PEX SYSTEM

kalde®

First Choice

PE-X Pipes

Applied Norms

- EN 578 - Plastics piping systems - plastics pipes and fitting- Determination of the opacity
- EN 579 - Plastics piping systems – cross linked polyethylene (PE-X) pipes – Determination of degree of cross linking by solvent extraction
- EN ISO 2505 – Plastic and duction systems – Thermoplactics pipes – Determination of the longitudinal reversion
- EN ISO 1167- 1 - Plastic piping systems - Thermoplactics pipes, fitting and assemblies for the conveyonce of fluids – Determination of the resistance to internal pressure – part 1: general method
- EN ISO 1167- 2 - Plastic piping systems - Thermoplactics pipes, fitting and assemblies for the conveyonce of fluids – Determination of the resistance to internal pressure – part 2: Preparation of pipe test pieces.
- EN ISO 15875 -1 Plastics piping systems for hot and cold water installations – cross linked polyethylene (PE-X); Part 1: Gen eral
- EN ISO 15875 -2 Plastics piping systems for hot and cold water installations – cross linked polyethylene (PE-X); Part 2: Pip es
- EN ISO 15875 -3 Plastics piping systems for hot and cold water installations – cross linked polyethylene (PE-X); Part 3: Fit tings
- EN ISO 15875-5 Plastics piping systems for hot and cold water installations – cross linked polyethylene (PE-X); Part 5: Fitn ess for purpose of the system
- DIN 16892 Crosslinked high-density polyethylene (PE-X) pipes – General quality requirements and testing
- DIN 16893 Crosslinked high-density polyethylene (PE-X) pipes - Dimension

Raw Material: Cross Linked Polyethylene (PE-X)

PE-X results from chemically joining individual polyethylene molecules in order to improve the performance of the original base resin in higher temperatures. The primary reason for cross-linking polyethylene (PE) is to raise the thermal stability of the material under load.

For high performance polyethylene applications, requiring higher temperature, creep, abrasion and chemical resistances, cross-linking is a must.

There are three different ways for crosslinking:

1- The peroxide method employs a special extruder with a plunger action where peroxide is added to the base resin and through a combination of pressure and high temperature the cross-linking takes place as the tubing is produced.
2- The “Silane” method of PE-X production involves grafting a reactive silane molecule to the backbone of the polyethylene. The tubing is produced by blending this grafted compound with a catalyst which can be done using either the Sioplas method or by using a special extruder it can be done using the Monosil method. After extrusion the tubing is exposed to either steam or hot water to induce the final cross-linking reaction in the tubing.
3- Electron Beam crosslinking takes place when very high energy radiation is used to initiate molecular cross-linking in high density polyethylene. This product is extruded like normal HDPE then taken to an E-beam facility and routed under a beam or ray in the accelerator where it is dosed with a specific amount of radiation to release the hydrogen atoms and cause polymer cahins to bond or link to the open carbon sites.

In European standards these three methods are referred to as PE-X_a, PE-X_b and PE-X_c.

PE-X_a - the Peroxide method
PE-X_b - the Silane
PE-X_c - Electron beam crosslinking

Kalde PE-X pipes are cross-linked using silane.

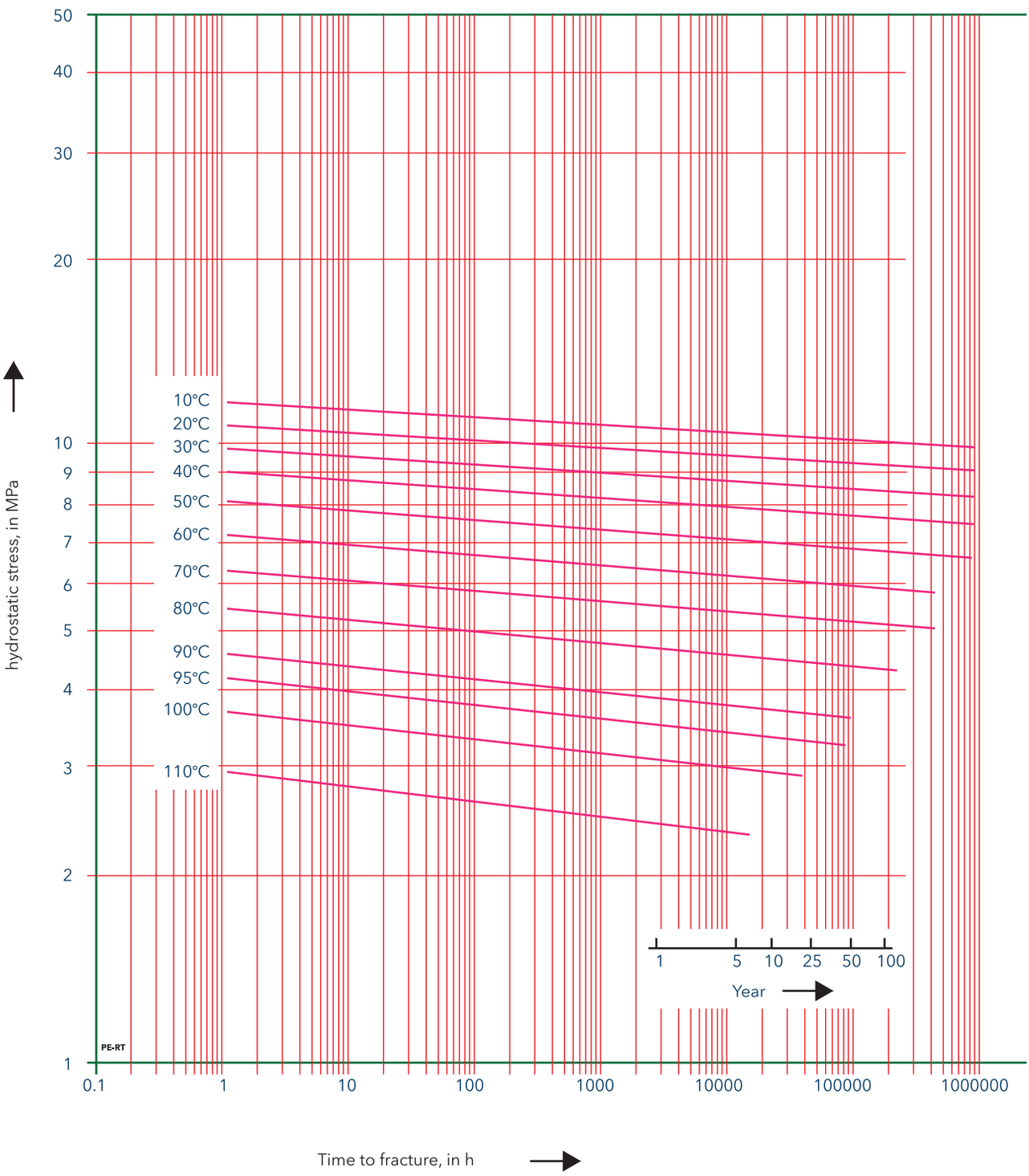
Physical, Thermal and Mechanical Properties

