REINFORCED
PIPING SYSTEMS

RRS & RRF Solutions



www.raktherm.com

RAKtherm®
Ultimate Piping Solutions

ADVANCED
GERMAN
TECHNOLOGY

Overview



50 years passed of expertise we have ruled

and established ourselves in plastic conversion products. Tahweel Industry is a multifaceted company known for it's RAKTherm ultimate piping solutions manufactured under German standards for hot and cold water delivery applications extensively used for residential, commercial, and industrial sectors that brings

high-technological advancement in the piping industry. Being the pioneer in the industry, we have never stopped and contented with what we can offer to the market, but rather we consistently respond to the growing demands of the global market. Over the years, we are devoted in providing our customers with the highest standard of German quality products.

We are guided by simple philosophies of hard work, consistent development, and innovation. We oversee that these philosophies are taken into action in our daily work that enables us to maintain leadership and quest for world class products. Tahweel Industry is a premium company known for it's innovative product range through latest technological advancement and value-added products.

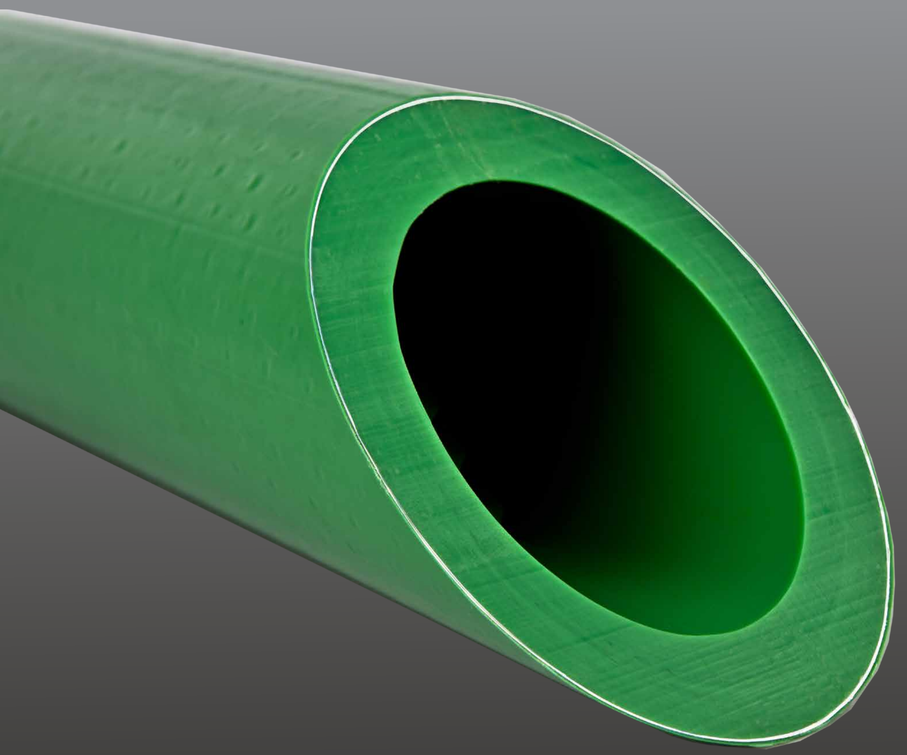


Raktherm a versatile and comprehensive system for water

and other fluid delivery, are used in applications of pressurized hot or cold water in all modern residential, commercial, and industrial applications. The creative solutions provided by RAKTherm in its product base renders it a leader in the construction industry, in the global markets

RAKtherm system has proven its high resilience even at the most extreme conditions. These factors and more, make RAKtherm the ideal system for the delivery of potable hot and cold water in your home, office or factory. RAKtherm pipes and fittings are extensively used in food and medical industries owing to their 'harmless and safe' properties. and as a need of continuous development to meet with construction demand we come-up with the new generation of pipes...

REINFORCED PIPING SYSTEMS
for, your plumbing challenges!



REINFORCED PIPING SYSTEMS

EXTRA FEATURES, EXTRA PERFORMANCE
AND LESS WALL THIKNESS

New Generation

New technology and new challenges has passed, with over 50 years of expertise we have mastered the piping networks through comprehensive research and development to bring innovative solutions for diverse application.s Being the pioneer and ultimate provider of piping systems, we are committed to deliver Value-added products with the highest standard of services.

