GF Piping Systems

GF Aquasystem PP-R and PP-RCT
Piping Systems

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About Us

Founded in Switzerland in 1802, Georg Fischer Corporation operates in 3 main business lines: GF Piping Systems, GF Casting Solutions and GF Machining Solutions. Georg Fischer is present in 34 countries with 57 production plants and 136 companies.

GF Piping Systems, the largest business line of Georg Fischer Corporation, is one of the leading companies in plastic and metal piping systems in the world. GFPS produces system solutions and high quality components for the secure transmission of water and gas in industries, utilities and building technology. Reaching out to over 100 countries with its more than 30 production plants, GF Piping Systems acquired **Hakan Plastik** in 2013.

Founded in 1965, **Hakan Plastik** has achieved so many breakthroughs as the first company that produced the silent pipe in Turkey and has reflected the importance that it attaches to development and change to its products and services as well.

GF Hakan Plastik has two production plants in Çerkezköy and Şanlıurfa. With the acquisition by GF, global GF product and process standards applicable worldwide have started to be applied. **GF Hakan Plastik** operates in the fields of Building Technology (BT) and Utility (UT) in plastic piping sector. Exporting its products to over 70 countries, the company has 7 sales areas in Turkey.

GF Hakan Plastik Training and Technology Center provides all its busienss partners with services with the aim of increasing the knowledge and awareness in the sector through both technical and practical trainings. Reaching out to a wider audience at the center such as the professionals serving the sector, university students and installers and providing diverse training and seminar programs for each stakeholder; the products of **GF Hakan Plastik** are promoted and information is provided about the accurate method of application of the products.

Our Market Segments

Based on its experience and high production technology in the sector, GF Hakan Plastik supports its clients in each phase of their projects.

- Building Technology Projects
- Industrial Buildings
- Utility Projects
- Irrigation Projects

Our Presence in the World

With our presence as a global brand, we choose to be closer to our clients.

GF Hakan Plastik exports its products to over 70 countries. As Georg Fischer Piping Systems, we provide our clients in over 100 countries with fast response and services.

We act in compliance with the local standards in our over 30 production plants in Europe, Asia and the USA. We ensure fast deliveries with our modern logistics organization deployed at our local distribution hubs. .

Complete Solution Concept

Our wide range of products and services represent our complete solution concept.

With our products intended for diverse sectors, we offer individual and comprehensive system solutions. Focusing on the needs of projects, we optimize the processes and applications integrated into the entire system.

We provide state-of-the-art technology by setting the standards in the market at all times. We always stand by our business partners through our experience in the piping systems and reliable service network.

As an industrial company that stands out with innovative and successful operations ever since our incorporation, we act as a solution point to meet all your needs based on our technical knowledge, specialization and reliability.

Benefits of Plastics

Plastics are polymers created by the chemical conversion of natural products or synthesized from organic materials. The primary components that make up the building blocks of plastics are long chains of carbon (C) and hydrogen (H) known as monomers.

The raw materials used for the production of plastics are natural compounds such as cellulose, coal, oil and natural gas. In the plastics industry, around 6 % of the petroleum products that come out from refineries is used.

Plastics fall into three main categories on the basis of their internal structure and the resulting mechanical characteris tics: thermoplastics, thermosetting plastics and elastomers.

Thermoplastics in turn can be split into two main categories as partially-regulated (semi-crystalline) and iregular (amorphous) molecular structures.

- Semicrystalline thermoplastics, which have a partially ordered molecular structure: this category includes the polyolefins (polypropylene, polyethylene, polybutylene) and fluoropolymers (PVDF, PTFE, etc.)
- Amorphous thermoplastics, which have no crystalline regions and no packed molecular structure: this category includes the vinyl chlorides (PVC-U, PVC-C, etc.) and styrenes (ABS, polystyrene, etc.]

Semicrystalline materials are more suitable for hot welding, while amorphous thermoplastics are ideal for cementing or cold welding (solvent cementing).

Advantages of Plastics

Thermoplastics obviously demonstrate different characteristics than those of the metals traditionally used for piping.

Metal Systems	Plastic Systems
High density * Crane needed for transport * Widely spaced fixings * High anchoring forces, fixing required	**Low density** * Can be carried by hand up to d110 * Closely spaced fixings * Limited anchoring forces, simple and economic
Thermal conductivity * Insulation is always needed to limit heat loss • Formation of condensation and resulting corrosion *	**Low thermal conductivity** * Limited heat loss • Low levels of condensation and resistance to corrosion
Corrosion Behaivors • Galvanic corrosion may occur • Internal diameter is reduced due to corrosion Reduction in internal diameter leads to pressure losses	**High Corrosion Resistance** • No risk of galvanic corrosion risk • No corrosion and reduction of internal diameter No pressure losses due to lack of reduction of internal diameter
Chemical resistance * Low resistance to acids, requiring use of costly alloys * Damage from incrustation	**High chemical resistance** * In combination with correct jointing methods, at least 25 years of useful life can be warranted * No incrustation

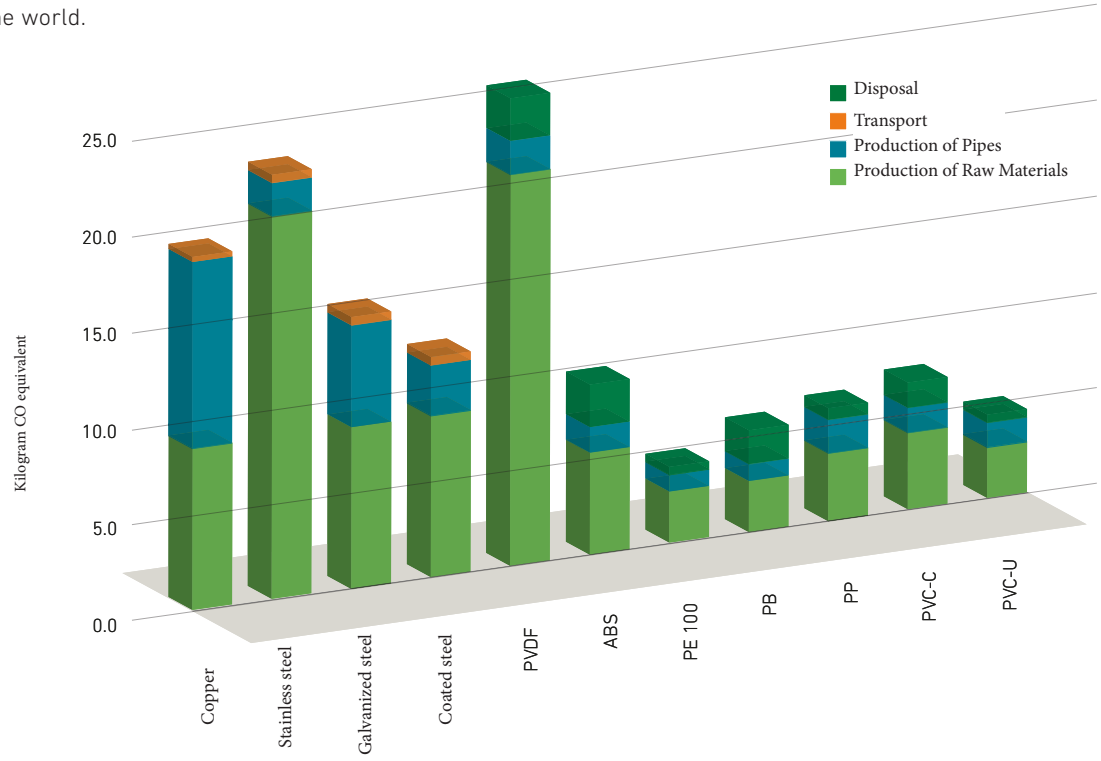
Service Life Analysis of Plastics

It is the total of all greenhouse gases emitted to the atmosphere during the entire lifetime including the processes for extracting a product having carbon footprint from under the ground, refining, producing, using and disposing of that product.

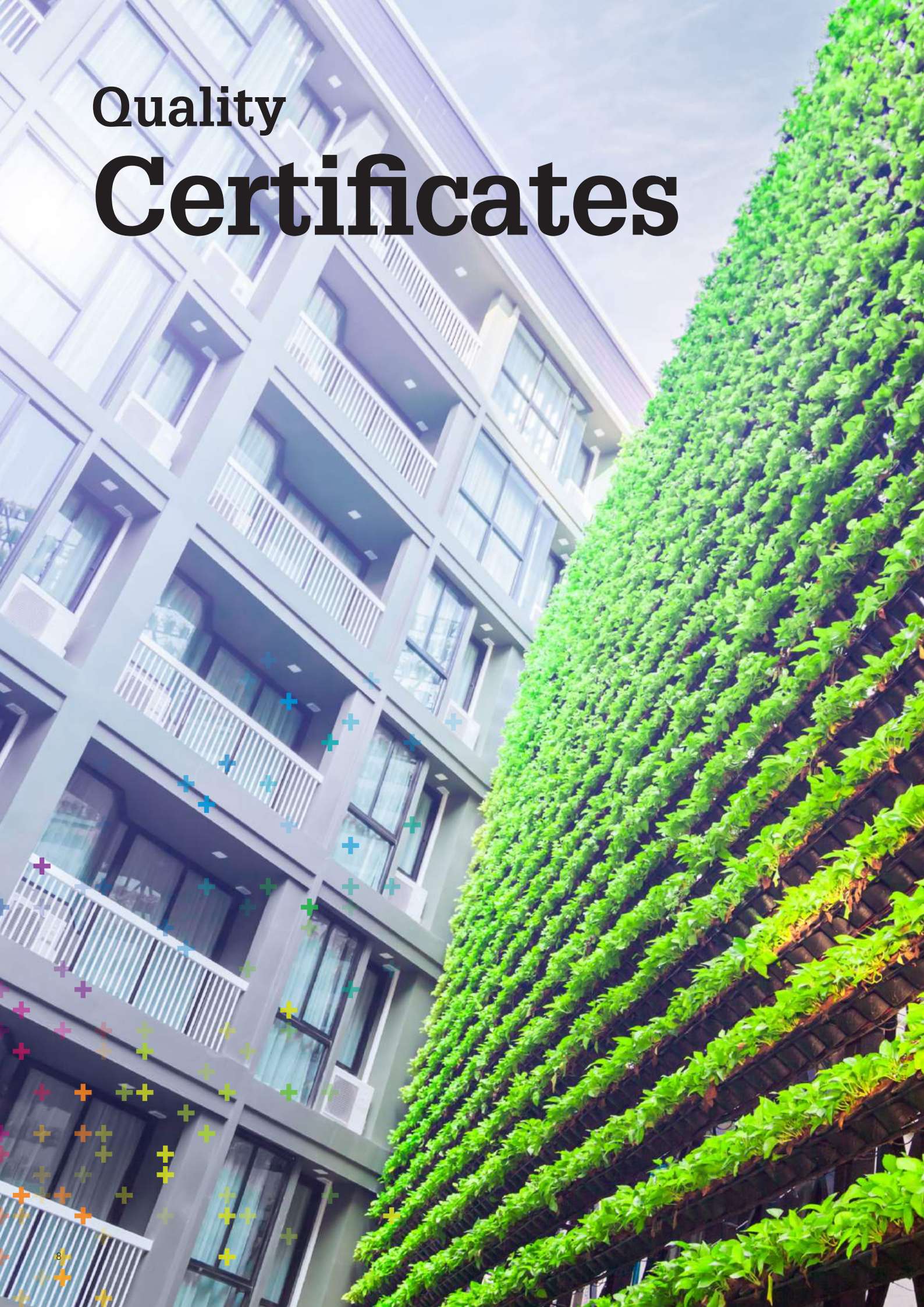
The following graphics indicate the assessment of the lifetime of thermoplastic piping systems in terms of the quality of their environmental perfomance and application of them in building technology, industry and water and gas distribution. In the analysis, the impacts of one meter long pipe was compared with the main competitor materials (DN25, DN80, DN150 and DN400) for each of the commonly used plastics. GF supplied this analysis from an independent, Swiss-based organization specialized in environmental performance analyzes, and is based on Ecoinvent, leading lifecycle inventory database in the world.

