	VPPRCT25FG
32mm	23.2mm	7.4	4.4mm	VPPRCT32FG
40mm	29.0mm	7.4	5.5mm	VPPRCT40FG
50mm	36.2mm	7.4	6.9mm	VPPRCT50FG
63mm	45.8mm	7.4	8.6mm	VPPRCT63FG
75mm	54.4mm	7.4	10.3mm	VPPRCT75FG
90mm	65.4mm	7.4	12.3mm	VPPRCT90FG
110mm	79.8mm	7.4	15.1mm	VPPRCT110FG
160mm	130.8mm	11	14.6mm	VPPRCT160FG
200mm	163.6mm	11	18.2mm	VPPRCT200FG
250mm	204.6mm	11	22.7mm	VPPRCT250FG

5.) VIALLI PP-RCT UV Pipes Multi-LayerGlass Fiber SDR 7.4



Description:
PP-RCT Pressure pipe, multi-layer, with fiber -middle-layer for reduce axial expansion

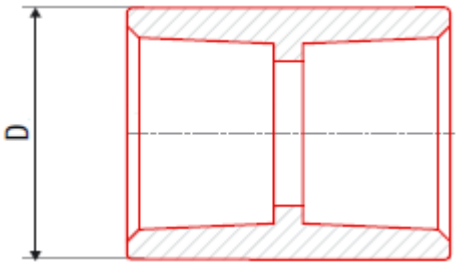
Material:
PP-RCT (Polypropylene Random-Copolymer Temperature Resistant) with modified crystalline structure (beta nucleated) and increased temperature resistance

Geometric Properties:
Outside Diameter and wall thickness according to DIN 8077 and DIN EN ISO 15874

Type:
Suitable for socket welding, butt-welding according DVS 2207, Welding Equipment according to DVS 2208

Properties:
Good resistance to chemicals
Corrosion resistance
Excellent processing capability

Size (O.D)	i.D	SDR	Wall Thickness	CODE
20mm	13.2mm	6	3.4mm	VPPRCT20FG
25mm	16.6mm	6	4.2mm	VPPRCT25FG
32mm	21.2mm	6	5.4mm	VPPRCT32FG
40mm	26.6mm	6	6.7mm	VPPRCT40FG
50mm	33.2mm	6	8.4mm	VPPRCT50FG
63mm	42.0mm	6	10.5mm	VPPRCT63FG
75mm	50.0mm	6	12.5mm	VPPRCT75FG
90mm	60.0mm	6	15mm	VPPRCT90FG
110mm	73.2mm	6	18.4mm	VPPRCT110FG
160mm	106.4mm	6	26.6mm	VPPRCT160FG
200mm	143.4mm	7.4	28.3mm	VPPRCT200FG
250mm	183.0mm	7.4	33.3mm	VPPRCT250FG



6.) Coupling (Equal Socket)

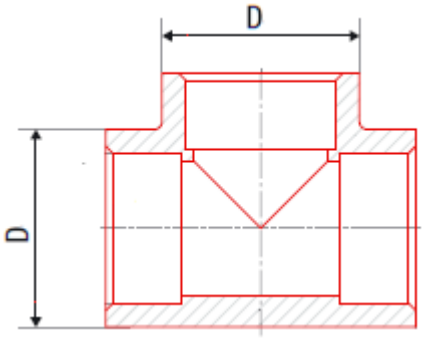
Our piping systems allow for easy interconnection of individual pipes within a water or heating distribution system, minimizing pressure loss.

Size (D)	Description	CODE
20mm	Equal Socket	VS1
25mm	Equal Socket	VS2
32mm	Equal Socket	VS3
40mm	Equal Socket	VS4
50mm	Equal Socket	VS5
63mm	Equal Socket	VS6
75mm	Equal Socket	VS7
90mm	Equal Socket	VS9
110mm	Equal Socket	VS10
160mm	Equal Socket	VS16
200mm	Equal Socket	VS20
250mm	Equal Socket	VS25

7.) Equal Tee

Our fittings facilitate the branching of a distribution system while ensuring that the inside diameter of the fittings remains unchanged compared to the inside diameter of the piping. As a result, these fittings do not significantly increase the pressure loss in the distribution system.

