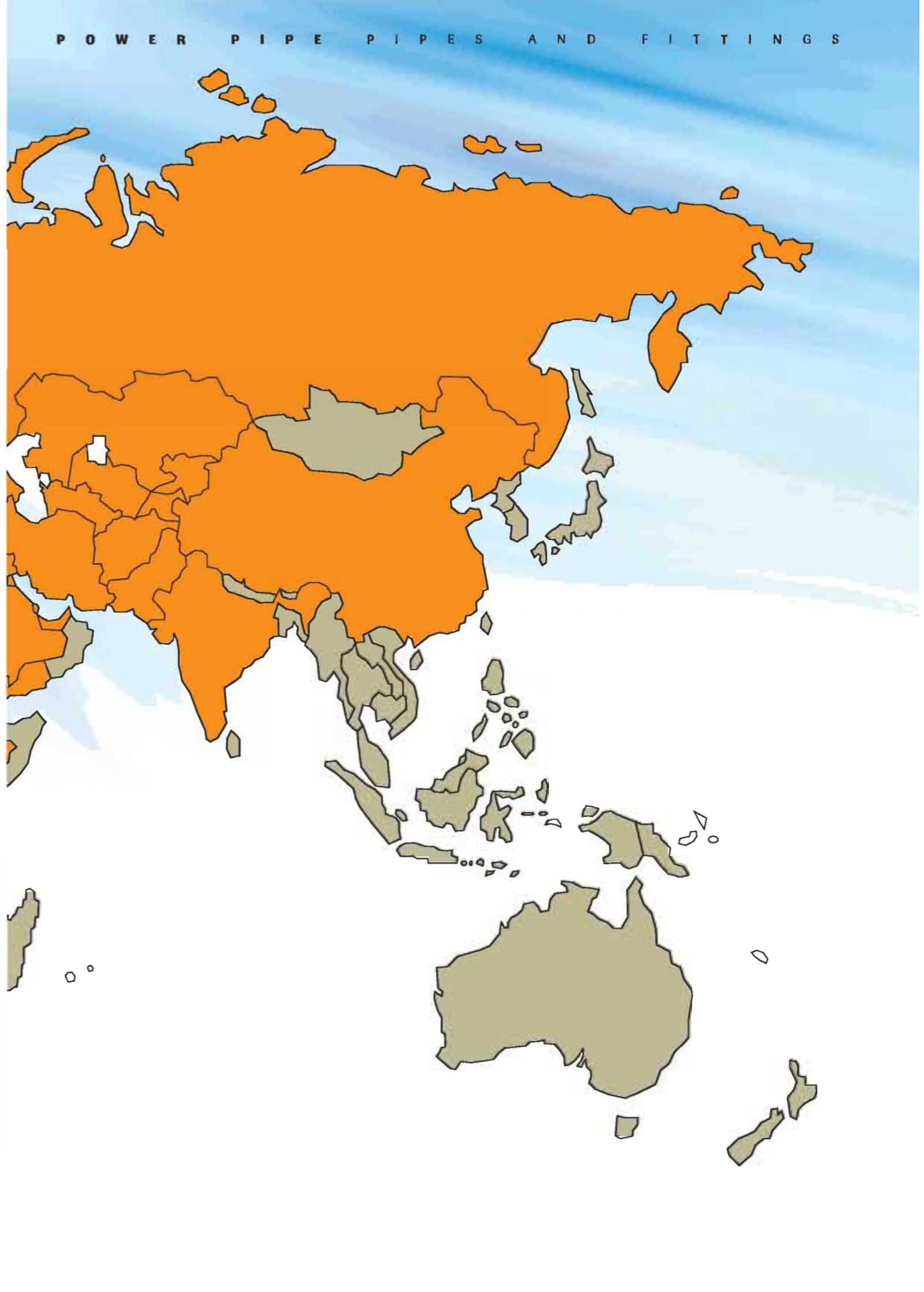


**FIRAT**

**RESIDENCE  
POWER PIPE**  
WASTE WATER SYSTEMS

**FIRAT**

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## FIRAT

FIRAT was established in 1972 to make production in the field of plastic construction materials. FIRAT, who has always followed its principle of "Quality Production at All Times" and "quality product diversity", has managed to become "the leader of sector" as well as "the export leader of sector" as a result of the serious enterprises.

With its plastic-based products, FIRAT makes production for various sectors like construction, agriculture, automotive, medical and white goods. It carries out its manufacturing process for these sectors in its factories of 650.000 m<sup>2</sup> in total in Istanbul-Buyukcekmece and Ankara-Sincan. FIRAT owns one of the five biggest manufacturing complexes of Europe.

According to the survey of Istanbul Chamber of Commerce in 2009, FIRAT ranks as the 53rd amongst the 500 big industrial establishments of Turkey. FIRAT ranks as the 48th one in the private sector ranking. According to the Corporate Tax Ranking of T.R. Ministry of Finance Revenue Administration Department in 2010, FIRAT is the 72nd amongst the top tax payer companies of Turkey. FIRAT ranks as the 150th in list of "Leader Exporting Manufacturers of Turkey in 2010", according to Turkey Exporters Committee and is the leader exporter in its sector.



As of the end of 2009, the number of personnel working under FIRAT structure is 1500. Believing in the understanding of "The most valuable factor is human", FIRAT has been constantly arranging in service trainings both for the personnel to increase their experience at work and their corporate knowledge.

### Product Diversity and Groups

Product diversity of FIRAT is over 4500. For our customers to obtain the optimum benefit and satisfaction out of these products, FIRAT makes production as integrated (completing one another) systems.

Thousands of FIRAT products like PVC Door and Window Profiles, PVC Rain Gutters and Fittings, PVC Drinking Water Pipes, PVC Waste Water Pipes, PVC Hose Groups, Rubber and PE Based Hoses, PPRC Sanitary Installation Pipes and Fittings, HDPE Pipes, EF Fittings, PE Fittings, PE 80 Natural gas Pipes, Tunnel Type Drainage Pipes, Drainage Pipes, Telecommunication Cable Protection Pipes, EPDM Sealing Manufacturing, TPE Sealing Manufacturing, Metal Injection Production (hinge and window connection components), PEX Mobile System and Floor Heating Pipes, PEX Pipe Metal Fittings, Pex Al Pex Pipe and PPSU Fittings, Drip Watering Pipes, Medical Products render service in numerous parts of Turkey and the world.

FIRAT Company - which has broken the world record by producing PE100 pipes of 1200 mm, 110 mm wall thickness and enduring up to 16 bars in the "Bosphorus Project", and has carried drinking water to the European side of Istanbul - now has performed a first in Turkey and has produced pipes of 500 meters length. These pipes are going to be used in a "purification of the sea - water project" in Libya. They were produced as 1400 mm PE100 pipes, withstanding 6,4 bars pressure with a wall thickness of 55 mm's. By producing these 6 pieces of 500 metersone - piece pipes, FIRAT is a pioneer in continuous pipe production for monolines for the first time in Turkey.

FIRAT manufactures FKS canalisation pipe, the testable operating life of which is 100 years. These pipes which can be manufactured up to 2400 mm diameter from HDPE (high density polyethylene) raw material are resistant against ground motion, gnawing animals, plant roots and chemical wastes. FKS pipes are manufactured with German company Kraih technology and licence.



Triplex pipes again manufactured in FIRAT facilities are used in outdoor installations and grounds as well as domestic connections, predominantly in sewer line, rain water drainage lines, industrial waste water installations, water conveying pipes and drainage systems.

Triplex pipe has big advantages like high flow performance, external load resistance, long operating life, transport and storage convenience, its becoming economic, endurance against chemical substances, price and maintenance convenience, imperviousness and filter-free operation choice.

FIRAT is the single firm in the world's plastic sector manufacturing all of the PVC window and door system components excluding glass and screw. Since full harmony of PVC window and door is only possible with integrated manufacturing process; FIRAT manufactures PVC Profile, EPDM seal, TPE seal, reinforcement steel and whole range of metal accessories in integrated manner within its facilities.

FIRAT is capable of conducting welding, heavy rain and wind resistance, blow and milled blow resistance, compression, shear and break-off strength ring rigidity (strength of FKS and Triplex pipes against soil load) tests in its the state-of-the-art test and analysis laboratories. Our products are offered to the service of our customers only after they are confirmed by the Quality Assurance Group related to their conformity to production, sale and outlet.

Following completion of all quality control tests, FIRAT products are offered to the market with "FIRAT Quality Assurance Confirmation". FIRAT holds international quality certificates such as RAL GOST, SKZ, EMI, DVGW, TSE as well as ISO 14001, OHSAS 18001, ISO 10002 and ISO 9001 system certificates.

FIRAT products achieved satisfaction of customers in more than 60 countries and deserved a distinguished place in the markets.



To develop, grow, struggle to achieve perfection through advanced technology and utilize all its resources in order to ensure long lasting customer satisfaction are the objectives of FIRAT.

Thanks to reliable, strong, easily accessible and easy-to-use products and perfect aftersale support, FIRAT achieves its target of perfection.

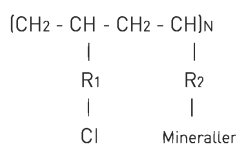
**FIRAT** Administration Building



# Rawmaterial

## FRVinylFlex®

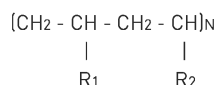
Firat Residence Power Pipe Waste Water Systems are produced with mixture of U-PVC and vinyl-copolymer (FRVinylFlex®) rawmaterial. Developed in the FIRAT research and development laboratories, FRVinylFlex is a mineral-based additive which gives Residence waste water systems with sound impermeability.



FRVinylFlex is a vinyl-copolymer enriched with various mineral at molecular base.

## Vinyl Kopolymer

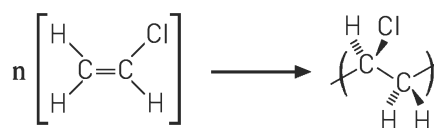
A polymer molecule which is a product of fusion of two different monomers is called as co-polymer. Vinyl-copolymer is a product of fusion of two different vinyl copolymers.



Viniyl-copolymer

## Poly Vinyl Chloride

Polymerization of a vinyl chloride  $\text{CH}_2=\text{CHCl}$  produces polyvinyl chloride (PVC).