Integrated with wide range of fitting and accessories



Engineered piping solutions!

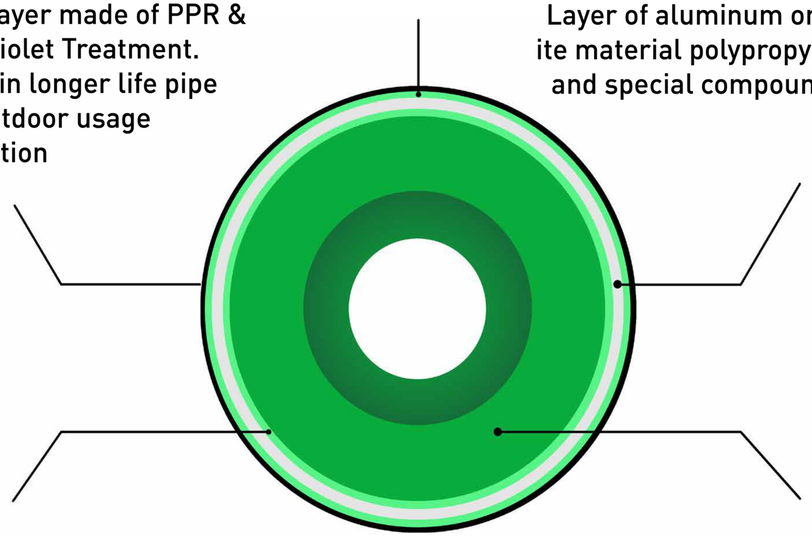
REINFORCED PIPING SYSTEMS

RAKtherm's REINFORCED PIPING SYSTEMS has been developed and engineered to intensify efficiency of piping networks and to serve new applicatons with new mission to achieve proving that Raktherm is leader in industry.

2 EVOH layer Developed by Raktherm for zero oxidation and longer network life

1 Outer layer made of PPR & Ultra-violet Treatment. Result in longer life pipe with outdoor usage application

3 Layer of aluminum or composite material polypropylene PPR, and special compounded combination



4 Adhesive compound that increases bonding structure of PPR with aluminium layer, significantly increasing pip structural integrity

5 Inner layer is made of PPR, for hot / cold temperature and pressure resistibility, with guarantees to compliance with the sanitary norms.



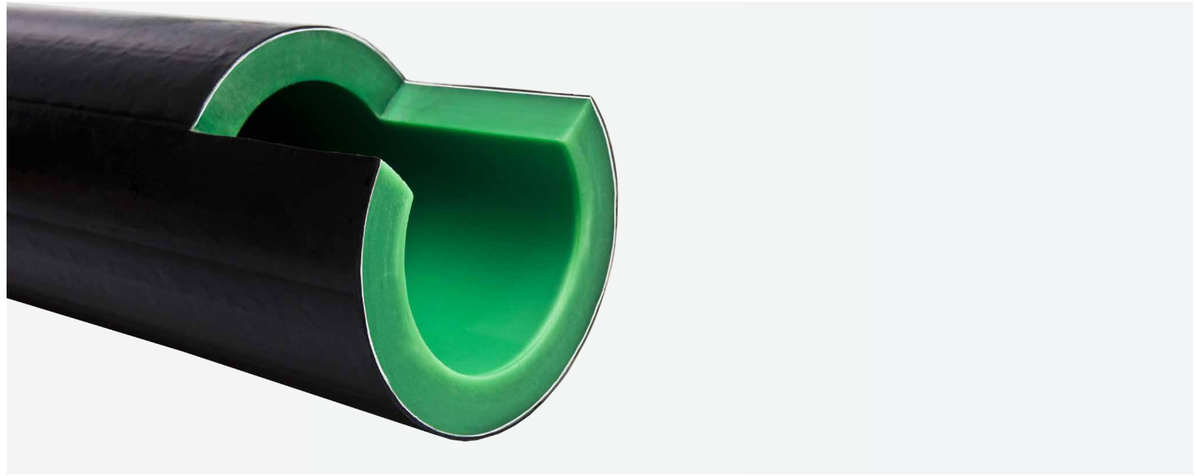
APPLICATIONS

- Suitable for portable hot and cold water piping network installations in residential, hotels, hospitals, shipbuilding, offices, school buildings and other establishments.
- Applicable for swimming pool facilities.
- Piping networks for solar plants.
- Excellent piping network for transport of aggressive type of fluids.

