

**FIRAT**

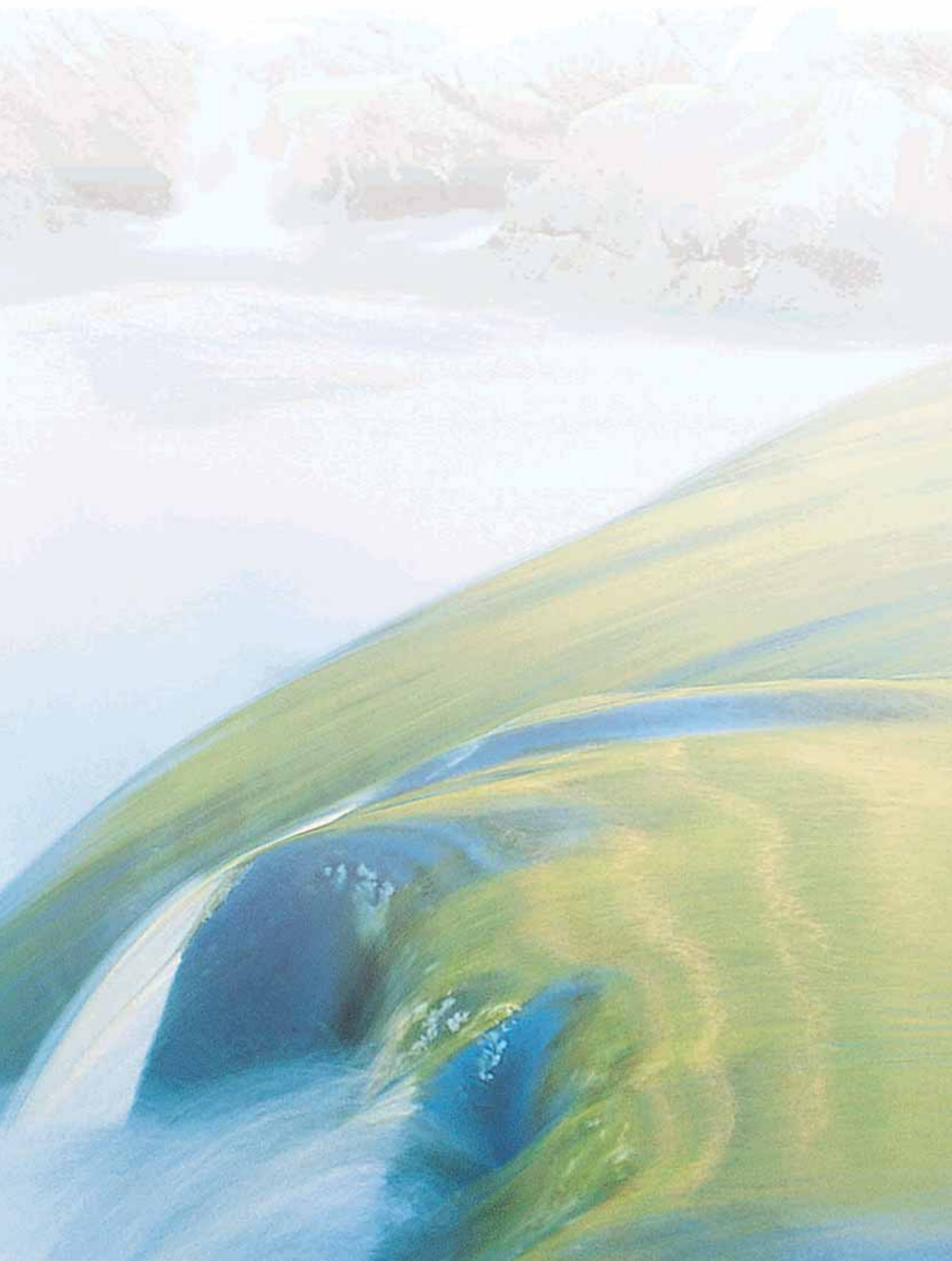
# D U B L E X

PVC WASTE WATER  
PIPE AND FITTINGS

**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 2011, FIRAT ranks as the 57th amongst the 500 big industrial establishments of Turkey. FIRAT ranks as the 51st in the private sector ranking. According to the Corporate Tax Ranking of T.R. Ministry of Finance Revenue Administration Department in 2011, 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 2011" according to Turkey Exporters Committee and is the leader exporter in its sector.



As of the end of 2011, the number of personnel working under FIRAT structure is 1700. Believing in the understanding of "The most valuable factor is human", FIRAT has been constantly arranging in service trainings 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, Irrigation Pipes and Fittings and 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 meters one - 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 Krahe 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, ISO 9001 and ISO 17025 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** Headquarters Building



# Raw Material

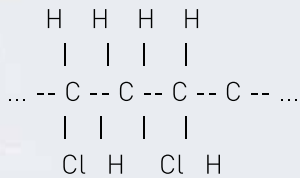
Waste Water Pipes and Fittings made of FIRAT PVC raw material has no negative effect on the human health. They do not change color and smell of the water.

PVC raw material used for FIRAT Duplex PVC Pipes and Fittings are from the company such as PETKIM, ATOFINA, SABIC etc, which are proved to be the manufacturers of the most quality raw material worldwide. They are kept subject to the Inbound Raw Material Quality Control tests in the FIRAT laboratories such as bulk density, grain-size distribution, K value, viscosity value and humidity.

## PVC (Polyvinyl Chloride)

PVC (Polyvinyl Chloride) is one of the most valuable chemical components in the chemical industry worldwide with a wide range of use in different industrial sectors. Polyvinyl Chloride is the lead in the category of amorphous plastics and a polymer, white or light yellow in color and powder in form. Thanks to its high resistance against acids, bases, flame, alcohol and gasoline, it shows no change in its physical structure. It is durable. Manufactured from hard PVC raw material, the waste water systems equipped with FIRAT Duplex Pipes and Fittings are the most preferred waste water pipe systems in the construction sector with their weathering, non-flammability, high resistance and rigid structure.

