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PVC-U Systems

kalde®
First Choice

PE-100
PE-X
PE-RT
PP-R
PVC-U
FLEXO
KORUGE
MANIFOLTS
SuperMUTE
GENERAL BRASS FITTINGS
PANEL RADIATORS
TOWEL RADIATORS

Kalde is the “First Choice” all around the world.

Why Kalde?

Kalde produces high quality products, designs and develops integrated solutions for customers worldwide.

It is among the leading companies in production of pipes and fittings with its knowledge and expertise of more then 40 years.

The headquarters of the company is located in Istanbul where the continents of Asia and Europe meet.

Our strategical location at the junction of Europe, Asia and Africa together with a reliable supply chain give us unique advantages in providing our business partners and customers with high quality service as well as the competition in the global markets. Currently, our products are exported to more than 40 countries worldwide including Germany, Hungary, Romania, Austria, Greece, Bulgaria, Russia, Ukraine, Egypt, Syria, Lebanon, etc.

Kalde has product design, development and quality control facilities in 300.000 m^2.

Kalde produces a wide range of products including PP-R pipes, PP-R fittings, PP-R and brass valves, Al-pex & PE-RT pipes, screw fittings, press fittings, PE-X pipes and collectors. Kalde has internationally accredited certificates from respected organisations such as DVGW SKZ (Germany), CSTB (France) and AENOR (Spain). Furthermore, our management system has been certified by ISO.
We are proud of our high quality products and experiences...

Our vision is providing our customers with an increasingly wide portfolio of high quality products and solutions with continuous research and development.

Our goal is to develop long term partnerships with our customers and suppliers.

We create integrated solutions by team work as well as collaboration with our customers and partners.

Having market-focused teams of around 1500 professionals supported by a strong management, we offer our business partners and customers worldwide with value-adding solutions.

As result of these reasons, kalde® Kalde is the “First Choice” of the users worldwide

Kalde Value Commitment.

Kalde was established by four young engineers dedicated to provide customers with the best service in 1977.

This spirit is still alive and is the essence of our mission statement.

The Success of Kalde is the Result of Various Factors.

- **High quality** products.
- Utilization of best **practices.**
- Products meeting your **unique** requirements.
- **Proven** products.
- **Total** customer satisfaction.
- **Long term** relationships with each customer.
- A **dedicated** team of around 1500 professionals.

Contents

PVC-U SYSTEMS

Raw Material and General Properties

Kalde Waste Water Systems are formed of pipes and joints which are produced of PVC-U raw material. They are manufactured according to the B and BD application areas of EN 1329 -1,2 standard.

PVC-U pipe and joints (B and BD marked) are used for the below mentioned purposes.

- Warm and cold domestic waste water,
- Air conditioning systems for domestic waste water lines,
- Building rain water installation,

Pipes and Joints:
The ones which are marked with "B" can be used only inside the building and the "BD" marked ones can be used as embedded under the ground in the building and within the building.

Application Area Code:
The application area code is the code showing the application areas of the pipes and fittings according to the below mentioned information.

B:
The application area code for pipes and fittings which are mounted on the wall outside the building or for pipes and fittings which are used on the ground inside the building.

D:
The application area code used for pipes and fittings used embedded under the ground which are one (1) meter away from the building and under the building in order to make connections for the underground drainage and sewerage systems.

BD:
The application area code for the pipes and fittings used in both application areas specified in B and D codes.

Note: The nominal diameter of the elements which are used as embedded under the ground inside the building (BD marked) should be at least 75 mm. Additional properties for the ground surface applications outside the building according to the weather conditions are determined by the user and manufacturer.

The elements which are produced according to the other plastic pipe system standards can be used together if they conform the PVC-U pipe and fittings, fitting dimensions and functional properties according to the EN 1329-1,2' standard.

Kalde PVC-U pipes and fittings are produced in DN 50, DN 75, DN 110, DN 125, DN 160, DN 200 and DN 250 dimensions. It is long-term and reliable system with its problem-free assembly technique. It provides long-term and easy usage with its interrelated easy fitting system.

Because the seals used in the kalde PVC-U pipes and fittings are covered by a special silicone layer, the seal is prevented from deformation and degradation in case of being exposed to sunbeam.

The smooth and bright internal and external layers of Kalde PVC-U pipes and fittings prevent the blockage of installation by keeping the residue and lime accumulation at the lowest level and provides fast and uniform flow.

PVC-U Physical and Mechanical Properties

Polyvinyl chloride comes under the amorphous plastics and it is a granulated polymer with white or light yellow color. It is possible to process polyvinyl chloride up to 60°C. When it is heated, it is solved by chlorinated hydrocarbons. It is resistant against the effect of acids and bases. Water, alcohol and benzene do not show any reaction to PVC. PVC has high electrolysis feature and it is a fireproofing polymer. PVC decomposes slowly at 140°C and easily at 170°C by HCL decomposition and double bond is formed at the polymer. Thus stabilizers partake in the polymer.