Water treatment plants & distribution network, Solar water heating systems, Water treatment plants & distribution network.

Industries such as Chemical plants, Petroleum & Gas plants, Oil plants, Mineral water plants, water treatment plants, Sugar Manufacturing plants etc.

RAKtherm's REINFORCED PIPING SYSTEMS



RAKtherm Reinforced Stabi (R.R.S System)

RAKtherm system has proven its high resillence even at the most extreme conditions. These factors and more, make RAKtherm the ideal system for the delivery of potable hot and cold water in your home, office or factory. Raktherm pipes and fittings are extensively used in food and medical industries owing to their harmless and safe properties.

RAKtherm Reinforce Stabi with U.V Protection (R.R.S.V System)

with new feature of exposed and open air installations under direct sunlight or UV radiation, R.R.S.V system remains physically stable through a specially developed external black layer for UIV block.

RAKtherm's REINFORCED PIPING SYSTEMS



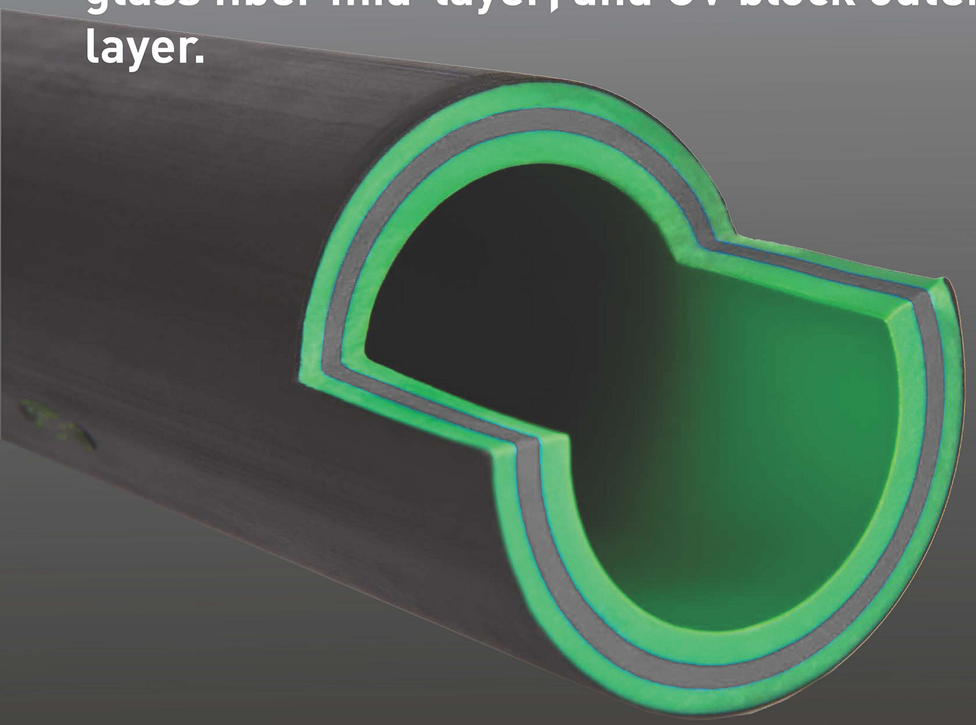
Covered with Aluminum, its inner part's system for water outer layer is coated with an Anthi-creep layer; the outer layer is coated with PP-R as mechanical protection, and combined with hot-melt glue between layers. All gives better Anti-creep property, same strength as metal pipe, shock resistance, and good stability. As well as easy detection by metal detector when buried.

Features

- 75% decresed linear expansion compared with normal PP-pipes.
- 20% incresed higher flow rate for extra performance.
- Superior performance even at extreme application.
- Ultimate impact strength for all installation conditions.
- Exceptional UV resistance for diverse applications.
- Zero oxygen infiltration.

RAKtherm®
Ultimate Piping Solutions
ADVANCED GERMAN TECHNOLOGY

RRF system a unique 4 layers pipe with glass fiber mid-layer, and UV block outer layer.