### Poli Vinil Clorur Formül



## PVC Raw Material Fields of Use:

More than 50% of the products manufactured from PVC material worldwide is used in the construction sector. Being convenient, easy to install, sound and homogenous, PVC-based products have replaced the conventional construction materials such as wood, concrete and clay. PVC-based products are widely used in a wide range of industrial sectors, especially in the construction sector, such as the door and window profile and sealing materials, piping and installation materials, flooring materials, hobby materials, gutters and attachments, power cables and cable insulating materials, greenhouse protection materials, ceiling covering materials, audio-visual cassettes, records, oxygen tents, blood and dialysis bags, serum hoses, watertight raincoats, life jackets, shoes and boats, aprons, baby clothing, toys, sports materials, etc. that we generally come across in the daily life. PVC-based products are considered environment-friendly, allowing recycling.

### PVC Raw Material Tests



Moisture Determination Test



Viscosity and K-Value Test



Grain Size Distribution



Solvent and Mixer



### Physical and Mechanic Test Table for Dublex PVC Pipes

Test	Test Duration	Test Conditions	Result	Test Method
Impact Strength	-	0°C	Max. %10	TS EN 744
Vicat Softing Temperature	-	min. 79°C	There should be no deformation	TS EN 727
Elongation Test	15 minute	150°C	max. % 5	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 - 0,5 bar	There should be no leakage	TSEN1277

#### Dublex PVC 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 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)

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.

## Quality Tests \*



Density



Melting Flow Rate



Homogeneity

## Our Quality Certificates

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

Quality of Duplex PVC Pipe and Attachments are certificated and documented by the following organizations for their compliance with the health and food guidelines.

- TSE – Turkish Standards Institute (Turkey) 
- SEPRO -(Ukraine) 



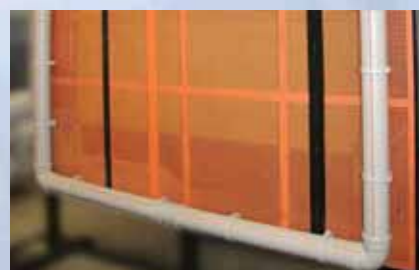
\*FIRAT has the state-of-art quality, control and test laboratory in the sector.



Impact strength



Pressure test



U Test

# General Information

Firat Dublex PVC waste water pipes and fittings are used in the villas and multi-storey buildings, hospitals, schools, hotels, industrial and sport buildings etc. as they are environment-friendly and cost-effective, maintaining its physical structure up to 60°C, suitable for long-term use, allowing safe and ideal discharge of surface and subsurface waste water.

FIRAT Dublex PVC waste water pipes and fittings are manufactured in the wall thicknesses of the application class BD specified as per the quality standards TS 275-1 EN 1329-1. Thanks to their smooth internal and external surfaces, they do not allow formation of deposit and debris or growth of bacteria and smell.

Manufactured from rigid PVC raw material, FIRAT Dublex PVC waste water pipes and fittings are of flame-retardant construction material class B1 as defined by the DIN 4102 and National Fire Regulations. FIRAT Dublex PVC-based waste water and fittings are, therefore, fireproof in case of possible fire cases (PP-based materials are inflammable and combustible), preventing spread of fire between the floors. For this reason, they are especially recommended for the multi-storey buildings.

With a wide range of alternatives in sizes, e.g., 50 - 315 mm diameter and 150 - 6000 mm length, FIRAT PVC Dublex waste water pipes and fittings satisfy all kinds of requirements for discharge of waste water discharge. Dublex PVC waste water fittings never allow leakage due to the sealing bearings which are single-cheek, spiked and fully compatible. As they are easy to install and replace, the discharge system is installed quickly and does not require laborious operations such as cutting, bending and adhering.



Outer Diameter	Outer 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

## Characteristics of Dublex PVC Pipes and Fittings

### Technical Specifications of Dublex PVC Waste Water Pipes and Fittings

#### Related Standards

FIRAT Dublex PVC waste water pipes and fittings are manufactured in the wall thicknesses of the application class BD specified as per the quality standards TS 275-1 EN 1329-1.

#### Description of the Standard

Characteristics of pipes, joints and system

#### Application Field Code

**B:** It covers elements to be used in the buildings above the ground and elements mounted on the wall outside the buildings. -

**D:** It covers pipe and its components used for subsurface drainage and sewerage systems under the buildings and as buried in the ground in distance of 3.26 feet from the buildings.

**BD:** It also covers elements of both application classes.

#### Physical Characteristics of Dublex PVC Pipes

1. Vicat Softening Temperature (min. 79 °C) (TS EN 727)
2. Elongation Change (TS EN 743)- (15 minutes 150 °C) (max. 5%)
3. Dichloromethane strength at the specified temperature (15 °C - 30 minutes)