Table 1

Properties	Specification	Value	Unit	Test Method
Density	0,94 - 0,95	0.94	g/cm^3	DIN 53497
Melt Flow Rate	0,7 – 1,9	0.96	(190◦C , 5kg)	ISO 1133
Degree of Crosslinking	≥ 65	68	%	EN 579
Tensile Strength	at 20◦C	19-26	N/mm^2	EN ISO 527
	at 100°C	Sep-13		
Elongation at Break	at 20◦C	350-500	%	EN ISO 527
	at 100°C	500-700		
Impact Strength	at 20◦C	No failure	KJ/m^2	ISO 179
Moisture Absorbtion	at 22◦C	0.01	Mg/4d	
Pipe Roughness		$5,10^{-4}$	mm	
Minimum Bending Radius	at 20◦C	5xø d	mm	
Softening Point	>122	130	◦C	ASTM D1525
Min. laying Temperature	-	-15	◦C	
Max. Operating Temperature	-	95	◦C	BS7291-3
Thermal Conductivity at 23C°	≥0,41	0.41	W/mK	DIN 52612
Flexural Modulus at 23C◦	>600	600	N/mm^2	DIN EN ISI 178
Coefficient of linear Expansion		$2,10^{-4}$	K^{-1}	DIN 53752
Resistance of Faces		10^{12}	Ω	DIN 53482

Reference Curves for Expected Strength of Cross Linked Polyethylene

Table 2



PE-X Pipe Permissible Working Pressure DIN 16893

Table 8

Temperature (°C)	Operating Life (years)	Series (S)			
		6.3	5	4	3.2
		Standart Dimension Ratio (SDR)			
		13.6	11	9	7.4
		Nominal Working Pressure			
		PN 10	PN 12,5	PN 16	PN 20
		Allowable Working Pressure (Bar)			
20	1	10.5	13.2	16.6	20.9
	5	10.3	12.9	16.3	20.5
	10	10.2	12.8	16.2	20.4
	25	10.1	12.7	16	20.1
	50	10	12.6	15.9	20
40	1	8.2	10.4	13.1	16.5
	5	8.1	10.2	12.8	16.2
	10	8	10.1	12.7	16.1
	25	7.9	10	12.6	15.9
	50	7.9	9.9	12.5	15.7
50	1	7.3	9.3	11.7	14.7
	5	7.2	9.1	11.4	14.4
	10	7.1	9	11.3	14.3
	25	7.1	8.9	11.2	14.1
	50	7	8.8	11.1	14
60	1	6.6	8.3	10.4	13.1
	5	6.4	8.1	10.2	12.9
	10	6.4	8	10.1	12.8
	25	6.3	7.9	10	12.6
	50	6.2	7.9	9.9	12.5
70	1	5.9	7.4	9.3	11.8
	5	5.7	7.3	9.1	11.5
	10	5.7	7.2	9.1	11.4
	25	5.6	7.1	9	11.3
	50	5.6	7	8.9	11.2
80	1	5.3	6.6	8.4	10.5
	5	5.2	6.5	8.2	10.3
	10	5.1	6.4	8.1	10.2
	25	5	6.4	8	10.1
90	1	4.7	6	7.5	9.5
	5	4.6	5.8	7.4	9.3
	10	4.6	5.8	7.3	9.2
95	1	4.5	5.7	7.1	9
	5	4.4	5.5	7	8.8
	10	4.3	5.5	6.9	8.7

Thermal Expansion in Polyethylene (PE-X) Pipes

The polyethylene pipes have an expansion coefficient that is much higher than the metal pipes. It is critical to take this characteristic into consideration during installations.

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

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

α = coefficient of linear thermal expansion. The value of α is $2 * 10^{-4}$ (K^{-1}) for pex tubes.

Table 9

Pipe length (m)	Temperature variation ΔT in K									
	10	20	30	40	50	60	70	80	90	100
	Linear expansion ΔL (mm)									
1	2	4	6	8	10	12	14	16	18	20
2	4	8	12	16	20	24	28	32	36	40
3	6	12	18	24	30	36	42	48	54	60
4	8	16	24	32	40	48	56	64	72	80
5	10	20	30	40	50	60	70	80	90	100
6	12	24	36	48	60	72	84	96	108	120
7	14	28	42	56	70	84	98	112	126	140
8	16	32	48	64	80	96	112	128	144	160
9	18	36	54	72	90	108	126	144	162	180
10	20	40	60	80	100	120	140	160	180	200

Kalde - PE-X Pipes

Kalde - PE-X is tested in accordance with the most respected standards such as EN ISO15875-2 and DIN 16892/93. All the test and quality controls required by these norms are performed in a modern and well-equipped laboratory. Production range consists of diameters from 16 mm up to 32 mm. The tables 3 and 5 show the details of Kalde - PE-X.