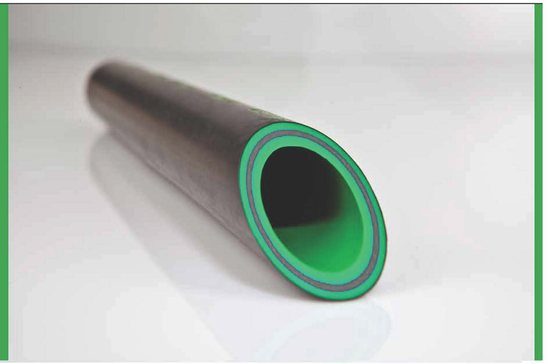
RAKtherm Reinforced Fiber (R.R.F. System)

unique recipe of glass fiber layer. One of the hindrances in using plastic material including PP-R is the possibility to expand drastically when exposed to heat. We have developed RAKtherm Fiber Pipes with xxxxxx innovative component of PPR and glass fiber to decrease linear expansion up to 70 %. Welding process is easier which requires lower supports. With No pilling feature that save installation time and effort, to be one more additive to our portfolio to the reinforced system.

RAKtherm Reinforce Fiber with U.V Protection (R.R.F.V system)

A unique 4 layers pipe with glass fiber core layer and UV treatment skin outer layer for premium UV protection.

Easy Installation, Less Energy, High Reliable and Safe Money



Features

- 70% decreased linear expansion compared to normal pipe
- 20% increased higher flow rate for extra performance.
- Superior performance even at extreme application
- Enhanced impact strength for all installation conditions.
- Easy installation no peeling to be used
- Exceptional UV resistance for diverse applications.
- Zero oxygen infiltration.

Quality & Certificates

RAKtherm's Reinforced piping systems were tested, conformed, qualified, and certified by DVGW, HY, SKZ, & TUV under German standard of 8077/8078. Our products have passed the quality assurance and quality performance tests to ensure that our products are suitable for global distribution and utilization.

QUALITY GUARANTEE

RAKtherm always maintains the highest standards of quality for its users. To support this, RAKtherm warrants a 15-year guarantee for all its piping network components from the date of purchase. (Please ask your local representative for details

MAINTAINING A HIGH LEVEL OF QUALITY

RAKtherm maintains a comprehensive quality control system beginning from designing the required specifications, to control of incoming raw materials processing of the product, packing, storage, shipping to the customer, and finally continuous servicing and support to guarantee that complete total quality is achieved.

This is accomplished parallel to the Quality Assurance Program with the objective to ensure that total quality, and not only localized quality is maintained as required.

The overall quality system operated and documented by RAKtherm is implemented throughout the plant. The overall system has been designed to exceed requirements stated by national and international authorities and institutions. Regular checks are done by neutral bodies,to further eliminate any chance of quality deviation. This is yet another quality assurance for our customer.



Environment Friendly

Our priority is to maintain the quality of water that reaches your family, RAKtherm's PPR-80 material in any way does not react or affect potable water as compared with other materials used in conventional piping systems that can corrode, react chemically, or seep certain contaminants into the water system. This ensures potable waters are hygienic for your family's consumption.

This ensures potable waters are hygienic for your family's consumption.



RAKtherm, Your Environment Friendly Choice

Heavy metals such as nickel and chrome have negative impact in our environment, and were not used in our product range. RAKtherm pipes and fitting materials can be used 100% recycled, and can be used again in other products. This is just few of the many ways that we contribute welfare to the environment.

Corrosion & Chemical Resistance

PPR used in RAKtherm piping systems has high corrosion resistant properties that gives impressive resistance to common chemicals used in household detergents and disinfectants. This advantage surpasses traditional piping systems, ensuring longer service life less prone to premature failure and expensive maintenance.

RAKtherm's Mechanical and Thermal Properties

In accordance with its areas of application, RAKtherm's Reinforced Piping Systems is designed for continuous temperatures of 10 degree Celsius to 90 degrees Celsius, and short-term peak temperatures of up to 100 degrees Celsius with service life of minimum 50 years. Therefore RAKtherm Reinforce Piping Systems is suitable for all types of chilled and heating water networks.



Product Specifications

RAKtherm®
Ultimate Piping Solutions
ADVANCED GERMAN TECHNOLOGY

Raktherm Reinforce Stabi (RRS System)

PPR PN 20 with Aluminum Thickness 0.2 mm According to DIN 8077/88.