#### Physical Characteristics of Duplex PVC Fittings

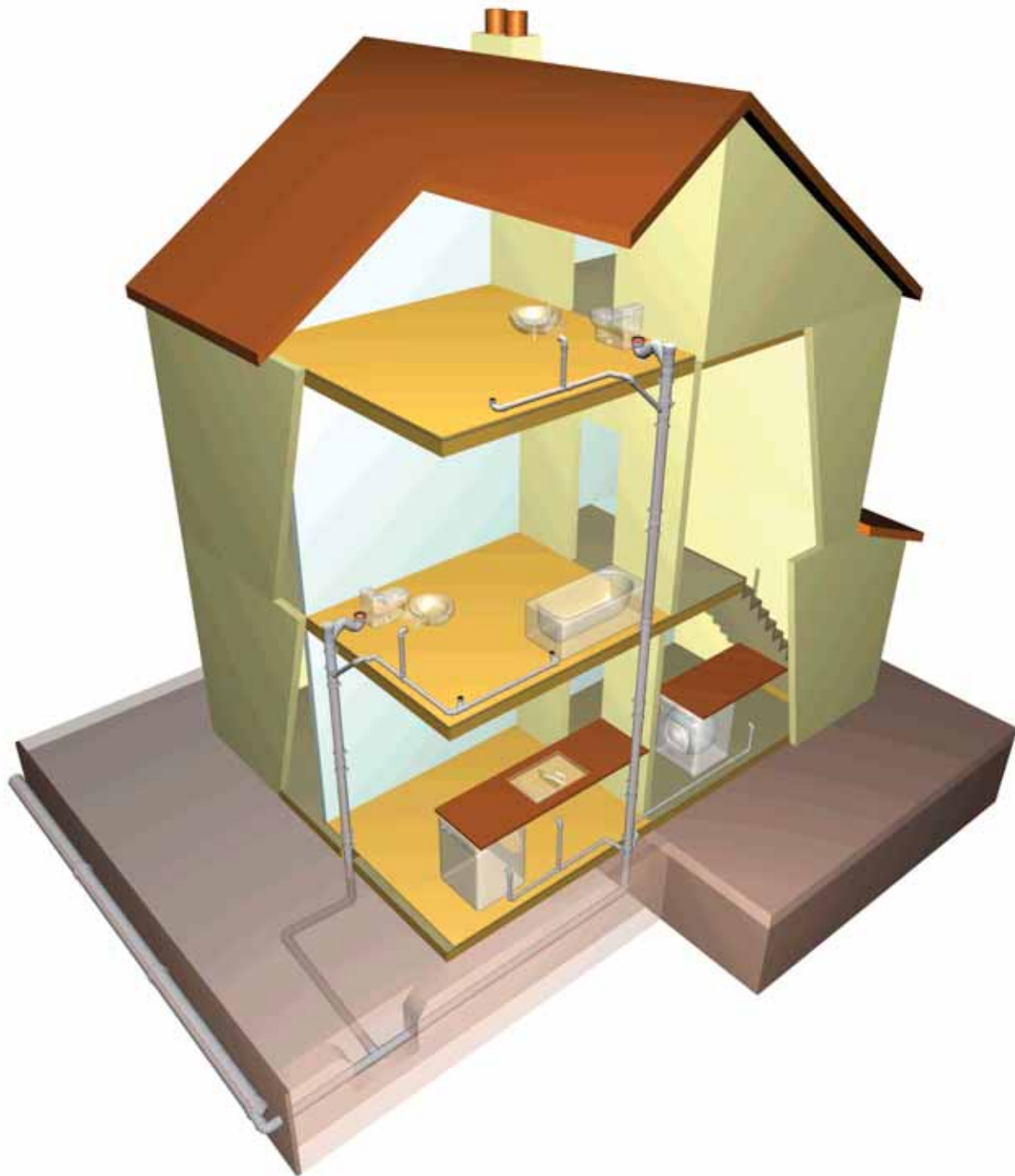
1. Vicat Softening Temperature (min. 79 °C) (TS EN 727)
2. Heat effect (150 °C- 30 minutes)
  - a) Depths of cracks, flakes or bubbles formed within an area 15 times the wall thickness around the injection point should not be more than 50% of the wall thickness at that point.
  - b) Length of cracks formed within the area of 10 times the wall thickness at the ring bearing should not be more than 50% of the wall thickness at that point.
  - c) Opening on the joining line should be more than 50% of the wall thickness on this line.
  - d) Depths of flakes at any other points of the component should not be more than 30% of the wall thickness and their length may not be more than 10% of the wall thickness.

#### Mechanic Characteristics of Dublex PVC Fittings

They should comply with TS 2171-1 EN 1401-1.

1. Mechanic Strength or Elasticity (TS EN 12256)
2. Impact Strength (TS prEN 12061)

## Characteristics of Dublex PVC Pipes and Fittings



Housing Application of Dublex PVC Pipes and Fittings



## Dublex PVC Pipe and Fittings are Inflammable

FIRAT Dublex PVC waste water pipes and fittings are manufactured from hard PVC raw materials defined as Class B1 fire-retardant construction material as per the standard DIN 4102 as defined National Fire Regulation.

FIRAT Dublex hard PVC-based waste water and fittings are, fireproof in case of possible fire cases (PP-based materials are inflammable and combustible), preventing spread of fire between the floors.



## Characteristics of Dublex PVC Pipes and Fittings

## Resistance of Dublex Pvc Pipes against Chemical Materials

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

Substance	Concentration %	20°C	60°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 Sulp..	sat. sol.	D	D
Amyl Alcohol	ts-s	D	SD
Amyl Acetate	ts-s	DZ	DZ
Ammonia, dry gas	ts-g	D	D
Ammonia, aquerous	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
Homy	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 (Fue)	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 Dublex 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 (III) 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 Etylenes	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
Fluorine, gaseous, humid	ts-g	DZ	DZ
Formaldehyde	dil.sol.	D	SD
Phosphine	ts-g	D	D
Phosphorus Oksiklorür	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
Carbon 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
- 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

## Characteristics of Dublex PVC Pipes and Fittings

## Resistance of Dublex Pvc Pipes against Chemical Materials

### Classification of Dublex PVC Pipe and Fittings 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 45%	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 Bisulphate	sat. sol.	D	D
Potassium Borate	sat. sol.	D	D
Potassium Fluoride	sat. sol.	D	D
Potassium Hexacyanferrate (II)	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 Dublex PVC Pipe and Fittings according to Resistance against Chemical Materials**