PVC-U SYSTEMS

Properties	Value	Standard
Density (g/cm^3)	1,41	ISO 1183
Water Absorption, 24 hrs. (%)	0,05	ASTM D570
Tensile Strength (N/mm^2)	52	ASTM D638
Flexural Strength, (N/mm^2)	88	ASTM D790
Modulus of Elasticity, (N/mm^2)	3316	ASTM D790
Hardness, (Rockwell R)	115	ASTM D785
IZOD Impact resistance (Joule)	5,40	ASTM D256
Coefficient of Linear Expansion, (mm/mK)	0,06	ASTM D696
Thermal conduction, (W/mK)	0,15	ASTM D696
VICAT softening temperature, (°C)	93	ASTM D1525
Surface Resistance (ohm)	>10^{12}	ASTM D257

Resistant:
Kalde PVC-U Waste water Pipes and Fittings keep their physical properties up to 60 °C. In case no internal pressure is applied and no external mechanical impact is applied, it is resistant against pH 2-7 acids at 20 °C and pH 7-12 alkaline. Kalde PVC-U Waste Water pipes and fittings are resistant against various mechanical effects. The impact durability is controlled with the falling ball test.

Abrasion-proofing:
Because Kalde PVC-U Waste Water pipes and fittings are rough PVC, it is more resistant against the external factors.

Smooth Internal Surface:
The smooth and flat internal surface of Kalde PVC-U Waste Water pipes and fittings provide ideal viscosity property. It is out of question to develop pollution which will cause choking.

Explosion-proof:
The Kalde PVC-U Waste Water pipes and fittings do not have spontaneous combustion property due to the structure of PVC-U and additives. They can only burn under open flame.

Deformation of PVC

PVC degradates by two ways.

1. by HEAT
Its degradation by heat is formed by HCl (Hydrogen Chloride) liberation. Together with this gas liberation, yellowing occurs on the PVC Color

When PVC is directly exposed to heat, hydrogen chloride (HCl) liberates and yellowing occurs on the PVC color. Related to the degradation level; yellowing, reddening, brown and black colors are seen on the PVC color. Together with this, changes in the physical and chemical properties of the product are seen. The waste gases and humidity which are formed during the process are removed from the environment and then eliminated.

2. by LIGHT
When PVC does not include any stabilizer material, it degrades over 100 °C temperature or if it is exposed to UV rays or gamma rays.

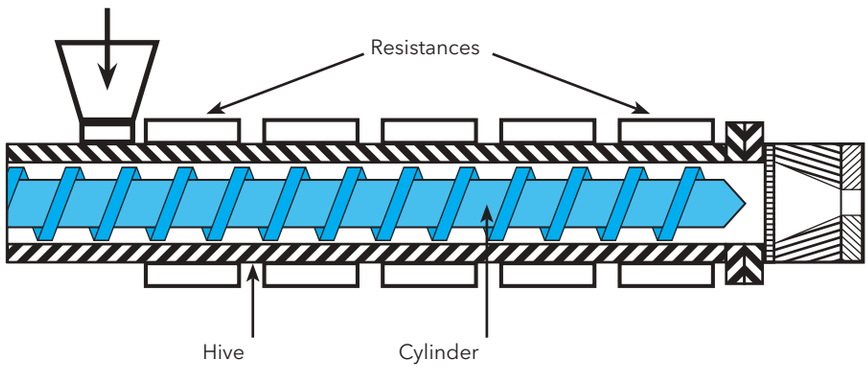
PVC-U SYSTEMS

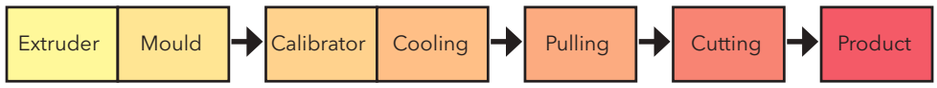
PVC-U Formulation

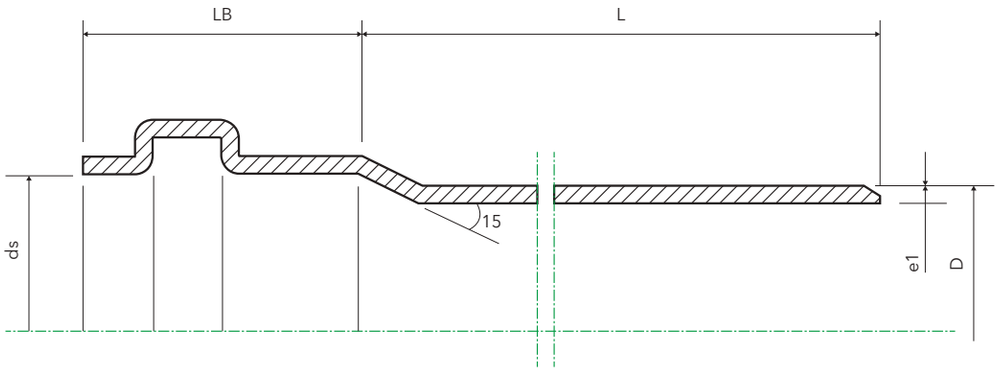
PVC-U is the material which some additives are added in the raw material of PVC. The PVC content of the material is at least 80% by mass for the pipes suitable to EN 1905 and at least 85% by mass for the fittings which are produced by injection molding. In PVC-U processes, according to the product type, it is compulsory to add some adjuvant additives. Correspondingly, the formulation is generally as follows:

1- PVC resin,
2- Stabilizers,
3- Lubricants,
4- Durability improvers,
5- Process adjuvant,
6- Pigments

Together with the above mentioned items, some other additives such as fire protectors, optic bleaches are used in the formulation.