Pipe Dimension - PN 20 According to EN ISO 15875-2, DIN 16893

Table 3

Outer Diameter (mm)	Diameter Tolerance (mm)	Wall Thickness S:3,2 -SDR:7,4 (mm)	Thickness Tolerance (mm)	Approx. Weight (kg/m)
16	0.3	2.2	0.4	0.94
20	0.3	2.8	0.4	0.148
25	0.3	3.5	0.5	0.23
32	0.3	4.4	0.6	0.368

Operating Conditions (S:3,2 SDR:7,4) (PN 20) DIN16893

Table 4

Temperature (°C)	Life (years)	Pressure (bar)
20	50	20
40	50	15.7
60	50	12.5
70	50	11.2
80	25	10.1
95	5	8.8

Pipe Dimension-PN 12,5 According to EN ISO 15875-2, DIN 16893

Table 5

Outer Diameter (mm)	Diameter Tolerance (mm)	Wall Thickness S:5 - SDR:11 (mm)	Thickness Tolerance (mm)	Approx. Weight (kg/m)
16	0.3	1.8	0.4	0.84
20	0.3	1.9	0.4	0.11
25	0.3	2.3	0.5	0.156
32	0.3	2.9	0.5	0.251

Operating Conditions (S:5 – SDR:11) (PN 12,5) DIN 16893

Table 6

Temperature (°C)	Life (years)	Pressure (bar)
20	50	12.6
40	50	9.9
60	50	7.9
70	50	7.1
80	25	6.4
95	5	5.5

Classification of Service Conditions DIN 16893

Table 7

Application class	Design temperature, TD (°C)	Time at TD (years)	Tmax (°C)	Time at Tmax (years)	Tmal (°C)	Time at Tmal (h)	Typical field of application
1	60	49	80	1	95	100	Hot water supply (60°C)
2	70	49	80	1	95	100	Hot water supply (70°C)

Kalde - PE-X Pipes are

- Flexible for faster and easier installation
- Corrosion free and high resistance to chemicals
- Replaceable pipe-in conduit
- Very good performance at high temperatures and high pressure
- Easy to cut and join
- Pipe laying can be carried out during the construction of building
- No electricity or heat is necessary for installation
- Allows high water speeds,
- Installed with fewer fittings, long runs without joints
- Quiet, does not transmit noise like metal pipes
- Long service life

Kalde - PE-X Pipes have

- excellent resistance to corrosion
- freeze damage resistance
- noise and water hammer resistance
- no odor, impurities or any other harmful chemicals.
- less condensation than the copper and metallic pipes.
- These properties of kalde-pex make it the ideal choice for sanitary piping systems.

Installation

Kalde - PE-X is ideally suited for potable water plumbing applications. The excellent properties of Kalde - PE-X make it perfect for plumping applications. Kalde is proud of the reliable and proven performance of its pex systems under the harshest conditions.

It is flexible, making it easy to install and service. PE-X is able to withstand the high and low temperatures found in plumbing and heating applications and is highly resistant to chemicals found in the plumbing environment.

Flexible systems are more quiet than rigid piping. The smooth interior will not corrode which can affect other materials long term pipe flow characteristics. PE-X is also very freeze- break resistant. PE-X systems have fewer joints and are easier to install providing a lower cost installation over traditional plumbing materials.

PE-RT Pipes

Applied Norms

- EN 578 - Plastics piping systems - plastics pipes and fitting- Determination of the opacity
- EN 579 - Plastics piping systems – cross linked polyethylene (PE-RT) pipes – Determination of degree of cross linking by solvent extraction
- EN ISO 2505 – Plastic and duction systems – Thermoplactics pipes – Determination of the longitudinal reversion
- EN ISO 1167- 1 - Plastic piping systems - Thermoplactics pipes, fitting and assemblies for the conveyonce of fluids – Determination of the resistance to internal pressure – part 1: general method
- EN ISO 1167- 2 - Plastic piping systems - Thermoplactics pipes, fitting and assemblies for the conveyonce of fluids – Determination of the resistance to internal pressure – part 2: Preparation of pipe test pieces.
- EN ISO 15875 -1 Plastics piping systems for hot and cold water installations – cross linked polyethylene (PE-X); Part 1: Gene ral
- EN ISO 15875 -2 Plastics piping systems for hot and cold water installations – cross linked polyethylene (PE-X); Part 2: Pipe s
- EN ISO 15875 -3 Plastics piping systems for hot and cold water installations – cross linked polyethylene (PE-X); Part 3: Fitt ings
- EN ISO 15875-5 Plastics piping systems for hot and cold water installations – cross linked polyethylene (PE-X); Part 5: Fitne ss for purpose of the system
- DIN 16892 Crosslinked high-density polyethylene (PE-X) pipes – General quality requirements and testing
- DIN 16893 Crosslinked high-density polyethylene (PE-X) pipes - Dimension

Raw Material: Temperature Resistance Raised Polyethylene (PE-RT)

PE-RT pipe is made of polyethylene (PE-RT) material, whose mechanical resistance is increased to high temperature.