<b>Substance</b>	<b>Concentration %</b>	<b>20°C</b>	<b>60°C</b>
Soap	sol.	D	SD
Cyclohexanone	ts-s	DZ	DZ
Vinegar	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 Ferricyanide	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 Pitrite	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
Gluco 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

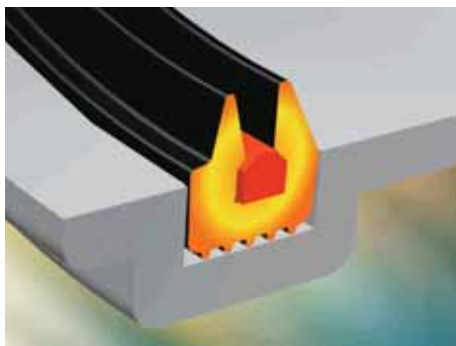
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- Sol.** Solution
- D** Durable
- SD** Limited durability. Little corrosion may occur
- DZ** Weak

# Dublex Pvc Pipes and Fittings

## DUBLEX PVC PIPES AND FITTINGS ARE NOT INFLAMMABLE AND FIREPROOF

Manufactured from hard PVC raw material, FIRAT Dublex waste water pipes and fittings are of flame-retardant construction material class B1 as defined by the DIN 4102 and National Fire Regulations. FIRAT Dublex PVC-based waste water and attachments are, therefore, fireproof in case of possible fire cases (PP-based materials are inflammable and combustible), preventing spread of fire between the floors.



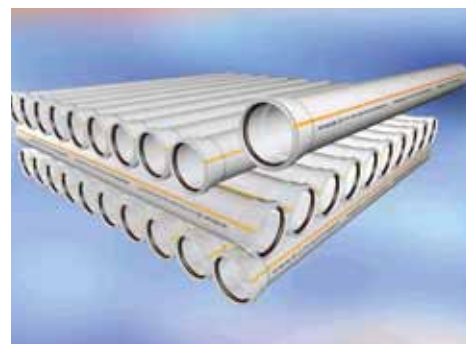
## DUBLEX PVC EPDM LEAK-PROOF GASKET

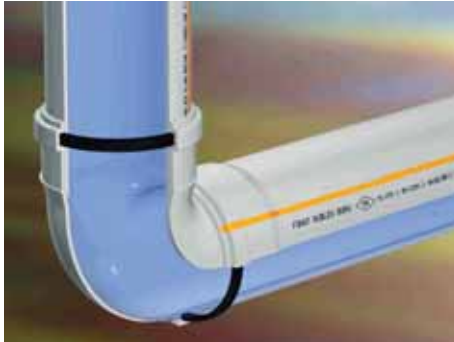
Dublex PVC waste water fittings are definitely leak proof thanks to being their single side, spiked and fully compliant. They are easily installed and replace as they do not require laborious operations such as cutting, bending and adhering, etc. The waste water discharge system made up of FIRAT Dublex PVC pipes and fittings have successfully passed the leak test which is made by delivering water to them for a period of 15 minutes under 0.5 bar.



## STORAGE AND TRANSPORTATION ADVANTAGES

As Dublex PVC waste water fittings can be easily stowed on each other in telescopic manner and in lap manner, they provide advantage for storage and transportation.





**DUBLEX PVC PIPES AND FITTINGS HAVE SMOOTH INNER AND OUTER SURFACES.**

Thanks to the smooth inner and outer surfaces of Firat Dublex pvc drain pipes and fittings, there will be no longer accumulations, bacteria, bad smell, blockage and flow-performance loss in your installations. Uniform and rapid flow is guaranteed. No flaking or stripping can be seen on the surfaces of pipes and fittings. Firat Dublex pvc waste water pipes and fittings have been awarded the "Hygiene Certificates" showing compliance to the Food Regulations of the Ministry of Health and the Public Hygiene Institute.



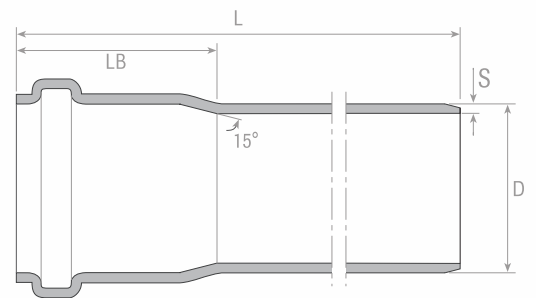
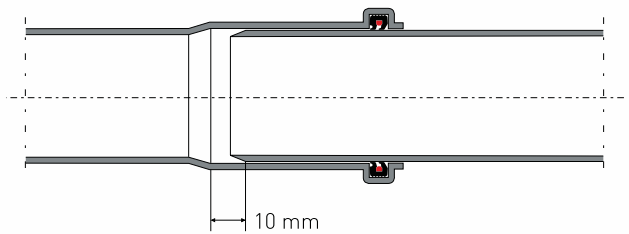
**DUBLEX PVC PIPES and FITTINGS HAVE A GREAT VARIETY OF DIAMETERS AND SIZES TO MEET ALL YOUR REQUIREMENTS**

With a wide range of alternatives in sizes, e.g., 50-315 mm diameter and 150 - 6000 mm length, FIRAT Dublex waste water pipes and fittings satisfy all kinds of your requirements for discharge of waste water discharge. As they are easy to install and replace, the discharge system is installed quickly and does not require laborious operations such as cutting, bending and adhering.

FIRAT Dublex PVC pipes and fittings provide a reliable solution for wastewater discharge in houses, residences, villas, hospitals, hotels, industrial and sports complexes with their long life, 100 % leak-free joints and excellent sound insulation properties. The PVC compound used in the manufacture of these products ensure flame retardancy and do not allow for propagation of fire between different floors in a building.