Dimension (TS EN 1329-1)

Out Diameter D (mm)	ds (mm)	Wall thickness (mm)		LB	Approximately weight (kg/m)
		e1 (min)	e1 (max)		
50	50.2	3	3.5	50	0.725
75	75.3	3	3.5	58	1.15
110	110.3	3.2	3.8	72	1.75
125	125.3	3.2	3.8	72	2.1
160	160.4	3.2	3.8	102	2.614
200	200.5	3.9	4.5	102	4.05
250	250.5	4.9	5.6	125	6.25

Chemical Resistance Table of PVC-U According to ISO/TR 10358, TS 11448

Chemical Material	Concentration (%)	Temperature (°C)	
		20	60
Adipic acid	saturated solution % 1,4	D	YD
Aluminium hydroxide	suspension	D	D
Ammonia, aqueous	saturated solution	D	D
Ammonium chloride	saturated solution	D	D
Ammonium sulphate	saturated solution	D	D
Acetic acid	50	D	YD
Acetone	ts-s	ZD	ZD
Copper 2 sulphate	saturated solution	D	D
Benzene	ts-s	ZD	ZD
Gasoline	Working solution	D	D
Beer	Working solution	D	D
Mercury	ts-s	D	D
Iron 2 chloride	saturated solution	D	D
Iron 3 chloride	saturated solution	D	D
Ethanol	95	D	YD
Phenol	90	ZD	ZD
Formaldehyde	30-40	D	D
Phosphoric acid	25-85	D	-
Glycerine	ts-s	D	D
Hydrogen peroxide	30	D	D
Hydrofluoric acid gas	ts-g	YD	ZD
Hydrofluoric acid	10' a kadar	D	D
Hydrofluoric acid	40	YD	ZD
Urine		D	YD
Calcium carbonate	suspension	D	D
Calcium chloride	saturated solution	D	D
Carbon dioxide, gas	ts-g	D	D
Carbon monoxide, gas	ts-g	D	D
Carbon tetrachloride	ts-s	ZD	ZD
Chlorine, dry gas	ts-g	YD	ZD
Chloroform	ts-s	ZD	ZD
Sulphur dioxide, dry gas	süsp.	D	D
Methyl alcohol	ts-s	D	YD
Nitric acid	25	D	-
Nitric acid	>50	ZD	ZD
Oxygen, gas	ts-g	D	D
Aliphatic hydrocarbons		ZD	ZD
Potassium hydroxide	solution	D	D
Potassium hydroxide	50' ye kadar	D	D
Soap	solution	D	YD
Vinegar	Working solution	D	D
Sodium bicarbonate	saturated solution	D	D
Sodium hydroxide	saturated solution	D	D
Sodium carbonate	saturated solution	D	D
Sodium chloride	saturated solution	D	D
Sodium sulfate	saturated solution	D	D
Water distilled		D	D
Water, use, mineral	Working solution	D	D
Sulfuric acid	50	D	D
Sulfuric acid	98	ZD	ZD
Sulfuric acid	smoky	ZD	ZD
Milk	Working solution	D	D
Wine	Working solution	D	D
Toluene	ts-s	ZD	ZD
Trichlorethylene	ts-s	ZD	ZD
Oils plant and animal	ts-s	D	D

Abbreviations

D	: Resistant
YD	: Resistant adequately
ZD	: Poor resistance
solution	: more than 10% concentrated but unsaturated aqueous solution Saturated aqueous solution, at 20 °C
Ts	: at technical purity, at least
Ts-k	: at technical purity, solid
Ts-s	: at technical purity, liquid
Ts-g	: at technical purity, gas
Working solution	: at the concentration which is commonly used in the industry
Suspension	: prepared at 20 °C saturated solution

Thermal Expansion in PVC-U Pipes

PVC-U pipes have low expansion coefficient.

Calculation of thermal expansion is as follows: $\Delta L = L * \Delta T * \lambda$

where

ΔT = variation of working temperature in Kelvin degrees (K) or Celsius(°C)

ΔL = variation of length in mm

L = initial length of the pipe in m

λ = coefficient of linear thermal expansion. The value of α is $0,6 * 10^{-4}$ (K^{-1}) for PVC-U tubes.

Pipe length (m)	Temperature variation ΔT in K									
	10	20	30	40	50	60	70	80	90	100
	Linear expansion ΔL (mm)									
1.0	0,60	1,20	1,80	2,40	3,00	3,60	4,20	4,80	5,40	6,00
4.0	2,40	4,80	3,60	9,60	12,00	14,40	16,80	19,20	21,60	24,00
5.0	3,00	6,00	9,00	12,00	15,00	18,00	21,00	24,00	27,00	30,00
6.0	3,60	7,20	10,80	14,40	18,00	21,60	25,60	28,80	32,40	36,00
7.0	4,20	8,40	12,60	16,80	21,00	25,20	29,40	33,60	37,80	42,00
8.0	4,80	9,60	14,40	19,20	24,00	28,80	33,60	38,40	43,20	48,00
9.0	5,40	10,80	16,20	21,60	27,00	32,40	37,80	43,20	48,60	54,00
10.0	6,00	12,00	18,00	24,00	30,00	36,00	42,00	48,00	54,00	60,00

Note: When water temperature circulating in the pipe is higher than environmental temperature,the pipe will elongate. But if water temperature circulating in the pipe is lower than environmental temperature,the result will be a shortage.