According to the main results of the study, plastic piping systems demonstrate better performance than metal systems. This finding has been confirmed by other studies conducted in this field.

The main reason for high performance of thermoplastics is that they are lightweight. This ensures key benefits during transport and installation. Fully-plastic solutions are lighter than other piping systems of conventional materials, and this creates significant impacts on carbon footprint.



Quality Certificates



Manufacturing its products in accordance with the European standards and Turkish standards equivalent to the European standards, our Company is a leading and dynamic organization in terms of continous improvement and customer satisfaction.

Some of the product quality certificates of our Company are as follows:

DVGW (Germany) - SKZ (Germany) - Hygiene Institute (Germany) - Fraunhofer (Germany) - Nordic Polymark (Sweden) - AENOR (Spain) - UkrSepro (Ukraine) - GOST (Russia) - SABS (South Africa) - TSE (Turkey)

Presenting its product standards in a way that offers the quality and continuity required for customers, GF Hakan Plastik exports its products to over 70 countries based on these certificates.

In addition to product quality, the process and system quality of GF Hakan Plastik is certified by BVQI through TS EN ISO 9001:2015 certificate and the company maintains its efforts on certification. Our Company that places top priority on process and system quality also has TS EN ISO 14001:2015 and TS EN ISO 45001:2018 certificates. Our both two production plants in Çerkezköy and Şanlıurfa have TS EN ISO/IEC 17025:2017 laboratory accreditation certificates awarded by TÜRKAK organization.

Certificates

TURKEY- TSE	SCANDINAVIAN COUNTRIES SWEDCERT	TURKEY TÜRKAK	RUSSIA-BELARUS UKRAINE GOST-r
SPAIN AFITI LICOF	GERMANY DIN CERTCO	SWITZERLAND SGS	RUSSIA-BELARUS KAZAKHSTAN-KYRYGYZSTAN ARMENIA
UKRAINE UKR - SEPRO	NETHERLANDS KIWA	BULGARIA BULGARKONTROLA	UK WRAS
UKRAINE HYGIENE	SCANDINAVIAN COUNTRIES SWEDCERT KIWA	HUNGARY HUNGARY - EMI	RUSSIA HYGIENE
BUREAU VERITAS	SOUTH AFRICA SABS	GERMANY- RUSSIA HYGENE INSTITUT	GERMANY HOCH
SOUTH AFRICA SANAS	UK LLOYD'S REGISTER	TURKEY EUROGAP	BULGARIA NJN
TURKEY YILDIZ TECHNICAL UNIVERSITY REPORT	MALAYSIA IKRAM QA	GERMANY DVGV	GERMANY DIBT
UNITED STATES OF AMERICA NSF	GERMANY FRAUNHOFER INSTITUTE	SPAIN AENOR	STN TC

GF Aquasystem PP-R and PP-RCT Piping Systems

Aquasystem PP-R Piping Systems is a lightweight piping system made of PP-R copolymer material, with high mechanical strength and resistance to corrosion.

• Provides high resistance to extreme temperatures and pressure. PP-R pipes and fittings are produced in accordance with TS EN 15874-1, TS EN 15874-2, TS EN 15874-3, DIN 8077, DIN 8078, TS 13715, DIN 18836 standards.
• Pipes and fittings available in the diameter range of d20-d200.
• High chemical resistance, no corrosion.
• Fast, easy and practical installation by using socket, butt and and electrofusion welding.
• White, grey and green options available.
• Hygienic and environmentally-friendly.

• GF Aquasystem PP-R Piping Systems are produced in 6 different types depending upon the areas of use and customer expectations:
- PP-R Standard Piping Systems (PN10-PN16-PN20)
- PP-R Glass Fiber Reinforced Piping Systems (PN20-PN25)
- PP-R Glass Fiber Reinforced Climafaser Piping Systems (PN10)
- PP-R Stable External Aluminum Foil Piping Systems (PN25)
- PP-R Aluplus Stable Middle Foil Piping Systems (PN20)
- PP-R UV-Resistant Piping Systems (PN20-PN25)

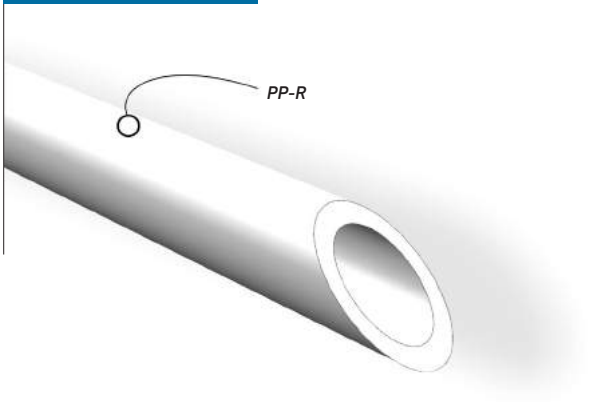
PP-RCT is a new generation raw material which is developed for polypropylene by using a special β-nucleation process.

Thanks to this enchancement, GF Aquasystem withstand higher operating pressures at extreme temperatures, higher flow rates and resistance to chlorine.
- PP-RCT Glass-Fiber Reinforced Piping Systems :
  • SDR9 - PN22
  • SDR7,4 - PN25

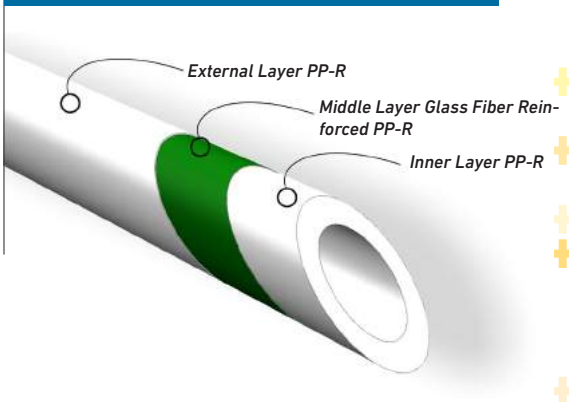
Fields of Application

• Central heating systems
• Hot and cold water systems
• Drinking water and treated water supply systems
• Industrial Piping Systems (Transfer and discharge of chemicals)
• Air conditioner systems
• Solar Collectors

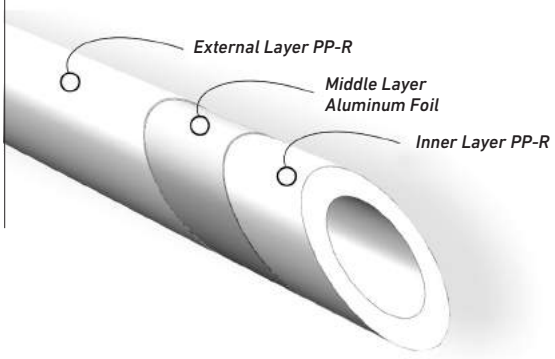
Standard PP-R Pipes



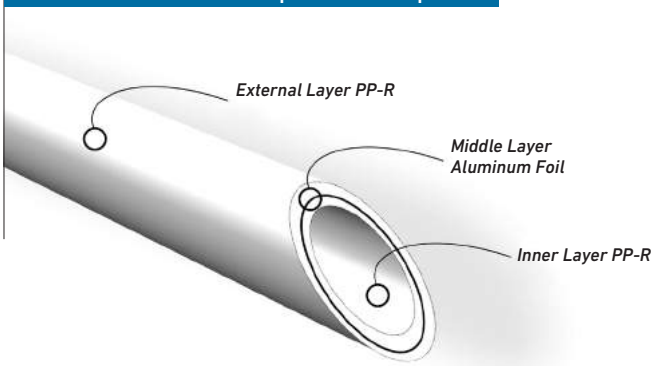
Glass Fiber Reinforced Composite PP-R Pipe



External Aluminum Foil Composite PP-R Pipe



Middle Aluminum Foil Composite PP-R Pipe



Technical Properties

Pipe Structure	One Layer-Standard Pipes Multi-Layer: Glass Fiber Reinforced Composite Pipes/Aluminum Foil Composite Pipes
Diameters [mm]	d20, d25, d32, d40, d50, d63, d75, d90, d110, d125, d160, d200
Pressure Classes:	Standard PPR Pipes PN10 (SDR11), PN16 (SDR7.4), PN20 (SDR6) Glass Fiber Reinforced Composite Pipes: PN10 (SDR11), PN20 (SDR7.4), PN25 (SDR6) External Aluminum Foil Composite Pipes: PN25 (SDR6) Middle Aluminum Foil Composite Pipes: PN20 (SDR6) PP-RCT Glass Fiber Reinforced Pipes (SDR9: PN22 – SDR7,4: PN25)
Pipe Length [mm]	4000 mm
Jointing Methods	Socket Fusion Welding, Butt-Welding, Electrofusion Welding, Mechanical Connection, Flange Connection
Color	White, Green, Grey (For grey colour codes, please contact to GF Hakan Sales Department)
Chemical Resistance	Resistant to organic and inorganic chemical environments for pH values between 2 and 12
Installation Temperature	Minimum: +5°C Maximum: +40°C
Operating Temperature	Standard PPR Pipes: +5°C - +70°C Glass Fiber Reinforced Composite Pipes: +5°C - +95°C Aluminum Foil Composite Pipes: +5°C - +95°C
Application Class	B (Building)
Standards	EN15874-1/2/3, DIN 8077-78
Thermal Expansion Coefficient	Standard Pipes: 0.15 mm/m°K Glass Fiber Reinforced Composite Pipes: 0.035 mm/m°K Aluminum Foil Composite Pipes: 0.030 mm/m°K
Thermal Conductivity Coefficient	0.24 W/m°K
Approvals and Certificates	**Spain:** AENOR, **UK:** WRAS, LLYOD's, **Germany:** DVGW, SKZ, HYGIENE, **Turkey:** TSE, **Ukraine:** HYGIENE, SEPRO, **Russia:** GOST, HYGIENE, **Bulgaria:** BULGARKONTROLA

PP-R Aquasystem

PP-R Standard Pipe - PN10 (SDR11)

Dia. (mm)	Thic. (mm)	Code - White	Code - Green	Packing Type	Pc
20	1,9	**4000002002021**	**4002002002021**	Bundle	100
25	2,3	**4000002502121**	**4002002502121**	Bundle	80
32	2,9	**4000003202221**	**4002003202221**	Bundle	60
40	3,7	**4000004002321**	**4002004002321**	Bundle	40
50	4,6	**4000005002421**	**4002005002421**	Bundle	20
63	5,8	**4000006302521**	**4002006302521**	Bundle	16
75	6,8	**4000007502621**	**4002007502621**	Bundle	12
90	8,2	**4000009002721**	**4002009002721**	Bundle	8
110	10,0	**4000011002821**	**4002011002821**	Bundle	4
125	11,4	**4000012502921**	**4002012502921**	Bundle	4
160	14,6	**4000016000821**	**4002016000821**	Bundle	4
200	18,2	**4000020000121**	**4002020000121**	Bundle	4

PP-R Glass Fiber Reinforced Climafaser Pipe - PN10 (SDR 11)

Dia. (mm)	Thic. (mm)	Code - Green	Packing Type	Pc
20 *	2,8	**4202002030021**	Bundle	100
25 *	3,5	**4202002530021**	Bundle	80
32	2,9	**4202003230121**	Bundle	60
40	3,7	**4202004030021**	Bundle	40
50	4,6	**4202005030021**	Bundle	20
63	5,8	**4202006330121**	Bundle	16
75	6,8	**4202007530021**	Bundle	12
90	8,2	**4202009030021**	Bundle	8
110	10,0	**4202011030021**	Bundle	4
125	11,4	**4202012530021**	Bundle	4

***For d20 and d25 diameter products, SDR7.4 (PN20) Glass Fiber Reinforced Composite Pipes are suggested.

Note: Our climafaser pipes are green.