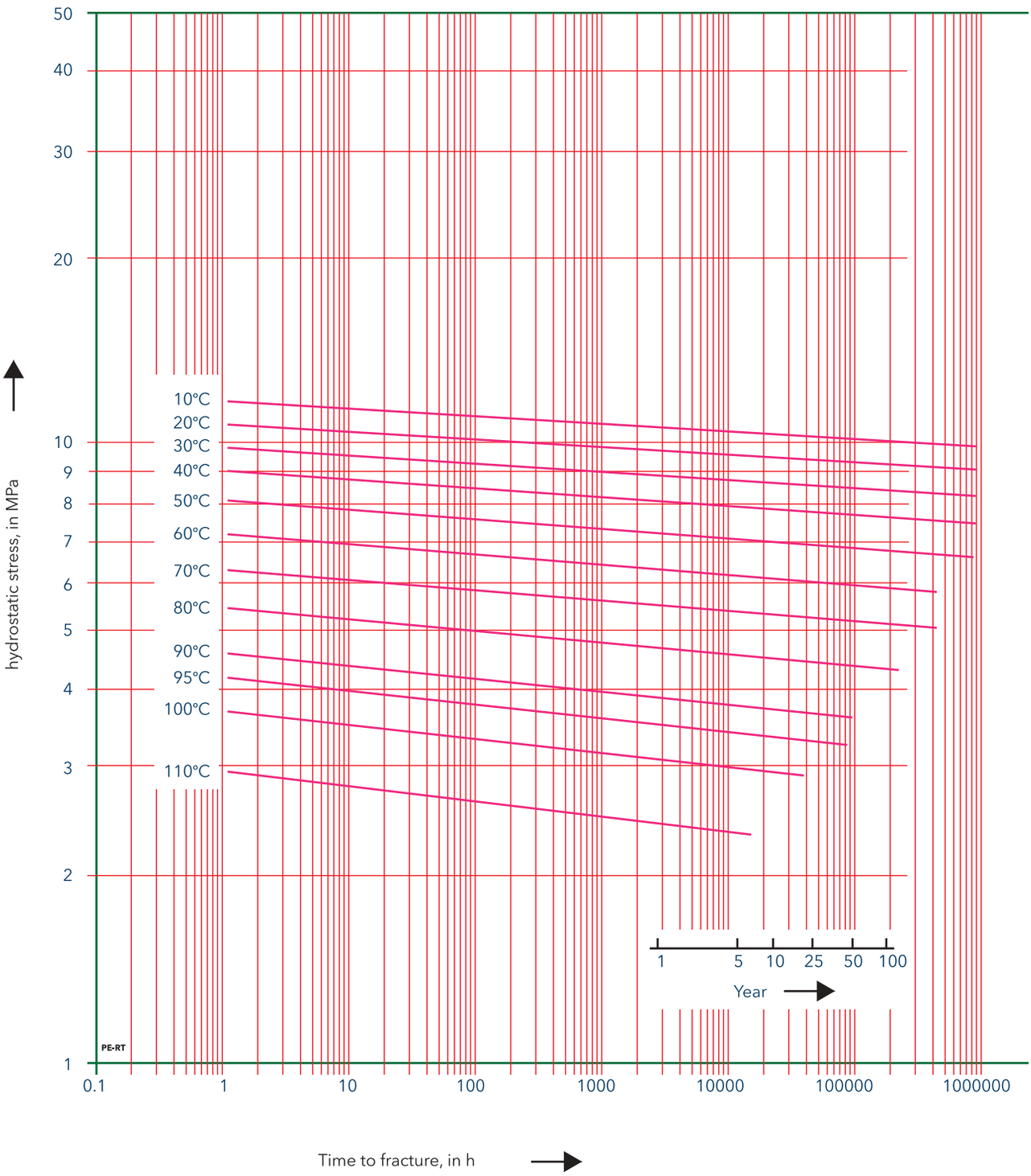
Physical, Thermal and Mechanical Properties

Table 1

Properties	Specification	Value	Unit	Test Method
Density	0,94 - 0,95	0.94	g/cm^3	DIN 53497
Melt Flow Rate	0,7 – 1,9	0.96	(190◦C , 5kg)	ISO 1133
Degree of Crosslinking	≥ 65	68	%	EN 579
Tensile Strength	at 20◦C	19-26	N/mm^2	EN ISO 527
	at 100°C	9-13		
Elongation at Break	at 20◦C	350-500	%	EN ISO 527
	at 100°C	500-700		
Impact Strength	at 20◦C	No failure	KJ/m^2	ISO 179
Moisture Absorbtion	at 22◦C	0.01	Mg/4d	
Pipe Roughness		$5,10^{-4}$	mm	
Minimum Bending Radius	at 20◦C	5xø d	mm	
Softening Point	>122	130	◦C	ASTM D1525
Min. laying Temperature	-	-15	◦C	
Max. Operating Temperature	-	95	◦C	BS7291-3
Thermal Conductivity at 23C°	≥0,41	0.41	W/mK	DIN 52612
Flexural Modulus at 23C◦	>600	600	N/mm^2	DIN EN ISI 178
Coefficient of linear Expansion		$2,10^{-4}$	K^{-1}	DIN 53752
Resistance of Faces		10^{12}	Ω	DIN 53482

Reference Curves for Expected Strength of Cross Linked Polyethylene

Table 2



Pipe Dimension - TS EN ISO 22391-2, DIN 16893

Table 3

Outer Diameter (mm)	Diameter Tolerance (mm)	Wall Thickness S:3,2 -SDR:7,4 (mm)	Thickness Tolerance (mm)	Approx. Weight (kg/m)
16	0.3	1.8	0.3	0.82
20	0.3	2.0	0.4	0.110

Operating Conditions (S:3,2 SDR:7,4) (PN 20) DIN16893

Table 4

Temperature (°C)	Life (years)	Pressure (PN12,5) (bar)
20	1	11.8
	5	11.7
	10	11.6
	50	11.5
50	1	7.9
	5	7.8
	10	7.8
	50	7.4
70	1	6.0
	5	5.9
	10	5.4
	50	4.1
95	1	4.0
	5	2.9

Thermal Expansion in Polyethylene (PE-RT) Pipes

The polyethylene pipes have an expansion coefficient that is much higher than the metal pipes. It is critical to take this characteristic into consideration during installations.

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

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

α = coefficient of linear thermal expansion. The value of α is $2 * 10^{-4}$ (K^{-1}) for pe-rt tubes.

Table 9

Pipe length (m)	Temperature variation ΔT in K								
	10	20	30	40	50	60	70	80	90
	Linear expansion ΔL (mm)								
1	2	4	6	8	10	12	14	16	18
4	8	16	24	32	40	48	56	64	72
8	16	32	48	64	80	96	112	128	144
10	20	40	60	80	100	120	140	160	180

Kalde - PE-RT Pipes

Kalde PE-RT pipe is produced in accordance with TS EN ISO 22391-2 and DIN 16833/34 standards and performs its tests and controls in its modern and advanced laboratories according to the quality requirements of all these standards.