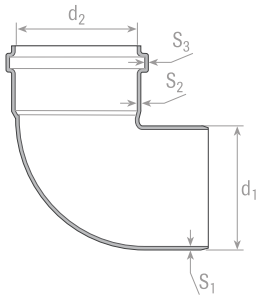
**DUBLEX PVC PIPES**

CODE NO	Ø D (mm)	Length L (mm)
7030050015	50	150
7030050025	50	250
7030050050	50	500
7030050100	50	1000
7030050200	50	2000
7030050300	50	3000
7030050600	50	6000
7030070015	75	150
7030070025	75	250
7030070050	75	500
7030070100	75	1000
7030070200	75	2000
7030070300	75	3000
7030070600	75	6000
7030100015	110	150
7030100025	110	250
7030100050	110	500
7030100100	110	1000
7030100200	110	2000
7030100300	110	3000
7030100600	110	6000
7030125015	125	150
7030125025	125	250
7030125050	125	500
7030125100	125	1000
7030125200	125	2000
7030125300	125	3000
7030125600	125	6000
7030150015	160	150
7030150025	160	250
7030150050	160	500
7030150100	160	1000
7030150200	160	2000
7030150300	160	3000
7030150600	160	6000
7030200015	200	150
7030200025	200	250
7030200050	200	500
7030200100	200	1000
7030200200	200	2000
7030200300	200	3000
7030200600	200	6000
7030250015	250	150
7030250025	250	250
7030250050	250	500
7030250100	250	1000
7030250200	250	2000
7030250300	250	3000
7030250600	250	6000
7030315050	315	500
7030315100	315	1000
7030315200	315	2000
7030315300	315	3000
7030315600	315	6000
7030400050	400	500
7030400100	400	1000
7030400200	400	2000
7030400300	400	3000
7030400600	400	6000



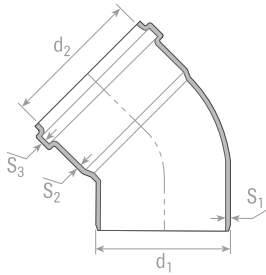
**Physical Specifications of Dublex PVC Pipes**

ØD (mm)	S <sub>3</sub> (mm)	LB	Weight (kg./m)
50	2,4	39,3	0,770
75	2,4	46,1	1,180
110	2,4	56,9	1,880
125	2,4	62,8	2,014
160	3,0	75,8	3,046
200	3,7	89,4	5,240
250	4,7	112,8	8,470
315	5,8	135,4	13,420



**ELBOW ( 87 ° )**

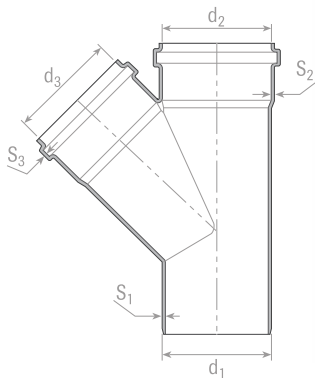
CODE	Ø D (mm)	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	S <sub>1</sub> (mm)	S <sub>2</sub> (mm)	S <sub>3</sub> (mm)
7011050087	50	50	50.3	3.0	2.7	2.3
7011075087	75	75	75.4	3.0	2.7	2.3
7011100087	110	110.4	110.4	3.2	2.9	2.4
7011125087	125	125.4	125.5	3.2	2.9	2.4
7011150087	160	160.5	160.5	4.0	3.6	3.0
7011200087	200	200.6	200.6	4.9	4.4	3.7
7011250087	250	250.6	250.6	6.2	5.6	4.7



**ELBOW ( 45 ° )**

CODE	Ø D (mm)	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)
7011050045	50	50	50.3	3.0	2.7	2.3
7011075045	75	75	75.4	3.0	2.7	2.3
7011100045	110	110	110.4	3.2	2.9	2.4
7011125045	125	125	125.5	3.2	2.9	2.4
7011160045	160	150	160.5	4.0	3.6	3.0
7011200045	200	200	200.6	4.9	4.4	3.7
7011250045	250	250	250.6	6.2	5.6	4.7

**SINGLE BRANCH ( 45 ° )**



CODE	Ø D (mm)	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)
7013050050	50-50	50	50.3	50.3	3.0	2.7	2.3
7013070050	75-50	75	75.4	50.3	3.0	2.7	2.3
7013070070	75-75	75	75.4	75.4	3.0	2.7	2.3
7013100050	110-50	110	110.4	50.3	3.2	2.9	2.4
7013100070	110-75	110	110.4	75.4	3.2	2.9	2.4
7013100100	110-110	110	110.4	110.4	3.2	2.9	2.4
7013125050	125-50	125	125.5	50.3	3.2	2.9	2.4
7013125070	125-75	125	125.5	75.4	3.2	2.9	2.4
7013125100	125-110	125	125.5	110.4	3.2	2.9	2.4
7013125125	125-125	125	125.5	125.5	3.2	2.9	2.4
70K0315005	160-50	160	160.6	50.4	4.0	3.6	3.0
70K0315007	160-75	160	160.6	75.4	4.0	3.6	3.0
7013150100	160-110	160	160.6	110.4	4.0	3.6	3.0
7013150125	160-125	160	160.5	125.5	4.0	3.6	3.0
7013150150	160-160	160	160.5	160.5	4.0	3.6	3.0
7013200100	200-110	200	200.7	110.5	4.9	4.4	3.7
70K0320012	200-125	200	200.7	125.5	4.9	4.4	3.7
7013200150	200-160	200	200.7	160.6	4.9	4.4	3.7
7013200200	200-200	200	200.7	200.7	4.9	4.4	3.7
70K0325010	250-100	250	200.7	110.5	6.2	5.6	4.7
70K0325012	250-125	250	250.6	125.5	6.2	5.6	4.7
70K0325015	250-150	250	250.6	160.6	6.2	5.6	4.7
70K0325020	250-200	250	250.6	200.7	6.2	5.6	4.7
7013250250	250-250	250	250.6	250.6	6.2	5.6	4.7