PP-R Standard Pipe - PN16 (SDR7,4)

Dia. (mm)	Thic. (mm)	Code - White	Code - Green	Packing Type	Pc
20	2,8	**4000002004021**	**4000002004021**	Bundle	100
25	3,5	**4000002504121**	**4000002504121**	Bundle	80
32	4,4	**4000003204221**	**4000003204221**	Bundle	60
40	5,5	**4000004004321**	**4000004004321**	Bundle	40
50	6,9	**4000005004421**	**4000005004421**	Bundle	20
63	8,6	**4000006304521**	**4000006304521**	Bundle	16
75	10,3	**4000007504621**	**4000007504621**	Bundle	12
90	12,3	**4000009004721**	**4000009004721**	Bundle	8
110	15,1	**4000011004821**	**4000011004821**	Bundle	4
125	17,1	**4000012504821**	**4000012504821**	Bundle	4
160	21,9	**4000016000921**	**4000016000921**	Bundle	4
200	27,4	**4000020001121**	**4000020001121**	Bundle	4

PP-R Glass Fiber Reinforced Pipe - PN20 (SDR7,4)

Dia. (mm)	Thic. (mm)	Code - White	Code - Green	Packing Type	Pc
20	2,8	**4200002000121**	**4202002000121**	Bundle	100
25	3,5	**4200002500221**	**4202002500221**	Bundle	80
32	4,4	**4200003200321**	**4202003200321**	Bundle	60
40	5,5	**4200004000421**	**4202004000421**	Bundle	40
50	6,9	**4200005000521**	**4202005000521**	Bundle	20
63	8,6	**4200006300621**	**4202006300621**	Bundle	16
75	10,3	**4200007500721**	**4202007500721**	Bundle	12
90	12,3	**4200009000821**	**4202009000821**	Bundle	8
110	15,1	**4200011000921**	**4202011000921**	Bundle	4
125	17,1	**4200012500121**	**4202012500121**	Bundle	4
160	21,7	**4200016000121**	**4202016000121**	Bundle	4

PP-R Standard Pipe - PN20 (SDR6)

Dia. (mm)	Thic. (mm)	Code - White	Code - Green	Packing Type	Pc
20	3,4	**4000002000121**	**4002002000121**	Bundle	100
25	4,2	**4000002500221**	**4002002500221**	Bundle	80
32	5,4	**4000003200321**	**4002003200321**	Bundle	60
40	6,7	**4000004000421**	**4002004000421**	Bundle	40
50	8,3	**4000005000521**	**4002005000521**	Bundle	20
63	10,5	**4000006300621**	**4002006300621**	Bundle	16
75	12,5	**4000007500721**	**4002007500721**	Bundle	12
90	15,0	**4000009000821**	**4002009000821**	Bundle	8
110	18,3	**4000011000921**	**4002011000921**	Bundle	4
125	20,8	**4000012501021**	**4002012501021**	Bundle	4
160	26,6	**4000016001021**	**4002016001021**	Bundle	4
200	33,2	**4000020000221**	**4002020000221**	Bundle	4

PP-R Glass Fiber Reinforced Pipe - PN25 (SDR6)

Dia. (mm)	Thic. (mm)	Code - White	Code - Green	Packing Type	Pc
20	3,4	**4200002002021**	**4202002002021**	Bundle	100
25	4,2	**4200002502121**	**4202002502121**	Bundle	80
32	5,4	**4200003202221**	**4202003202221**	Bundle	60
40	6,7	**4200004002321**	**4202004002321**	Bundle	40
50	8,3	**4200005002421**	**4202005002421**	Bundle	20
63	10,5	**4200006302521**	**4202006302521**	Bundle	16
75	12,5	**4200007506521**	**4202007506521**	Bundle	12
90	15,0	**4200009006621**	**4202009006621**	Bundle	8
110	18,3	**4200011006421**	**4202011006421**	Bundle	4
125	20,8	**4200012500221**	**4202012500221**	Bundle	4
160	26,6	**4200016000221**	**4202016000221**	Bundle	4

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PP-R Middle Aluminum Foiled Pipe- PN20 (SDR6)

Dia. (mm)	Thic. (mm)	Code - White	Code - Green	Packing Type	Pc
20	3,4	**4100002010021**	**4102002010021**	Bundle	100
25	4,2	**4100002510021**	**4102002510021**	Bundle	80
32	5,4	**4100003210021**	**4102003210021**	Bundle	40
40	6,7	**4100004010021**	**4102004010021**	Bundle	40
50	8,3	**4100005010021**	**4102005010021**	Bundle	20
63	10,5	**4100006310021**	**4102006310021**	Bundle	16

PP-R UV Resistant Standard Pipe - PN20 (SDR6)

Dia. (mm)	Thic. (mm)	Code - White	Code - Green	Packing Type	Pc
20	3,4	**4000002010021**	**4002002010021**	Bundle	100
25	4,2	**4000002510021**	**4002002510021**	Bundle	80
32	5,4	**4000003210021**	**4002003210021**	Bundle	60
40	6,7	**4000004010021**	**4002004010021**	Bundle	40
50	8,3	**4000005010021**	**4002005010021**	Bundle	20
63	10,5	**4000006310021**	**4002006310021**	Bundle	16

PP-R External Aluminum Foiled Pipe - PN25 (SDR6)

Dia. (mm)	Thic. (mm)	Code - White	Code - Green	Packing Type	Pc
20	4,5	**4100002010021**	**4102002010021**	Bundle	100
25	5,3	**4100002510021**	**4102002510021**	Bundle	80
32	6,5	**4100003210021**	**4102003210021**	Bundle	40
40	7,8	**4100004010021**	**4102004010021**	Bundle	40
50	9,4	**4100005010021**	**4102005010021**	Bundle	20
63	11,6	**4100006310021**	**4102006310021**	Bundle	16
75	13,6	**4100007500721**	**4102007500721**	Bundle	12
90	16,1	**4100009000821**	**4102009000821**	Bundle	8
110	19,4	**4100011000921**	**4102011007421**	Bundle	4

PP-R UV Resistant External Aluminum Foiled Pipe - PN25 (SDR6)

Dia. (mm)	Thic. (mm)	Code - White	Code - Green	Packing Type	Pc
20	4,5	**4100002000121**	**4102002000121**	Bundle	100
25	5,3	**4100002500221**	**4102002500221**	Bundle	80
32	6,5	**4100003200321**	**4102003200321**	Bundle	40
40	7,8	**4100004000421**	**4102004000421**	Bundle	40
50	9,4	**4100005000521**	**4102005000521**	Bundle	20
63	11,6	**4100006300621**	**4102006300621**	Bundle	16

Aquasystem® PP-RCT Faser Fiberglass Reinforced Pipe SDR7.4 - PN25

Dia. (mm)	Thic. (mm)	Code - Green	Packing Type	Pc
20	2.8	**4202002050021**	Bundle	100
25	3.5	**4202002550021**	Bundle	80
32	4.4	**4202003250021**	Bundle	60
40	5.5	**4202004050021**	Bundle	40
50	6.9	**4202005050021**	Bundle	20
63	8.6	**4202006350021**	Bundle	16
75	10.3	**4202007550021**	Bundle	12
90	12.3	**4202009050021**	Bundle	8
110	15.1	**4202011050021**	Bundle	4
125	17.1	**4202012550021**	Bundle	4
160	21.7	**4202016050021**	Bundle	4

Aquasystem® PP-RCT Faser Fiberglass Reinforced Pipe SDR9 - PN22

Dia. (mm)	Thic. (mm)	Code - Green	Packing Type	Pc
20	2.3	**4202002050121**	Bundle	100
25	2.8	**4202002550121**	Bundle	80
32	3.6	**4202003250121**	Bundle	60
40	4.5	**4202004050121**	Bundle	40
50	5.6	**4202005050121**	Bundle	20
63	7.1	**4202006350121**	Bundle	16
75	8.4	**4202007550121**	Bundle	12
90	10.1	**4202009050121**	Bundle	8
110	12.3	**4202011050121**	Bundle	4
125	14.0	**4202012550121**	Bundle	4
160	17.9	**4202016050121**	Bundle	4

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PP-R Elbow 90°

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20	**4300102000721**	**4302102000721**	Cartonbox	400
25	**4300102500821**	**4302102500821**	Cartonbox	250
32	**4300103200921**	**4302103200921**	Cartonbox	125
40	**4300104001021**	**4302104001021**	Cartonbox	75
50	**4300105001121**	**4302105001121**	Cartonbox	40
63	**4300106301221**	**4302106301221**	Cartonbox	20
75	**4300107501321**	**4302107501321**	Cartonbox	16
90	**4300109001421**	**4302109001421**	Cartonbox	8
110	**4300111001521**	**4302111001521**	Cartonbox	3
125	**4300112501622**	**4302112501622**	Cartonbox	2
160	**4300116001421**	**4302116001421**	Cartonbox	2

For butt fusion type, please contact with Product Manager

PP-R Socket

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20	**4300502020021**	**4302502020021**	Cartonbox	500
25	**4300502520121**	**4302502520121**	Cartonbox	350
32	**4300503220221**	**4302503220221**	Cartonbox	200
40	**4300504020321**	**4302504020321**	Cartonbox	125
50	**4300505020421**	**4302505020421**	Cartonbox	70
63	**4300506320521**	**4302506320521**	Cartonbox	45
75	**4300507520621**	**4302507520621**	Cartonbox	30
90	**4300509020721**	**4302509020721**	Cartonbox	20
110	**4300511020821**	**4302511020821**	Cartonbox	10
125	**4300512520922**	**4302512520921**	Cartonbox	7
160	**4300516000121**	**4302516000121**	Cartonbox	4

PP-R Elbow 45°

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20	**4300102000121**	**4302102000121**	Cartonbox	400
15	**4300102500221**	**4302102500221**	Cartonbox	300
32	**4300103200321**	**4302103200321**	Cartonbox	175
40	**4300104000421**	**4302104000421**	Cartonbox	75
50	**4300105000521**	**4302105000521**	Cartonbox	40
63	**4300106300621**	**4302106300621**	Cartonbox	20
75	**4300107501221**	**4302107501221**	Cartonbox	16
90	**4300109001322**	**4302109001322**	Cartonbox	6
110	**4300111001422**	**4302111001422**	Cartonbox	4
125	**4300112501522**	**4302112501522**	Cartonbox	2
160	**4300116001621**	**4302116001621**	Cartonbox	2