Kalde - PE-RT Pipes are

- Flexible for quick and easy installation
- It is stainless and resistant to chemicals.
- It performs very well at high temperatures and high pressures.
- Easy to cut and join.
- No electricity or heater is required for the installation.
- It is silent and does not transmit sound like metal pipes.
- It has a long service life.
- It is odorless and does not contain dirt or other harmful chemicals.
- It makes less concentration than copper and metal pipes.

Kalde - PE-RT Pipes with Oxygen Barrier

Corrosion in metal and metal components in heating systems is caused by the presence of free oxygen in the water. Oxygen can be found in every system, and it can enter into the system from certain points. It is found in any system where it can also enter gas-permeable materials (pipes etc.), such as open-head tanks, valves, threaded connections and pumps connections.

In closed circuit heating systems that are not fed with continuous hot water, minimizing oxygen inflow from the pipe wall will significantly reduce corrosion. For this reason, oxygen barrier pert pipes have been developed. Oxygen barrier pipes consist of 3 basic layers; Kalde oxygen barrier Pert pipes, inner base layer, adhesive (adhesive) and outer layer (ethylene vinyl alcohol copolymer (EVOH)). the middle layer is an adhesive material that is compatible with both inner and outer layer materials to form an integrated structure. EVOH is an oxygen barrier material with very low oxygen permeability properties.

Datasheet Typical Properties of EVAL™ Resin

EVAL™ FP104B

Test Method		Unit	Value
Ethylene Content	Kuraray Method	mol %	32
Oxygen Transmission Rate	ISO 14663-2 annexC 20°C 0%RH	$cm^3.20\mu m/m^2.day.atm$	0.2
	ISO 14663-2 annexC 20°C 35%RH	$cm^3.20\mu m/m^2.day.atm$	0.3
	ISO 14663-2 annexC 20°C 50%RH	$cm^3.20\mu m/m^2.day.atm$	
	ISO 14663-2 annexC 20°C 65%RH	$cm^3.20\mu m/m^2.day.atm$	0.4
	ISO 14663-2 annexC 20°C 85%RH	$cm^3.20\mu m/m^2.day.atm$	1.5
	ISO 14663-2 annexC 20°C 90%RH	$cm^3.20\mu m/m^2.day.atm$	3
	ISO 14663-2 annexC 20°C 100%RH	$cm^3.20\mu m/m^2.day.atm$	19

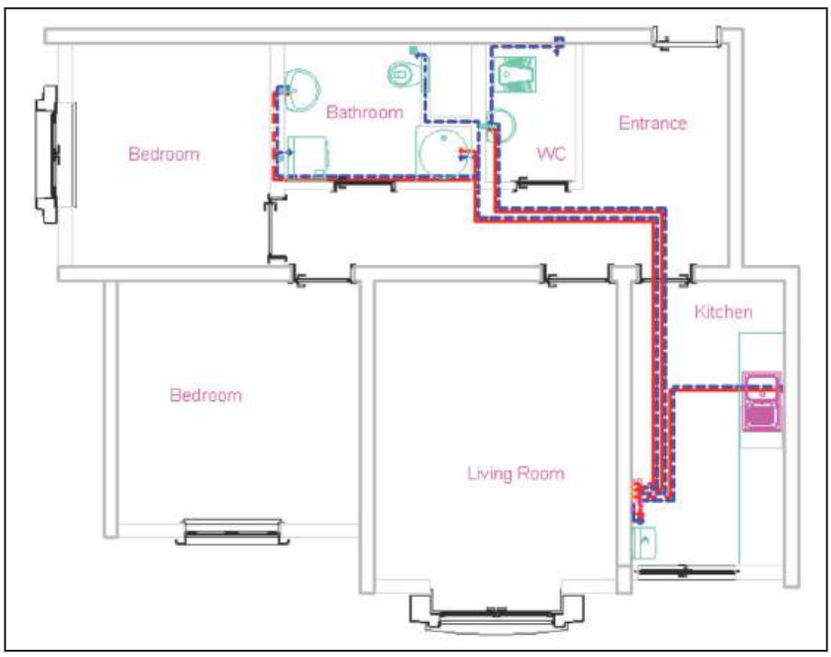
Installation

Kalde – PE-RT is ideally suited for potable water plumbing applications. The excellent properties of Kalde – PE-RT make it perfect for plumping applications. Kalde is proud of the reliable and proven performance of its PE-RT systems under the harshest conditions.
It is flexible, making it easy to install and service. PE-RT is able to withstand the high and low temperatures found in plumbing and heating applications, and is highly resistant to chemicals found in the plumbing environment.

Flexible systems are more quiet than rigid piping. The smooth interior will not corrode which can affect other materials long term pipe flow characteristics. PE-RT is also very freeze- break resistant. PE-RT systems have fewer joints and are easier to install providing a lower cost installation over traditional plumbing materials.

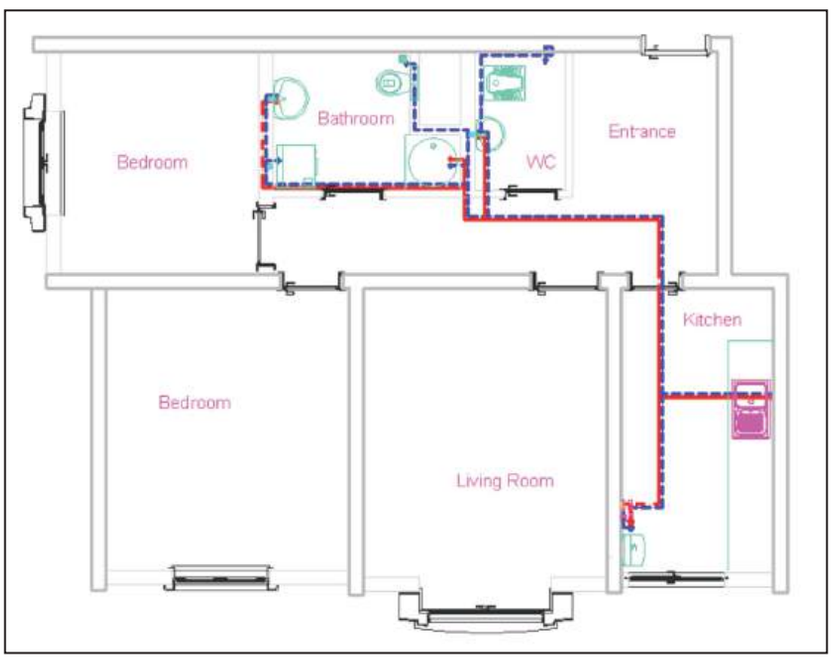
A - Flooring with Manifolds

This installation method allows the pipes to directly reach the consumption points from the manifold. The components needed for installation are minimized also resulting in time and labor savings.