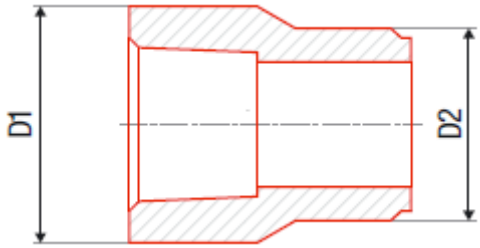
Size (D)	Description	CODE
20x20x20mm	Equal Tee	VT1
25x25x25mm	Equal Tee	VT2
32x32x32mm	Equal Tee	VT3
40x40x40mm	Equal Tee	VT4
50x50x50mm	Equal Tee	VT5
63x63x63mm	Equal Tee	VT6
75x75x75mm	Equal Tee	VT7
90x90x90mm	Equal Tee	VT9
110x110x110mm	Equal Tee	VT10
160x160x160mm	Equal Tee	VT16
200x200x200mm	Equal Tee	VT20
250x250x250mm	Equal Tee	VT25

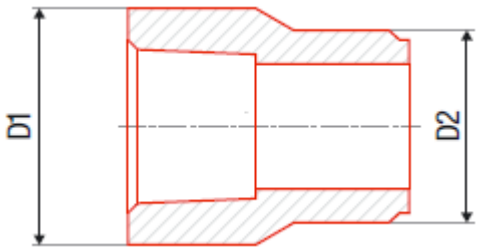


8.) Reducer Socket

Reduces interconnection of individual pipes within a water or heating distribution system, resulting in reduced pressure loss.

Size (D1, D2)	Description	CODE
25/20mm	Reducer Socket	VRS21
32/20mm	Reducer Socket	VRS31
32/25mm	Reducer Socket	VRS32
40/20mm	Reducer Socket	VRS41
40/25mm	Reducer Socket	VRS42
40/32mm	Reducer Socket	VRS43
50/25mm	Reducer Socket	VRS52
50/32mm	Reducer Socket	VRS53
50/40mm	Reducer Socket	VRS54
63/25mm	Reducer Socket	VRS62
63/32mm	Reducer Socket	VRS63
63/40mm	Reducer Socket	VRS64
63/50mm	Reducer Socket	VRS65
75/20mm	Reducer Socket	VRS71
75/25mm	Reducer Socket	VRS72
75/32mm	Reducer Socket	VRS73
75/40mm	Reducer Socket	VRS74
75/50mm	Reducer Socket	VRS75
75/63mm	Reducer Socket	VRS76





Reducer Socket

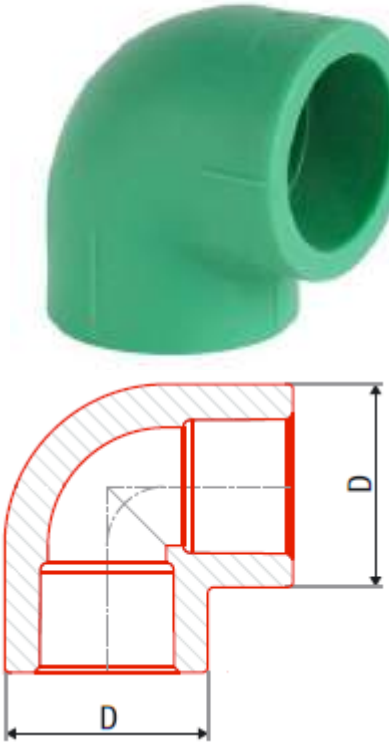
Reduces interconnection of individual pipes within a water or heating distribution system, resulting in reduced pressure loss.

Size (D1, D2)	Description	CODE
90/32mm	Reducer Socket	VRS93
90/40mm	Reducer Socket	VRS94
90/50mm	Reducer Socket	VRS96
90/63mm	Reducer Socket	VRS96
90/75mm	Reducer Socket	VRS97
110/40mm	Reducer Socket	VRS104
110/50mm	Reducer Socket	VRS105
110/63mm	Reducer Socket	VRS106
110/75mm	Reducer Socket	VRS107
110/90mm	Reducer Socket	VRS109
160/110mm	Reducer Socket	VRS1610
200/90mm	Reducer Socket	VRS209
200/110mm	Reducer Socket	VRS2010
200/160mm	Reducer Socket	VRS2016
250/160mm	Reducer Socket	VRS2510
250/200mm	Reducer Socket	VRS2520