For butt fusion type, please contact with Product Manager

Reducer PP-R

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
25-20	**4300402510021**	**4302402510021**	Cartonbox	500
32-20	**4300403210121**	**4302403210121**	Cartonbox	400
32-25	**4300403210221**	**4302403210221**	Cartonbox	350
40-20	**4300404010321**	**4302404010321**	Cartonbox	250
40-25	**4300404010421**	**4302404010421**	Cartonbox	250
40-32	**4300404010521**	**4302404010521**	Cartonbox	175
50-20	**4300405010621**	**4302405010621**	Cartonbox	150
50-25	**4300405010721**	**4302405010721**	Cartonbox	150
50-32	**4300405010821**	**4302405010821**	Cartonbox	150
50-40	**4300405010921**	**4302405010921**	Cartonbox	100
63-25	**4300406311021**	**4302406311021**	Cartonbox	75
63-32	**4300406311121**	**4302406311121**	Cartonbox	75
63-40	**4300406311221**	**4302406311221**	Cartonbox	75
63-50	**4300406311321**	**4302406311321**	Cartonbox	50
75-50	**4300407511421**	**4302407511421**	Cartonbox	40
75-63	**4300407511521**	**4302407511521**	Cartonbox	40
90-50	**4300409011521**	**4302409011521**	Cartonbox	20
90-63	**4300409011621**	**4302409011621**	Cartonbox	20
90-75	**4300409011721**	**4302409011721**	Cartonbox	16
110-63	**4300411011721**	**4302411011721**	Cartonbox	16
110-75	**4300411011821**	**4302411011821**	Cartonbox	16
110-90	**4300411011921**	**4302411011921**	Cartonbox	16
125-75	**4300412512022**	**4302412512022**	Cartonbox	12
125-90	**4300412512122**	**4302412512122**	Cartonbox	12
125-110	**4300412512222**	**4302412512222**	Cartonbox	5
160-110	**4300416011921**	**4302416011921**	Cartonbox	1

PP-R Male to Female Elbow 90°

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20	**4300102005021**	**4302102005021**	Cartonbox	350
25	**4300102505121**	**4302102505121**	Cartonbox	200

PP-R Reducing Elbow

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-25	**4300402011021**	**4302402011021**	Cartonbox	250
25-32	**4300402511121**	**4302402511121**	Cartonbox	150

PP-R Aquasystem

PP-R Tee

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20	**4300902008021**	**4302902008021**	Cartonbox	250
25	**4300902508121**	**4302902508121**	Cartonbox	150
32	**4300903208221**	**4302903208221**	Cartonbox	100
40	**4300904008321**	**4302904008321**	Cartonbox	50
50	**4300905008421**	**4302905008421**	Cartonbox	30
63	**4300906308521**	**4302906308521**	Cartonbox	20
75	**4300907508621**	**4302907508621**	Cartonbox	10
90	**4300909008721**	**4302909008721**	Cartonbox	6
110	**4300911008821**	**4302911008821**	Cartonbox	3
125	**4300912508922**	**4302912508922**	Cartonbox	2
160	**4300916009021**	**4302916009021**	Cartonbox	1

For butt fusion type, please contact with Product Manager

PP-R End Cap

Dia. [mm]	Code	Packing Type	Pc
20	**4300902006021**	Cartonbox	1000
25	**4300902506121**	Cartonbox	600
32	**4300903206221**	Cartonbox	300
40	**4300904006321**	Cartonbox	175
50	**4300905006421**	Cartonbox	100
63	**4300906306521**	Cartonbox	50
75	**4300907506621**	Cartonbox	25
90	**4300909006821**	Cartonbox	18
110	**4300911006721**	Cartonbox	9

PP-R Blind Cap

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20	**4300902014021**	**4302902014021**	Cartonbox	700
25	**4300902514121**	**4302902514121**	Cartonbox	500

PP-R Reducing Tee

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
25-20-20	**4300902520021**	**4302902520021**	Cartonbox	200
25-20-25	**4300902520121**	**4302902520121**	Cartonbox	175
32-20-20	**4300903220221**	**4302903220221**	Cartonbox	125
32-20-25	**4300903220321**	**4302903220321**	Cartonbox	125
32-20-32	**4300903220421**	**4302903220421**	Cartonbox	100
32-25-20	**4300903220521**	**4302903220521**	Cartonbox	125
32-25-32	**4300903220621**	**4302903220621**	Cartonbox	100
40-20-40	**4300904020721**	**4302904020721**	Cartonbox	50
40-25-40	**4300904020821**	**4302904020821**	Cartonbox	50
40-32-40	**4300904020921**	**4302904020921**	Cartonbox	50
50-20-50	**4300905021021**	**4302905021021**	Cartonbox	40
50-25-50	**4300905021221**	**4302905021221**	Cartonbox	30
50-32-50	**4300905021321**	**4302905021321**	Cartonbox	30
50-40-50	**4300905021421**	**4302905021421**	Cartonbox	30
63-20-63	**4300906321321**	**4302906321321**	Cartonbox	24
63-25-63	**4300906321421**	**4302906321421**	Cartonbox	24
63-32-63	**4300906321521**	**4302906321521**	Cartonbox	24
63-40-63	**4300906321621**	**4302906321621**	Cartonbox	16
63-50-63	**4300906321721**	**4302906321721**	Cartonbox	16
75-63-75	**4300907521722**	**4302907521722**	Cartonbox	10
75-32-75	**4300907521822**	**4302907521822**	Cartonbox	10
75-40-75	**4300907521922**	**4302907521922**	Cartonbox	10
90-63-90	**4300909021622**	**4302909021622**	Cartonbox	4
90-75-90	**4300909021722**	**4302909021722**	Cartonbox	6
110-63-110	**4300911021522**	**4302911021522**	Cartonbox	2
110-75-110	**4300911021622**	**4302911021622**	Cartonbox	2

PP-R Crossover w Socket Short

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20	**4300902000321**	**4302902000321**	Cartonbox	200
25	**4300902500321**	**4302902500321**	Cartonbox	125

PP-R Crossover w Socket

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20	**4300902000121**	**4302902000121**	Cartonbox	120
25	**4300902500221**	**4302902500221**	Cartonbox	80
32	**4300903200321**	**4302903200321**	Cartonbox	30

PP-R Cross

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20	**4300902060022**	**4302902060022**	Cartonbox	200
25	**4300902560122**	**4302902560122**	Cartonbox	150
32	**4300903260222**	**4302903260222**	Cartonbox	75
40	**4300904060322**	**4302904060322**	Cartonbox	40

PP-R Aquasystem

PP-R Reducing Cross

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
25-20	4300902560222	-	Cartonbox	150
32-25	4300903260322	4302903260322	Cartonbox	75
40-32	4300904060422	4302904060422	Cartonbox	40

PP-R Omega

Dia. [mm]	Code	Packing Type	Pc
20	4300902007022	Cartonbox	15
25	4300902507122	Cartonbox	10
32	4300903207222	Cartonbox	7
40	4300904007322	Cartonbox	5

PP-R Saddle w Spigot Female - (G-Type)

Dia. (mm)	Code - Green	Packing Type	Pc
40 - 20	4302904090022	Cartonbox	50
40 - 25	4302904090122	Cartonbox	50
50 - 20	4302905090022	Cartonbox	50
50 - 25	4302905090122	Cartonbox	50
63 - 20	4302906390022	Cartonbox	50
63 - 25	4302906390122	Cartonbox	50
63 - 32	4302906390222	Cartonbox	25
75 - 20	4302907590022	Cartonbox	50
75 - 25	4302907590122	Cartonbox	50
75 - 32	4302907590222	Cartonbox	25
75 - 40	4302907590322	Cartonbox	25
90 - 20	4302909090022	Cartonbox	50
90 - 25	4302909090122	Cartonbox	50
90 - 32	4302909090222	Cartonbox	25
90 - 40	4302909090322	Cartonbox	25
110 - 20	4302911090022	Cartonbox	50
110 - 25	4302911090122	Cartonbox	50
110 - 32	4302911090222	Cartonbox	24
110 - 40	4302911090322	Cartonbox	25
125 - 20	4302912590022	Cartonbox	50
125 - 25	4302912590122	Cartonbox	50
125 - 32	4302912590222	Cartonbox	25
125 - 40	4302912590322	Cartonbox	25
110 - 50	4302911090422	Cartonbox	24
125 - 63	4302912590422	Cartonbox	18

PP-R Pipe Clamp Single

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20	4300902025021	4302902025021	Cartonbox	1000
25	4300902525121	4302902525121	Cartonbox	700
32	4300903225221	4302903225221	Cartonbox	500
40	4300904025322	4302904025322	Cartonbox	1000
50	4300905025422	4302905025422	Cartonbox	100
63	4300906331622	4302906331622	Cartonbox	100
75	4300907532022	4302907532022	Cartonbox	200
90	4300909032022	4302909032022	Cartonbox	100
110	4300911009022	4302911009022	Cartonbox	100

Pipe Double Clamp

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20	4300902025521	4302902025521	Cartonbox	400
25	4300902525621	4302902525621	Cartonbox	250
32	4300903225722	4302903225722	Cartonbox	200

Flange Adapter

Dia. (mm)	Code - Green	Packing Type	Pc
25	4302902533022	Cartonbox	50
32	4302903233022	Cartonbox	50
40	4302904033022	Cartonbox	50
50	4302905033022	Cartonbox	20
63	4302906333022	Cartonbox	10
75	4302907533022	Cartonbox	4
90	4302909033022	Cartonbox	4
110	4302911033022	Cartonbox	3
125	4302912533022	Cartonbox	1
160	4302916033022	Cartonbox	1

PP-R Male Coupler (Round) - (G-Type)

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-1/2"	4300702032021	4302702032021	Cartonbox	250
20-3/4"	4300702032121	4302702032121	Cartonbox	200
25-1/2"	4300702532221	4302702532221	Cartonbox	200
25-3/4"	4300702532321	4302702532321	Cartonbox	200
32-3/4"	4300703227321	4302703227321	Cartonbox	100
32-1"	4300703232421	4302703232421	Cartonbox	100

PP-R Aquasystem

PP-R Male Coupler (Round) - (BSPT-R)

Dia. (mm)	Code - Green	Packing Type	Pc
20-1/2"	**4302702040221**	Cartonbox	250
20-3/4"	**4302702040321**	Cartonbox	200
25-1/2"	**4302702540221**	Cartonbox	200
25-3/4"	**4302702540321**	Cartonbox	200
32-3/4"	**4302703240121**	Cartonbox	100
32-1"	**4302703240321**	Cartonbox	100

PP-R Male Coupler (Hexagonal) - (BSPT-R)

Dia. (mm)	Code - Green	Packing Type	Pc
32-1"	**4302703230321**	Cartonbox	80
40-1.1/4"	**4302704040121**	Cartonbox	50
50-1.1/2"	**4302705040121**	Cartonbox	40
63-2"	**4302706340121**	Cartonbox	20
75-2.1/2"	**4302707527621**	Cartonbox	16
90-3"	**4302709029621**	Cartonbox	10
110-4"	**4302711027821**	Cartonbox	4

PP-R Female Coupler (Round) - (G-Type)

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-1/2"	**4300702030021**	**4302702030021**	Cartonbox	325
20-3/4"	**4300702030121**	**4302702030121**	Cartonbox	250
25-1/2"	**4300702530221**	**4302702530221**	Cartonbox	225
25-3/4"	**4300702530321**	**4302702530321**	Cartonbox	225
32-1"	**4300703230421**	**4302703230421**	Cartonbox	125
32-3/4"	**4300703225321**	**4302703225321**	Cartonbox	100

PP-R Female Coupler (Hexagonal) (G-Type)

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
32-1"	**4300703225021**	**4302703225021**	Cartonbox	80
40-1.1/4"	**4300704025121**	**4302704025121**	Cartonbox	50
50-1.1/2"	**4300705025221**	**4302705025221**	Cartonbox	40
63-2"	**4300706325321**	**4302706325321**	Cartonbox	20
75-2.1/2"	**4300707525421**	**4302707525421**	Cartonbox	16
90-3"	**4300709025621**	**4302709025621**	Cartonbox	10
110-4"	**4300711025521**	**4302711025521**	Cartonbox	6

PP-R Female Coupler (Round) - (BSPT-Rp)

Dia. (mm)	Code - Green	Packing Type	Pc
20-1/2"	**4302702040021**	Cartonbox	325
20-3/4"	**4302702040121**	Cartonbox	250
25-1/2"	**4302702540021**	Cartonbox	225
25-3/4"	**4302702540121**	Cartonbox	225
32-3/4"	**4302703240021**	Cartonbox	100
32-1"	**4302703240221**	Cartonbox	125