Polyvinylchloride (PVC)

## PVC Rawmaterial Tests



Moisture Measurement Test



Viscosity and K Number Measurement Test

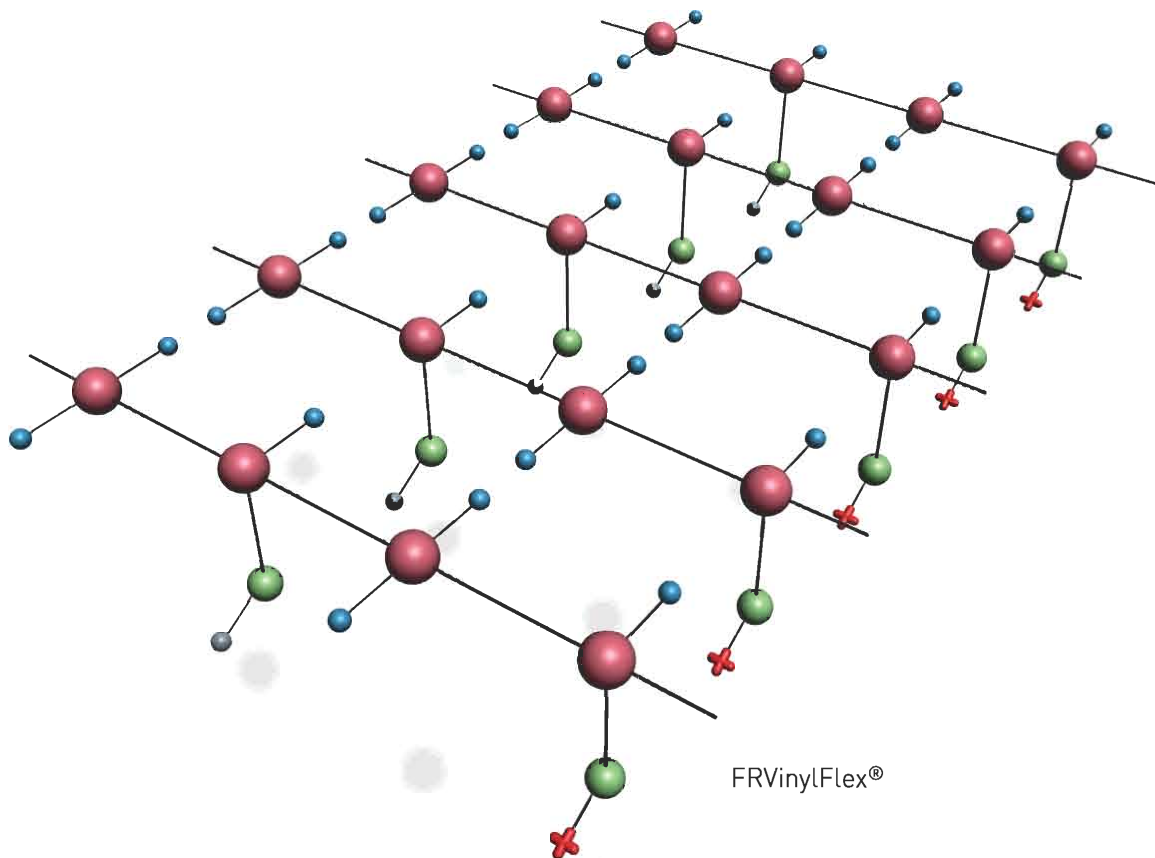


Grain Thickness Distribution Measurement Test



FIRAT FRVinylFlex and PVC rawmaterial-based Residence Power Pipe does not have any adverse effect on human health. It does not change colour, taste and smell of water.

PVC rawmaterial used in FIRAT Residence Pipe and Fittings are purchased from world-recognized quality rawmaterial producing companies such as PETKIM, ARKEMA, EVC, SOLVIN, SABIC etc. and rawmaterial is subjected to Input Quality Control tests such as mass density, grain thickness distribution, K number, viscosity number, moisture test in the FIRAT laboratories.



- Hydrogen
- Free Radical
- Carbon
- Chloride
- + Mineral

## Our Notion of Quality

Process of the quality control conducted in the laboratories of FIRAT is consisted of three stages:

1. Raw Material Quality Control
2. Process Quality Control
3. Final Quality Control

### **Raw Material Quality Control**

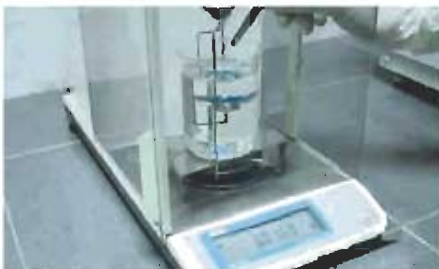
All types of raw materials and auxiliary materials from our suppliers are subject to Raw Material Control tests in accordance with the quality-manufacturing materials standards established by FIRAT. Samples taken as per the "acceptance sampling" from each lot of the raw materials and auxiliary materials received from our suppliers in lots should pass the test of physical conformance, chemical conformance, density, MFI, moisture, bulk density, viscosity, grain size distribution, K-number conducted in the laboratories of Inbound Raw Material Control and should be certified as "**Appropriate for Manufacturing**".

### **Process Quality Control**

In the process of manufacturing by using the raw materials and auxiliary materials certified as Appropriate for Manufacturing, the samples taken on the production lines and during and immediately after the production are kept subject to the Process Quality Control tests in the laboratories of FIRAT as specified by the national (TSE) and international (DVGW, SKZ, EN, DIN, etc.) standards and regularly recorded. Major Process Quality Control tests are as follows:

- \* Impact Strength (resistance against external factors)
- \* Hydrostatic Pressure Test (for products to operate under pressure lines)
- \* Elongation Test (resistance to heat)
- \* Density Test
- \* Homogeneity Test
- \* Melting Flow Rate Test
- \* Plasticity Control Test
- \* U Test (Sealing Test)

### **Quality Tests \***



Density Test



Melting Flow Rate Test



Homogeneity Test

During the Process Quality Control, the diameter, wall thickness and ovalness measurements are made full automatically and synchronous with the production by means of ultrasonic measuring equipment available on all production lines and thus any defective production is eliminated with audio and visual warning given when any off-standard situations are detected. Our products should pass all tests made in frequency and number as specified in the standards and get "Quality Certification".

#### Final Quality Control

After the automatic packaging and packing of our products certified in terms of quality should pass the controls made for Packaging Conformance, Packing Conformance, Identification and Labelling Conformance and get certification for "Appropriate for Shipping".

Furthermore, in addition to the quality control tests conducted in the laboratories of FIRAT all our products are taken from our production lines by the national (T.S.E.) and international (GOST for Russia and Ukraine) test and certification organizations regularly and twice a year for quality and hygiene conformity tests.

Having passed all these tests and satisfied the quality standard requirements, our products are offered to the use of our customers.

"FIRAT has the state-of-art quality, control and test laboratory in the sector."



Impact strength Test



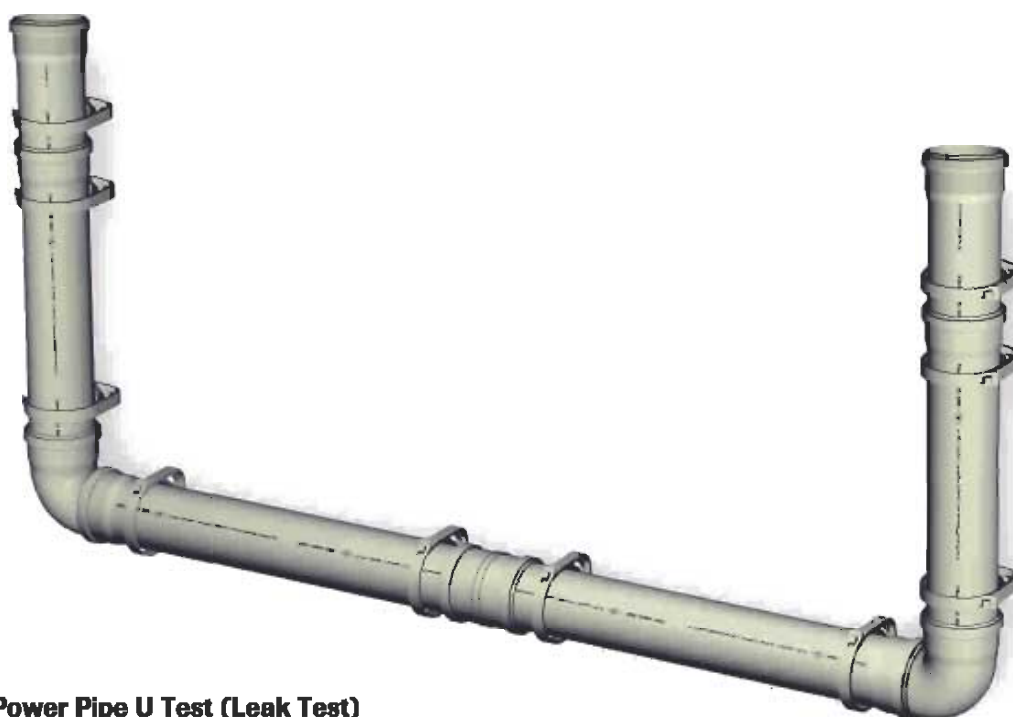
Pressure Test



U Test

### Physical and Mechanic Test Table for Residence Power Pipe

Test	Test Duration	Test Conditions	Result	Test Method
Impact Strength	-	0°C	Max. %10	TS EN 744
Vicat Softing Temperature	-	150°C	min. 79°C	TS EN 727
Elongation Test	30 minute	150°C	max. % 5 (Metod B)	TS EN 743
Dichloromethane Strength	30 minute	15°C	There should be failure on the surface	TS EN 580
Heat-Effect Test	30 minute	150°C	There should be no loose parts	TS EN 763
Leak Test	15 minute	23°C	There should be no leakage	TSEN1277



#### Residence Power Pipe U Test (Leak Test)

##### U Test (Fabrique Control System Test)

U test is an obligatory test that should be conducted on PVC Pipe and attachment systems. A U-shape mechanism is prepared by means of PVC Pipes and fittings in height of minimum 5m.

Water is given freely to this U-shaped system to conduct leak test. Thanks to the washers used on the system, any water leak from the joints is prevented.





## Our Quality Certificates



Smooth and polished inner surfaces of FIRAT Residence Power Pipe and Fittings neither allow bacterial growth nor create any smell.

Quality of Residence Power Pipe and Attachments are certificated and documented by the following organizations for their compliance with the health and food guidelines;



- TSE - Türk Standartları Enstitüsü (Türkiye) 
- GOST - Kalite ve Hijyen (Rusya) 
- GOST - Kalite ve Hijyen (Ukrayna) 
- IBP - Fraunhofer Yapıfiziği Enstitüsü (Almanya) 



## Corporate Training

Relying on the understanding of “**Human comes first**”, FIRAT invests in human. FIRAT provides its employees with miscellaneous regular intra-company training programs and offers them opportunities to join necessary training, seminar and congress events both within the country and abroad for the purpose of enhancing both their own corporate know-how and business performance.

FIRAT is the leading organization of its sector also in the area of corporate training through clearly and precisely conveying **targeted** results to its employees, ensuring its employees to enjoy and **efficiently** implement their assignments and become more participative in the processes, offering them all types of business, training and organization facilities and acting as a “**team**” with all its employees.

Primarily emphasizing the fact of knowledge-based progress in its training programs, FIRAT adopted the principles of utilizing knowledge and technology in its production processes and aftersale services through researcher and problem-solving, result-oriented employees and ensuring continuous customer satisfaction through regular personnel and dealer training programs.



FIRAT ISO Standard preparatory meeting, Brussels- Belgium



# Environment Friendly FIRAT

Producing by the use of “**Environmental Friendly Production Technologies**” since its foundation, FIRAT proves its sensitivity toward environmental health through its **Environmental Management System** established in 2002 and considers this area as a “**Window of Management**”.

Upon obtaining TS EN ISO 14001 2004 “**Environment Management System**” certificate from SGS in 2003, FIRAT had its sensitivity toward environmental health confirmed in national and international setting.

FIRAT not only retains its established environmental consciousness within its organization but also transforms this consciousness into an environmental policy and shares it with its neighbors, suppliers and customers. Especially during domestic and foreign seminars held for its end-users, FIRAT shares its efforts made toward environmental problems and importance that should be attached to the environmental health primarily with its business partners.

95% of the products of FIRAT consists of re-cycled, re-processable materials. It sends its non-household wastes and non-recyclable waste products to “**Disposal Facilities**” licensed by the Rep. of Turkey, Ministry of Environment and Forests and implements recycling process in these facilities.

**Environment Management Programs and Projects oriented to Environmental Health Protection** drawn up by the **Environmental Group** consisting of our environmental engineers are being realized within FIRAT organization.

Committing its compliance with all national and international **Environmental Legislative Directives** and **Environmental Regulations**, FIRAT fulfills all its legal liabilities and declares statutory assessment reports to the relevant Ministry.

