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Corrugated Pipes



kalde®

First Choice

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

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 than 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 m².

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.

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Kalde Corrugated Pipe Systems

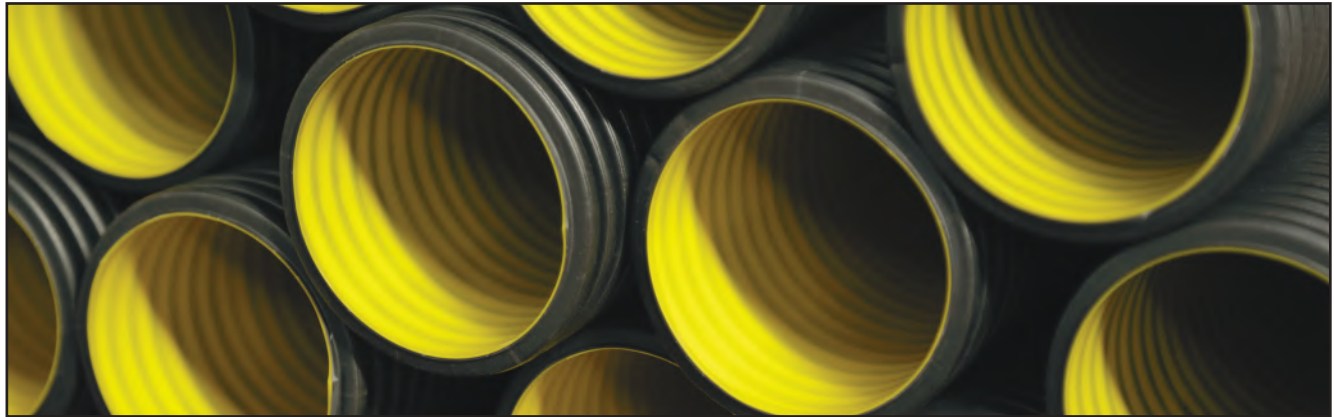
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Corrugated Pipe Set

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Corrugated Pipes

Kalde Corrugated Pipe Systems



Kalde Corrugated Pipe Systems are manufactured using polyethylene (PE) raw material in accordance with TS EN 13476-3 standards and complying with SN4 and SN8 ring stiffness having inner diameter of DN100, DN150, DN200, DN250, DN300 and length of 6 meters and being extruded.

Corrugated Pipe Systems are used in sewage systems, rain water drainage lines, water transportation lines, and drainage lines because of their superior characteristics against corrosion, chemicals, abrasion and can be easily used.

Advantages of Kalde Corrugated Pipes

- 1- Because of its flexibility property they are not affected negatively from ground activities such as earthquakes (because they are in harmony with ground activities), traffic load etc.
- 2- Corrugated pipes are connected using coupling-elastomeric gasket connection method, as a result of this; it provides tightness at 0.5 bar pressure, which is stated in related standards. By being known as environment friendly, it helps for the prevention of the environment.
- 3- It does not require heavy equipment's in installation of pipes as big as DN300, because of it is being light and its connection easiness.
- 4- The inner surfaces of Corrugated pipes are manufactured in yellow color, as a result of this it can be easily traced via camera.
- 5- Outer surface is in black color, which is UV contributed and it cannot affect from sunshine.
- 6- Life of Corrugated pipes are minimum 50 years.
- 7- Because of being light, Corrugated pipes are providing easiness in transportation and stowage. It can be put as nested and as a result of this telescopic stowage and transportation can be done.
- 8- It provides laminar flow because its inner surfaces are less rough than other materials and this minimizes the friction surface of fluid. And also it removes the risk of cut shrinkage.