PP-R Female Coupler (Hexagonal) - (BSPT-Rp)

Dia. (mm)	Code - Green	Packing Type	Pc
32-1"	**4302703230621**	Cartonbox	80
40-1.1/4"	**4302704040021**	Cartonbox	50
50-1.1/2"	**4302705040021**	Cartonbox	40
63-2"	**4302706340021**	Cartonbox	20
75-2.1/2"	**4302707525621**	Cartonbox	16
90-3"	**4302709028621**	Cartonbox	10
110-4"	**4302711025721**	Cartonbox	4

PP-R Male Coupler (Hexagonal) - (G-Type)

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
32-1"	**4300703227021**	**4302703227021**	Cartonbox	80
40-1.1/4"	**4300704027121**	**4302704027121**	Cartonbox	50
50-1.1/2"	**4300705027221**	**4302705027221**	Cartonbox	40
63-2"	**4300706327321**	**4302706327321**	Cartonbox	20
75-2.1/2"	**4300707527421**	**4302707527421**	Cartonbox	16
90-3"	**4300709027521**	**4302709027521**	Cartonbox	10
110-4"	**4300711027621**	**4302711027621**	Cartonbox	4

PP-R Male Elbow (G-Type)

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-1/2"	**4300102007021**	**4302102007021**	Cartonbox	200
20-3/4"	**4300102007121**	**4302102007121**	Cartonbox	200
25-1/2"	**4300102507221**	**4302102507221**	Cartonbox	180
25-3/4"	**4300102507321**	**4302102507321**	Cartonbox	100
32-3/4"	**4300103207421**	**4302103207421**	Cartonbox	75
32-1"	**4300103207521**	**4302103207521**	Cartonbox	80

PP-R Aquasystem

PP-R Male Elbow (BSPT-R)

Dia. (mm)	Code - Green	Packing Type	Pc
20-1/2"	**4302102030221**	Cartonbox	200
20-3/4"	**4302102030321**	Cartonbox	180
25-1/2"	**4302102530221**	Cartonbox	180
25-3/4"	**4302102530321**	Cartonbox	100
32-3/4"	**4302103230221**	Cartonbox	75
32-1"	**4302103230321**	Cartonbox	80

PP-R Female Elbow (G-Type)

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-1/2"	**4300102006021**	**4302102006021**	Cartonbox	200
20-3/4"	**4300102006121**	**4302102006121**	Cartonbox	200
25-1/2"	**4300102506221**	**4302102506221**	Cartonbox	175
25-3/4"	**4300102506321**	**4302102506321**	Cartonbox	140
32-3/4"	**4300103206421**	**4302103206421**	Cartonbox	75
32-1"	**4300103206521**	**4302103206521**	Cartonbox	75

PP-R Female Elbow (BSPT-Rp)

Dia. (mm)	Code - Green	Packing Type	Pc
20-1/2"	**4302102030021**	Cartonbox	200
20-3/4"	**4302102030121**	Cartonbox	200
25-1/2"	**4302102530021**	Cartonbox	175
25-3/4"	**4302102530121**	Cartonbox	140
32-3/4"	**4302103230021**	Cartonbox	75
32-1"	**4302103230121**	Cartonbox	75

PP-R Male Tee - (G-Type)

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-1/2"	**4300902012021**	**4302902004021**	Cartonbox	150
20-1/2"	**-**	**4302902030221**	Cartonbox	-

PP-R Female Tee - (G-Type)

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-1/2"	**4300902010021**	**4302902010021**	Cartonbox	160
20-3/4"	**4300902010121**	**4302902010121**	Cartonbox	160
25-1/2"	**4300902510221**	**4302902510221**	Cartonbox	120
25-3/4"	**4300902510321**	**4302902510321**	Cartonbox	120
32-3/4"	**4300903210421**	**4302903210421**	Cartonbox	60
32-1"	**4300903210521**	**4302903210521**	Cartonbox	70

PP-R Female Tee (BSPT-Rp)

Dia. (mm)	Code - Green	Packing Type	Pc
20-1/2"	**4302902030021**	Cartonbox	160
20-3/4"	**4302902030121**	Cartonbox	160
25-1/2"	**4302902530021**	Cartonbox	120
25-3/4"	**4302902530121**	Cartonbox	120
32-3/4"	**4302903230021**	Cartonbox	60
32-1"	**4302903230121**	Cartonbox	70

PP-R Union Socket Female (G-Type)

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-1/2"	**4300902003021**	**4302702003021**	Cartonbox	300
20-3/4"	**4300902003121**	**4302902003121**	Cartonbox	150
25-3/4"	**4300902503321**	**4302702503121**	Cartonbox	150
32-1"	**4300903203521**	**4302703203521**	Cartonbox	150
40-1.1/4"	**4300904005021**	**4302904005021**	Cartonbox	50
50-1.1/2"	**4300905005121**	**4302905005121**	Cartonbox	30
63-2"	**4300906305221**	**4302906305221**	Cartonbox	20

PP-R Union Socket Female (BSPT-Rp)

Dia. (mm)	Code - Green	Packing Type	Pc
20-1/2"	**4302702030421**	Cartonbox	300
20-3/4"	**4302902030321**	Cartonbox	150
25-3/4"	**4302702530021**	Cartonbox	150
32-1"	**4302703230021**	Cartonbox	150
40-1.1/4"	**4302904030021**	Cartonbox	50
50-1.1/2"	**4302905030021**	Cartonbox	30
63-2"	**4302906330021**	Cartonbox	20

PP-R Union Male Female (G-Type)

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-1/2"	**4300902004021**	**4302702004021**	Cartonbox	300
20-3/4"	**4300902004121**	**4302902004121**	Cartonbox	150
25-3/4"	**4300902504321**	**4302702504321**	Cartonbox	150
32-1"	**4300903204521**	**4302703204521**	Cartonbox	125
40-1.1/4"	**4300904005321**	**4302904005321**	Cartonbox	50
50-1.1/2"	**4300905005421**	**4302905005421**	Cartonbox	30
63-2"	**4300906305521**	**4302906305521**	Cartonbox	20

PP-R Aquasystem

PP-R Union Socket Male (BSPT-R)

Dia. (mm)	Code - Green	Packing Type	Pc
20-1/2"	**4302702030521**	Cartonbox	300
20-3/4"	**4302902030421**	Cartonbox	150
25-3/4"	**4302702530121**	Cartonbox	150
32-1"	**4302703230121**	Cartonbox	125
40-1.1/4"	**4302904030121**	Cartonbox	50
50-1.1/2"	**4302904030121**	Cartonbox	30
63-2"	**4302904030121**	Cartonbox	20

PP-R Backplate Elbow Male (G-Type)

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-1/2"	**4300902002121**	**4302902002121**	Cartonbox	150

PP-R Backplate Elbow Male (G-Type)

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
25-3/4"	**4300102509221**	**4302102509221**	Cartonbox	100
25-3/4"	*	**4302102530621**	Cartonbox	100

Note: Please ask for Product Manager.

PP-R Backplate Elbow Female (G-Type)

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-1/2"	**4300902002021**	**4302902002021**	Cartonbox	150
25-1/2"	**4300102508221**	**4302102530421**	Cartonbox	-
20-1/2"	-	**4302902030721**	Cartonbox	-
25-3/4"	-	**4302102530621**	Cartonbox	-
20-1/2"	-	**4302902030621**	Cartonbox	-

PP-R Backplate Elbow Female (G-Type)

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-3/4"	**4300102008121**	**4302102008121**	Cartonbox	100
25-1/2"	**4300102508221**	**4302102508221**	Cartonbox	100
25-3/4"	**4300102508321**	**4302102508321**	Cartonbox	100

PP-R Backplate Elbow Double Female (G-Type)

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
25-1/2"	**4300902502121**	**4302902502121**	Cartonbox	80

Transition w Loose Nut

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-1/2"	**4300902013021**	**4302902013021**	Cartonbox	300
20-3/4"	**4300902513221**	**4302902513221**	Cartonbox	200
25-1"	**4300902513321**	**4302902513321**	Cartonbox	150

PP-R Faucet Connection- Bidet (G-Type)

Dia. (mm)	Code	Packing Type	Pc
20-1/2"	**4300902012121**	Parcel	15

PP-R Distribution Manifold

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-1/2"	**4300902002321**	**4302902002321**	Cartonbox	15

PP-R Backplate Elbow Female 2 Pins (G-Type)

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
25-1/2"	**4300902503121**	**4302902503121**	Cartonbox	50
20-1/2"	**4300902011021**	**4302902011021**	Cartonbox	50

PP-R Double Male Faucet Connection (G-Type)

Dia. (mm)	Code	Packing Type	Pc
25-1/2"	**4300902502021**	Parcel	40

PP-R Aquasystem

PP-R Saddle w Spigot Female

Dia. (mm)	Code - Green	Packing Type	Pc
40-1/2''	**4302904091122**	Cartonbox	50
50-1/2''	**4302905091122**	Cartonbox	50
50-3/4''	**4302905091022**	Cartonbox	50
63-1/2''	**4302906391122**	Cartonbox	50
63-3/4''	**4302906391022**	Cartonbox	50
75-1/2''	**4302907591122**	Cartonbox	50
75-3/4''	**4302907591022**	Cartonbox	50
75-1''	**4302907591222**	Cartonbox	25
90-1/2''	**4302909091122**	Cartonbox	50
90-3/4''	**4302909091022**	Cartonbox	50
90-1''	**4302909091222**	Cartonbox	25
110-1/2''	**4302911091122**	Cartonbox	50
110-3/4''	**4302911091022**	Cartonbox	50
110-1''	**4302911091222**	Cartonbox	25
125-1/2''	**4302912591122**	Cartonbox	50
125-3/4''	**4302912591022**	Cartonbox	50
125-1''	**4302912591222**	Cartonbox	25

PP-R Electro Fusion Coupler

Dia. (mm)	Code - Green	Packing Type	Pc
20	**4302902091522**	Cartonbox	150
25	**4302902591522**	Cartonbox	130
32	**4302903291522**	Cartonbox	80
40	**4302904091522**	Cartonbox	50
50	**4302905091522**	Cartonbox	30
63	**4302906391522**	Cartonbox	20
75	**4302907591522**	Cartonbox	14
90	**4302909091522**	Cartonbox	10
110	**4302911091522**	Cartonbox	3
125	**4302912591522**	Cartonbox	3
160	**4302916091522**	Cartonbox	2

PP-R Union – PN10

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20	**4300902028021**	**4302902028021**	Cartonbox	200
25	**4300902528121**	**4302902528121**	Cartonbox	125
32	**4300903228221**	**4302903228221**	Cartonbox	80
40	**4300904028321**	**4302904028321**	Cartonbox	50
50	**4300905028421**	**4302905028421**	Cartonbox	30
63	**4300906328521**	**4302906328521**	Cartonbox	20
75	**4300907528621**	**4302907528621**	Cartonbox	16
90	**4300909032521**	**4302909032521**	Cartonbox	8

Note: Only for cold water applications.

PP-R Check Valve – PN10

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20	**4300902031022**	**4302902031022**	Cartonbox	80
25	**4300902531122**	**4302902531122**	Cartonbox	50
32	**4300903231222**	**4302903231222**	Cartonbox	40
40	**4300904031322**	**4302904031322**	Cartonbox	24
50	**4300905031422**	**4302905031422**	Cartonbox	15
63	**4300906331522**	**4302906331522**	Cartonbox	8
75	**4300907531622**	**4302907531622**	Cartonbox	4
90	**4300909031722**	**4302909031722**	Cartonbox	2

Note: Only for cold water applications.