K: Confection Production



**TEE PIECE**

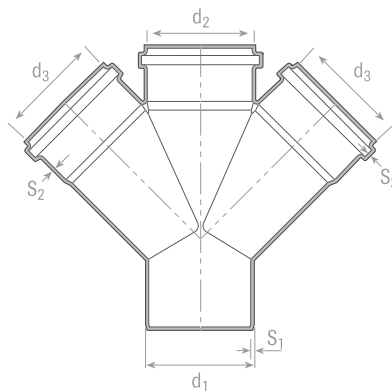
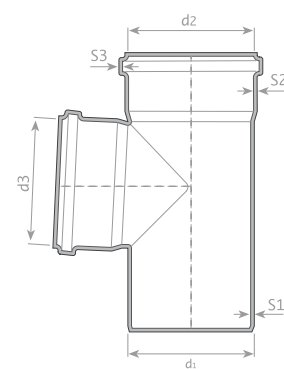
CODE	Ø D (mm)	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	d <sub>3</sub> (mm)	S <sub>1</sub> (mm)	S <sub>2</sub> (mm)	S <sub>3</sub> (mm)
7014050050	50-50	50	50.3	50.3	3.0	2.7	2.3
7014070050	75-50	75	75.4	75.4	3.0	2.7	2.3
7014070070	75-75	75	75.4	75.4	3.0	2.7	2.3
7014100050	110-50	110	110	110.4	3.2	2.9	2.4
7014100070	110-75	110	110	110.4	3.2	2.9	2.4
7014100100	110-110	110	110	110.4	3.2	2.9	2.4
70K0412505	125-50	125	125	125.5	3.2	2.9	2.4
70K0412507	125-75	125	125	125.5	3.2	2.9	2.4
7014125100	125-110	125	125	125.5	3.2	2.9	2.4
7014125125	125-125	125	125	125.5	3.2	2.9	2.4
70K0415005	160-50	160	160	160.5	4.0	3.6	3.0
70K0415007	160-75	160	160	160.5	4.0	3.6	3.0
7014150100	160-110	160	160	160.5	4.0	3.6	3.0
7014150125	160-125	160	160	160.5	4.0	3.6	3.0
7014150150	160-160	160	160	160.5	4.0	3.6	3.0
70K0420010	200-110	200	200	200.7	4.9	4.4	3.7
70K0420012	200-125	200	200	200.7	4.9	4.4	3.7
70K0420015	200-160	200	200	200.7	4.9	4.4	3.7
7014200200	200-200	200	200	200.7	4.9	4.4	3.7
70K0425015	250-160	250	250	250.6	6.2	5.6	4.7
70K0425020	250-200	250	250	250.6	6.2	5.6	4.7
7014250250	250-250	250	250	250.6	6.2	5.6	4.7

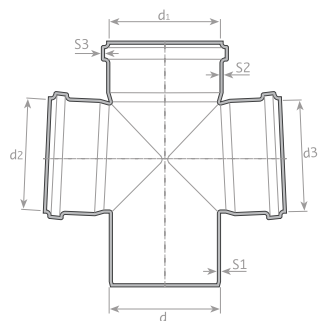
K: Confection Production

**DOUBLE BRANCH ( 45 ° )**

CODE	Ø D (mm)	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)
7015050050	50-50	50	50.3	50.3	3.0	2.7	2.3
7015070050	75-50	75	75.4	50.3	3.0	2.7	2.3
7015070070	75-75	75	75.4	75.4	3.0	2.7	2.3
7015100050	110-50	110	110.4	50.3	3.2	2.9	2.4
70K0510007	110-75	110	110.4	75.4	3.2	2.9	2.4
7015100100	110-110	110	110.4	110.4	3.2	2.9	2.4
70K0512505	125-50	125	125.5	50.3	3.2	2.9	2.4
70K0512507	125-75	125	125.5	75.4	3.2	2.9	2.4
7015125100	125-110	125	125.5	110.4	3.2	2.9	2.4
70K0512512	125-125	125	125.5	125.5	3.2	2.9	2.4
70K0515005	160-50	160	160.6	50.4	4.0	3.6	3.0
70K0515007	160-75	160	160.6	75.4	4.0	3.6	3.0
70K0515010	160-110	160	160.6	110.4	4.0	3.6	3.0
70K0515012	160-125	160	160.5	125.5	4.0	3.6	3.0
70K0515015	160-160	160	160.5	160.5	4.0	3.6	3.0
70K0520010	200-110	200	200.7	110.5	4.9	4.4	3.7
70K0520012	200-125	200	200.7	125.5	4.9	4.4	3.7
70K0520015	200-160	200	200.7	160.6	4.9	4.4	3.7
70K0520020	200-200	200	200.6	200.6	4.9	4.4	3.7
70K0525025	250-250	250	250.6	250.6	6.2	5.6	4.7

K: Confection Production



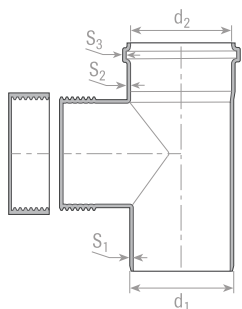


**CROSS - T**

CODE	Ø D (mm)	d-d <sub>1</sub> (mm)	d <sub>2</sub> -d <sub>3</sub> (mm)	S <sub>1</sub> (mm)	S <sub>2</sub> (mm)	S <sub>3</sub> (mm)
7014500100	110	110	110.4	3.2	2.9	2.4