9.) Elbow 90°

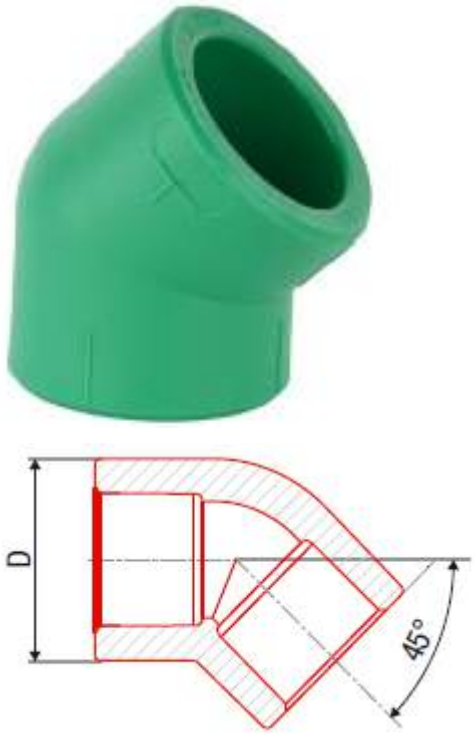
A simple, reliable fitting used to change the direction of a Distribution system. When installed properly it increases the Pressure loss in the distribution system noticeably less than Elbows in other distribution systems. Thanks to the full-size Inside Diameter corresponding to that of the piping.

Size (D)	Description	CODE
20mm	Elbow 90°	VE190
25mm	Elbow 90°	VE290
32mm	Elbow 90°	VE390
40mm	Elbow 90°	VE490
50mm	Elbow 90°	VE590
63mm	Elbow 90°	VE690
75mm	Elbow 90°	VE790
90mm	Elbow 90°	VE990
110mm	Elbow 90°	VE1090
160mm	Elbow 90°	VE1690
200mm	Elbow 90°	VE2090
250mm	Elbow 90°	VE2590



10.) Elbow 45°

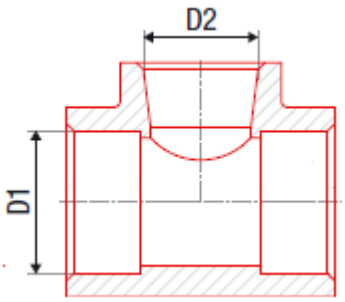
A simple, reliable fitting used to change the direction of a Distribution System. When installed properly, it increases the pressure loss in the distribution system noticeably less than elbows in other distribution systems, thanks to the full-size inside diameter corresponding to that of the piping.



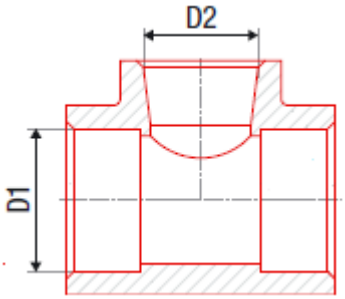
Size (D)	Description	CODE
20mm	Elbow 45°	VE145
25mm	Elbow 45°	VE245
32mm	Elbow 45°	VE345
40mm	Elbow 45°	VE445
50mm	Elbow 45°	VE545
63mm	Elbow 45°	VE645
75mm	Elbow 45°	VE745
90mm	Elbow 45°	VE945
110mm	Elbow 45°	VE1045
160mm	Elbow 45°	VE1645
200mm	Elbow 45°	VE2045
250mm	Elbow 45°	VE2545

11.) Reducer Tee

A fitting allowing for the branching of a distribution system. The Inside diameter of the fitting is not reduced compared to the Inside diameter of the piping, and therefore, the fitting dose not Significantly increase the pressure loss in the distribution system.