Assembly and Storage

Points to consider during transport, discharging and storing the KALDE PVC-U Pipes

1- Moving the product from a place to another place: The products should not be dropped down during transport. The pipes should be transport to the new location in yokes.

2- Discharging the product from the vehicle: The products should not be thrown from the vehicle. They should be placed on a flat surface in yokes. Falling down of the products from the vehicle should be prevented.

3- Storing the products: The products should be suitably stowed and if necessary, a palette should be placed under. When the pipes are being superimposed; it should be considered to leave the hub parts externally without contacting each other. During storage; it should be considered that the height of the pipe yokes should not exceed 1,5 meters.

Information Related to Pipe Laying (Application)

Preparation of the Pipe

Although it is possible to obtain pipes with various sizes; it can be compulsory to cut the pipes on site. In this case, it is very easy to cut the pipe by a hacksaw or a cutting stone. The cutting process should be performed in regular form. In order to chamfer the pipe ends angular as came from the factory; a thick-thread file or abrasive blaster can be used. If the required chamfer angle is not provided (150), pipe assembly can be very hard during pipe laying and it is inevitable that the gasket will slip from its place.

Overground Pipe Laying

In indoor applications; pay attention to use sufficient quantity of clamps. Using clamps both provides to have your line in alignment and supports the pipe weight on the line. In horizontal and vertical lines; attaching a clamp with 1 - 1,5 meters clearance will remove various possible problems.

- Well-informed and qualified personnel should work in transport and combining the PVC products.
- Sufficient quantity of clamps at appropriate clearances (1 – 1,5mt) should be used against possible stress/strain that may occur on the line.
- The line should not be tested with high-pressure air or gas.
- Clamps should be used at every discrimination point on the line and at route changing process of the line.
- The size of the clamp to be used should conform to the pipe diameter.
- The metal clamps to be used should be assembled without developing any pressure and deformation on the pipe.
- If metal clamps are going to be used in high buildings, it will be suitable to use metal clamps consisting of a gasket inside.
- In vertical declines (such as rain falls); a fixed support should be located on the bottom part of the line that will carry the pipe and its contents.

Underground Pipe Laying

- Before starting the pipe laying process and till the pipe laying process is completed; all the required occupational safety precautions should be taken.
- The excavation soil from the canal should be placed to a distance that will not prevent the pipe laying process (0,5 mt).
- Inner section of the canal should be kept as dry as possible. Owing to the water that may occur within the canal; the pipe may move and joint may segregate. In order to prevent this, soil with 1,5 times the nominal diameter of pipe should be placed.
- All precautions shall be taken in order to prevent the water entry inside the canal until the pipe laying process is completed and then covered by the filling material. Otherwise the pipe may move and cause leakages.

Pipe Assembly

- Kalde PVC-U pipes should be protected from impacts, strokes etc. Because the friableness of the pipe increases when the temperature is near to 0°C, this matter becomes more significant.
- On Kalde PVC-U Pipes; avoid applying processes that may cause grooves, cuts or traces. The clamps to be used should wrap the pipe completely, its edges should be rounded and internal surfaces should be flat and smooth.
- Vertically laid Kalde PVC-U pipes should be fastened by a clamp immediately after the pipes are enlaced and thus sliding should be prevented.
- 10 mm clearance should be left between the pipe hub end and the fitting at the joint points because of thermal expansion.
- Before starting the assembly; the hub area and the gasket and the pipe end should be cleaned from slurry, sand or other foreign particles.
- Cleaning of the gasket and the exact assembly of the gasket into the canal are ensured by manually controlling the gasket.
- In order to perform the pipe assembly easily and to prevent the gasket slide from its place during assembly; upper side of the gasket on the hub area and the pipe end should be completely lathered with liquid soap. Immediately after the lathering process; assembly should be performed without delay.
- The pipes should enlace tightly. If you have any difficulty during the assembly, the pipe should be taken out and it should be controlled that whether the gasket slides from its slot or not and the chamfer angle should be controlled.
- If the gasket is damaged, it should be replaced. Re-assembly process should be applied. If difficulty continues; your line may not be in line, it will be required to control and align the line in order to eliminate the shrinkage.
- Kalde PVC-U pipes that will remain under the alum should be tested according to one of the below mentioned methods before the alum is poured. AS 2032

Water Test

The pipe to be tested should be filled with water at a level of not less than minimum 1 meter from the surface. The mechanism should be tested from the upper point but this upper point should not exceed 5 meters from the minimum level. The test should keep the water level for at least 15 minutes without any leakage. Each joint should be controlled visually whether there is any leakage or not and if there is a defect, it should be repaired and the test should be repeated.

Air Test

It is applied to the pipe line slowly till obtaining 0,5 bar pressure by the appropriate method. This pressure should be kept for at least 3 minutes. No visual leakage should be present at the end of the 3rd minute. Then the system providing air should be closed and if the air pressure provided inside the pipe does not go under 0,35 bar within 60 seconds, the pipe line is accepted as sufficient. For any reason, if the pressure cannot be kept between the specified limits, air is again given inside the line and the solution prepared by soapy water should be poured on the joint and it is controlled visually whether there is a leakage or not. If there is a leakage, it should be repaired and the test should be repeated.