FIRAT, awarded by ISO (Istanbul Chamber of Industry) with “**Environment Incentive Reward**” with its environmental project drawn up in 2006, always gives precedence to the importance of environmental health and shows necessary sensitivity in all its investments.



## General Information

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FIRAT Residence Power Pipe and Fittings are perfect for a waste water system, with its sound-impermeable, perfect physical structure since it is made of mineral-additive FR VinylFlex and PVC rawmaterial mix.

Residence Power Pipe waste water system enables silent and reliable discharge of waste water (either due to foundation or facility itself) without any leakage, is environment-friendly and economic as well as converses its physical structure in any condition for longer product service life in villas, multi-storey residences, hospitals, schools, hotels and any industrial and sportive buildings, etc.

Thanks to its mineral-reinforced FR VinylFlex's special formula and perfect physical structure, Residence Power Pipe waste water systems prevent any noise by trapping hums and vibrations due to water movements inside the installation.

Residence Power Pipe waste water systems are produced at wall thickness of BD application type defined according to Quality Standards of TS 275-1 EN 1329-1. Residence Power Pipe waste water systems contribute in improving quality of your life as well as market value of your structure thanks to its installation easiness, anti-corrosive, smooth internal and external surfaces, maintenance-free, outstanding physical properties not allowing bacterial growth and smell formation and very low level of sound permeability, compared to its counterparts.





Residence Power Pipe waste water systems meet your needs of any waste water discharge in your buildings with options of 50-135 mm external diameter and length of 150 - 6000 mm. Residence Power Pipe waste water systems are impermeable thanks to its snap ring, double jaw seal and fully compatible seal slot. Fast and Easy to install. It does not require exhausting workmanship such as cutting, bending and adhering.

Produced from PVC and rich mineral reinforced FRVinylFlex rawmaterial, Residence Power Pipe waste water systems are classified as B1 Flame-retardant building material in DIN 4102 Standards and National Fire Regulation. Residence Power Pipe waste water systems are non-flammable in any likely fire and do not allow fire passing between floors, thanks to this feature. (PP-based products are flammable and combustible). Therefore, it is specifically preferred for multi-storey buildings.



## Residence Power Pipe Waste Water Systems Specifications

### Noise

Noise can be defined as "as an undesired sound which has no meaning and having adverse effects on human". When considering this definition it can be told that sound is not necessarily be at higher levels to be considered as noise.

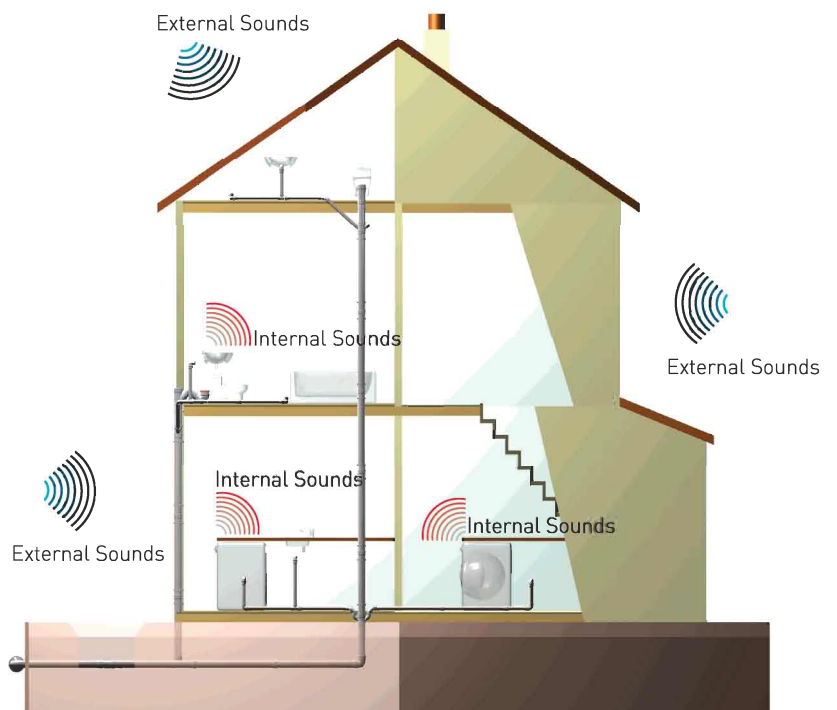
### Noise Pollution

Among factors which causes noise pollution, industrialization, traffic, unplanned urbanization, fast population increase and insufficient education thereon and economic insufficiencies etc. can be counted.

For residences, higher sounds of TV and musical devices, technical installations in the house, untimely maintenance and repairs and noises due to some workplaces affect hearing health and perception of people undesirably and deteriorates physiological and psychological balance and decreases job performance. Especially, noise densities are at very high levels in our metropolises and these levels are above the ones declared by World Health Organization.

### Some Acceptable Noise Levels

Application Area	Sound (dBA)
Watch tick tack	10
Silent environment	20
Conference Halls	30
Hospitals	35
Classrooms	45
Living Rooms	60
Streets	75
Factories	80
Motorcycle	110
Motor drill	120
Ear tolerance limit	140

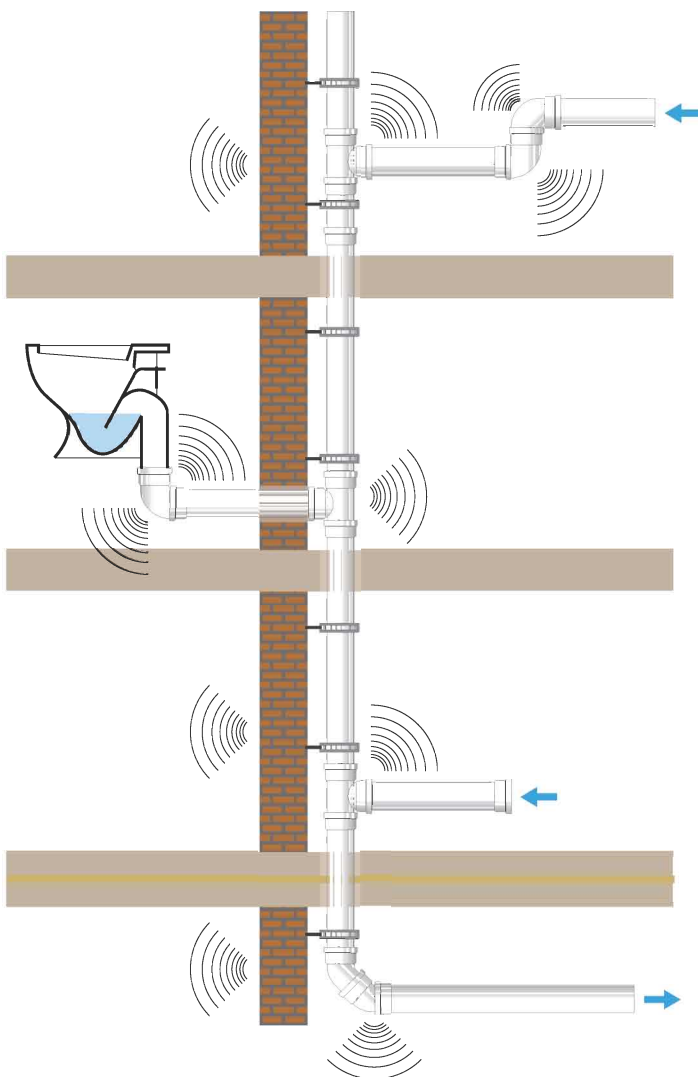


**Possible sources of noise according to DIN 4109 Norm**

External Environment, Traffic, Industry, people  
 Neighbours, guests in the same building.  
 Technical installation inside home, elevator, music installation,  
 kitchen appliances, sanitary installations and waste water installations.

**Noise formation in waste water systems.**

In waste water systems irregular noises caused by the water flowing inside the pipes are emitted into the environment in two different ways from the system as contact and air.



## Residence Power Pipe Waste Water Systems Specifications

### Noise and Its Effects

One of the measures that can be taken to decrease the noise and prevent the discomfort is to use self-insulated products and materials in the buildings.

Especially prevention of sound due to waste water installation is considered in specialty buildings such as hotels, hospitals, business complexes and luxurious residences in our country by using mineral reinforced pipes and recommending their use. Our engineers and architects are developing themselves in this subject with their facilities and efforts and contribute in sensitivity of our people in sound issue and improve the life quality.

### Adverse effects of noise on human

#### 1. Physical Effects:

Temporary or continuous hearing impairments.

#### 2. Physiological Effects:

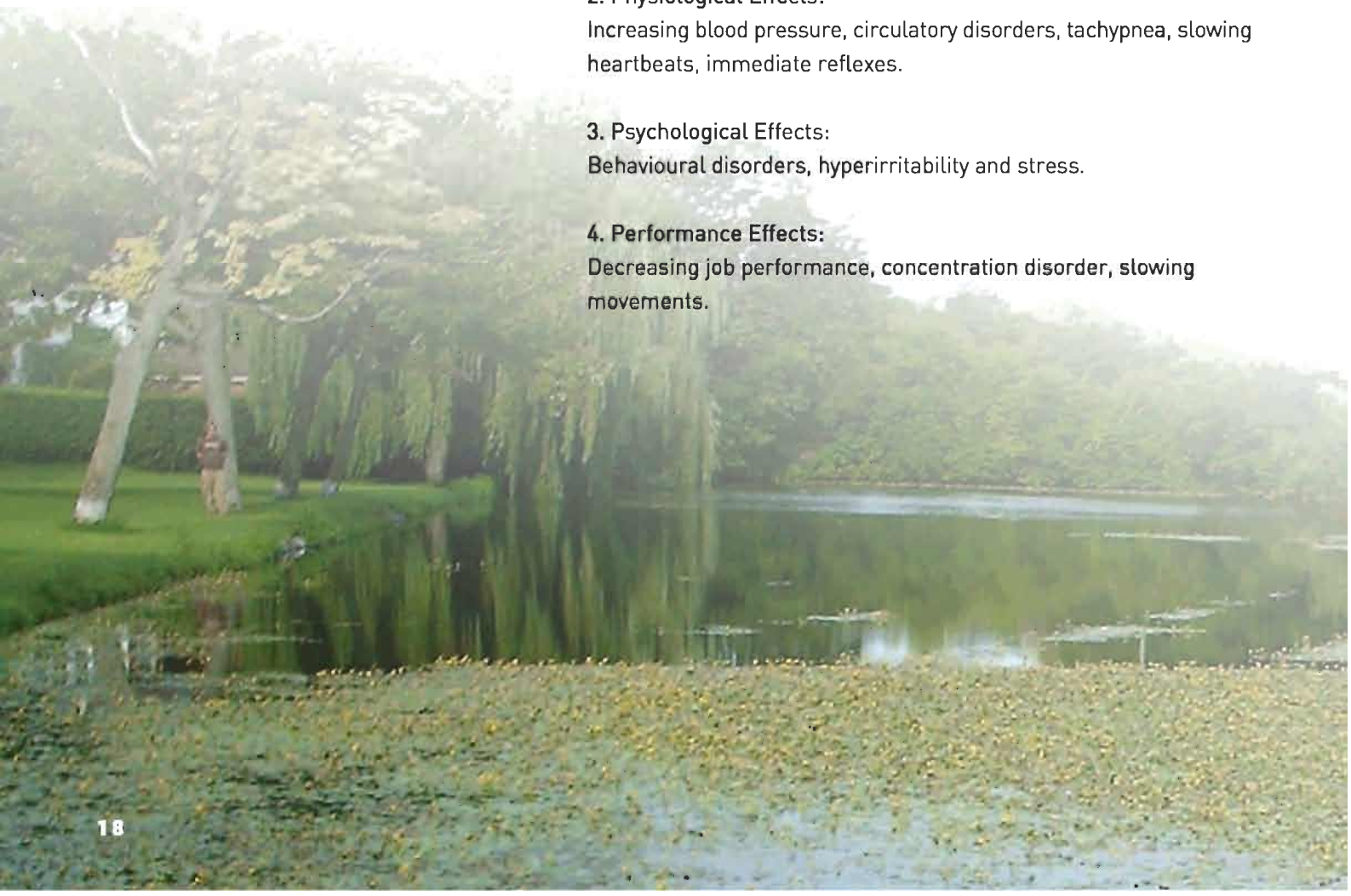
Increasing blood pressure, circulatory disorders, tachypnea, slowing heartbeats, immediate reflexes.