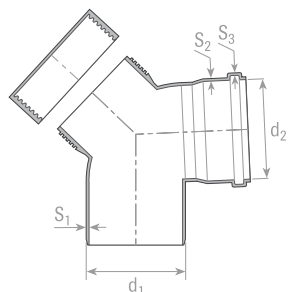
**ACCESS PIECE**

CODE	Ø D (mm)	d <sub>2</sub> (mm)	S <sub>1</sub> (mm)	S <sub>2</sub> (mm)	S <sub>3</sub> (mm)
7016001070	75	75.4	3.3	2.7	2.3
7016001100	110	110.4	3.2	2.9	2.4
7016001125	125	125.5	3.2	3.6	2.4
7016001150	160	160.5	4.0	3.6	3.0
7016001200	200	250.6	4.9	4.4	3.7



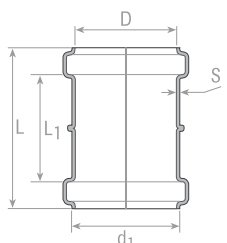
**CLEAN OUT ELBOW**

CODE	Ø D (mm)	d <sub>2</sub> (mm)	S <sub>1</sub> (mm)	S <sub>2</sub> (mm)	S <sub>3</sub> (mm)
7016001110	110	110.4	3.2	2.9	2.9



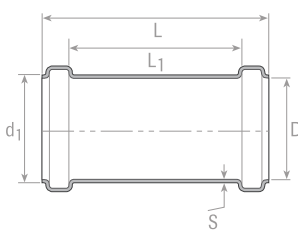
**SLIDING SOCKET**

CODE	Ø D (mm)	D(mm)	d <sub>1</sub> (mm)	S(mm)	L(mm)	L <sub>1</sub> (mm)
7016007050	50	50.3	59.6	3.0	84	58.4
7016007070	75	75.4	84.5	3.0	96	70.4
7016007100	110	110.4	120.6	3.2	130	98.8
7016007125	125	125.5	137.5	3.2	160	105.0
7016007150	160	160.5	174.3	4.0	170	125.0



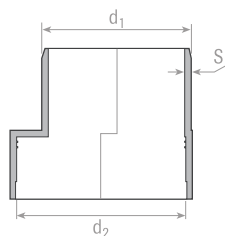
**SOCKET**

CODE	Ø D (mm)	D(mm)	d <sub>1</sub> (mm)	S(mm)	L(mm)	L <sub>1</sub> (mm)
7016007200	200	200.6	216.2	4.9	760	700



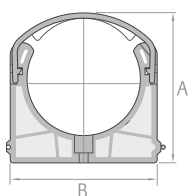
**WC CONNECTOR**

CODE	Ø D (mm)	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	S(mm)
7016002100	110	110	131.0	3.2



**BRACELETS**

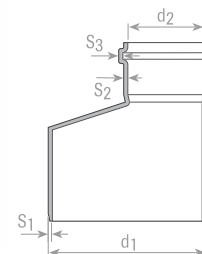
CODE	Ø D (mm)	A(mm)	B(mm)
7016005050	50	78.30	57.60
7016005070	75	118.20	83.60
7016005100	110	152.55	120.00
7016005125	125	159.50	167.65
7016005150	160	207.60	207.45



### REDUCER

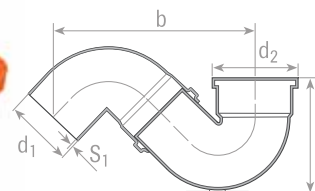
CODE	Ø D (mm)	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	S <sub>1</sub> (mm)	S <sub>2</sub> (mm)	S <sub>3</sub> (mm)
7012070050	75-50	75	50.3	3.3	2.7	2.3
7012100050	110-50	110	50.3	3.2	2.9	2.4
7012100070	110-75	110	75.4	3.2	2.9	2.4
7012125070	125-75	125	75.4	3.2	2.9	2.4
7012125100	125-110	125	110.4	3.2	2.9	2.4
7012150100	160-110	160	110.4	4.0	3.6	3.0
7012150125	160-125	160	125.5	4.0	3.6	3.0
7012200100	200-110	200	110.4	4.9	4.4	3.7
70K0220012	200-125	200	125.5	4.9	4.4	3.7
7012200150	200-160	200	160.5	4.9	4.4	3.7
7012250200	250-200	250	200.6	6.2	4.4	3.7

K: Confection Production



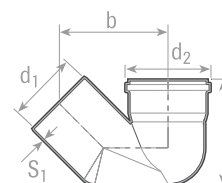
### S SIPHON

CODE	Ø D (mm)	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	a(mm)	b(mm)	S(mm)
7016002145	75/45°	75	97	150	202	3.0
7016002175	75/87°	75	97	150	195	3.0
7016003100	110	110	140	212	290	3.2
7016003145	110/45°	110	140	212	263	3.2



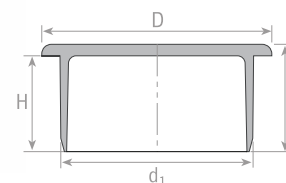
### S SIPHON WITH MUFF

CODE	Ø D (mm)	d <sub>1</sub> (mm)	d <sub>2</sub> (mm)	a(mm)	b(mm)	S(mm)
7017000100	110	110	126	176	167	3.2
7017000145	110/45°	110	126	176	268	3.2



### PLUG

CODE	Ø D (mm)	D(mm)	d <sub>1</sub> (mm)	L(mm)	H(mm)
7016004050	50	60	50	28	25
7016004070	75	85	75	34	30
7016004100	110	120	110	38	34
7016004125	125	138	115	50	45
7016004150	160	173	160	60	55
7016004200	200	214	200	71	65