3.2 Waste Water Pipe and Fittings

PVC-U Pipe / Type B

Code	Size	e. min.	e. max.	L	Pcs.
5203-tbe-0k0150	ø50	3.0	3.5	150	100
5203-tbe-0k0250	ø50	3.0	3.5	250	80
5203-tbe-0k0500	ø50	3.0	3.5	500	50
5203-tbe-0k1000	ø50	3.0	3.5	1000	10
5203-tbe-0k2000	ø50	3.0	3.5	2000	10
5203-tbe-0k3000	ø50	3.0	3.5	3000	10
5203-tbe-0k6000	ø50	3.0	3.5	6000	1
5203-tbe-0l0150	ø75	3.0	3.5	150	40
5203-tbe-0l0250	ø75	3.0	3.5	250	35
5203-tbe-0l0500	ø75	3.0	3.5	500	30
5203-tbe-0l1000	ø75	3.0	3.5	1000	5
5203-tbe-0l2000	ø75	3.0	3.5	2000	5
5203-tbe-0l3000	ø75	3.0	3.5	3000	5
5203-tbe-0l6000	ø75	3.0	3.5	6000	1
5203-tbe-0m0150	ø110	3.2	3.8	150	25
5203-tbe-0m0250	ø110	3.2	3.8	250	15
5203-tbe-0m0500	ø110	3.2	3.8	500	14
5203-tbe-0m1000	ø110	3.2	3.8	1000	5
5203-tbe-0m2000	ø110	3.2	3.8	2000	5
5203-tbe-0m3000	ø110	3.2	3.8	3000	2
5203-tbe-0m6000	ø110	3.2	3.8	6000	1
5203-tbe-0n0150	ø125	3.2	3.8	150	15
5203-tbe-0n0250	ø125	3.2	3.8	250	12
5203-tbe-0n0500	ø125	3.2	3.8	500	10
5203-tbe-0n1000	ø125	3.2	3.8	1000	2
5203-tbe-0n2000	ø125	3.2	3.8	2000	2
5203-tbe-0n3000	ø125	3.2	3.8	3000	2
5203-tbe-0n6000	ø125	3.2	3.8	6000	1
5203-tbe-0p0150	ø160	3.2	3.8	150	10
5203-tbe-0p0250	ø160	3.2	3.8	250	8
5203-tbe-0p0500	ø160	3.2	3.8	500	6
5203-tbe-0p1000	ø160	3.2	3.8	1000	2
5203-tbe-0p2000	ø160	3.2	3.8	2000	2
5203-tbe-0p3000	ø160	3.2	3.8	3000	2
5203-tbe-0p6000	ø160	3.2	3.8	6000	1

PVC-U Pipe / Type B

Code	Size	e. min.	e. max.	L	Pcs.
5203-tbe-0r0150	ø200	3.9	4.5	150	6
5203-tbe-0r0250	ø200	3.9	4.5	250	4
5203-tbe-0r0500	ø200	3.9	4.5	500	4
5203-tbe-0r1000	ø200	3.9	4.5	1000	2
5203-tbe-0r2000	ø200	3.9	4.5	2000	2
5203-tbe-0r3000	ø200	3.9	4.5	3000	2
5203-tbe-0r6000	ø200	3.9	4.5	6000	1
5203-tbe-0s0150	ø250	4.9	5.6	150	4
5203-tbe-0s0250	ø250	4.9	5.6	250	3
5203-tbe-0s0500	ø250	4.9	5.6	500	3
5203-tbe-0s1000	ø250	4.9	5.6	1000	1
5203-tbe-0s2000	ø250	4.9	5.6	2000	1
5203-tbe-0s3000	ø250	4.9	5.6	3000	1
5203-tbe-0s6000	ø250	4.9	5.6	4000	1

PVC-U Pipe / Type BD

Code	Size	e. min.	e. max.	L	Pcs.
5203-tbd-0p0150	ø160	4.0	4.6	150	10
5203-tbd-0p0250	ø160	4.0	4.6	250	8
5203-tbd-0p0500	ø160	4.0	4.6	500	6
5203-tbd-0p1000	ø160	4.0	4.6	1000	2
5203-tbd-0p2000	ø160	4.0	4.6	2000	2
5203-tbd-0p3000	ø160	4.0	4.6	3000	2
5203-tbd-0p6000	ø160	4.0	4.6	6000	1
5203-tbd-0r0150	ø200	4.9	5.6	150	6
5203-tbd-0r0250	ø200	4.9	5.6	250	4
5203-tbd-0r0500	ø200	4.9	5.6	500	4
5203-tbd-0r1000	ø200	4.9	5.6	1000	2
5203-tbd-0r2000	ø200	4.9	5.6	2000	2
5203-tbd-0r3000	ø200	4.9	5.6	3000	2
5203-tbd-0r6000	ø200	4.9	5.6	6000	1
5203-tbd-0s0150	ø250	6.2	7.1	150	4
5203-tbd-0s0250	ø250	6.2	7.1	250	3
5203-tbd-0s0500	ø250	6.2	7.1	500	3
5203-tbd-0s1000	ø250	6.2	7.1	1000	1
5203-tbd-0s2000	ø250	6.2	7.1	2000	1
5203-tbd-0s3000	ø250	6.2	7.1	3000	1
5203-tbd-0s6000	ø250	6.2	7.1	6000	1