Union Ball Valve – PN10

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20	**4300802042522**	**4302802042522**	Cartonbox	70
25	**4300802542622**	**4302802542622**	Cartonbox	50
32	**4300803242722**	**4302803242722**	Cartonbox	30
40	**4300804043122**	**4302804043122**	Cartonbox	15
50	**4300805043222**	**4302805043222**	Cartonbox	12
63	**4300806343322**	**4302806343322**	Cartonbox	8

Note: Only for cold water applications.

Ball Valve New (Welt-In) - PN20

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20	**4300802042822**	**4302802042822**	Cartonbox	100
25	**4300802542922**	**4302802542922**	Cartonbox	70
32	**4300803243022**	**4302803243022**	Cartonbox	45
40	**4300804043622**	**4302804043622**	Cartonbox	25
50	**4300805043722**	**4302805043722**	Cartonbox	20
63	**4300806343822**	**4302806343822**	Cartonbox	15
75	**4300807543322**	**4302807543322**	Cartonbox	8

PP-R Gate Valve

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-1/2"	**4300802035021**	**4300802035021**	Cartonbox	75
25-3/4"	**4300802535121**	**4300802535121**	Cartonbox	60
32-1"	**4300803235221**	**4300803235221**	Cartonbox	40

PP-R Aquasystem

PP-R Chromium Valve Short

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-1/2"	**4300802040021**	**4302802040021**	Cartonbox	50
25-3/4"	**4300802540221**	**4302802540221**	Cartonbox	40
32-1"	**4300803240421**	**4302803240421**	Cartonbox	40

PP-R Chromium Valve Long

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-1/2"	**4300802040121**	**4302802040121**	Cartonbox	50
25-3/4"	**4300802540321**	**4302802540321**	Cartonbox	40
32-1"	**4300803240521**	**4302803240521**	Cartonbox	40

PP-R Lux Chromium Valve Long

Dia. (mm)	Code - White	Code - Green	Packing Type	Pc
20-1/2"	**4300802060721**	**4302802060721**	Cartonbox	50
25-3/4"	**4300802560821**	**4302802560821**	Cartonbox	40
32-1"	**4300803240621**	**4302803240621**	Cartonbox	40

PP-R Pipe Sharpener Metal

Dia. (mm)	Code - White	Packing Type	Pc
20-25	**4301902040082**	Cartonbox	100
32-40	**4301903240182**	Cartonbox	50
50-63	**4301905040282**	Cartonbox	15
75-90	**4301907540382**	Cartonbox	8

PP-R Boiler Set

Type	Code - White	Packing Type	Pc
Round (Gate Straight)	**4300900050022**	Cartonbox	8
Corner (Gate Angled)	**4300900050122**	Cartonbox	8

PP-R Pipe Sharpener Plastic

Dia. (mm)	Code - White	Packing Type	Pc
20-25	**4300902041022**	Cartonbox	70
32-40	**4300903241122**	Cartonbox	50

Welding Machine

Dia. (mm)	Code - White	Packing Type	Pc
d20-d125	**4301900045082**	Metalbox	1
d20-d100	**4301900044382**	Cartonbox	1

Welding Machine

Dia. (mm)	Code - White	Packing Type	Pc
75-100	**4301900044382**	Cartonbox	1

Welding Machine

Dia. (mm)	Code - White	Packing Type	Pc
63-160	**4301900045982**	Cartonbox	1

PP-R Pipe Cutter

Dia. (mm)	Code - White	Packing Type	Pc
-	**4301900043082**	Parcel	16

PP-R Pipe Welding Mould

Dia. (mm)	Code - White	Packing Type	Pc
20	**4301902045082**	Cartonbox	300
25	**4301902545182**	Cartonbox	15
32	**4301903245282**	Cartonbox	200
40	**4301904045382**	Cartonbox	40
50	**4301905045482**	Cartonbox	70
63	**4301906345582**	Cartonbox	45
75	**4301907545682**	Cartonbox	30
90	**4301909045782**	Cartonbox	5
110	**4301911045882**	Cartonbox	5
160	**4301916046082**	Cartonbox	-

Technical Tables

- Temperature, Pressure and Service Life Tables

Temperature, Pressure and Service Life Tables

According to EN 15874 - 75 Standard:

Application Class (Class) 1: Hot Water Distribution 60°C	
Operating Temperature	49 years at 60°C
Maximum Operating Temperature	1 year at 80°C
Degradation Temperature	100 hours at 95°C
Maximum Operating Pressure	10 bars
Application Class (Class) 2: Hot Water Distribution 70°C	
Operating Temperature	49 years at 70°C
Maximum Operating Temperature	1 year at 80°C
Degradation Temperature	100 hours at 95°C
Maximum Operating Pressure	10 bars
Application Class (Class) 4: Underfloor Heating and Radiators at Low Temperatures	
Operating Temperature	20°C for 2,5 years
	40°C for the subsequent 20 years
	60°C for the subsequent 20 years
Maximum Operating Temperature	2,5 years at 70°C
Degradation Temperature	100 hours at 100°C
Maximum Operating Pressure	10 bars
Application Class (Class) 5: Radiators at High Temperatures	
Operating Temperature	20°C for 14 years,
	60°C for the subsequent 25 years
	80°C for the subsequent 10 years
Maximum Operating Temperature	1 year at 90°C
Degradation Temperature	100 hours at 100°C
Maximum Operating Pressure	10 bars

Standard PP-R Pipes:
SDR 11/S5.0 (PN10) class 1/6 bar class 2/4 bar
SDR 7.4/S3.2 (PN16) class 1/8 bar class 2/6 bar class 4/10 bar class 5/6 bar
SDR 6/S2.5 (PN20) class 1/10 bar class 2/8 bar class 4/10 bar class 5/6 bar

Glass Fiber Reinforced PP-R Pipes:
SDR 11/S5.0 (PN10) class 1/6 bar class 2/4 bar
SDR 7.4/S3.2 (PN20) class 1/8 bar class 2/6 bar class 4/10 bar class 5/6 bar
SDR 6/S2.5 (PN25) class 1/10 bar class 2/8 bar class 4/10 bar class 5/6 bar

Aluplus Stable Pipes:
SDR6/S2.5 (PN20) class 1/6 bar

Stable Pipes:
SDR6/S2.5 (PN25) class 1/10 bar class 2/8 bar class 4/10 bar class 5/6 bar

PE-RT, PE-XB Pipes:
Class 1-2-4/10 bar class 5/8bar

Glass Reinfoced PP-RCT Pipes:
SDR7,4 class 1/10 bar class 2/10 bar class 4/10 bar class 5/8 bar
SDR9 class 1/8 bar class 2/8 bar class 4/8 bar class 5/6 bar

According to DIN 8077 Standard:

Maximum Operating Pressures according to DIN 8077 with safety factor of 1,5

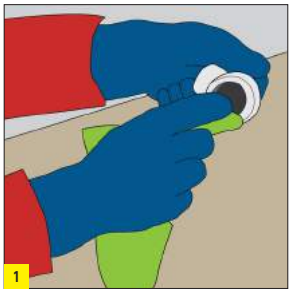
Operating Temperature(°C)	Service Life (year)	PP-R			PP-RCT	
		SDR 11 (S5)	SDR 7.4 (S3.2)	SDR 6 (S2.5)	SDR9 (S4)	SDR7.4 (S3.2)
10 °C*	1	17,6	27,8	35	24	30,2
	5	16,7	26,3	33,2	23,2	29,3
	10	16,1	25,6	32,1	22,9	28,9
	25	15,6	24,8	31,1	22,5	28,4
	50	15,2	24,1	30,3	22,2	28
20 °C*	1	15	23,8	30	20,9	26,3
	5	14,1	22,3	28,2	20,2	25,4
	10	13,7	21,8	27,3	19,9	25,1
	25	13,3	21	26,5	19,6	24,6
	50	12,9	20,4	25,8	19,3	24,3
30 °C	1	12,8	20,2	25,5	18,1	22,7
	5	12	18,9	23,9	17,4	22
	10	11,6	18,4	23,1	17,2	21,7
	25	11,2	17,8	22,3	16,9	21,2
	50	10,9	17,3	21,8	16,6	20,9
40 °C	1	10,8	17,2	21,5	15,5	19,6
	5	10,1	16	20,2	15	18,9
	10	9,8	15,6	19,7	14,7	18,6
	25	9,4	15	18,8	14,4	18,2
	50	9,2	14,5	18,3	14,2	17,9
50 °C	1	9,2	14,5	18,3	13,3	16,7
	5	8,5	13,5	17	12,8	16,1
	10	8,3	13,1	16,4	12,6	15,8
	25	8	12,6	15,9	12,3	15,5
	50	7,8	12,3	15,4	12,1	15,2
60 °C	1	7,8	12,3	15,4	11,2	14,2
	5	7,2	11,3	14,3	10,8	13,6
	10	6,9	11	13,8	10,6	13,4
	25	6,7	10,6	13,3	10,4	13,1
	50	6,4	10,3	12,8	10,2	12,8
70 °C	1	6,5	10,3	13	9,4	11,9
	5	6	9,5	11,9	9,1	11,4
	10	5,8	9,3	11,7	8,9	11,2
	25	5,1	8	10,1	8,7	10,9
	50	4,3	6,8	8,5	8,5	10,7
80 °C	1	5,4	8,6	10,9	7,9	9,9
	5	4,8	7,6	9,6	7,5	9,5
	10	4	6,4	8	7,4	9,3
	25	3,2	5,2	6,3	7,2	9,1
95 °C	1	3,8	6,1	7,7	5,9	7,4
	5	2,5	4,1	5,1	5,6	7,1
	10	2,2	3,4	4,3	5,5	6,9

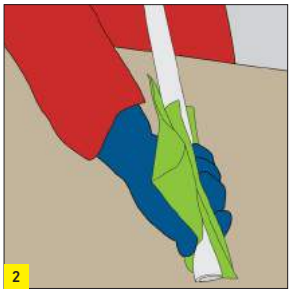
* Cold water applications.

Building Technology (BT) Product Range Installation Instructions

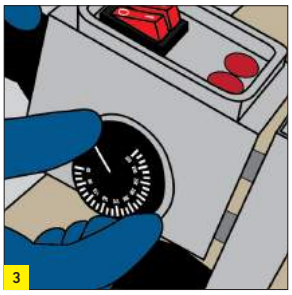
- GF Aquasystem PP-R and PP-RCT Piping Systems

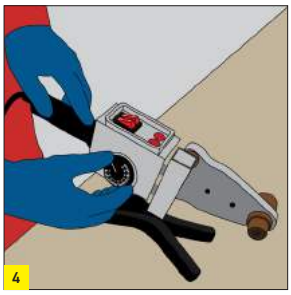
Aquasystem PP-R and PP-RCT Piping Systems



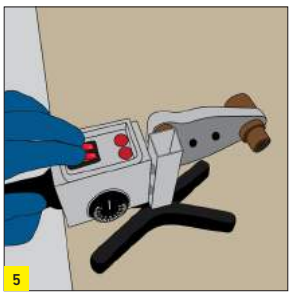


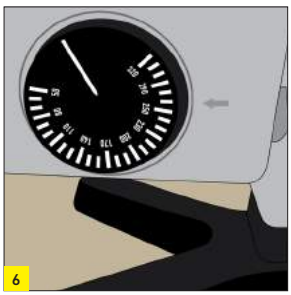
Make sure that pipes, fittings and welding machine are clean.