Art-.No.	Dimension	Packing Unit	Outer Diameter (OD)mm	Wall Thickness (S)	Intrernal Diameter(ID)mm	Water content l/mt	Kg / mt
PS20-20	20 mm	100 mts	20	2.8	14.4	0.163	0.220
PS20-25	25 mm	100 mts	25	3.5	18	0.254	0.320
PS20-32	32 mm	40 mts	32	4.4	23.2	0.415	0.470
PS20-40	40 mm	40 mts	40	5.5	29	0.651	0.720
PS20-50	50 mm	20 mts	50	6.9	36.2	1.029	1.060
PS20-63	63 mm	20 mts	63	8.6	45.8	1.633	1.650
PS20-75	75 mm	20 mts	75	10.3	54.4	2.307	2.280
PS20-90	90 mm	12 mts	90	12.3	65.4	3.318	3.200
PS20-110	110 mm	8 mts	110	15.1	79.8	5.674	4.600

Raktherm Reinforce Stabi (RRS System)

PPR PN 25 with Aluminum Thickness 0.2 mm According to DIN 8077/88.

Art-.No.	Dimension	Packing Unit	Outer Diameter(OD)mm	Wall Thickness (S)	Intrernal Diameter(ID)mm	Water content l/mt	Kg / mt
PS25-20	20 mm	100 mts	20	3.4	13.2	0.137	0.241
PS25-25	25 mm	100 mts	25	4.2	16.6	0.216	0.350
PS25-32	32 mm	40 mts	32	5.4	21.2	0.353	0.542
PS25-40	40 mm	40 mts	40	6.7	26.6	0.556	0.805
PS25-50	50 mm	20 mts	50	8.3	33.4	0.866	1.217
PS25-63	63 mm	20 mts	63	10.5	42	1.385	1.860
PS25-75	75 mm	20 mts	75	12.5	50	1.963	2.586
PS25-90	90 mm	12 mts	90	15	60	2.827	3.656
PS25-110	110 mm	8 mts	110	18.3	73.4	4.208	5.372

Raktherm Reinforce Stabi-UV (RRSV System)

PPR PN 20 with Aluminum Thickness 0.2 mm According to DIN 8077/88 special technology with black layer UV resistant for outdoor and external installations under direct sunlight.

Art-.No.	Dimension	Packing Unit	Outer Diameter(OD)mm	Wall Thickness (S)	Intrernal Diameter(ID)mm	Water content l/mt	Kg / mt
PSUV20-20	20 mm	100 mts	20	2.8	14.4	0.163	0.220
PSUV20-25	25 mm	100 mts	25	3.5	18	0.254	0.320
PSUV20-32	32 mm	40 mts	32	4.4	23.2	0.415	0.470
PSUV20-40	40 mm	40 mts	40	5.5	29	0.651	0.720
PSUV20-50	50 mm	20 mts	50	6.9	36.2	1.029	1.060
PSUV20-63	63 mm	20 mts	63	8.6	45.8	1.633	1.650
PSUV20-75	75 mm	20 mts	75	10.3	54.4	2.307	2.280
PSUV20-90	90 mm	12 mts	90	12.3	65.4	3.318	3.200
PSUV20-110	110 mm	8 mts	110	15.1	79.8	5.674	4.600

Raktherm Reinforce Stabi-UV (RRSV System)

PPR PN 25 with Aluminum Thickness 0.2 mm According to DIN 8077/88 special technology with black layer UV resistant for outdoor and external installations under direct sunlight.

Art-.No.	Dimension	Packing Unit	Outer Diameter(OD)mm	Wall Thickness (S)	Intrernal Diameter(ID)mm	Water content l/mt	Kg / mt
PSUV25-20	20 mm	100 mts	20	3.4	13.2	0.137	0.241
PSUV25-25	25 mm	100 mts	25	4.2	16.6	0.216	0.350
PSUV25-32	32 mm	40 mts	32	5.4	21.2	0.353	0.542
PSUV25-40	40 mm	40 mts	40	6.7	26.6	0.556	0.805
PSUV25-50	50 mm	20 mts	50	8.3	33.4	0.866	1.217
PSUV25-63	63 mm	20 mts	63	10.5	42	1.385	1.860
PSUV25-75	75 mm	20 mts	75	12.5	50	1.963	2.586
PSUV25-90	90 mm	12 mts	90	15	60	2.827	3.656
PSUV25-110	110 mm	8 mts	110	18.3	73.4	4.208	5.372

Product Specifications

Raktherm Reinforce Fiber (RRF System)

PPR PN 20 (SDR 7.4) enhanced with fiber According to DIN 8077/88.