2.2 Waste Water Pipe System

Sedef PVC-U Pipe

Code	Size	e. min.	e. max	L	Pcs.
6203-tbs-0k0150	ø50	2.2		150	100
6203-tbs-0k0250	ø50	2.2		250	80
6203-tbs-0k0500	ø50	2.2		500	50
6203-tbs-0k1000	ø50	2.2		1000	10
6203-tbs-0k2000	ø50	2.2		2000	10
6203-tbs-0k3000	ø50	2.2		3000	10
6203-tbs-0k6000	ø50	2.2		6000	5
6203-tbs-0l0150	ø75	2.2		150	40
6203-tbs-0l0250	ø75	2.2		250	35
6203-tbs-0l0500	ø75	2.2		500	30
6203-tbs-0l1000	ø75	2.2		1000	5
6203-tbs-0l2000	ø75	2.2		2000	5
6203-tbs-0l3000	ø75	2.2		3000	5
6203-tbs-0l6000	ø75	2.2		6000	5
6203-tbs-0m0150	ø110	2.2		150	25
6203-tbs-0m0250	ø110	2.2		250	15
6203-tbs-0m0500	ø110	2.2		500	14
6203-tbs-0m1000	ø110	2.2		1000	5
6203-tbs-0m2000	ø110	2.2		2000	5
6203-tbs-0m3000	ø110	2.2		3000	5
6203-tbs-0m6000	ø110	2.2		6000	5
6203-tbs-0n0150	ø125	2.2		150	15
6203-tbs-0n0250	ø125	2.2		250	12
6203-tbs-0n0500	ø125	2.2		500	10
6203-tbs-0n1000	ø125	2.2		1000	5
6203-tbs-0n2000	ø125	2.2		2000	5
6203-tbs-0n3000	ø125	2.2		3000	5
6203-tbs-0n6000	ø125	2.2		6000	5

PVC-U Elbow 87°

Code	Size	e. min.	Pcs.
5213-elb-0k0087	ø50	3.0	150
5213-elb-0l0087	ø75	3.0	75
5213-elb-0m0087	ø110	3.2	25
5213-elb-0n0087	ø125	3.2	15
5213-elb-0p0087	ø160	4.0	10
5213-elb-0r0087	ø200	3.9	4
5213-elb-0s0087	ø250	4.9	2

PVC-U Elbow 45°

Code	Size	e. min.	Pcs.
5213-elb-0k0045	ø50	3.0	200
5213-elb-0l0045	ø75	3.0	75
5213-elb-0m0045	ø110	3.2	30
5213-elb-0n0045	ø125	3.2	20
5213-elb-0p0045	ø160	4.0	10
5213-elb-0r0045	ø200	3.9	5
5213-elb-0s0045	ø250	4.9	3

PVC-U Double Branch 45°

Code	Size	e. min.	Pcs.
5213-dbr-0k0k45	ø50/50	3.0	60
5213-dbr-0l0k45	ø75/50	3.0	20
5213-dbr-0l0l45	ø75/75	3.0	20
5213-dbr-0m0k45	ø110/50	3.2	20
5213-dbr-0m0l45	ø110/75	3.2	10
5213-dbr-0m0m45	ø110/110	3.2	8
5213-dbr-0n0k45	ø125/50	3.2	15
5213-dbr-0n0l45	ø125/75	3.2	10
5213-dbr-0n0m45	ø125/110	3.2	6
5213-dbr-0n0n45	ø125/125	3.2	5
5213-dbr-0p0k45	ø160/50	4.0	5
5213-dbr-0p0l45	ø160/75	4.0	5
5213-dbr-0p0m45	ø160/110	4.0	4
5213-dbr-0p0n45	ø160/125	4.0	4
5213-dbr-0p0p45	ø160/160	4.0	4
5213-dbr-0r0k45	ø200/50	3.9	3
5213-dbr-0r0l45	ø200/75	3.9	3
5213-dbr-0r0m45	ø200/110	3.9	3
5213-dbr-0r0n45	ø200/125	3.9	3
5213-dbr-0r0p45	ø200/160	3.9	3
5213-dbr-0r0r45	ø200/200	3.9	3
5213-dbr-0s0m45	ø250/110	4.9	3
5213-dbr-0s0n45	ø250/125	4.9	3
5213-dbr-0s0p45	ø250/160	4.9	3
5213-dbr-0s0r45	ø250/200	4.9	3
5213-dbr-0s0s45	ø250/250	4.9	3

PVC-U Double Branch 87°

Code	Size	e. min.	Pcs.
5213-dbr-0m0m87	ø110/110	3.2	8

PVC-U Single Branch 45°

Code	Size	e. min.	Pcs.
5213-sbr-0k0k45	ø50/50	3.0	80
5213-sbr-0l0k45	ø75/50	3.0	50
5213-sbr-0l0l45	ø75/75	3.2	20
5213-sbr-0m0k45	ø110/50	3.2	15
5213-sbr-0m0l45	ø110/75	3.2	15
5213-sbr-0m0m45	ø110/110	3.2	10
5213-sbr-0n0k45	ø125/50	3.2	15
5213-sbr-0n0l45	ø125/75	3.2	10
5213-sbr-0n0m45	ø125/110	3.2	10
5213-sbr-0n0n45	ø125/125	3.2	8
5213-sbr-0p0k45	ø160/50	4.0	8
5213-sbr-0p0l45	ø160/75	4.0	8
5213-sbr-0p0m45	ø160/110	4.0	6
5213-sbr-0p0n45	ø160/125	4.0	5
5213-sbr-0p0p45	ø160/160	4.0	4
5213-sbr-0r0k45	ø200/50	3.9	5
5213-sbr-0r0l45	ø200/75	3.9	5
5213-sbr-0r0m45	ø200/110	3.9	4
5213-sbr-0r0n45	ø200/125	3.9	4
5213-sbr-0r0p45	ø200/160	3.9	4
5213-sbr-0r0r45	ø200/200	3.9	4
5213-sbr-0s0k45	ø250/50	4.9	3
5213-sbr-0s0l45	ø250/75	4.9	3
5213-sbr-0s0m45	ø250/110	4.9	3
5213-sbr-0s0n45	ø250/125	4.9	3
5213-sbr-0s0p45	ø250/160	4.9	3
5213-sbr-0s0r45	ø250/200	4.9	3
5213-sbr-0s0s45	ø250/250	4.9	3