Size (D1, D2)	Description	CODE
25x20x25mm	Reducer Tee	VRT212
32x25x32mm	Reducer Tee	VRT323
32x20x32mm	Reducer Tee	VRT313
40x20x40mm	Reducer Tee	VRT414
40x25x40mm	Reducer Tee	VRT424
40x32x40mm	Reducer Tee	VRT434
50x20x50mm	Reducer Tee	VRT515
50x25x50mm	Reducer Tee	VRT525
50x32x50mm	Reducer Tee	VRT535
50x40x50mm	Reducer Tee	VRT545
63x25x63mm	Reducer Tee	VRT626
63x32x63mm	Reducer Tee	VRT636
63x40x63mm	Reducer Tee	VRT646
63x50x63mm	Reducer Tee	VRT656
75x25x75mm	Reducer Tee	VRT727

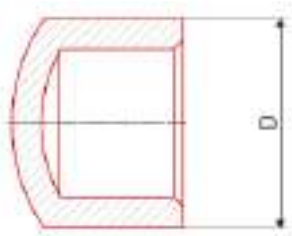


Reducer Tee

Size (D1, D2)	Description	Art. No.
75x32x75mm	Reducer Tee	VRT737
75x40x75mm	Reducer Tee	VRT747
75x50x75mm	Reducer Tee	VRT757
75x63x75mm	Reducer Tee	VRT767
90x40x90mm	Reducer Tee	VRT949
90x50x90mm	Reducer Tee	VRT959
90x63x90mm	Reducer Tee	VRT969
90x75x90mm	Reducer Tee	VRT979
110x40x110mm	Reducer Tee	VRT10410
110x50x110mm	Reducer Tee	VRT10510
110x63x110mm	Reducer Tee	VRT10610
110x75x110mm	Reducer Tee	VRT10710
110x90x110mm	Reducer Tee	VRT10910
160x110x160mm	Reducer Tee	VRT161016

12.) End cap

A permanent or temporary end of a branch of a water or heating Distribution system. Fully corresponding to the pressure range.



Size (D)	Description	CODE
20mm	End Cap	VEC1
25mm	End Cap	VEC2
32mm	End Cap	VEC3
40mm	End Cap	VEC4
50mm	End Cap	VEC5
63mm	End Cap	VEC6
75mm	End Cap	VEC7
90mm	End Cap	VEC9
110mm	End Cap	VEC10
160mm	End Cap	VEC16
200mm	End Cap	VEC20
250mm	End Cap	VEC25

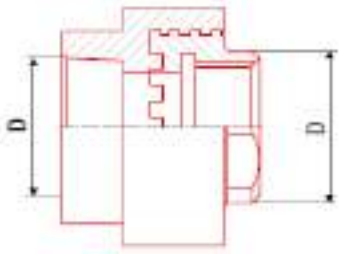
13.) Pipe Bridge

Allows for crossing of individual tracks of a water and Heating Distribution system. It is most often used for distribution systems in Floor or when avoiding vertical pipes.

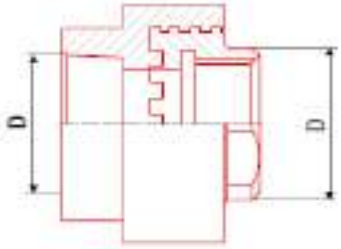
Size (D)	Description	CODE
20mm	Pipe Bridge	VB1
25mm	Pipe Bridge	VB2
32mm	Pipe Bridge	VB3

14.) Female Adaptor (NON – HEXAGONAL)

A fitting used for the transition from a welded part a water or Heating distribution system to brass screw joints and threaded Fittings.



Size (D)	Description	CODE
20x ½”	Female Adaptor	VFA10
25x ½”	Female Adaptor	VFA20
25x ¾”	Female Adaptor	VFA21
32X ½”	Female Adaptor	VFA30
32X ¾”	Female Adaptor	VFA31



15.) Female Adaptor (HEXAGONAL)

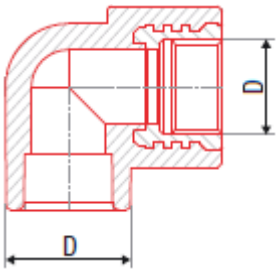
A fitting used for the transition from a welded part of a water or heating distribution system to brass screw joints and Threaded Fittings.