#### 3. Psychological Effects:

Behavioural disorders, hyperirritability and stress.

#### 4. Performance Effects:

Decreasing job performance, concentration disorder, slowing movements.





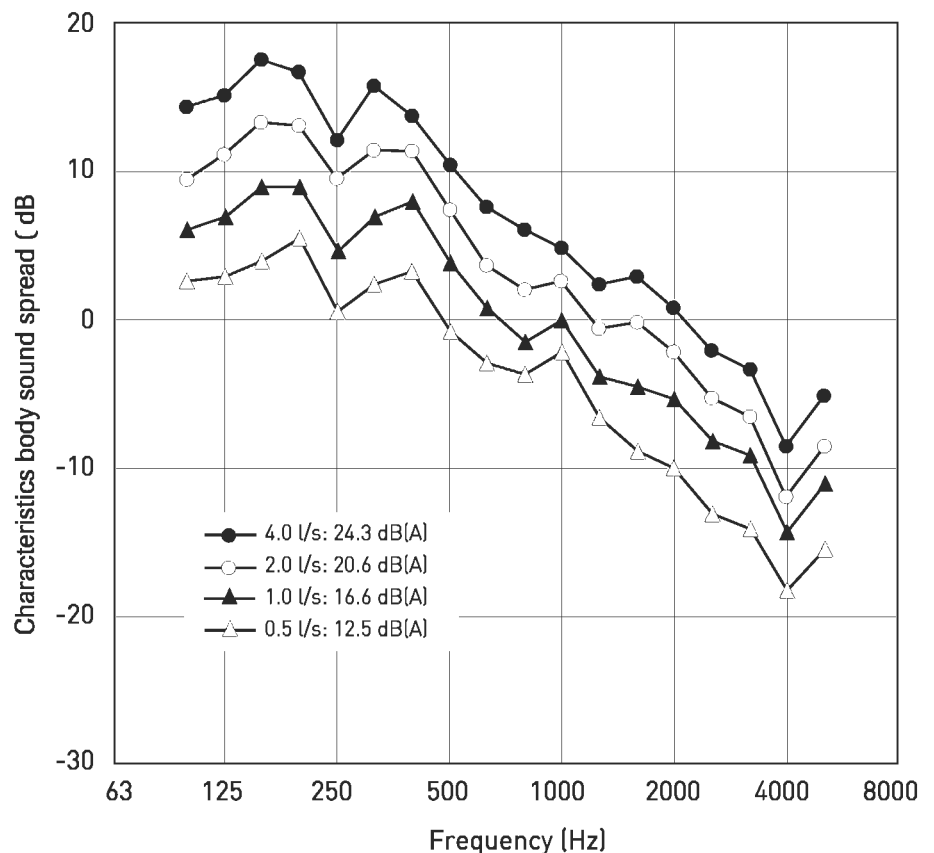
## Residence Power Pipe Waste Water Systems Specifications

### Residence Power Pipe Sound Measurement Performance

According to test report no P-BA 59/2008e dated as 18.02.2008 of German Fraunhofer Building Physics Institute sound performance, the characteristics body sound measurement performance is 10 dB of waste water installation with Firat Residence Power Pipe and Fittings at PVC-U BD SN4\* 3.2 mm of wall thickness and 110 mm of diameter at 0.5 l/s water flow.

\* Residence Power Pipe and Fittings are produced at wall thickness of BD application type defined according to Quality Standards of TS 275-1 EN 1329-1.

POWER PIPE 110 Pipe and 110 CLAMP Waste Water System Test 1				
Flow Rate (l/s)	0,5	1,0	2,0	4,0
Characteristics body sound spread $L_{sc,A}$ (dB(A))	10	14	19	24

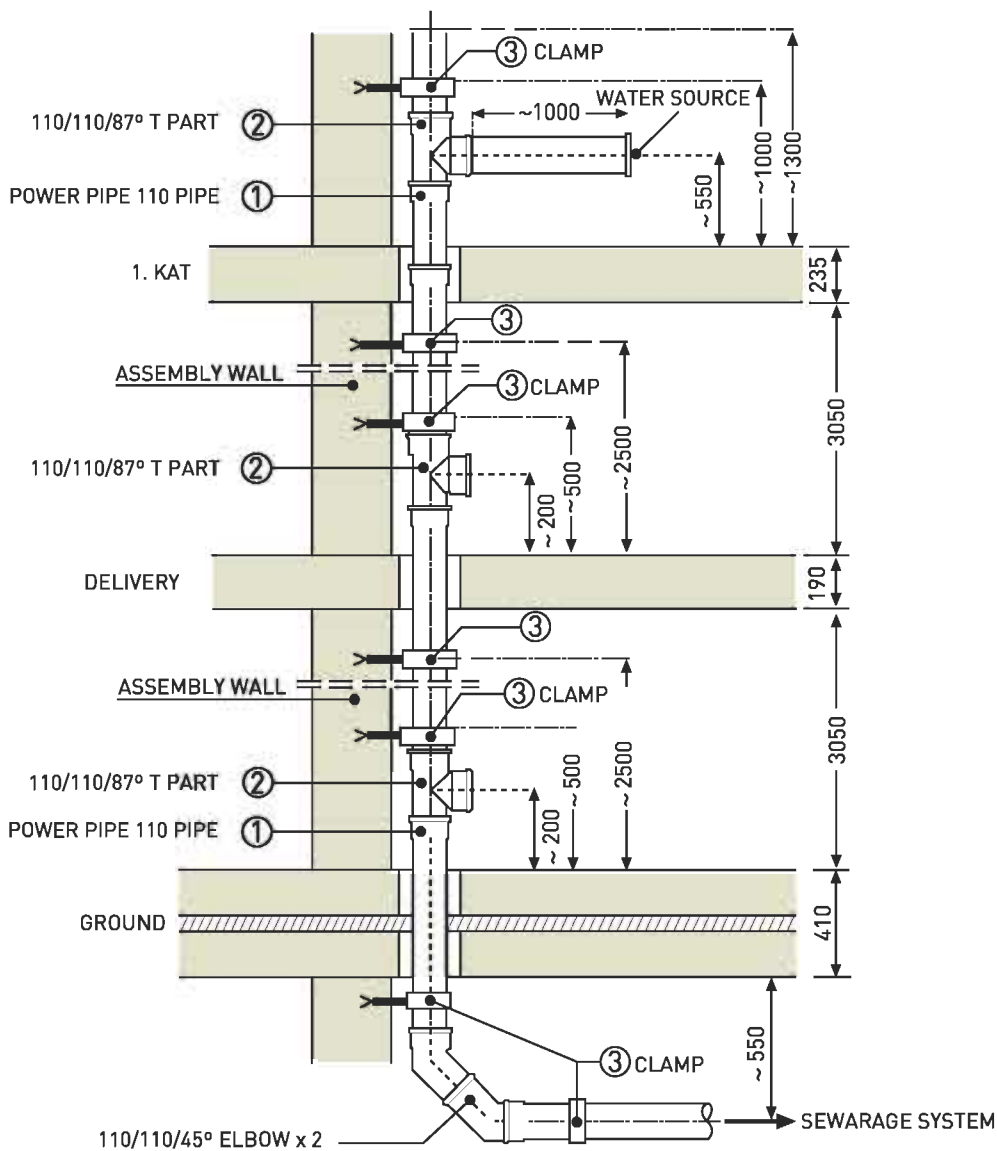


Characteristic sound level according to DIN EN 41366 Norm

Residence Power Pipe Sound Measurement Performance

Sound Measurement Formula

$$L_{n,AF,10} = 10 \cdot \lg \left( 10^{\frac{L_{w,r}}{10}} - 10^{\frac{L_{w,f}}{10}} \right) + 10 \cdot \lg \frac{A_n}{A_n} + k(A)_n$$



Measurement of Waste Water System Sound Spread in Laboratory Conditions	
Waste Water Pipe System	FIRAT RESIDENCE POWER PIPE
Sound spread measurement at foundation, basement, entrance floor and upper storeys, provided that clamps are used.	

## Residence Power Pipe Waste Water Systems Specifications

### Residence Power Pipe Technical and Physical Specs

Residence Power Pipe and Fittings meet the technical, chemical and physical properties stated in Standard TS 275-1 EN 1329-1 (Pipes, fittings and system specs).

#### Sound-Dampening Material

Residence Power Pipe and Fittings are produced with the rawmaterial obtained with then mixture of FR VinylFlex and PVC. Mineral-reinforced Residence Power Pipe waste water systems both absorb the contact sound as well as sound passage.

#### Length and Wall Thickness

Residence Power Pipe and Fittings are produced at wall thickness of BD application type defined according to Quality Standards of TS 275-1 EN 1329-1.

#### Uygulama Alanı Kodu

**B:** Bina içinde toprak üzerinde kullanılacak elemanlar için bina dışında duvara monte edilmiş elemanları kapsar.

**D:** Pipes and fittings used as buried under the earth under the building and within 1 meter outside the building in order for connection to underground drainage and sewerage systems.

**BD:** Covers the fittings of both application class.

External Diameter	External Diameter Tolerance	Wall Thickness (Class B) min.	Wall Thickness (Class BD ) min.
50	+0,2	3,0	3,0
75	+0,3	3,0	3,0
110	+0,3	3,2	3,2
125	+0,3	3,2	3,2
160	+0,4	3,2	4,0
200	+0,5	3,9	4,9
250	+0,5	4,9	6,2
315	+0,6	6,2	7,7



## Quality Control

Residence Power Pipe and Fittings are under the quality and control guarantee of Firat at all stages including rawmaterial, production and storage. All of our product must have "Quality Approval" after passing all the tests conducted in accordance with control frequency and number stated in standards.

## Residence Power Pipe Flame-Retardant

Since Residence Power Pipe and Fittings are produced from hard PVC material which is defined as high flame-retardant material in Class B1 of DIN 4102 Standards and National Fire Regulation, they are flame-retardant and does not allow fire to pass from one storey to the other in case of a fire.



## Residence Power Pipe Waste Water Systems Specifications

### Residence Power Pipe Technical and Physical Specs

#### Physical Properties of Residence Power Pipes

1. Vicat Softening Temperature (min. 79 °C) [TS EN 727].
2. Lengthwise Dimension Change (TS EN 743)-(15 minutes 150 °C) ( $\leq 5\%$ ).
3. Dichloromethane resistance at specified temperature (15 °C - 30 minutes).