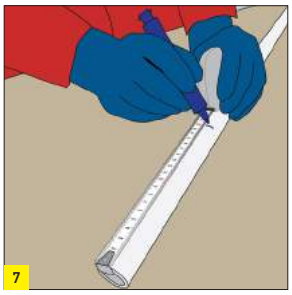


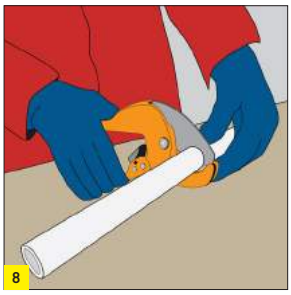
Before operating the socket fusion machine, make sure that the working area is safe. To avoid the rotation and movement of parts, welding plates should be appropriately placed into the welding machine.

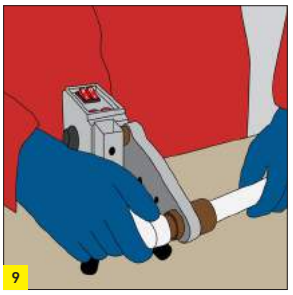




Connect the welding machine to 220 Volts standard socket. Adjust the temperature as 260°C (500 °F). Push the power button. Heating will take 1 to 3 minutes. When the temperature reaches 260°C (500°F), thermostat light will switch off automatically.







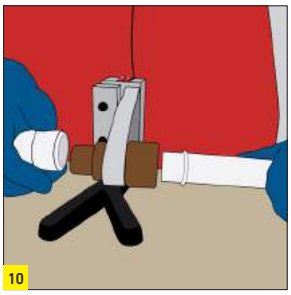
Place the pipes cut in the desired measurements and fittings into the welding plates. If foiled (stabile) pipes are used, first of all, shave the outer layer completely by using a stripper. Make trials to ensure that the blade is accurately adjusted.

Diameter [mm]	Welding Depth [mm]	Heating Time [mm]	Welding Time [s]	Cooling Time [m]
20	14	5	4	2
25	15	7	4	2
32	16,5	8	5	3
40	18	12	6	4
50	20	18	7	4
63	24	24	8	6
75	28	30	8	6
90	29	40	8	8
110	32,5	50	10	8
125	40	70	10	8
160	45	90	12	10

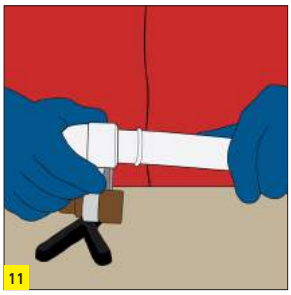
Pipes and fittings should be heated at the same time. Heating times vary depending upon the diameters of pipes. If you do not follow the times indicated in the table, this will cause reduction in the welding quality. If you heat them for too much time, it will cause the pipe to tighten so much and the fitting to expand extremely, resulting in loose connection.

PP-RCT Pipes are fully compatible and weldable with our PP-R fittings:
- Same tooling/equipments
- Same welding parameters
- Same assembling instructions

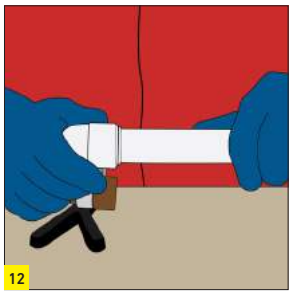
Installation



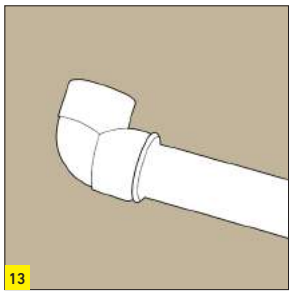
After heating, take out the pipes and fittings from the welding mould carefully.



Push the pipe into the fitting at straight angle without rotating it, and joint it quickly.



After jointing it, wait for the cooling process by following the cooling times indicated.



After cooling, the connection will be ready for use.

• After using it, switch off and disconnect the machine. Wait for it to cool. Never use water to cool the welder because it will damage the metal heated. Always keep the welding plates dry.
• Do not perform welding operation in ambient temperatures below 5°C. As PP-R material is fragile in cold weather conditions, treat the pipes with more attention in those conditions.
• While working with the welding machine, wear appropriate hand and arm protective gloves to avoid the risk of burning. Wearing protection goggles are also recommended. During the operation, always beware of the position of the machine. Make sure that welding plates are tightly fitted and not loose. Always take occupational safety measures.
• Cut the pipes vertically by using the proper cutters. Make sure that the cutters are sharp.
• To guarantee a perfect connection, make sure that the surfaces of the welding plates are in good quality and the surfaces are always clean.

Test Instructions

Upon completion of the pipe installation, the installation should be absolutely tested according to the following testing method. After making the controls, the installation should be switched off.

Testing Method i

1- All valves in the installation are switched off.
2- During the supply of water into the installation, the main valve is switched on, but it should not be switched on too much. To protect the installation against strong pressure impacts, the air of the installation is carefully released at the highest and the farthest point of the line.
3- Fill the installation with water slowly until water comes out at such point.
4- The valves of each area of the installation to be tested are switched on and separately tested.

Starting the Test

Pressure test is carried out in two steps.

Step 1: Testing is conducted for 30 minutes by 1.5 times more of the highest operating pressure prescribed in the entire piping installation within the building. During this period of time, the installation is observed in terms of pressure drop and leakage in the minute 10 and 20. If there is pressure drop but not leakage, then water is re-supplied and restored to the testing pressure.

Step 2: Pressure is applied for 2 hours by 1.5 fold of the highest operating pressure prescribed in the entire piping installation within the building. There should not be any pressure drop at the end of such 2 hours.

The lines not to be used in the testing should be switched off and each area should be separately tested. If, at the end of the testing, the installation will not be used, it should be absolutely discharged. In terms of freezing, no water should be available in the line not to be used.

Thermal Expansions

Linear expansion of pipes depends upon the difference between the operating temperature and installation temperature:

$$\Delta T = T_{\text{Operating Temperature}} - T_{\text{Installation Temperature}}$$

Therefore, thermal expansion values of cold water applications could be neglected. For hot water applications, the expansions should be calculated due to the linear expansion depending upon the temperature of the material, and the clamp distances should be adjusted based on the tables.
It should be taken into account that the critical parameter is thermal expansion coefficient.

• Linear expansion coefficient of Aquasystem PP-R Standard pipes is **0.150 mm/m°K**.
• Linear expansion coefficient of Aquasystem Faser Fiberglass Reinforced and Climafaser Fiberglass Reinforced PP-R pipes is **0.035 mm/m°K**.
• Linear expansion coefficient of Aquasystem Aluminum Foiled (Stable-Aluplus) PP-R pipes is **0.030 mm/m°K**.

Installation

Total linear expansion of PP-R system is calculated according to the following formula:

$\Delta L = L_o \times \alpha \times \Delta T$

ΔL; Linear Expansion (mm)

L_o; Pipe Installation Length (m)

α; Linear coefficient of thermal expansion

ΔT; Temperature Difference Between Operating and Installation Temperature

(°K, °C or °F)

For example, 2 m-long Aquasystem Glass Fiber Reinforced (Faser) PP-R pipe operates at 65°C and installed at 25°C, rectilinear expansion is calculated as follows:

$\Delta L = L_o \times \alpha \times \Delta T$

$\Delta L = 2 \times 0{,}035 \times 40$

$\Delta L = 2{,}8$ mm

Briefly, if a 2 meter long system is made with Aquasystem Glass Fiber Reinforced PP-R product and is exposed to 40°C temperature difference, the system demonstrates 2,8 mm thermal expansion.

The following tables indicate the example expansion calculations with different temperature differences of products with different thermal expansion coefficients.

	Thermal Expansion of Standard PP-R Pipes [mm] α = 0.150 mm/m°K							
	Temperature Differences (°C)							
Pipe Length (m)	**10°C**	**20°C**	**30°C**	**40°C**	**50°C**	**60°C**	**70°C**	**80°C**
1,0	1,5	3,0	4,5	6,0	7,5	9,0	10,5	12,0
2,0	3,0	6,0	9,0	12,0	15,0	18,0	21,0	24,0
3,0	4,5	9,0	13,5	18,0	22,5	27,0	31,5	36,0
4,0	6,0	12,0	18,0	24,0	30,0	36,0	42,0	48,0
5,0	7,5	15,0	22,5	30,0	37,5	45,0	52,5	60,0
6,0	9,0	18,0	27,0	36,0	45,0	54,0	63,0	72,0
7,0	10,5	21,0	31,5	42,0	52,5	63,0	73,5	84,0
8,0	12,0	24,0	36,0	48,0	60,0	72,0	84,0	96,0
9,0	13,5	27,0	40,5	54,0	67,5	81,0	94,5	108,0
10,0	15,0	30,0	45,0	60,0	75,0	90,0	105,0	120,0

	Thermal Expansion of Glass Fiber Reinforced (Faser) PP-R Pipes [mm] α = 0.035 mm/m°K							
	Temperature Differences (°C)							
Pipe Length (m)	**10°C**	**20°C**	**30°C**	**40°C**	**50°C**	**60°C**	**70°C**	**80°C**
1,0	0,4	0,7	1,1	1,4	1,8	2,1	2,5	2,8
2,0	0,7	1,4	2,1	2,8	3,5	4,2	4,9	5,6
3,0	1,1	2,1	3,2	4,2	5,3	6,3	7,4	8,4
4,0	1,4	2,8	4,2	5,6	7,0	8,4	9,8	11,2
5,0	1,8	3,5	5,3	7,0	8,8	10,5	12,3	14,0
6,0	2,1	4,2	6,3	8,4	10,5	12,6	14,7	16,8
7,0	2,5	4,9	7,4	9,8	12,3	14,7	17,2	19,6
8,0	2,8	5,6	8,4	11,2	14,0	16,8	19,6	22,4
9,0	3,2	6,3	9,5	12,6	15,8	18,9	22,1	25,2
10,0	3,5	7,0	10,5	14,0	17,5	21,0	24,5	28,0

	Thermal Expansion of Aluminum Foil PP-R Pipes [mm] α = 0.030 mm/m°K							
	Temperature Differences (°C)							
Pipe Length (m)	**10°C**	**20°C**	**30°C**	**40°C**	**50°C**	**60°C**	**70°C**	**80°C**
1,0	0,3	0,6	0,9	1,2	1,5	1,8	2,1	2,4
2,0	0,6	1,2	1,8	2,4	3,0	3,6	4,2	4,8
3,0	0,9	1,8	2,7	3,6	4,5	5,4	6,3	7,2
4,0	1,2	2,4	3,6	4,8	6,0	7,2	8,4	9,6
5,0	1,5	3,0	4,5	6,0	7,5	9,0	10,5	12,0
6,0	1,8	3,6	5,4	7,2	9,0	10,8	12,6	14,4
7,0	2,1	4,2	6,3	8,4	10,5	12,6	14,7	16,8
8,0	2,4	4,8	7,2	9,6	12,0	14,4	16,8	19,2
9,0	2,7	5,4	8,1	10,8	13,5	16,2	18,9	21,6
10,0	3,0	6,0	9,0	12,0	15,0	18,0	21,0	24,0

Installation

Thermal Elongation Compensation

All piping systems need adequate gap for thermal expansion. The necessary gaps should be created on the system through thermal expansion compensation so that no extra tension is created on the system due to temperature differences and the system is not damaged. In the vertical lines (riser), thermal expansion compensation is not required. However, in the horizontal lines, thermal expansion compensations should be included into the system by using the following calculations and designs.

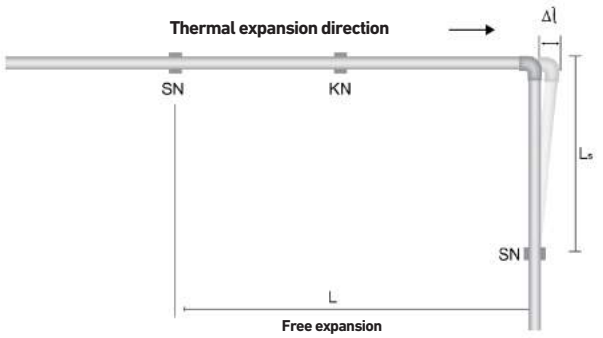
Free Expansion

Fixed Points (FP) blocks the undesired movements of the system. These fixed points are created by using fasteners. Fixed points should be more resistant and stable than sliding points (SP). It is not recommended to use fixed points at bending areas.