Applied Norms

- 1- TS EN 13476-3 - Plastic pipe systems- it is for unpressurized, underground, drainage and waste waters - not contributed plasticizer polyvinylchloride (PVC-U), Polypropylene (PP), and Polyethylene (PE) pipes which is walls are pipe systems with profile and not contributed any plasticizer - part 3: inner surfaces are smooth and outer surfaces are type B pipes with profile, properties for joint parts and system.
- 2- EN ISO 1133 - Plastics - Assignment of spherical flow rate (MFR) and volumetric flow rate (MVR) of melted thermoplastic.
- 3- EN ISO 1183-1 - Nonporous plastics - density assignment methods- part 1- immersion method, liquid pycnometer method and titration method.
- 4- ISO 12091 - Thermoplastic pipes - profiled - stove experiment
- 5- EN ISO 580 - Plastic pipe and channel systems - thermoplastic joint parts manufactured by injection molding - eye check methods for temperature effects.
- 6- EN ISO 9969 - Thermoplastic pipes - Assignment of ring rigid
- 7- EN 744 - Plastic pipes and channel systems- Thermoplastic pipes - resistance experiment for outer impacts along circle.
- 8- EN 1446 - Plastic pipes and channel systems - Thermoplastic pipes - assignment of ring flexibility

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- 9- EN 1277 - Plastic pipes systems - thermoplastic pipes systems used in unpressurized applications in underground - tightness experiment for elastomeric ring type coupling- gasket
- 10- EN 12061 - Plastic pipes systems - assignment of thermoplastic joint's resistance for impact
- 11- EN 12256 - Plastic pipes systems - thermoplastic joint parts- experiment for mechanical resistance or flexibility of joints that are fabrication manufactured.
- 12- EN 1053 - Plastic piping systems - thermoplastics piping systems for non-pressure applications - test method for water tightness.

Material:

The material is manufactured from polyethylene (PE) raw material. Additives are included to this material in accordance with TS EN 13476-3 standards for the easiness of manufacturing process . Type B pipes in Spiral, can contain a support profile made of other than polymers except PE.

Table-1 Material Characteristics of Pipes and Joints

Polyethylene (PE) Material			
Characteristics	Standard	Unit	Value
Melt flow rate (MFI) 190°C, 5Kg	EN ISO 1133	gr /10 min	≤ 1,6
Thermal Stability (OIT1) 200°C	EN 728	Min.	≥ 20
Density	EN ISO 1183-1	Kg/m3	≥ 930
Tensile stress	ISO 527	Mpa	22-27
Elasticity module	ISO 527	Mpa	900
Elongation at rupture	ISO 527	%	>600
Hardness	ISO 868	Shore D	63

(OIT1): This characteristic is only applied for verifying installation of butt weld or fusion welding with pipe and joints.

Table-2 Physical Characteristics of PE Pipes and Joints

Pipes			
Characteristics	Standard	Unit	Value
Thermal durability, (150 ±2) °C	ISO 12091	Heating time: e ≤ 3 mm 30 min e > 8 mm 60 min	Delamination, cracking, bubbles in pipe shall not be seen.
Fittings			
Heating effect, (150 ±2) °C	EN ISO 580 Method A, air	Immersion time: e ≤ 3 mm 15 min 3<e≤10mm 30 min 10<e≤20mm 60 min	Cracking and bubbles in joints shall not be seen.

e: Wall thickness

Mechanical and Performance Characteristics of PE Pipes and Joints

1- Ring stiffness (SN):

Kalde Corrugated pipes, are providing SN4 and SN8 values when SN (Ring stiffness) value, that is stipulated by TS EN 13476-3 standards, are tested in accordance with ISO 9969 standards which is referenced by this standard.

Characteristics	Standard	Unit	Value
Ring stiffness, SN 4	ISO 9969	KN /M2	≥ 4
Ring stiffness, SN 8	ISO 9969	KN /M2	≥ 8

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Nominal Diameter -ID (mm)	Inside Diameter (mm)	Outside Diameter (mm)	Ring Stiffness -SN (kN/m ²)	
100	101.6	118	4	8
150	149.6	174	4	8
200	199	233	4	8
250	249	290.5	4	8
300	300.9	353.5	4	8

2- Ring flexibility:

Outer diameter of Kalde Corrugated pipes are stretched with 30% pressure in accordance with EN 1446 standards and as a result of this there will be no cracking, breaking and deformation in pipes.

3- Impact strength:

When Kalde Corrugated pipes are tested in accordance with EN 744 standards, the pipes can stand without being broken when a load, which is suitable for every diameter that is referenced in standard concerning pipe samples conditioned at 0°C, is applied on it.