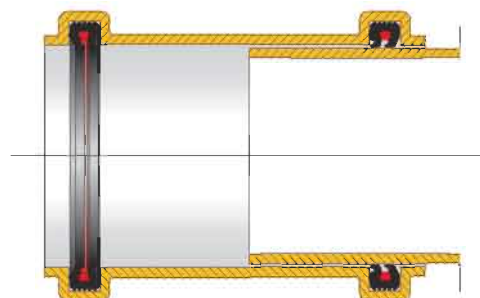
#### Physical Specs of Residence Power Pipe Fittings

1. Vicat Softening Temperature (min. 79 °C) [TS EN 727].
2. Temperature effect (150 °C - 30 minutes).
  - a) The depths of cracks, flaking or cavitations occurred in an area with a diameter 15 times than the wall thickness around the injection point must not be more than 50% of wall thicknesses at that point.
  - b) The length of the cracks occurred within a distance 10 times than wall thickness at ring slot must not be more than 50% of wall thickness at that point.
  - c) The gap in the joining line must not be more than 50% of wall thickness at that line.
  - d) The depths of peeling-offs in any other region of the part must not be more than 30% of wall thickness and its length must not be more than 10% of wall thickness.

#### Mechanical Specs of Residence Power Pipe Fittings

It must comply with TS 2171-1 EN 1401-1.

1. Mechanical Resistance or Flexibility [TS EN 12256].
2. Impact Resistance [TS prEN 12061].



## Snap Ring Seal

Residence Power Pipe and Fittings are impermeable with its double jaw snap ring seal and fully-compatible muff slot.



**Colour**  
Grey RAL 7004

## Residence Power Pipe Waste Water Systems Specifications

### Sound System Structure

Mineral reinforced Power Pipe waste water systems have high resistance against impact, corrosion and chemicals. With system integrity that is long life, complete and maintenance-free, they can be used in all structures for longer years.

### Different Diameter and Length Options

Residence Power Pipe and fittings meet your needs of waste water discharge in your buildings with options of diameter of 50-135 mm and length of 150 - 6000 mm.

### Smooth Internal and External Surfaces

Thanks to its smooth, glossy internal and external surfaces, Residence Power Pipe does not allow residuals, deposits, bacteria, smell and clogging in your waste water installation and makes flow performance better.

### Easy and Fast Installation

System Installation of Residence Power Pipe and fittings is easy and fast. It does not require exhausting workmanships such as maintenance, repair, cutting, bending and adhering etc.

### Easy to Handle and Storage

Residence Power Pipes and fittings can be stacked on top of each other in an alternative manner and stacked telescopically easily thanks to its rigidity, providing advantage in storage and handling.



### Residence Power Pipe Noise-Dampening

Aimed at increasing life quality of people, continuous technological development of today's world surpasses old technologies after some time. Produced with the rawmaterial developed in Firat R&D laboratories by combining mineral reinforced vinyl-copolymer which has noise dampening feature (FRVinylFlex®) with PVC, Residence Power Pipe Waste Water Systems has high sound isolation performance and sound physical features.

Mineral-reinforced Residence Power Pipe waste water systems both absorb the contact sound as well as sound passage.



**Residence Power Pipe Waste Water Systems Specifications**

**Resistance of Power Pipe Waste Water Systems Against Chemicals**

**Classification of Power Pipe Waste Water Systems according to Resistance against Chemical Materials**

Substance	Concentration %	20°C	80°C
Adipic Acid	sat. sol.	D	SD
Acrylonitrile	ts-s		
Allyl Alcohol	ts-s	SD	DZ
Aluminum Fluoride	susp.	D	DZ
Aluminum Hydroxide	susp.	D	D
Aluminum Oxychloride	susp.	D	D
Aluminum Potassium Sulphate	sat. sol.	D	D
Amyl Alcohol	ts-s	D	SD
Amyl Acetate	ts-s	DZ	DZ
Ammonia, dry gas	ts-g	D	D
Ammonia, aqueous	sat. sol.	D	D
Ammonium Fluoride	up to 20	D	SD
Ammonium Metaphosphate	sat. sol.	D	D
Ammonium Hyd. Carbonate	sat. sol.	D	D
Ammonium Persulfate	sat. sol.	D	D
Ammonium Thiocyanate	sat. sol.	D	D
Ammonium Sulphur	sat. sol.	D	D
Aniline	ts-s	DZ	DZ
Antimon (III) Chloride	sat. sol.	D	D
Acetane Hydride	ts-s	DZ	DZ
Acetophenon	ts-k	DZ	DZ
Acetone	ts-s	DZ	DZ
Copper (II) Chloride	sat. sol.	D	D
Copper (II) Nitrate	sat. sol.	D	D
Formy	sat. sol.	D	D
Barium Hydroxide	sat. sol.	D	D
Barium Carbonate	sat. sol.	D	D
Barium Sulphate	sat. sol.	D	D
Benzaldehyde	ts-s	DZ	DZ
Benzene	ts-s	DZ	DZ
Gasoline (Fuel)	opt. sol.	D	D
Benzoic Acid	sat. sol.	SD	DZ
Beer	opt. sol.	D	D
Yeast	susp.	D	SD
Borax	sol.	D	D
Bromine, gaseous	ts-g	DZ	DZ
Bromine, liquid	ts-s	DZ	DZ
Butadien, gaseous	ts-g	D	D
Butane, gaseous	ts-g	D	D
Mercury	ts-s	D	D
Mercury (I) Nitrate	sol.	D	D
Mercury (II) Chloride	sat. sol.	D	D
Zinc Chloride	sat. sol.	D	D
Zinc Nitrate	sat. sol.	D	D

Classification of Duplex PVC Pipe and Fittings according to Resistance against Chemical Materials

Substance	Concentration %	20°C	60°C
Zinc Oxide	susp.	D	D
Zinc Sulphate	sat.sol.	D	D
Iron (II) Nitrate	sat.sol.	D	D
Iron (II) Sulphate	sat.sol.	D	D
Iron (III) Sulphate	sat.sol.	D	D
Dichloro Acetic Acid	ts-s	DZ	DZ
Dichloro Ethylenes	ts-s	DZ	DZ
Diocetyl Phthalate	ts-s	DZ	DZ
Apple Juice	opt.sol.	D	D
Ethanol Amide	ts-s	DZ	DZ
Ethyl Ether	ts-s	DZ	DZ
Ethyl Chloride	ts-g	DZ	DZ
Ethylene Glycol	ts-s	D	D
Fior, , gaseous, humid	ts-g	DZ	DZ
Formaldehyde	dil.sol.	D	SD
Phosphine	ts-g	D	D
Phosphorus Oxalklorür	ts-s	DZ	DZ
Glycerin	ts-s	D	D
Glucose	sol.	D	D
Air	ts-g	D	D
Hydrogen	ts-g	D	D
Hydrogen Sulphure	ts-g	D	D
Hydroquinone	sat. sol.	D	D
Hydrochloric Acid	up to 10%	D	D
Urinary		D	SD
Isopropyl Alcohol	ts-s	D	D
Gelatine	sol.	D	D
Tin (II) Chloride	sat. sol.	D	D
Calcium Hydrogen Sulphure	sol.	D	D
Calcium Hydroxide	sat. sol.	D	D
Calcium Carbonate	susp.	D	D
Calcium Chlorate	sat. sol.	D	D
Calcium Nitrate	sat. sol.	D	D
Calcium Sulphate	susp.	D	D
Carbon dioxide, moist gas	ts-g	D	D
Carbon dioxide, aqueous sol.	sat. sol.	D	D
Carbone Disulphide	ts-s	DZ	DZ
Carbon monoxide, gas	ts-g	D	D
Carbonchloride	ts-s	DZ	DZ
Chloro Benzene	ts-s	DZ	DZ
Chloro Ethanol	ts-s	DZ	DZ
Chloroform	ts-s	DZ	DZ
Chloromethane, gaz	ts-g	DZ	DZ
Chlorosulphonic Acid	ts-k	SD	DZ

**Abbreviations and Symbols**

- ts - s Liquid at Technical Purity
- ts - g Gas at Technical Purity
- sat. sol Saturated Solution
- s. sol Operating solution, the concentration most widely used in the industry
- Sol. Solution
- D Durable
- SD Limited durability. Little corrosion may occur
- DZ Weak

## Residence Power Pipe Waste Water Systems Specifications

## Resistance of Power Pipe Waste Water Systems Against Chemicals

Classification of Power Pipe Waste Water Systems according to Resistance against Chemical Materials

Substance	Concentration %	20°C	60°C
Cresols	ts-s	DZ	DZ
Chromium Alum	sol.	D	D
Lead Acetate	dil.sol.	D	D
Sulphur dioxide		D	D
Lactic Acid	ts-s	SD	DZ
Magnesium Hydro	sat. sol.	D	D
Magnesium Carbonate	susp.	D	D
Magnesium Chloride	sat. sol.	D	D
Magnesium Nitrate	sat. sol.	D	D
Magnesium Sulphate	sat. sol.	D	D
Maleic Acid	sat. sol.	D	SD
Malic Acid	sol.	D	D
Methyl Alcohol	ts-s	D	SD
Methyl Acetate	ts-s	DZ	DZ
Methyl Ethyl Ketone	ts-s	DZ	DZ
Methylene Chloride	ts-s	DZ	DZ
Mineral Oil	opt.sol.	D	D
Nafta	opt.sol.	DZ	DZ
Nickel Chloride	sat. sol.	D	D
Nickel Nitrate	sat. sol.	D	D
Nickel Sulphate	sat. sol.	D	D
Nitric Acid	up to 46%	D	SD
Nitrobenzene	ts-s	DZ	DZ
Oxygen gas	ts-g	D	D
Oleic Acid	ts-s	D	D
Oxalic Acid	sat. sol.	D	D
Oleum		DZ	DZ
Pikric Acid	sat. sol.	D	D
Pyridine	ts-s	DZ	
Potassium Bicarbonate	sat. sol.	D	D
Potassium Blauphate	sat. sol.	D	D
Potassium Borate	sat. sol.	D	D
Potassium Fluoride	sat. sol.	D	D
Potassium Hexacyanferate (I)	sat. sol.	D	D
Potassium Hydrogen Sulphide	sol.	D	D
Potassium Hydroxide	sol.	D	D
Potassium Carbonate	sat. sol.	D	D
Potassium Chlorate	sat. sol.	D	D
Potassium Chloride	sat. sol.	D	D
Potassium Nitrate	sat. sol.	D	D
Potassium Persulphate	sat. sol.	D	SD
Potassium Cyanide	sat. sol.	D	D
Potassium Sulphate	sat. sol.	D	D
Potassium Sulphide	sat. sol.	D	D



Classification of Power Pipe Waste Water Systems according to Resistance against Chemical Materials

Substance	Concentration %	20°C	80°C
Soap	sol.	D	SD
Cyclohexanone	ts-s	DZ	DZ
Vinagar	opt. sol.	D	D
Citric Acid	sat. sol.	D	D
Sodium Antimonate	sat. sol.	D	D
Sodium Arsenide	sat. sol.	D	D
Sodium Bicarbonate	sat. sol.	D	D
Sodium Bisulphate	sat. sol.	D	D
Sodium Bromide	sat. sol.	D	D
Sodium Dichromate	sat. sol.	D	
Sodium Ferricyanide	sat. sol.	D	D
Sodium Ferriyanide	sat. sol.	D	D
Sodium Floride	sat. sol.	D	D
Sodium Hydrogen Sulphide	sat. sol.	D	D
Sodium Carbonate	sat. sol.	D	D
Sodium Chlorate	sat. sol.	D	D
Sodium Chloride	sat. sol.	D	D
Sodium Nitrate	sat. sol.	D	D
Sodium Nitrite	sat. sol.	D	D
Sodium Silicate	sol.	D	D
Sodium Cyanide	sat. sol.	D	
Sodium Sulphate	sat. sol.	D	D
Sodium Sulphate	sat. sol.	D	SD
Water		D	D
Water, Distilled		D	D
Water, Sea		D	D
Water, Service		D	D
Water, Mineral		D	D
Water, Fresh		D	D
Water, Salt		D	D
Sulphuric Acid	up to 50%	D	D
Milk	opt. sol.	D	D
Wine	opt. sol.	D	D
Glucose Solution	sol.	D	D
Tannic Acid	sol.	D	D
Tartaric Acid	sol.	D	D
Tetrahydrofuran	ts-s	DZ	DZ
Toluene	ts-s	DZ	DZ
Trichloroethylene	ts-s	DZ	DZ
Turnip Juice	opt. sol.	D	D
Vinyl Acetate	ts-s	DZ	DZ
Whisky	opt. sol.	D	D
Oils (Vegetable and Animal)	ts-s	D	D