PVC-U Sigle Branch 87°

Code	Size	e. min.	Pcs.
5213-sbr-0k0k87	ø50 x 50	3.0	100
5213-sbr-0l0k87	ø75 x 50	3.0	30
5213-sbr-0l0l87	ø75 x 75	3.0	20
5213-sbr-0m0k87	ø110 x 50	3.2	15
5213-sbr-0m0l87	ø110 x 75	3.2	20
5213-sbr-0m0m87	ø110 x 110	3.2	15
5213-sbr-0n0k87	ø125 x 50	3.2	10
5213-sbr-0n0l87	ø125 x 75	3.2	15
5213-sbr-0n0m87	ø125 x 110	3.2	10
5213-sbr-0n0n87	ø125 x 125	3.2	10
5213-sbr-0p0k87	ø160 x 50	4.0	10
5213-sbr-0p0l87	ø160 x 75	4.0	8
5213-sbr-0p0m87	ø160 x 110	4.0	6
5213-sbr-0p0n87	ø160 x 125	4.0	6
5213-sbr-0p0p87	ø160 x 160	4.0	5
5213-sbr-0r0m87	ø200 x 110	3.9	6
5213-sbr-0r0n87	ø200 x 125	3.9	4
5213-sbr-0r0p87	ø200 x 160	3.9	4
5213-sbr-0r0r87	ø200 x 200	3.9	4
5213-sbr-0s0m87	ø250 x 110	4.9	3
5213-sbr-0s0n87	ø250 x 125	4.9	3
5213-sbr-0s0p87	ø250 x 160	4.9	3
5213-sbr-0s0r87	ø250 x 200	4.9	3
5213-sbr-0s0s87	ø250 x 250	4.9	3

PVC-U Reduction

Code	Size	e. min.	Pcs.
5213-rdc-0l0k00	75/50	3.0	100
5213-rdc-0m0k00	110/50	3.2	60
5213-rdc-0m0l00	110/75	3.2	60
5213-rdc-0n0l00	125/75	3.2	40
5213-rdc-0n0m00	125/110	3.2	30
5213-rdc-0p0l00	160/75	4.0	25
5213-rdc-0p0m00	160/110	4.0	25
5213-rdc-0p0n00	160/125	4.0	25
5213-rdc-0r0m00	200/110	3.9	15
5213-rdc-0r0n00	200/125	3.9	15
5213-rdc-0r0p00	200/160	3.9	15
5213-rdc-0s0m00	250/110	4.9	10
5213-rdc-0s0n00	250/125	4.9	10
5213-rdc-0s0p00	250/160	4.9	10
5213-rdc-0s0r00	250/200	4.9	10

PVC-U Sliding Coupling

Code	Size	e. min.	Pcs.
5213-soc-0k0000	ø50	3.0	200
5213-soc-0l0000	ø75	3.0	100
5213-soc-0m0000	ø110	3.2	30
5213-soc-0n0000	ø125	3.2	25
5213-soc-0p0000	ø160	4.0	10
5213-soc-0r0000	ø200	3.9	8

PVC-U S

Code	Size	e. min.	Pcs.
5213-spi-0l0045	ø75	3.0	25
5213-spi-0m0045	ø110	3.2	10
5213-spi-0l0087	ø75	3.0	25
5213-spi-0m0087	ø110	3.2	10

PVC-U Check Valve

Code	Size	Pcs.
5213-cvl-0m0000	ø110	1
5213-cvl-0n0000	ø125	1
5213-cvl-0p0000	ø160	1
5213-cvl-0r0000	ø200	1

PVC-U Cleaning Part

Code	Size	e. min.	Pcs.
5213-clp-0l0000	ø75	3.0	25
5213-clp-0m0000	ø110	3.2	15
5213-clp-0n0000	ø125	3.2	10
5213-clp-0p0000	ø160	4.0	5
5213-clp-0r0000	ø200	3.9	5
5213-clp-0r0000	ø200		4

PVC-U Cleaning Elbow 87°

Code	Size	e. min.	Pcs.
5213-elp-0m0000	ø110	3.2	15

Kada

Code	Size	e. min.	Pcs.
5213-cad-0m0000	ø110	3.2	100

Stopend

Code	Size	e. min.	Pcs.
5213-ste-0k0000	ø50	3.0	500
5213-ste-0l0000	ø75	3.0	400
5213-ste-0m0000	ø110	3.2	150
5213-ste-0n0000	ø125	3.2	100
5213-ste-0p0000	ø160	3.2	80
5213-ste-0r0000	ø200	3.9	30
5213-ste-0s0000	ø250	4.9	10