### AIR HOLE PIPE

CODE	Ø D (mm)	d <sub>1</sub> (mm)	S(mm)
70K0707000	75	75	3.0
70K0710000	110	110	3.2



### ADAPTING SEAL

CODE	Ø D (mm)
2001003050	50



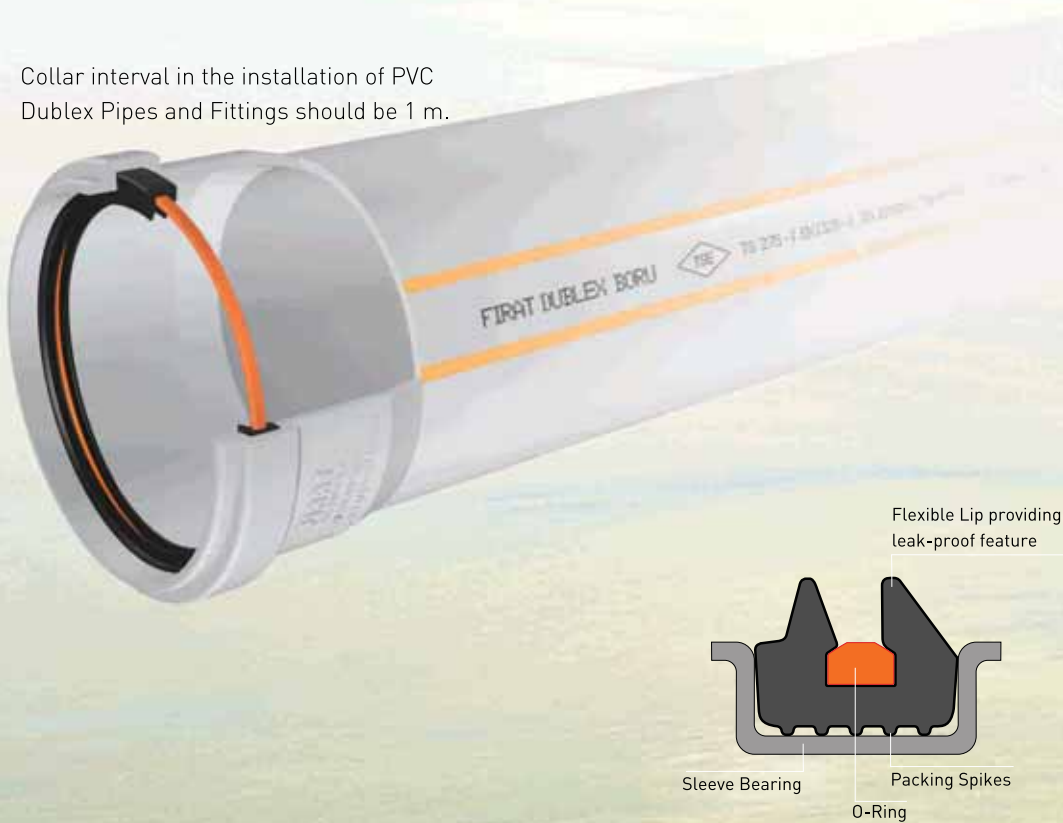
## Installation Technique of Dublex Pipes and Fittings

### Installation of Dublex PVC Pipes



1- Sleeve end and seal bearing of PVC pipe to which the seal is installed is wiped by a clean cloth to remove any dust particles, wetness, etc.

Collar interval in the installation of PVC Dublex Pipes and Fittings should be 1 m.



### Installation of Dublex Pipe Collar



1- Collar is installed by means of screwdriver to the wall to which the wall shall be installed. 2- Mouth part of Dublex collar is easily stretched out for easy placement of Dublex Pipe into the collar. 3- Collar mouth part can be easily closed after installation of the pipe. 4- Thanks to self-locking feature of Dublex collar, the pipe installation is easily completed.



2- The spiked outer side of the seal is placed into the seal bearing thus cleaned and the cheek inner part on the diameter center of the pipe.



3- Liquid soap etc. may be applied to the cheek side of the seal installed to PVC pipe that will be in contact with the pipe for sliding purpose.



4- Likewise, the joining distance to contact with the pipe or attachment to be installed is wiped and lubricated with similar material.



5- Thus installation of the pipes and attachments completes.

### Test After Installation

After installation of PVC waste water pipes and fittings indoor is completed, water is freely passed through the system to control for any leaking at all the jointing parts.

## **FIRAT sells to a lot of Countries in Europe, Asia and Africa**

### **Countries to which FIRAT exports:**

Afghanistan	India	Pakistan
Albania	Iran	Poland
Algeria	Iraq	Portugal
Armenia	Italy	Qatar
Azerbaijan	Jordan	Romania
Bahrain	Kazakhstan	Russia
Belarus	Kenya	Saudi Arabia
Belgium	Kosovo	Serbia
Bulgaria	Kuwait	Slovakia
Bosnia and Herzegovina	Kyrgyzstan	Slovenia
Brasil	Lebanon	South Africa
China	Latvia	Spain
Croatia	Libya	Sudan
Czech Republic	Luxemburg	Sweden
Denmark	Macedonia	Syria
Dubai	Maldives	Tajikistan
Egypt	Malta	Tanzania
England	Moldova	Tunisia
Ethiopia	Montenegro	Turkmenistan
France	Mongolia	Ukraine
Gabon	Morocco	United Arab Emirates
Gambia	Netherlands	Union of the Comoros
Georgia	New Zealand	Uzbekistan
Germany	Nigeria	Yemen
Greece	TR of Northern Cyprus	
Hungary	Palestine	