**Abbreviations and Symbols**

ts - s Liquid at Technical Purity

ts - g Gas at Technical Purity

sat.sol Saturated Solution

o.sol Operating solution, the concentration most widely used in the industry

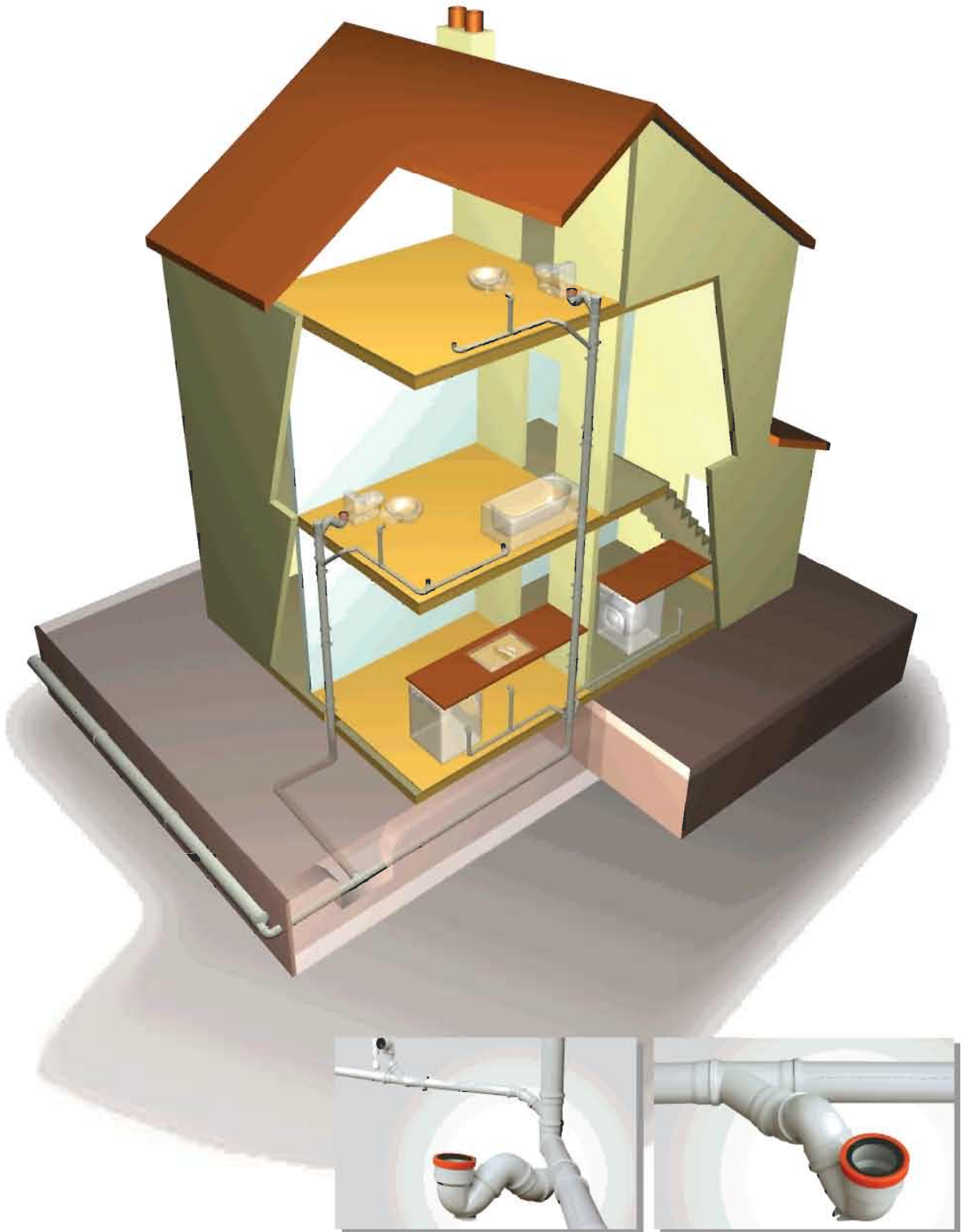
Sol. Solution

D Durable

SD Limited durability. Little corrosion may occur

DZ Weak

**Residence Power Pipe Waste Water  
Systems Specifications**



## Residence "POWER PIPE" Waste Water Systems

Developed in Firat laboratories, Residence Power Pipe waste water systems have outstanding technical and physical properties.

- \* High sound insulation
- \* Powerful physical structure
- \* Flame-Retardant rawmaterial
- \* Impermeable thanks to snap ring seal.
- \* Resistance against Chemicals
- \* Smooth internal and external surfaces
- \* Fast and smooth flow performance
- \* Fast and Easy Installation
- \* Rich length and diameter availability
- \* Maintenance-free thanks to system integrity



RESIDENCE PIPE  TS 2

## Residence Power Pipe Waste Water Systems Specifications

### Residence Power Pipe Installation Method



1- Liquid soap etc. lubricants are applied to the jaw section of the seal which will come into contact with pipe, if necessary. The joint section of the pipe or fitting to be applied is cleaned.



2- Lubricant is applied to the joint section of pipe or fitting that will come into contact with seal and it is joined.



3- Installation is completed by joining pipes and fittings.

- Residence "POWER PIPE" Seal
- Maintaining Impermeability
- Flexible Lip
- Muff Slot
- Snap Ring
- Tightness Spikes

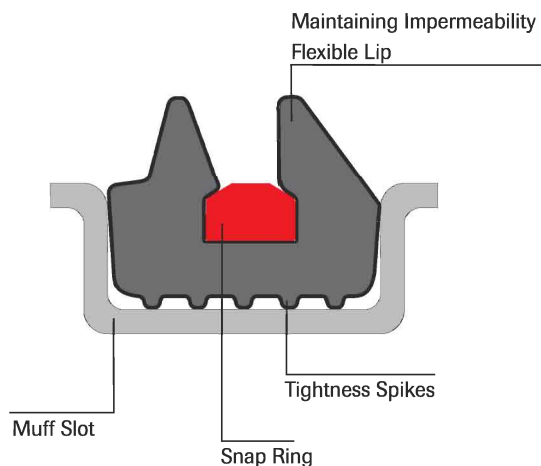
### Seal Installation Method



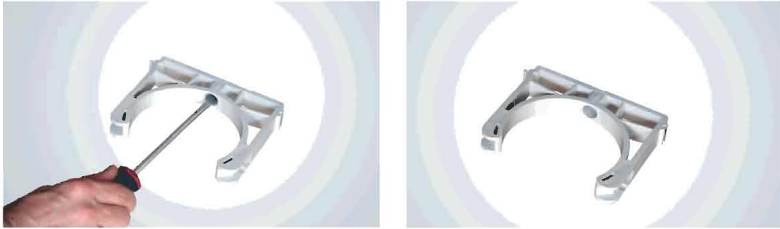
The muff opening and seal slot of the pipe are cleaned until no dust particles, moisture etc. are left. Snap ring seal is placed into the muff slot as its spiked external side will be towards cleaned seal slot bottom and jawed internal side towards the pipe center and so the installation is completed.



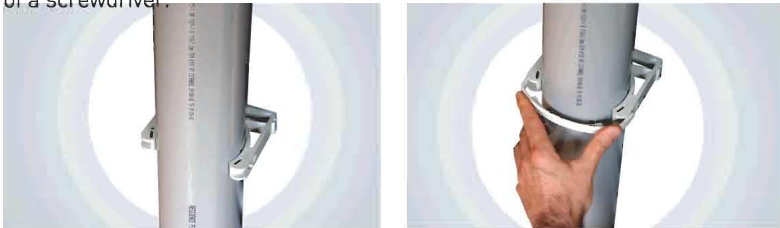
Residence "POWER PIPE" Seal



### Residence Power Pipe Clamp Installation Method



1- Clamp is attached to the wall where the pipe will be assembled with the help of a screwdriver.



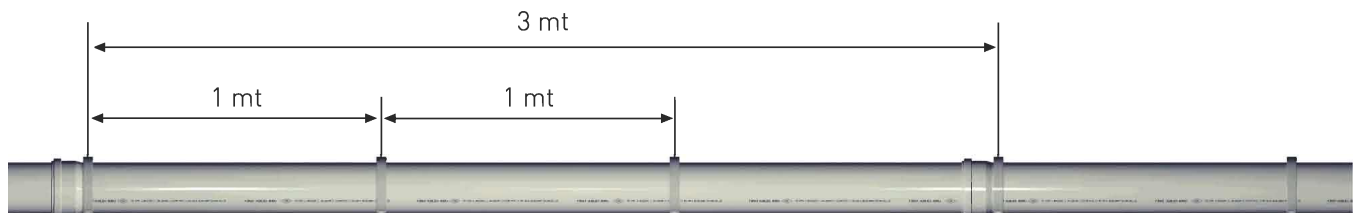
Pipe is placed in the clamp and rim of the clamp is closed easily.



3- So, clamp attachment is completed easily.

### Residence Pipe Clamp Distance

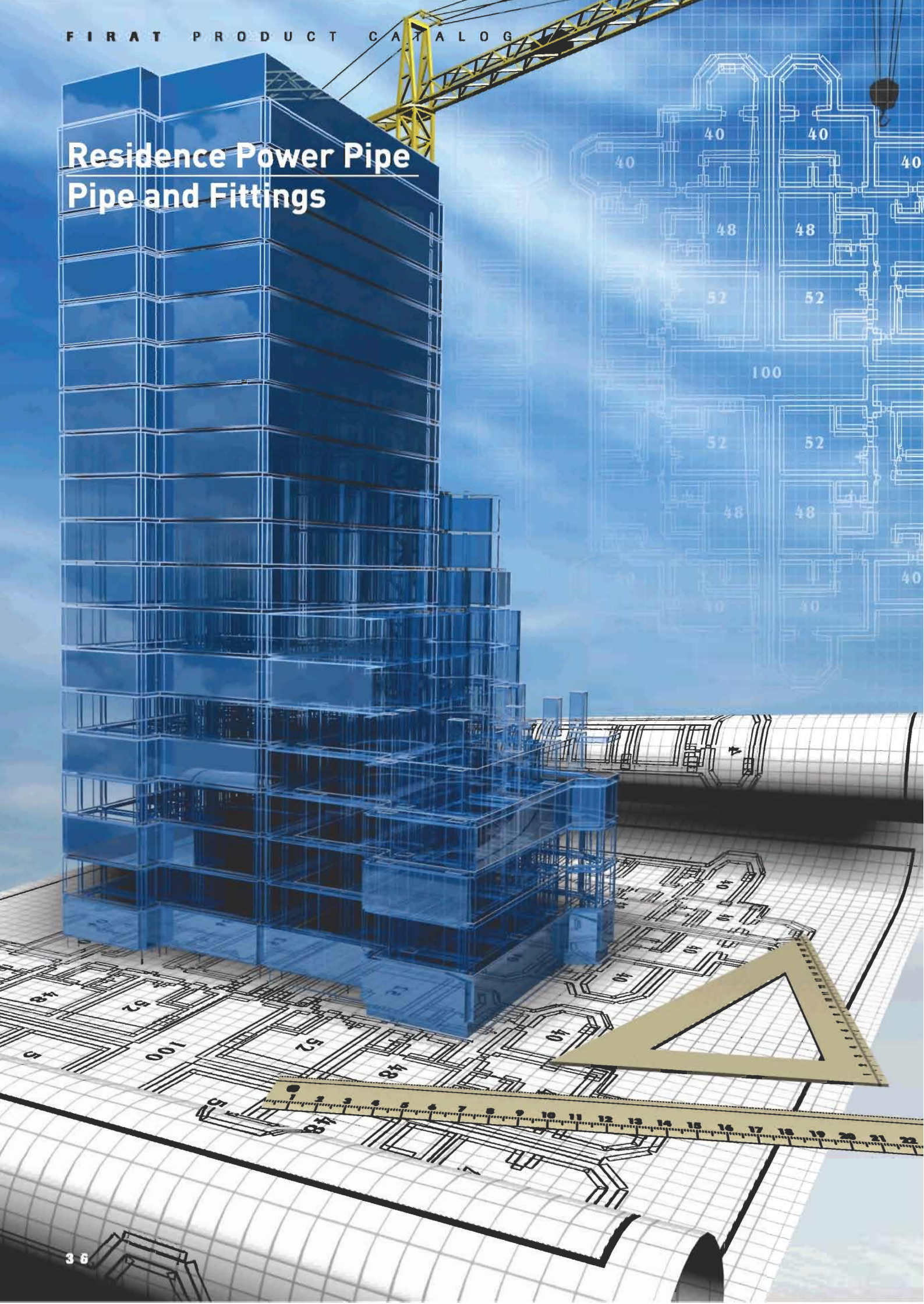
Clamp distance must be 1 metre in installation of Residence Pipe and Fittings.