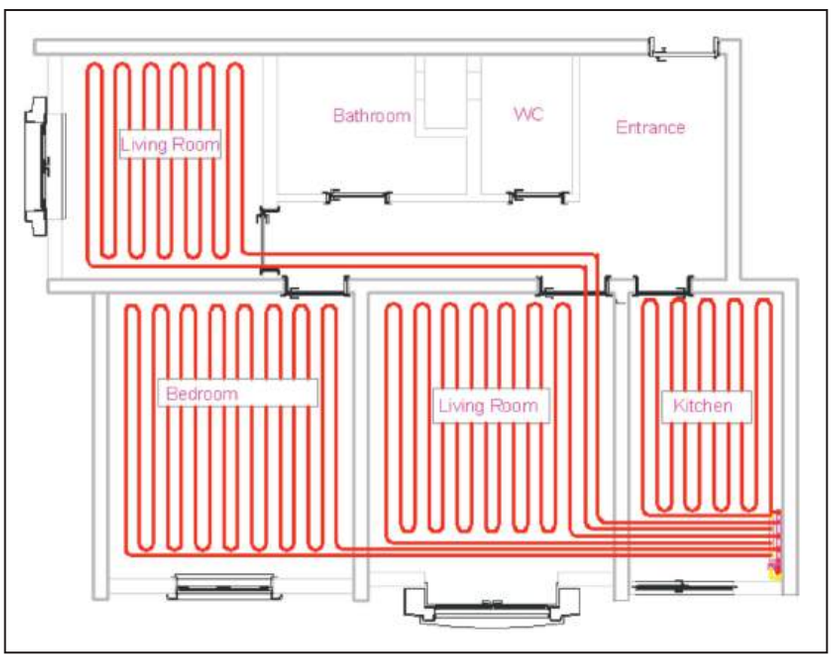
B - Flooring without Manifolds

This installation approach is preferred for gaining space by not using a manifold. T-elements are used at junctions, the installed pipe lenghts are minimized.



C- Under-Floor Heating

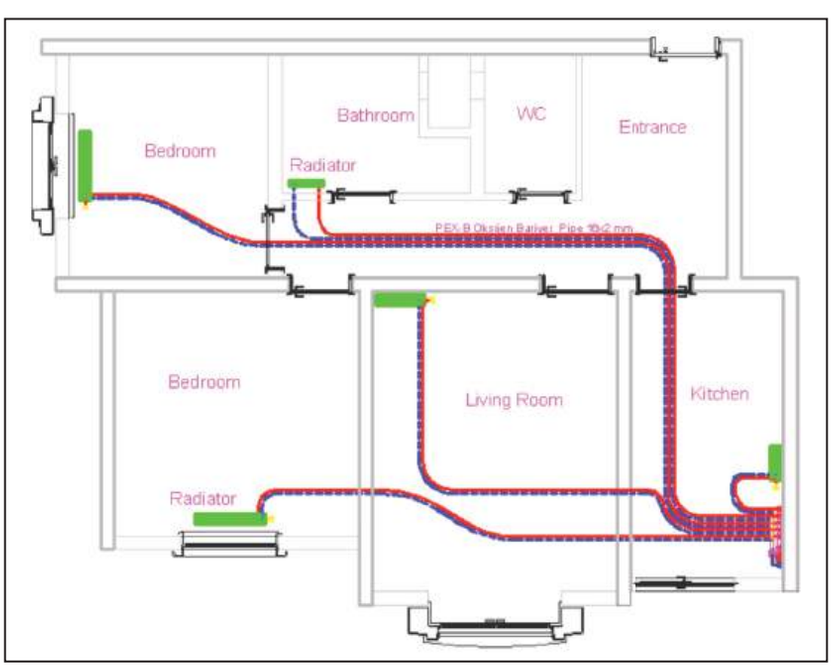
The ideal heat distribution pattern is to have the warmest temperatures at floor level and cooler temperatures at head and ceiling levels. This can be achieved by installing Kalde - PE-X piping system under the floor surface. This is a definite advantage of Kalde - PE-X over some other main heating systems such as radiators where the heat is trapped at the ceiling level.



D– Radiator Connection

The water temperatures in a radiator heating system are around 70 - 90°C. Water at high temperatures is corrosive, especially when it contains added chemicals such as chlorine and acids. The oxygen dissolved in the water reacts with metal components of a heating system causing corrosion, or depositing scale.

Kalde - PE-X pipes overcome these complications with their superior properties at high temperatures. Furthermore, since the pipes are also protected with a corrugated pipe, if the inner pipe gets demaged it can easily be replaced without any damage to the floor or the wall.



General Instructions

1- Do not install the pipe if the temperature is below 0°C. If needed, store the pipe and the accessories in a warm room before installation.

2- Although the pipe is rather flexible, the minimum bending radius of the pipe is r min=5*d outer. The minimum bending radius at room temperature (20°C) is given in the following table.

Pipe Outer Diameter (mm)	Minimum Pipe Bending radius r (cm)	Bending Diameter R (cm)
16	8.0	16.0
20	10.0	20.0
25	12.5	25.0
32	16.0	32.0

3- As the thermal expansion of the pipes is approximately 42 mm per 10°C for every 25 m pipe length, do not pull tubing tight during installation but allow about 10mm longitudinal clearance per meter of run to accommodate thermal expansion.