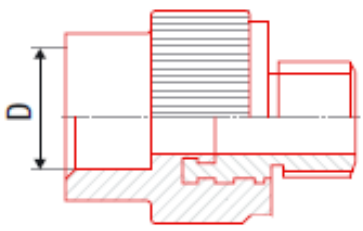
Size (D)	Description	CODE
32x 1”	Female Adaptor	VFA32
40x 1 ¼”	Female Adaptor	VFA43
50x 1 ½”	Female Adaptor	VFA54
63x 2”	Female Adaptor	VFA65
75x 2 ½”	Female Adaptor	VFA76
90x 3”	Female Adaptor	VFA97
110x 4”	Female Adaptor	VFA108

16.) Female Elbow 90°

A fitting used for the transition from a welded part of a water or heating distribution system to brass screw joints and threaded fittings.

Size (D)	Description	CODE
20x ½”	Female Elbow	VFE10
25x ½”	Female Elbow	VFE20
25x ¾”	Female Elbow	VFE21
32x ½”	Female Elbow	VFE30
32x ¾”	Female Elbow	VFE31
32x 1”	Female Elbow	VFE32





17.) Male Adaptor (NON – HEXAGONAL)

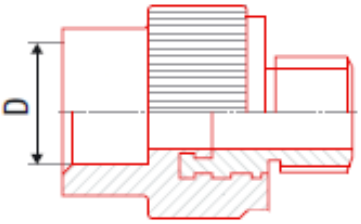
A fitting used for the transition from a welded part of a water or heating distribution system to brass screw joints and Threaded Fittings.

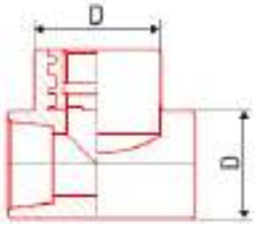
Size (D)	Description	CODE
20x ½”	Male Adaptor	VMA10
25x ½”	Male Adaptor	VMA20
25x ¾”	Male Adaptor	VMA21
32x ½”	Male Adaptor	VMA30
32x ¾”	Male Adaptor	VMA31

18.) Male Adaptor (HEXAGONAL)

A fitting used for the transition from a welded part a water or Heating distribution system to brass screw joints and threaded
Fittings.

Size (D)	Description	CODE
32x 1"	Male Adaptor	VMA32
40x 1 ¼"	Male Adaptor	VMA43
50x 1 ½"	Male Adaptor	VMA54
63x 2"	Male Adaptor	VMA65
75x 2 ½"	Male Adaptor	VMA76
90x 3"	Male Adaptor	VMA97
110x 4"	Male Adaptor	VMA108





19.) Female Tee

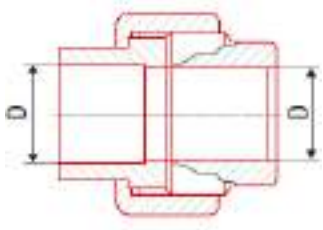
A fitting used for the transition from a welded part of a water or Heating distribution system to brass screw joints and threaded Fittings.

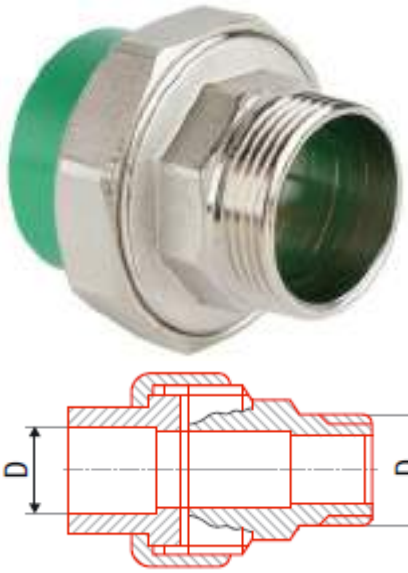
Size (D)	Description	CODE
20x ½"x20	Female Tee	VFT10
25x ½"x25	Female Tee	VFT20
25x ¾"x25	Female Tee	VFT21
32x ½"x32	Female Tee	VFT30
32x ¾"x32	Female Tee	VFT31
32x1"x32	Female Tee	VFT32

20.) Female Union

A fitting used for the transition from a welded part of a water or Heating distribution system to brass screw joints and threaded fittings.