4- Tightness of elastomeric ring seal joint:

Tightness experiment that is applied to a system consisting of elastomeric ring type pipes and joints in accordance with EN 1277 standards and is tested for 0,5 bar water and for 15 minutes, the system will stand without any leakage.

5- Chemical resistance:

Chemical resistance of Polyethylene and Polypropylene are in good level.

(For details please see table 3)

Table 3 - Polyethylene and Polypropylene Chemical Resistance 20, 60 and 100°C

PE		Temperature °C		
		20	60	100
Acetaldehyde	Ts-s	d	sd	-
Acetic acid	50%	d	-	-
Acetic acid	80%	d	-	-
Ace anhydride	TVs-s	d	sd	-
Acetone	Ts-s	sd	sd	-
Ally alcohol	TVs-s	d	d	-
Ammonium nitrate	Saturated Solution	d	d	-
Ammonium chloride	Saturated Solution	d	d	-
Amyl acetate	Ts-s	d	sd	-
Amyl alcohol	Ts-s	d	sd	-
Aniline	Ts-s	d	sd	-
Antimony (III) chloride	Saturated Solution	d	d	-
Arsenic acid	Saturated Solution	d	d	-
Benzene	Ts-s	sd	sd	-
Benzoic acid	Saturated Solution	d	d	-
Beer	Working Solution	d	d	-
Boric acid	Saturated Solution	D	d	-
Butane, gas	Ts-g	d	d	-
Butyl acetate	Ts-s	-	-	-
Mercury	Ts-s	d	d	-

Table 3 - Polyethylene and Polypropylene Chemical Resistance 20, 60 and 100°C

PE		Temperature °C		
		20	60	100
Mercury (I) nitrate	Saturated Solution	d	d	-
Mercury (II) chloride	Saturated Solution	d	d	-
Mercury (II) cyanide	Saturated Solution	d	d	-
Dextrin	Solution	d	d	-
Ferric (III) chloride	Saturated Solution	d	d	-
Ethanol	95%	-	-	-
Ethylene glycol	Ts-s	d	d	-
Formic acid	50%	d	d	-
Formic acid	Ts-s	d	d	-
Formaldehyde	%30-40	d	d	-
Phosphoric acid	Up to %50	d	d	-
Phosphoric acid	%25-85	-	-	-
Natural gas, dry	Ts-g	d	d	-
Natural gas, wet	Ts-g	d	-	-
Gasoline (petroleum)	Working Solution	D	sd	-
Glycerin	Ts-s	d	d	-
Silver Cyanide	Saturated Solution	d	d	-
Glucose	Solution	d	d	-
Air	Ts-g	d	d	-
Hydro bromic acid	Up to % 48	d	d	-

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Table 3 - Polyethylene and Polypropylene Chemical Resistance 20, 60 and 100°C

PE		Temperature °C		
		20	60	100
Hydrofluoric acid	Up to %10	d	d	-
Hydrogen	Ts-g	d	d	-
Hydrochloric acid	%10-20	d	d	-
Hydrochloric acid	% >30	d	d	-
Urine		d	d	-
Calcium hydroxide	Saturated Solution	d	d	-
Calcium carbonate	Suspension	d	d	-
Calcium chloride	Saturated Solution	d	d	-
Calcium nitrate	Saturated Solution	d	d	-
Carbon dioxide, dry gas	Ts-g	d	d	-
Lactic acid	%10-90	d	d	-
Fruit juice	Working Solution	-	-	-
Mineral Oils	Working Solution	d	sd	-
Nitric acid	5%	d	d	-
Nitric acid	10%	d	d	-
Nitric acid	>%50	ds	dz	dz
Ozone, gas	Ts-g	sd	dz	-
Potassium hydroxide	10%	d	d	-
Potassium chloride	Saturated Solution	d	d	-