Art-.No.	Dimension	Packing Unit	Outer Diameter(OD)mm	Wall Thickness (S)	Intrernal Diameter(ID)mm	Water content l/mt	Kg / mt
PF20-20	20 mm	100 mts	20	2.8	14.4	0.163	0.159
PF20-25	25 mm	100 mts	25	3.5	18	0.254	0.247
PF20-32	32 mm	40 mts	32	4.4	23.2	0.423	0.395
PF20-40	40 mm	40 mts	40	5.5	29	0.66	0.61
PF20-50	50 mm	20 mts	50	6.9	36.2	1.029	0.951
PF20-63	63 mm	20 mts	63	8.6	45.8	1.647	1.490
PF20-75	75 mm	20 mts	75	10.3	54.4	2.323	2.115
PF20-90	90 mm	12 mts	90	12.3	65.4	3.358	3.03
PF20-110	110 mm	8 mts	110	15.1	79.8	5.99	4.53

Raktherm Reinforce Fiber (RRF System)

PPR PN 25 (SDR 6) enhanced with fiber According to DIN 8077/88.

Art-.No.	Dimension	Packing Unit	Outer Diameter (OD)mm	Wall Thickness (S)	Intrernal Diameter (ID)mm	Water content l/mt	Kg / mt
PF25-20	20 mm	100 mts	20	3.4	13.2	0.197	0.193
PF25-25	25 mm	100 mts	25	4.2	16.6	0.304	0.296
PF25-32	32 mm	40 mts	32	5.4	21.2	0.519	0.484
PF25-40	40 mm	40 mts	40	6.7	26.6	0.804	0.743
PF25-50	50 mm	20 mts	50	8.3	33.4	1.237	1.439
PF25-63	63 mm	20 mts	63	10.5	42	2.010	1.816
PF25-75	75 mm	20 mts	75	12.5	50	2.819	2.566
PF25-90	90 mm	12 mts	90	15	60	4.095	3.695
PF25-110	110 mm	8 mts	110	18.3	73.4	7.259	5.372

Product Specifications

Raktherm Reinforce Fiber-UV (RRFV System)

PPR PN 20 (SDR 7.4) enhanced with latest generation of fiber with UV resistant According to DIN 8077/88.

Art-.No.	Dimension	Packing Unit	Outer Diameter(OD)mm	Wall Thickness (S)	Intrernal Diameter(ID)mm	Water content l/mt	Kg / mt
PFUV20-20	20 mm	100 mts	20	2.8	14.4	0.163	0.220
PFUV20-25	25 mm	100 mts	25	3.5	18	0.254	0.320
PFUV20-32	32 mm	40 mts	32	4.4	23.2	0.415	0.423
PFUV0-40	40 mm	40 mts	40	5.5	29	0.651	0.66
PFUV20-50	50 mm	20 mts	50	6.9	36.2	1.029	1.029
PFUV20-63	63 mm	20 mts	63	8.6	45.8	1.633	1.647
PFUV20-75	75 mm	20 mts	75	10.3	54.4	2.307	2.323
PFUV20-90	90 mm	12 mts	90	12.3	65.4	3.318	3.358
PFUV20-110	110 mm	8 mts	110	15.1	79.8	5.674	5.99

Raktherm Reinforce Fiber-UV (RRFV System)

PPR PN 25 (SDR 6) enhanced with fiber According to DIN 8077/88.

Art-.No.	Dimension	Packing Unit	Outer Diameter (OD)mm	Wall Thickness (S)	Intrernal Diameter (ID)mm	Water content l/mt	Kg / mt
PFUV25-20	20 mm	100 mts	20	3.4	13.2	0.197	0.193
PFUV25-25	25 mm	100 mts	25	4.2	16.6	0.304	0.296
PFUV25-32	32 mm	40 mts	32	5.4	21.2	0.519	0.484
PFUV25-40	40 mm	40 mts	40	6.7	26.6	0.804	0.743
PFUV25-50	50 mm	20 mts	50	8.3	33.4	1.237	1.439
PFUV25-63	63 mm	20 mts	63	10.5	42	2.010	1.816
PFUV25-75	75 mm	20 mts	75	12.5	50	2,819	2.566
PFUV25-90	90 mm	12 mts	90	15	60	4.095	3.695
PFUV25-110	110 mm	8 mts	110	18.3	73.4	7.259	5.490

Linear Expansion

Linear expansion of pipes is directly proportional to the heat subjected to the pipe material. Hence, cold water pipes have practically no linear expansion and could be neglected in the installation design. On the other hand, expansion of pipes is significant in warm water and heating installations and in extreme temperature varying environments, and therefore needs to be considered.