### Test After Installation

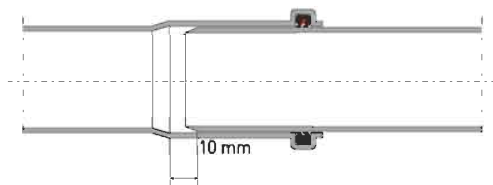
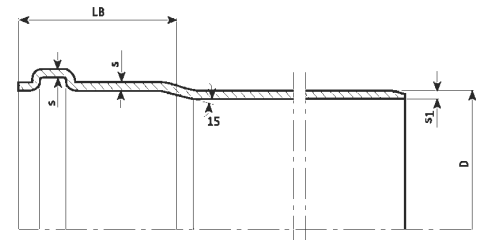
System must be fed with water, in order to control leakage at all joining points after installation of the power pipe waste water pipes and fittings.

# Residence Power Pipe Pipe and Fittings



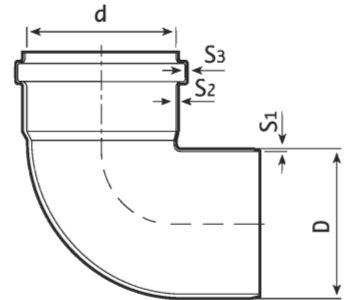
**RESIDENCE POWER PIPES**

Code	Diameter Ø (mm)	Lenth L (mm)	Pieces	Packing Type
7050050015	50	150	100	Packet
7050050025	50	250	80	Packet
7050050050	50	500	20	Bundle
7050050100	50	1000	10	Bundle
7050050200	50	2000	10	Bundle
7050050300	50	3000	10	Bundle
7050050600	50	6000	1	Pieces
7050070015	75	150	50	Bundle
7050070025	75	250	30	Bundle
7050070050	75	500	10	Bundle
7050070100	75	1000	5	Bundle
7050070200	75	2000	5	Bundle
7050070300	75	3000	5	Bundle
7050070600	75	6000	1	Pieces
7050100015	110	150	25	Bundle
7050100025	110	250	20	Bundle
7050100050	110	500	10	Bundle
7050100100	110	1000	5	Bundle
7050100200	110	2000	5	Bundle
7050100300	110	3000	5	Bundle
7050100600	110	6000	1	Pieces
7050125015	125	150	25	Bundle
7050125025	125	250	25	Bundle
7050125050	125	500	10	Bundle
7050125100	125	1000	5	Bundle
7050125200	125	2000	5	Bundle
7050125300	125	3000	5	Bundle
7050125600	125	6000	1	Pieces
7050150015	160	150	15	Bundle
7050150025	160	250	15	Bundle
7050150050	160	500	6	Bundle
7050150100	160	1000	3	Bundle
7050150200	160	2000	3	Bundle
7050150300	160	3000	3	Bundle
7050150600	160	6000	1	Pieces
7050200015	200	150	5	Bundle
7050200025	200	250	5	Bundle
7050200050	200	500	2	Bundle
7050200100	200	1000	1	Pieces
7050200200	200	2000	1	Pieces
7050200300	200	3000	1	Pieces
7050200600	200	6000	1	Pieces
7050250015	250	150	5	Bundle
7050250025	250	250	5	Bundle
7050250050	250	500	2	Bundle
7050250100	250	1000	1	Pieces
7050250200	250	2000	1	Pieces
7050250300	250	3000	1	Pieces
7050250600	250	6000	1	Pieces
7050315050	315	500	1	Pieces
7050315100	315	1000	1	Pieces
7050315200	315	2000	1	Pieces
7050315300	315	3000	1	Pieces
7050315600	315	6000	1	Pieces

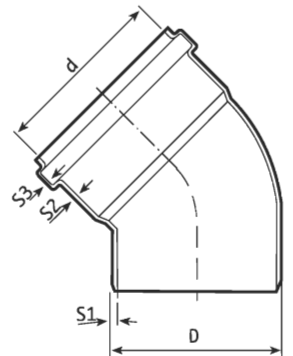


Diameter	S <sub>1</sub> (mm)	S <sub>2</sub> (mm)	S <sub>3</sub> (mm)	LB	Weight(kg/m)
<b>50</b>	3.0	2.9	2.4	39.3	0.770
<b>75</b>	3.0	2.9	2.4	46.1	1.180
<b>110</b>	3.2	2.9	2.4	56.9	1.880
<b>125</b>	3.2	2.9	2.4	62.8	2.140
<b>160</b>	4.0	3.6	3.0	75.8	3.460
<b>200</b>	4.9	4.4	3.7	89.4	5.240
<b>250</b>	6.2	5.6	4.7	112.8	8.470
<b>315</b>	7.7	6.9	5.8	135.4	13.420

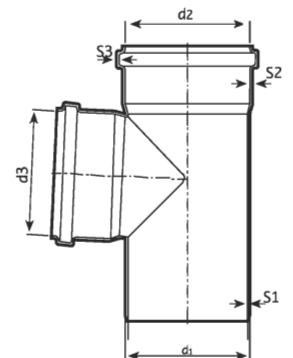
**ELBOW (87°)**



**ELBOW (45°)**



**T BRANCH**



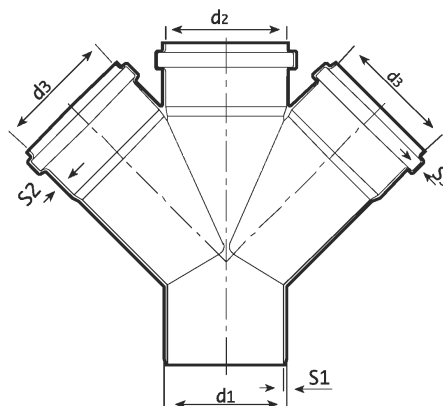


Code	Diameter	d (mm)	S <sub>1</sub> (mm)	S <sub>2</sub> (mm)	S <sub>3</sub> (mm)	Pieces	Packing Type
7061050087	50	50.3	3.0	2.9	2.4	75	Packet
7061070087	75	75.4	3.0	2.9	2.4	30	Packet
7061100087	110	110.4	3.2	2.9	2.4	13	Packet
7061125087	125	125.5	3.2	2.9	2.4	9	Packet
7061150087	160	160.5	4.0	3.6	3.0	4	Packet
7061200087	200	200.6	4.9	4.4	3.7	3	Packet
7061250087	250	250.6	6.2	5.6	4.7	2	Bundle

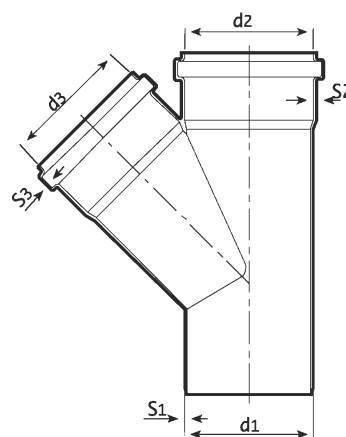
Code	Diameter	d (mm)	S <sub>1</sub> (mm)	S <sub>2</sub> (mm)	S <sub>3</sub> (mm)	Pieces	Packing Type
7061050045	50	50.3	3.0	2.9	2.4	100	Packet
7061070045	75	75.4	3.0	2.9	2.4	50	Packet
7061100045	110	110.4	3.2	2.9	2.4	18	Packet
7061125045	125	125.5	3.2	2.9	2.4	10	Packet
7061150045	160	160.5	4.0	3.6	3.0	6	Packet
7061200045	200	200.6	4.9	4.4	3.7	4	Packet
7061250045	250	250.6	6.2	5.6	4.7	3	Packet

Code	Diameter	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	d <sub>3</sub> (mm)	S <sub>1</sub> (mm)	S <sub>2</sub> (mm)	S <sub>3</sub> (mm)	Pieces	Packing Type
7064050050	50-50	50	50.3	50.3	3.0	2.9	2.4	45	Packet
7064070050	75-50	75	75.4	50.3	3.0	2.9	2.4	25	Packet
7064070070	75-75	75	75.4	75.4	3.0	2.9	2.4	20	Packet
7064100050	110-50	110	110.4	50.3	3.2	2.9	2.4	5	Bundle
7064100070	110-75	110	110.4	75.4	3.2	2.9	2.4	5	Bundle
7064100100	110-110	110	110.4	110.4	3.2	2.9	2.4	5	Bundle
7064125100	125-110	125	125.5	110.5	3.2	2.9	2.4	5	Bundle
7064125125	125-125	125	125.5	125.5	3.2	2.9	2.4	5	Bundle
7064150100	160-110	160	160.5	110.5	4.0	3.6	3.0	5	Bundle
7064150125	160-125	160	160.5	125.5	4.0	3.6	3.0	5	Bundle
7064150150	160-160	160	160.5	160.5	4.0	3.6	3.0	4	Bundle
7064250250	200-250	250	250.6	250.6	6.2	5.6	4.7	1	Pieces

**DOUBLE BRANCH (45°)**



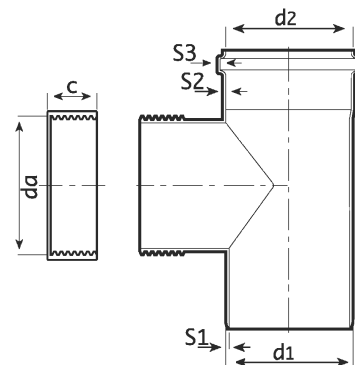
**SINGLE BRANCH (45°)**



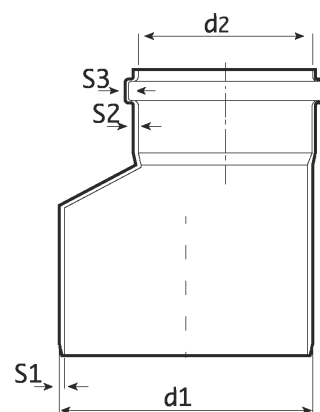
<b>Code</b>	<b>Diameter</b>	<b>d<sub>1</sub>(mm)</b>	<b>d<sub>2</sub>(mm)</b>	<b>d<sub>3</sub>(mm)</b>	<b>S<sub>1</sub>(mm)</b>	<b>S<sub>2</sub>(mm)</b>	<b>S<sub>3</sub>(mm)</b>	<b>Pieces</b>	<b>Packing Type</b>
7065050050	50-50	50	50.3	50.3	3.0	2.9	2.4	25	Packet
7065070050	75-50	75	75.4	50.3	3.0	2.9	2.4	15	Packet
7065070070	75-75	75	75.4	75.4	3.0	2.9	2.4	13	Packet
7065100050	110-50	110	110.4	50.3	3.2	2.9	2.4	5	Bundle
7065100100	110-110	110	110.4	110.4	3.2	2.9	2.4	5	Bundle
7065125100	125-110	125	125.5	110.4	3.2	2.9	2.4	5	Bundle