4- Pipe cutting should be done with pipe cutters. The pipe cut should be straight, and perpendicular to the tubing. Cutting the pipe on an angle may result in an improper fitting assembly. Extra care should be taken when cutting the corrugated pipe not to damage the inner pipe.

5- Leave some extra pipe at the beginning and end of runs to simplify the connection to manifolds and fittings.

6- When entering or exiting the slab, a 90°C angle pipe guide or metal bend supports should be used.

7- Installed tubing should be protected from possible damage. Tubing runs should be safeguarded with suitable steel plate protectors during construction since they can be pierced by screws, nails, etc.

8- Manifold locations should be chosen so that they are accessible for future use. This provides convenient access to all fixtures, permits easy connections to the supply mains and provides adequate protection from freezing.

9- Each exit of the distributing manifolds should have a shut-off valve so that it can be isolated as necessary.

10- The system must be tested pressure testing before use and concrete is discarded. During the pressure test, ensure that the pressure is stable and that all joints are leak-free.

11- Use teflon for sealing when assembling threaded parts and do not overload to screw it. If linen is used as sealing material; care should be taken not to over wrap, In case of excessive use, brass inserts or other brass parts may cause fatigue cracking or breakage over time and separation of plastic and metal from each other.

12- Before installation, the products to be used must be visually checked, if there are cracks, broken etc. defects should be returned to our company for replacement without using the product.

13- After the installation is finished, the products in the system should be tested for leakage. If there are leaking products those should be returned to our company to be replaced with a new one.

Note: Products that have not been checked and tested before and after installation are excluded from the warranty. Any damages arising from this reason are the responsibility of the implementing company.

Test Procedures (DIN 1988-2)
finished installation, filtered and vacuum to be filled completely with water.

Pressure testing should be carried out in two stages. The first stage is surfficient for smaller sections of the system, e.g. for testing supply pipes and branch pipes in wet rooms.

a) For the first stage, a test pressure equal to the permissible working pressure plus 5 bars should be produced twice within 30 minutes at 10-minute intervals. Than it shall be checked whether, over a further period of 30 minutes, the pressure has dropped by more than 0,6 bar (at the rate of 0,1 bar per minute) and leakage has occurred.

b) The second stage should immediately follow the first stage and should last two hours with no breaks. Then, one checked whether the pressure has dropped by more than 0,2 bar and the pipework shows any signs of leakage.

PE-X Tube and Fittings

PE-X and Spiral Pipes

Code	Size	Pcs.
3512-pxb-162016	PE-X ø16 x 2.2	100
3518-pxs-162010	PE-X ø16 x 2 S	100
3517-pxs-162010	PE-X ø16 x 2 S	100
3512-pxo-202816	PE-X ø20x 2.8	100
3518-pos-202810	PE-X ø20x 3 S+O	100
3517-pos-202810	PE-X ø20x 3 S+O	100
3512-spb-250010	Spiralø25	50
3512-spr-320010	Spiralø32	50

S= Spiral covered O= Oksygen barriered

PE-RT and Spiral Pipes

Code	Size	Pcs.
3858-prs-162010	PE-RT 16 x 2 S	100
3857-prs-162010	PE-RT 16 x 2 S	100
3852-pro-162016	PE-RT 16 x 2 O	160
3858-pos-162010	PE-RT 16 x 2 S+O	100
3857-pos-162010	PE-RT 16 x 2 S+O	100

S= Spiral covered O= Oksygen barriered

Pipe Fixture for PE-X

Code	Size	Pcs.
3592-pfp-000000	for ø16 PE-X	5000
3595-pfp-250000	for Spiral	5000

Pipe Fixture

Code	Size	Pcs.
3592-pft-350000	ø35	400

Angle Pipe Guide

Code	Size	Pcs.
3595-ccr-000000	ø16	250

Male Adapter (DZR Brass & Bronze)

Code	Size	Pcs/Box
3411-cmc-160c00	16 x 1/2 "	100
3411-cmc-200c01	20 x 1/2 "	100

Female Elbow (DZR Brass & Bronze)

Code	Size	Pcs/Box
3411-ela-160bo3	16 x 1/2 "	100
3411-ela-160bo4	20 x 1/2 "	100

Nut

Code	Size	Pcs.
2421-som-160000	ø16	100
2421-som-180000	ø18	75
2421-som-200000	ø20	75
2421-som-260000	ø26	50
2421-som-320000	ø32	40

Insert

Code	Size	Pcs.
2421-uch-160000	ø16	100
2421-uch-180000	ø18	75
2421-uch-200000	ø20	75
2421-uch-260000	ø26	50
2421-uch-320000	ø32	40

Compression Ring

Code	Size	Pcs.
2421-yks-160000	ø16	100
2421-yks-180000	ø18	75
2421-yks-200000	ø20	75
2421-yks-260000	ø26	50
2421-yks-320000	ø32	40

Bracket

Code	Size	Pcs.
3391-bck-0c0000	3/4″	75
3391-bck-100000	1″	100
3391-bck-100001	1″ Light	100
3391-bck-1a0000	1 1/4″	60

Ball Valve with Thermocouple

Code	Size	Pcs.
3391-bvt-100000	1″	30

Stopend

Code	Size	Pcs.
3391-ste-0c0000	3/4″	300
3391-ste-100000	1″	200
3391-ste-1a0000	1 1/4″	125

Female Nipple

Code	Size	Pcs.
3431-nff-160b00	ø16x1/2″	175
3431-nff-160c00	ø16x3/4″	125
3431-nff-180b00	ø18x1/2″	125
3431-nff-180c00	ø18x3/4″	125
3431-nff-200b00	ø20x1/2″	125
3431-nff-200c00	ø20x3/4″	100
3431-nff-260c00	ø26x3/4″	65
3431-nff-261000	ø26x1″	60
3431-nff-321000	ø32x1	40

Air Vent

Code	Size	Pcs.
3391-pur-0e0000	1/8″	750
3391-pur-0a0000	1/4″	500
3391-pur-0d0000	3/8″	500
3391-pur-0b0000	1/2″	400