FORMULA FOR CALCULATION OF LINEAR EXPANSION

The linear expansion ΔL is calculated according to following formula:

$\Delta L = \alpha \bullet L \bullet \Delta T$

Where:

ΔL Expanded length (mm)

Coeffi cient of linear expansion (mm/mK)

L Length of segment in (mm)

ΔL Temperature difference between working and installation

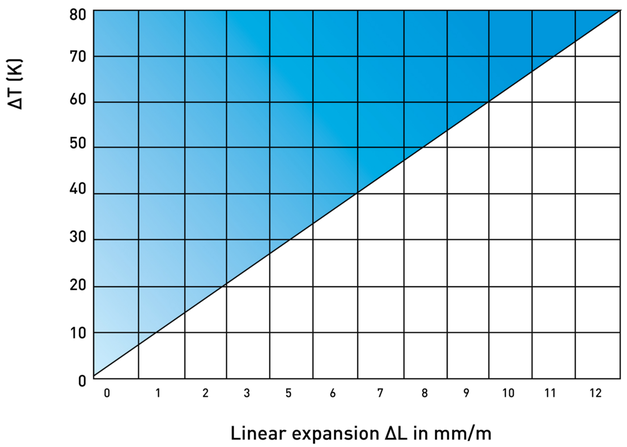
LINEAR EXPANSION CALCULATION EXAMPLE:

Assuming you need to calculate the expansion (ΔL) of a standard RAKtherm pipe segment (L) of 1.6 meters at a maximum working temperature of 70°C. You know that the RAKtherm standard pipe has a coeffi cient of linear expansion of (α= 0.15). You know that the installation was executed at the typical ambient temperature of 25°C.

$\Delta L = \alpha \bullet L \bullet \Delta L$ or $\Delta L = 0.15 * 1.6 * (70°C - 25°C) = 10.8$ mm

That means you can expect a linear expansion of 10.8 mm for this segment of pipe if the temperature difference is respected.