Size (D)	Description	CODE
25x ¾"	Female Union	VFU25
32x1"	Female Union	VFU32
40x1¼"	Female Union	VFU43
50x 1½"	Female Union	VFU54
63x2"	Female Union	VFU65





21.) Male Union

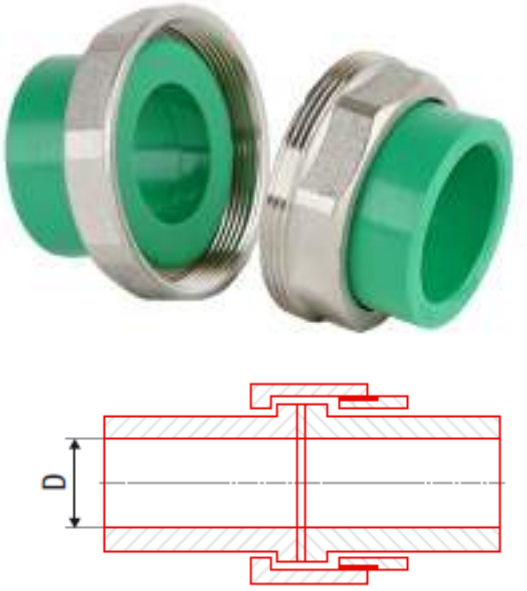
A fitting used for transition from a welded part of a water or Heating distribution system to brass screw joints and threaded fittings.

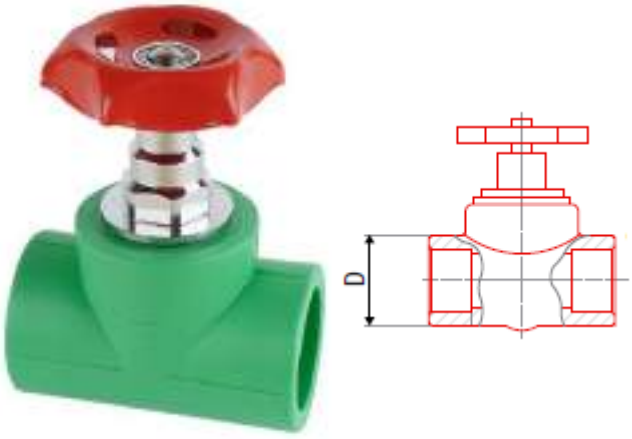
Size (D)	Description	CODE
20x ½"	Male Union	VMU10
25x ¾"	Male Union	VMU21
32x1"	Male Union	VMU32
40x1¼"	Male Union	VMU43
50x 1½"	Male Union	VMU54
63x2"	Male Union	VMU65
75x2 ½"	Male Union	VMU76

22.) Union Socket – Metal

A fitting used for the transition from a welded part of a water or Heating distribution system to brass screw joints and threaded fittings.

Size (D)	Description	CODE
20mm	Union Socket	VUS20
25mm	Union Socket	VUS25
32mm	Union Socket	VUS32
40mm	Union Socket	VUS40M
50mm	Union Socket	VUS50M
63mm	Union Socket	VUS63M
75mm	Union Socket	VUS75M





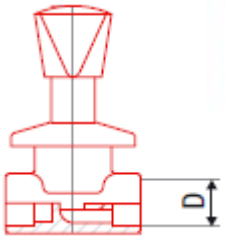
23.) Stainless Steel Non-Rising Stem Valve

Our straight-way plastic valve not only allows for the closure of a distribution system but also enables partial flow regulation in specific sections. With proper operation and maintenance, the replacement parts ensure an almost endless service life.

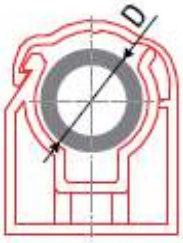
Size (D)	Description	CODE
20mm	S.S Non-Rising Stem Valve	VSSV1
25mm	S.S Non-Rising Stem Valve	VSSV2
32mm	S.S Non-Rising Stem Valve	VSSV3
40mm	S.S Non-Rising Stem Valve	VSSV4
50mm	S.S Non-Rising Stem Valve	VSSV5
63mm	S.S Non-Rising Stem Valve	VSSV6

24.) Chrome Plated Valve

An elegant concealed valve for closing branches of a Distribution System, intended for premises with higher aesthetic requirements Such as bathrooms, toilet rooms and wash rooms.