Air Vent Mechanic

Code	Size	Pcs.
3391-pur-0a0001	1/4″	500
3391-pur-0e0002	1/8″	500

Spiral PE-X Stopend

Code	Size	Pcs.
3592-pxs-160000	ø16	1000

Cabinet

Code	Size	L2	L1	L	Pcs.
3392-cab-400000	40 x 70 x 11				1
3392-cab-600000	60 x 70 x 11				1
3392-cab-800000	80 x 70 x 11				1

Code	Size	Pcs / Box
3301-mnf-0c0200	3/4" 2 Ways	60
3301-mnf-0c0300	3/4" 3 Ways	45
3301-mnf-0c0400	3/4" 4 Ways	30
3301-mnf-0c0500	3/4" 5 Ways	30
3301-mnf-0c0600	3/4" 6 Ways	15
3301-mnf-0c0700	3/4" 7 Ways	15
3301-mnf-0c0800	3/4" 8 Ways	15
3301-mnf-0c0900	3/4" 9 Ways	15
3301-mnf-0c1000	3/4" 10 Ways	15

Light Type

Code	Size	Pcs / Box
3301-mnf-0c0201	3/4" Light 2 Ways	60
3301-mnf-0c0601	3/4" Light 3 Ways	45
3301-mnf-0c0401	3/4" Light 4 Ways	30
3301-mnf-0c0501	3/4" Light 5 Ways	30
3301-mnf-0c0601	3/4" Light 6 Ways	15
3301-mnf-0c0701	3/4" Light 7 Ways	15
3301-mnf-0c0801	3/4" Light 8 Ways	15
3301-mnf-0c0901	3/4" Light 9 Ways	15
3301-mnf-0c1001	3/4" Light 10 Ways	15

Code	Size	Pcs / Box
3301-mnf-100200	1" 2 Ways	40
3301-mnf-100300	1" 3 Ways	30
3301-mnf-100400	1" 4 Ways	20
3301-mnf-100500	1" 5 Ways	20
3301-mnf-100600	1" 6 Ways	20
3301-mnf-100700	1" 7 Ways	10
3301-mnf-100800	1" 8 Ways	10
3301-mnf-100900	1" 9 Ways	10
3301-mnf-101000	1" 10 Ways	10
3301-mnf-101100	1" 11 Ways	10
3301-mnf-101200	1" 12 Ways	10
3301-mnf-101300	1" 13 Ways	10

WARRANTY

For Kalde water Installation systems with PEX Pipes Fittings

Kalde Klima Orta Basinc ve Valf Sanayii A.S.'s (“Kalde”) Products are manufactured according to international standards and they particularly conform to the DIN norms.
This Limited Warranty provides that, subject to the following limitations, each Kalde Product will be free from defects in material and workmanship and will conform to Kalde's specification for the particular Product. Your exclusive remedy for any defective Product is limited to the repair or replacement of the defective Product within fifty (50) years from the date of purchase.
If Kalde is unable to repair or replace, as applicable, a defective Product which is covered by this Limited Warranty, Kalde shall, within a reasonable time refund the purchase price of the Product.
This Limited Warranty covers only those defects that arise as a result of normal use, Kalde shall not be liable for any defects that are caused by the neglect, abuse, misuse or mistreatment by anyone or any entity other than Kalde, including but not limited to, improper installation or testing, user's flawed designs or specifications, unsatisfactory applications, use in conjunction with incompatible materials, contact with aggressive chemical agents, freezing or overheating of liquids in the product and any other neglect or misuse.
This Limited Warranty shall be void if the Product fails to function properly as a result of any force majeure (i.e. earthquakes, flood, fire etc.) This Limited Warranty also specifically excludes failure or damage caused by fire stopping materials, tread sealants, plasticized vinyl products or damage caused by the fault or negligence of anyone other than Kalde, or defects that are caused by any Products that have been altered or modified in any way by a person or entity other than Kalde. Products must be used in accordance with standards, regulations and the applicable standards, failure to adhere to these standards shall void this Limited Warranty.
Kalde shall have sole and absolute authority to decide whether the Product is covered under the Limited Warranty.
Kalde shall have a reasonable time to repair or replace a defective Product, after determining that a defective Product exists. Kalde's replacement Product under its Limited Warranty will be manufactured from new and serviceable used parts. Kalde's warranty applies to repaired or replaced Products for the balance of the applicable period of the original warranty or ninety days from the date of shipment of a repaired or replaced Product, whichever is longer.
For warranty application the end-user must present the purchase invoice.
Kalde's entire liability for any defective Product shall in no event exceed the purchase price for the defective Product. There are no warranties which extend beyond the face of Kalde's Limited Warranty.
Kalde specifically disclaims all other warranties, express or implied, regarding the Products, including any implied warranties of merchantability, fitness for a particular purpose or satisfactory quality.
In no event shall Kade or its third party suppliers be liable for direct, indirect, special, collateral, punitive, incidental or consequential damages, No claim or suit or action shall be brought against Kalde more than one year after the related cause of action has occurred. The foregoing liability limitations are essential elements of this Limited Warranty. No course of dealing or trade usage or course of performance shall be relevant to explain or supplement any term in this Limited Warranty. No addition to or modification of any provision of This Limited Warranty shall be binding upon Kalde unless made in writing and signed by Kalde Klima Orta Basınç ve Valf Sanayii A.Ş. This Limited Warranty shall be governed by and construed under the law of Republic of Turkey, without regard to the conflict of law principles thereof. All disputes arising out of or relating to this Limited Warranty shall be adjudicated at İstanbul Merkez Mahkemeleri, Turkey. Kalde doesn't provide any warranty to Products sold to U.S. and Canada.

Notes:

kalde®

First Choice

WRAS DVGW

ECOLAND

ايكو لاند لتجارة مواد البناء و الإنشاءات ش.ذ.م.م

Eco Land For Building & Construction Materials Trading L.LC

P.O.Box : 37818,DUBAI - U.A.E

T : +971 4 341 4186 **E :** info@ecolanduae.com **w :** www.ecolanduae.com