Table 3 - Polyethylene and Polypropylene Chemical Resistance 20, 60 and 100°C

PE		Temperature °C		
		20	60	100
Potassium nitrate	Saturated Solution	d	d	-
Potassium sulfate	Saturated Solution	d	d	-
Silicon oil	Ts-s	-	-	-
Citric acid	Saturated Solution	d	d	-
Sodium hydroxide	%10-35	d	d	-
Water, distilled		d	d	-
Water, sea		d	d	-
Water, utilization		d	d	-
Water, mineral		d	d	-
Sulfuric acid	Up to %10	d	d	-
Sulfuric acid	50%	d	d	-
Sulfuric acid	98%	d	dz	-
Wines	Working Solution	d	d	-
Milk	Working Solution	d	d	-
Aqua vitae(Alcohol)	Working Solution	d	d	-
Urea	Solution	d	d	-
Whiskey	Working Solution	d	d	-
Oil (vegetable and animal)	Ts-s	d	sd	-
Olive oil	Working Solution	-	-	-

Ts-s	In technical purity, liquid
Ts-g	In technical purity, gas
Saturated Solution	Saturated Solution with water at 20°C
Working Solution	Working Solution, most used concentration in second
Solution	Solution, Concentrated more than %10 but unsaturated aqueous solution
Suspension	Suspension. Prepared in saturated solution at 20°C
D	Resistant
Sd	Limited resistant
Dz	Not resistant

Subjects That Shall Be Paid Attention During Storage and Transportation

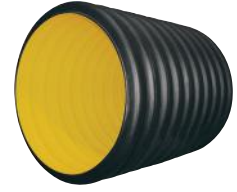
- The storage location of Corrugated pipes shall be purified from specular materials such as rock, stone, and metals etc., which can harm pipes
- Corrugated pipes shall be stowed up to not more than 3 meters height.
- Corrugated pipes shall not be exposed to sunshine. If possible it shall be stored in places, where its top is closed with penthouse. As a result of this it long term storage can be done.
- Elastomeric gaskets in Corrugated pipes shall not be exposed to direct sunshine.
- Stowage shall be done in the form that the pipe muffs are cross stowed over and over.
- During loading higher loads, the ropes shall be tensed without giving any damage for pipes.
- During transportation, loading and locating pipes to the ditch, the pipes shall be prevented from damages by lifting after being hanged on hanger..
- Hanging using forklift, the pipes shall be centered from its middle and than lifted.
- In open vehicle loadings, necessary precautions should be taken for damages that can be arisen from the side stands of vehicle body.
- Pipes shall not be carried by creeping but in smooth surfaces it can be carried by rolling without damaging it.
- In telescopic loadings, when loading pipes having small diameter into big diameter pipes, please pay attention not to damage the muffs and welding parts of pipes.

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Corrugated Pipe Set

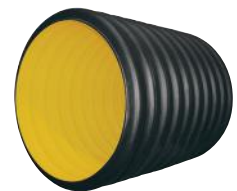
Corrugated Pipe Set SN4

Code	Size	Pcs.
8302-set-100004	100 Lenght / 1 Coupling + 2 joint	1
8302-set-150004	150 Lenght / 1 Coupling + 2 joint	1
8302-set-200004	200 Lenght / 1 Coupling + 2 joint	1
8302-set-250004	250 Lenght / 1 Coupling + 2 joint	1
8302-set-300004	300 Lenght / 1 Coupling + 2 joint	1



Corrugated Pipe Set SN8

Code	Size	Pcs.
8302-set-100008	100 Lenght / 1 Coupling + 2 joint	1
8302-set-150008	150 Lenght / 1 Coupling + 2 joint	1
8302-set-200008	200 Lenght / 1 Coupling + 2 joint	1
8302-set-250008	250 Lenght / 1 Coupling + 2 joint	1
8302-set-300008	300 Lenght / 1 Coupling + 2 joint	1



Corrugated Pipes

HDPE Coupling SN4

Code	Size	Pcs.
8312-muf-100004	100	1
8312-muf-150004	150	1
8312-muf-200004	200	1
8312-muf-250004	250	1
8312-muf-300004	300	1



Corrugated Joint

Code	Size	Pcs.
7302-sel-100000	100	1
7302-sel-150000	150	1
7302-sel-200000	200	1
7302-sel-250000	250	1
7302-sel-300000	300	1





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