Size (D)	Description	CODE
20mm	Chrome Plated Valve	VCV1
25mm	Chrome Plated Valve	VCV2
32mm	Chrome Plated Valve	VCV3



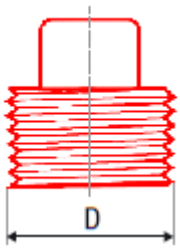
25.) Pipe Clamp

PP-RCT system accessory for fastening pipes.

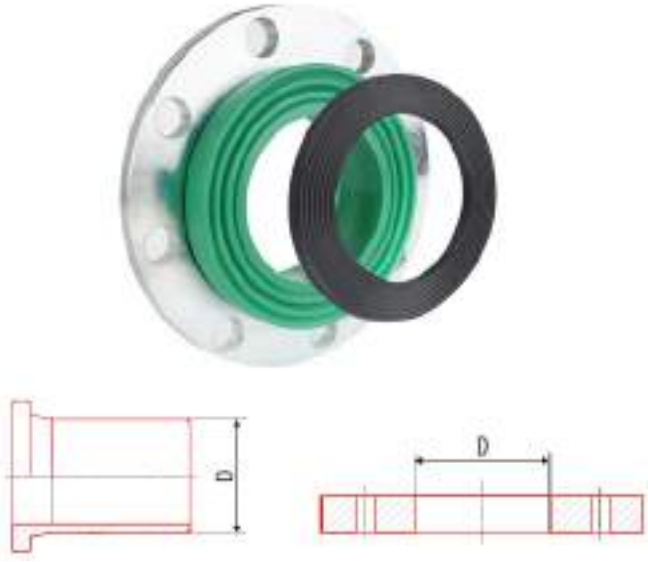
Size (D)	Description	CODE
20mm	Pipe Clamp	VPC1
25mm	Pipe Clamp	VPC2
32mm	Pipe Clamp	VPC3
40mm	Pipe Clamp	VPC4

26.) Test Plug

Temporary closure of threaded fittings in water or heating Distribution systems. It is used especially for blank wall-Mounted Tee fittings.



Size (D)	Description	CODE
½”	Test Plug	VPTP0



27.) Flange set

A fitting and steel flange used for the transition from a welded part of a welder or a piping distribution system to flange disconnectable parts.

Size (D)	Description	CODE
63mm	Flange Set	VFL6
75mm	Flange Set	VFL7
90mm	Flange Set	VFL9
110mm	Flange Set	VFL10
160mm	Flange Set	VFL16
200mm	Flange Set	VFL20
250mm	Flange Set	VFL25

28.) Welding Socket

To connect pipes to valves, fittings, or other pipe sections, it is recommended to use fillet-type seal welds. Socket welded joints construction is an excellent choice, especially when high leakage integrity and exceptional structural strength are critical design considerations.

Size	Description	CODE
20mm	Welding Socket	VWS1
25mm	Welding Socket	VWS2
32mm	Welding Socket	VWS3
40mm	Welding Socket	VWS4
50mm	Welding Socket	VWS5
63mm	Welding Socket	VWS6
75mm	Welding Socket	VWS7
90mm	Welding Socket	VWS9
110mm	Welding Socket	VWS10

29.) Pipe Cuter

A pipe cutter is a type of tool used by plumber to cut pipes. besides producing a clean cut, the tool is often a faster, cleaner, and more convenient way of cutting pipe

Size	Description	CODE
16-40 mm	Pipe Cuter	PC
16-160mm	PPR Cutter	VPC160
50-160mm	Special Pipe Cuter	SPC

30.) Welding Machine Set

Our PP-Rc Pipe Welding Machine is designed for welding PP-Rc pipes and fittings. It features a high-quality PTFE non-stick coating, ensuring smooth and efficient welding operations.

Size	Description	CODE
20-32 mm	Welding Machine	VWMB
40-110mm	Welding Machine	VSWM

31.) Adjustable Welding Machine Set

Our PP-Rc Pipe Welding Machine is specifically designed for welding PP-Rc pipes and fittings. It is equipped with a high-quality PTFE non-stick coating, ensuring smooth and efficient welding operations

Size	Description	Art. No.
110-200mm	Welding Machine	VBSWM

VIALLI GERMANY GmbH

Terminalstrasse Mittle 18, Munich, Bayern, 85356 Germany
Email: info@vialligmbh.de
Tel: +49 173 4674615

www.vialligmbh.de