<b>Code</b>	<b>Diameter</b>	<b>d<sub>1</sub>(mm)</b>	<b>d<sub>2</sub>(mm)</b>	<b>d<sub>3</sub>(mm)</b>	<b>S<sub>1</sub>(mm)</b>	<b>S<sub>2</sub>(mm)</b>	<b>S<sub>3</sub>(mm)</b>	<b>Pieces</b>	<b>Packing Type</b>
7063050050	50-50	50	50.3	50.3	3.0	2.9	2.4	38	Packet
7063070050	75-50	75	75.4	50.3	3.0	2.9	2.4	25	Packet
7063070070	75-75	75	75.4	75.4	3.0	2.9	2.4	15	Packet
7063100050	110-50	110	110.4	50.3	3.2	2.9	2.4	5	Bundle
7063100070	110-75	110	110.4	75.4	3.2	2.9	2.4	5	Bundle
7063100100	110-110	110	110.4	110.4	3.2	2.9	2.4	5	Bundle
7063125050	125-50	125	125.5	50.3	3.2	2.9	2.4	5	Bundle
7063125070	125-75	125	125.5	75.4	3.2	2.9	2.4	5	Bundle
7063125100	125-110	125	125.5	110.4	3.2	2.9	2.4	5	Bundle
7063125125	125-125	125	125.5	125.5	3.2	2.9	2.4	5	Bundle
7063150100	160-110	160	160.6	160.5	4.0	3.6	3.0	5	Bundle
7063150125	160-125	160	160.5	110.5	4.0	3.6	3.0	5	Pieces
7063150150	160-160	160	160.5	160.5	4.0	3.6	3.0	4	Bundle
7063200100	200-110	200	200.7	110.5	4.9	4.4	3.7	4	Bundle
7063200150	200-160	200	200.7	160.6	4.9	4.4	3.7	3	Bundle
7063200200	200-200	200	200.7	200.7	4.9	4.4	3.7	3	Bundle
7063250250	250-250	250	250.6	250.6	6.2	5.6	4.7	1	Pieces

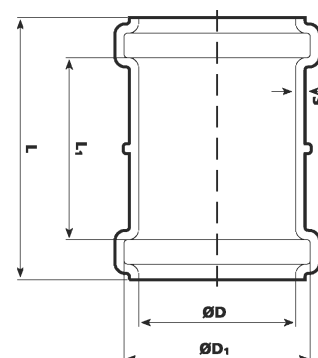
**ACCESS T PIECE**



**REDUCER**



**SOCKET**



Code	Diameter	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	S <sub>1</sub> (mm)	S <sub>2</sub> (mm)	S <sub>3</sub> (mm)	Pieces	Packing Type
7066001070	75	75	75.4	3.0	2.9	2.4	20	Packet
7066001100	110	110	110.4	3.2	2.9	2.4	5	Packet
7066001125	125	125	125.5	3.2	3.6	2.4	5	Packet
7066001150	160	160	160.5	4.0	3.6	3.0	3	Packet

Code	Diameter	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	S <sub>1</sub> (mm)	S <sub>2</sub> (mm)	S <sub>3</sub> (mm)	Pieces	Packing Type
7062070050	75-50	75	50.3	3.0	2.9	2.4	63	Packet
7062100050	110-50	110	50.3	3.2	2.9	2.4	25	Packet
7062100070	110-75	110	75.4	3.2	2.9	2.4	20	Packet
7062125070	125-75	125	75.4	3.2	2.9	2.4	18	Packet
7062125100	125-110	125	110.4	3.2	2.9	2.4	13	Packet
7062150100	160-110	160	110.4	4.0	3.6	3.0	10	Packet
7062150125	160-125	160	125.5	4.0	3.6	3.0	10	Packet
7062200100	200-110	200	110.4	4.9	4.4	3.7	5	Packet
7062200150	200-160	200	160.6	4.9	4.4	3.7	6	Packet
7062250200	250-200	250	200.6	6.2	4.4	3.7	3	Packet

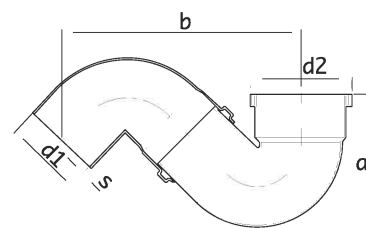
**SLIDING COLLAR**

Code	Diameter	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	S (mm)	L (mm)	L <sub>1</sub> (mm)	Pieces	Packing Type
7066007050	50	50.3	59.6	3.0	84	58.4	75	Packet
7066007070	75	75.4	84.5	3.0	96	70.4	38	Packet
7066007100	110	110.4	120.6	3.2	130	98.8	15	Packet

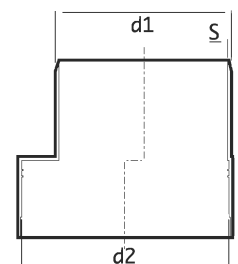
**SOCKET**

Code	Diameter	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	S (mm)	L (mm)	L <sub>1</sub> (mm)	Pieces	Packing Type
7066006125	125	125.4	137.5	3.2	480	420	1	Adet
7066006150	160	160.5	174.3	4.0	480	420	1	Pieces
7066006200	200	200.6	216.7	4.9	760	700	1	Pieces

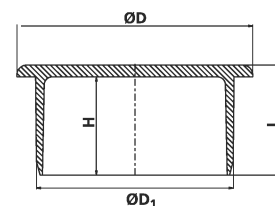
**S SIPHONE**



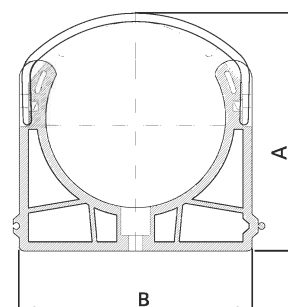
**WC CONNECTOR**



**PLUG**



**BRACELETS**



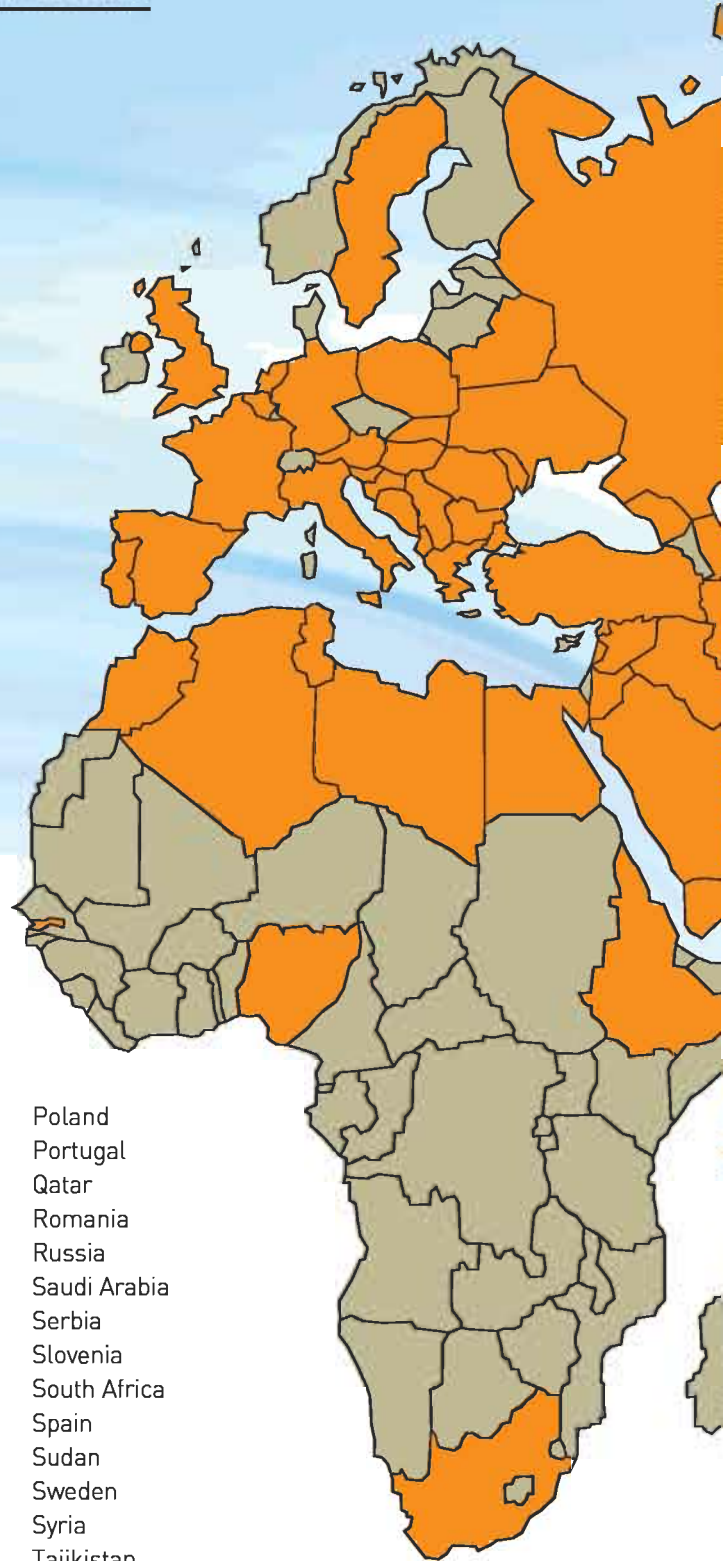
<b>Code</b>	<b>Diameter</b>	<b>d<sub>1</sub>(mm)</b>	<b>d<sub>2</sub>(mm)</b>	<b>a (mm)</b>	<b>b (mm)</b>	<b>S (mm)</b>	<b>Pieces</b>	<b>Packing Type</b>
7066003100	110	110	140	210	300	3.2	4	Packet

<b>Code</b>	<b>Diameter</b>	<b>d<sub>1</sub>(mm)</b>	<b>d<sub>2</sub>(mm)</b>	<b>S (mm)</b>	<b>Pieces</b>	<b>Packing Type</b>
7066002100	110	110	131.0	3.2	24	Packet

<b>Code</b>	<b>Diameter</b>	<b>D(mm)</b>	<b>D<sub>1</sub>(mm)</b>	<b>L(mm)</b>	<b>H(mm)</b>	<b>Pieces</b>	<b>Packing Type</b>
7066004050	50	60	50	28	25	450	Packet
7066004070	75	85	75	34	30	150	Packet
7066004100	110	120	110	38	34	65	Packet

<b>Code</b>	<b>Diameter</b>	<b>A (mm)</b>	<b>B (mm)</b>	<b>Pieces</b>	<b>Packing Type</b>
7066005050	50	78.30	57.60	250	Box
7066005070	75	118.20	83.60	150	Box
7066005100	110	152.55	120.00	75	Box
7066005125	125	159.50	167.65	70	Sack
7066005150	160	207.60	207.45	50	Sack

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