PVC-U Air Chimney

Code	Size	e. min.	Pcs.
5213-arh-0l00000	ø75	3.0	30
5213-arh-0m0000	ø110	3.2	18

Clamp

Code	Size	Pcs.
5213-bcc-0k0000	ø50	500
5213-bcc-0l0000	ø75	200
5213-bcc-0m0000	ø110	100
5213-bcc-0n0000	ø125	100
5213-bcc-0p0000	ø160	50
5213-bcc-0r0000	ø200	40

Adapter Joint

Code	Size	Pcs.
5213-aru-0k0000	ø50	200

Joint

Code	Size	e. min.	e. max	Pcs.
5213-rur-0k0000	ø50	6.5	3.5	7000
5213-rur-0l0000	ø75	6.5	4.0	5000
5213-rur-0m0000	ø110	7.9	4.0	2500
5213-rur-0n0000	ø125	8.9	4.5	2000
5213-rur-0p0000	ø160	10.2	4.8	1000
5213-rur-0r0000	ø200	11.2	6.5	700
5213-rur-0s0000	ø250	15.2	10.5	250

3.2 Waste Water Systems / Roof Gutter and Fittings

Rain Gutter Rectangular

Code	Size	e. min.	L	Pcs.
7203-dre-150000	150	2.2	4000	5

Rain Gutter

Code	Size	e. min.	L	Pcs.
8203-drr-100000	100	2.2	4000	5

Rain Gutter- Corner In

Code	Size	e. min.	Pcs.
8213-der-100001	100	2.2	30

Rain Gutter- Corner Out

Code	Size	e. min.	Pcs.
8213-der-100002	100	2.2	30

Rectangular Rain Gutter

Code	Size	e. min.	Pcs.
7213-ddr-150750	150 x 75	3.2	20
7213-ddr-150110	150 x 110	3.2	20

Rain Gutter Rectangular-Down Piece Rectangular

Code	Size	e. min.	Pcs.
7213-dde-150750	150 x 75	3.2	20

Rain Gutter Rectangular- Corner Piece

Code	Size	e. min.	Pcs.
7213-der-150000	150	3.2	30

Round Rain Gutter

Code	Size	e. min.	Pcs.
8213-ddr-100750	100 x 75	2.2	30

Round Corner Piece (Inside)

Code	Size	e. min.	Pcs.
8213-muf-100000	100	2.2	200

Rectangular Connection Piece

Code	Size	e. min.	Pcs.
7213-muf-150000	150	3.2	60

Rectangular Blanking Cab

Code	Size	e. min.	Pcs.
7213-ste-150000	150	3.2	120

Round Blanking Cab

Code	Size	e. min.	Pcs.
8213-ste-100000	100	2.2	400

Rectangular Bracket

Code	Size	e. min.	Pcs.
7213-bcc-150000	150	3.2	100

Round Bracket

Code	Size	e. min.	Pcs.
8213-bcc-150000	150	2.2	100

Rectangular Rain Gutter

Code	Size	e. min.	L	Pcs.
7203-tbe-0l1000	100 x 70	2.2	1000	6
7203-tbe-0l2000	100 x 70	2.2	2000	6
7203-tbe-0l3000	100 x 70	2.2	3000	4

Rectangular Down Elbow 45°

Code	Size	e. min.	Pcs.
7213-elb-0l0000	100 x 70	2.2	50

Rectangular Single Branch

Code	Size	e. min.	L	Pcs.
7213-sbr-0l0k00	100 x 70	2.2	50	50

Rectangular Double Branch

Code	Size	e. min.	L	Pcs.
7213-dbr-0l0k00	100 x 70	2.2	50	35

Rectangular Connection Piece

Code	Size	e. min.	L	Pcs.
7213-muf-0l0000	100 x 70	2.2	50	100

Rectangular Bracelet with Lock

Code	Size	e. min.	Pcs.
7213-bcc-0l0000	100 x 70	3.2	100

Manhole Boxes and Covers

Manhole Box and Cover - Flat

Code	Size	Pcs.
9213-set-202000	20 x 20 x 20	1
9213-set-303000	30 x 30 x 30	1
9213-set-404000	40 x 40 x 40	1
9213-set-555500	55 x 55 x 50	1

Manhole Box and Cover - Grid

Code	Size	Pcs.
9213-set-202001	20 x 20 x 20	1
9213-set-303001	30 x 30 x 30	1
9213-set-404001	40 x 40 x 40	1
9213-set-555501	55 x 55 x 50	1

Manhole Box Cover - Flat

Code	Size	Pcs.
9213-kpk-202000	20 x 20 x 3	1
9213-kpk-303000	30 x 30 x 4	1
9213-kpk-404000	40 x 40 x 4,5	1
9213-kpk-555500	55 x 55 x 6,5	1

Manhole Box Cover - Grid

Code	Size	Pcs.
9213-kpk-202001	20 x 20 x 3	1
9213-kpk-303001	30 x 30 x 4	1
9213-kpk-404001	40 x 40 x 4,5	1
9213-kpk-555501	55 x 55 x 6,5	1

Notes

Notes

+90 212 876 43 43 +90 212 876 76 49 Kalde Klima A.Ş. İstanbul / Türkiye info@kaldeklima.com www.kalde.com