Linear Expressions



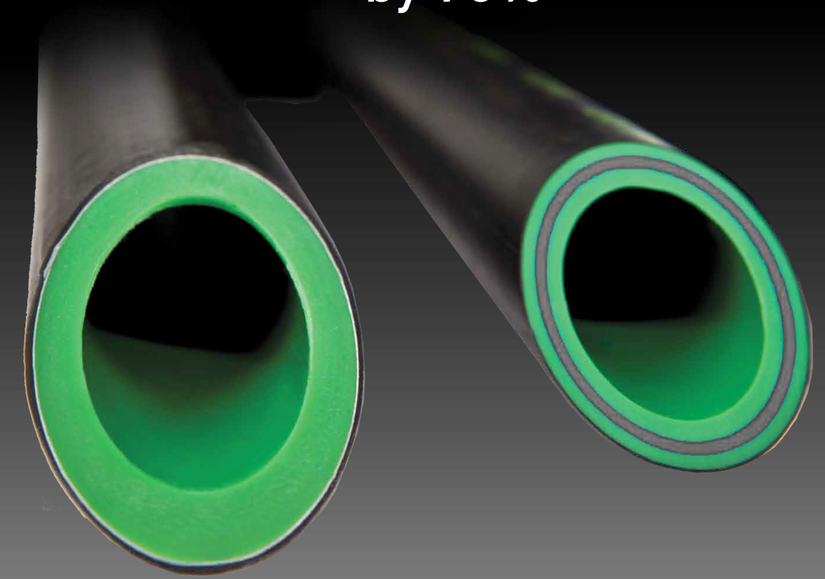
GRAPH 5.1 LINEAR EXPANSION CAUSED BY TEMPERATURE FOR RAKTHERM NORMAL PIPE

Length of segment (meters)	ΔT(°K)** 10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
0.1	0.15	0.23	0.30	0.38	0.45	0.53	0.60	0.68	0.75	0.83	0.90	0.98	1.05	1.13	1.20
0.2	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.50	1.65	1.80	1.95	2.10	2.25	2.40
0.3	0.45	0.68	0.90	1.13	1.35	1.58	1.80	2.03	2.25	2.48	2.70	2.93	3.15	3.38	3.50
0.4	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70	3.00	3.30	3.60	3.90	4.20	4.50	4.80
0.5	0.75	1.13	1.50	1.88	2.25	2.63	3.00	3.38	3.75	4.13	4.50	4.88	5.25	5.63	6.00
0.6	0.90	1.35	1.80	2.25	2.70	3.15	3.60	4.05	4.50	4.95	5.40	5.85	6.30	6.75	7.20
0.7	1.05	1.58	2.10	2.63	3.15	3.68	4.20	4.73	5.25	5.78	6.30	6.83	7.35	7.88	8.40
0.8	1.20	1.80	2.40	3.00	3.60	4.20	4.80	5.40	6.00	6.60	7.20	7.80	8.40	9.00	9.60
0.9	1.35	2.03	2.70	3.38	4.05	4.73	5.40	6.08	6.75	7.43	8.10	8.78	9.45	10.13	10.80
1.0	1.50	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50	8.25	9.00	9.75	10.50	11.25	12.00
2.0	3.00	4.50	6.00	7.50	9.00	10.50	12.00	13.50	15.00	16.50	18.00	19.50	21.00	22.50	24.00
3.0	4.50	6.75	9.00	11.25	13.50	15.75	18.00	20.25	22.50	24.75	27.00	29.25	31.50	33.75	36.00
4.0	6.00	9.00	12.00	15.00	18.00	21.00	24.00	27.00	30.00	33.00	36.00	39.00	42.00	45.00	48.00
5.0	7.50	11.25	15.00	18.75	22.50	26.25	30.00	33.75	37.50	41.25	45.00	48.75	52.50	56.25	60.00
6.0	9.00	13.50	18.00	22.50	27.00	31.50	36.00	40.50	45.00	49.50	54.00	58.50	63.00	67.50	72.00
7.0	10.50	15.75	21.00	26.25	31.50	36.75	42.00	47.25	52.50	57.75	63.00	68.25	73.50	78.75	84.00
8.0	12.00	18.00	24.00	30.00	36.00	42.00	48.00	54.00	60.00	66.00	72.00	78.00	84.00	90.00	96.00
9.0	13.50	20.25	27.00	33.75	40.50	47.25	54.00	60.75	67.50	74.25	81.00	87.75	94.50	101.30	108.00
10.0	15.00	22.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00	97.50	105.00	112.50	120.00

TABLE 5.2: STANDARD PIPE LINEAR EXPANSION CHART (METERS)

RRS Reduce your linear expansion by 75%

RRF Reduce your linear expansion by 70%



RAKtherm® Ultimate Piping Solutions ADVANCED GERMAN TECHNOLOGY

Standards

RAKtherm Reinforce Piping System and Fittings are produced with the Following Standards. Also we are following DVGW W 544 Technical Guidelines and KTW –Recommendation of the Federal Republic of Germany.

Standards	Standards
DIN 8076	Standard For Testing Metal Thread Joints
DIN 8077	PPR Pipes Dimension
DIN 8078	PPR Pipes Testing
DIN 16962	PPR Fittings Dimensions &Testing
DVS 2207	Welding Of Thermoplastic Pipes
SKZ HR 3.10	PPR Pipes & Fittings Standards for SKZ
ISO 18553	Homogeneity Test for PP-R & PE-X Pipes
DIN 16836	Standards for Aluminum Composite Pipe
DIN 16893	PE-X Pipes Dimension
DIN 16893	PE-X Pipes Testing
DIN EN 579	Cross-linking Test
SKZ HR 3.2	SKZ Specification for PE-X pipes

Visit our website to see more information about solutions and services

RAK therm®

Ultimate Piping Solutions

ADVANCED GERMAN TECHNOLOGY

Engineered piping Solutions!

REINFORCED PIPING SYSTEM

UAE Ras al-Khaimah P.O.Box 30739 **Tel:** +971 7 2447128 **Fax:** +971 7 2447129
Email: info@raktherm.com academy@raktherm.com **Website:** www.raktherm.com