Thermal expansion compensation can be calculated according to the following formula by taking the free movements into consideration:

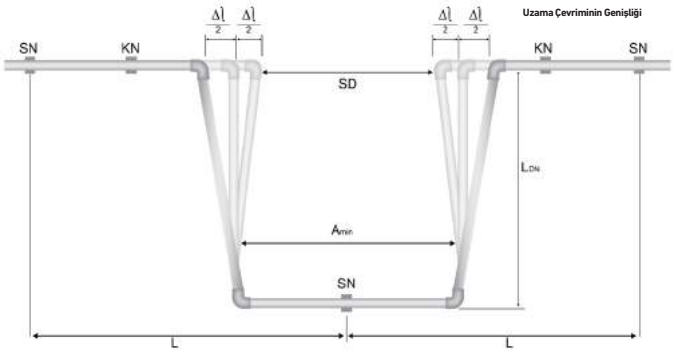
$A_{min} = 2 \times \Delta L + SD$

A_{min}; Minimum thermal expansion compensation width (mm)
SD; Safety gap (150 mm)
ΔL; Total elongation of the system from fixed point (mm)



The adjustments of thermal expansion compensation are generally calculated as uniaxial (along the pipe). To avoid any additional stress in the system, PP-R pipes should freely expand in the axial direction.
Safety gap specified as 150 mm should be increased if there are temperature difference fluctuations in the system.

If the system is biaxial (horizontal and vertical) and longer than 5 m, thermal expansions should be calculated and the following expansion cycles should be used.



$L_{DN} = K \times \sqrt{(d \times \Delta L)}$

SF; Fixed Point
SP; Sliding Point
L_{DN}; Length of free bending part (mm)
d; External diameter of pipe (mm)
L; Length of pipe
ΔL; Total thermal expansion (or contraction) (mm)
L; Pipe Length (m)
K; Material constant (K=30)

Distances Between Clamps in PP-R Installation:

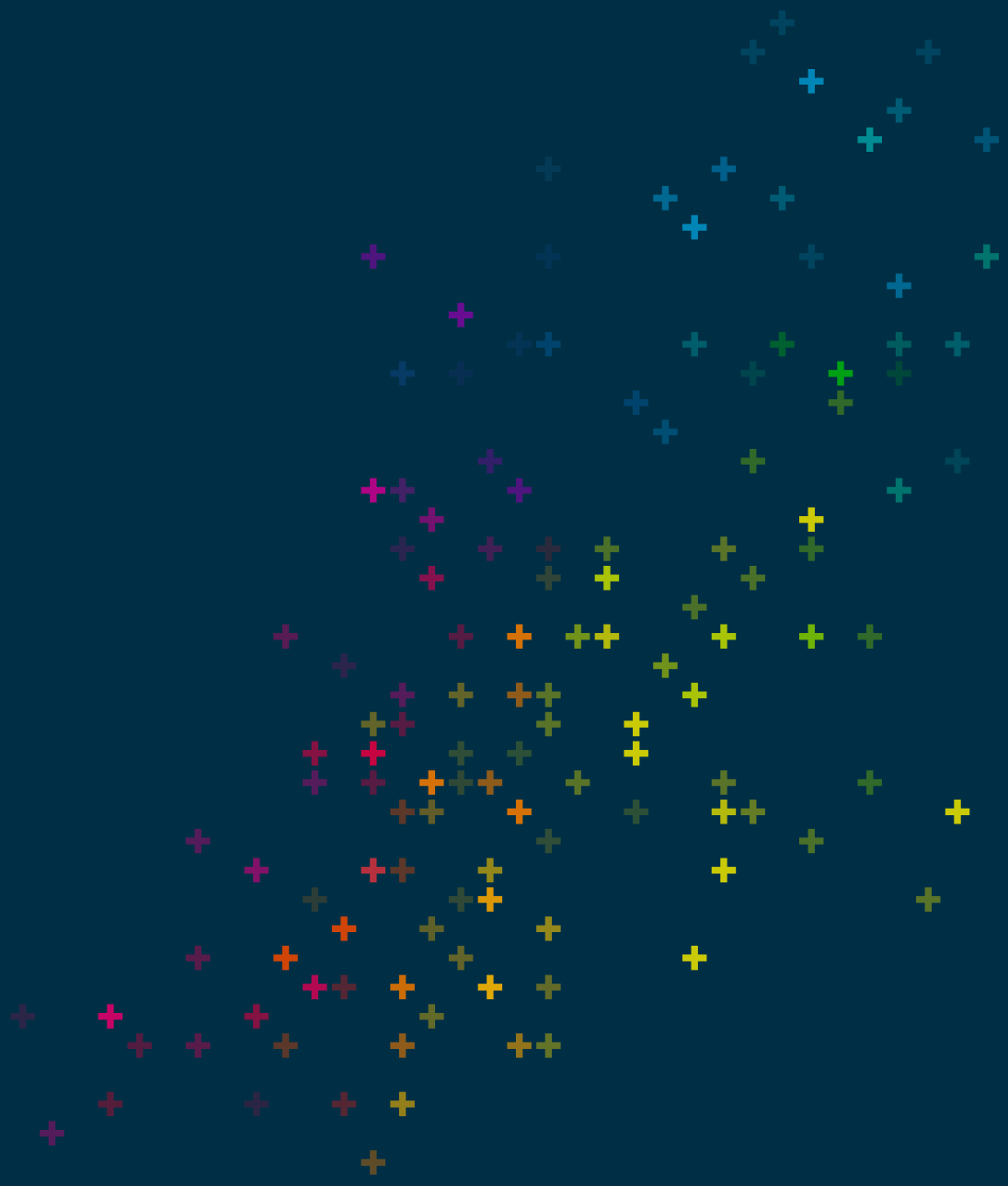
	Temperature Difference	Clamp Distances (cm)										
Standard PP-R Pipes	ΔT (°C)	d20	d25	d32	d40	d50	d63	d75	d90	d110	d125	d160
	0	85	105	125	140	165	190	205	220	250	270	290
	20	60	75	90	100	120	140	150	160	180	200	230
	30	60	75	90	100	120	140	150	160	180	200	230
	40	60	70	80	90	110	130	140	150	170	180	200
	50	60	70	80	90	110	130	140	150	170	180	200
	60	55	65	75	85	100	115	125	140	160	170	180
	70	50	60	75	80	95	105	115	125	140	155	180

Installation

Glass Reinforced PP-R	Temperature Difference	Clamp Distances (cm)										
	ΔT (°C)	d20	d25	d32	d40	d50	d63	d75	d90	d110	d125	d160
	0	115	130	150	165	185	215	240	260	280	300	320
	20	90	100	115	130	145	165	185	200	215	225	250
	30	90	100	115	130	145	165	185	200	210	235	255
	40	80	90	105	120	135	155	175	190	200	215	230
	50	80	90	105	120	135	155	175	190	180	200	210
	60	70	80	100	115	130	145	165	180	175	190	200
	70	65	75	90	105	120	135	155	175	175	190	200

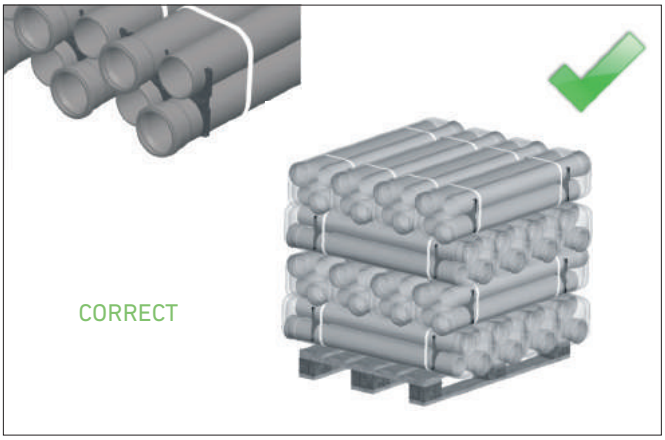
Aluminum Foil Pipes	Temperature Difference	Clamp Distances (cm)										
	ΔT (°C)	d20	d25	d32	d40	d50	d63	d75	d90	d110	d125	d160
	0	120	140	160	180	205	230	245	260	280	300	320
	20	90	105	120	135	155	175	185	200	215	225	250
	30	90	105	120	135	155	175	185	200	210	235	255
	40	85	95	110	125	145	165	175	190	200	215	230
	50	85	95	110	125	145	165	175	190	180	200	210
	60	80	90	105	120	135	155	165	180	175	190	200
	70	70	80	95	110	130	145	165	175	175	190	200

Packaging, Storage and Transportation

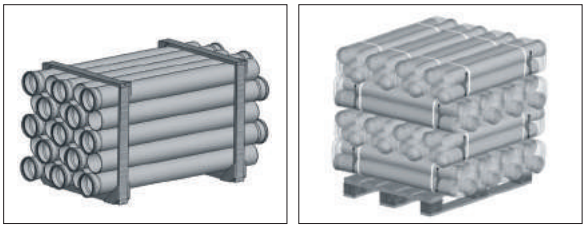


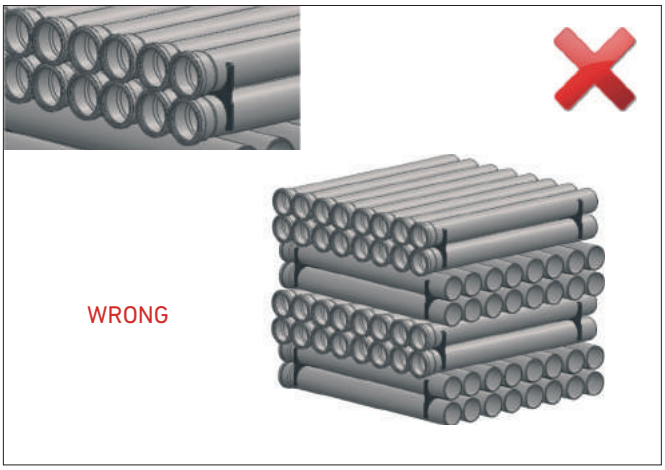
Packaging

GF Hakan Plastik pipes and fittings are packed as ready for transport in a customer-friendly way. Packing ensures safety, efficient storage and easy transport.



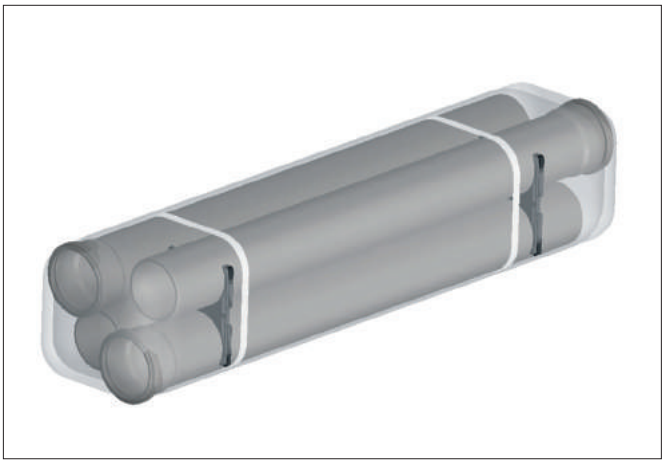
Waste water pipes are shipped on wooden frames or pallets according to the demands of customers.





Pipes and fittings with socket are placed in a way that they will not stay on top of each other.

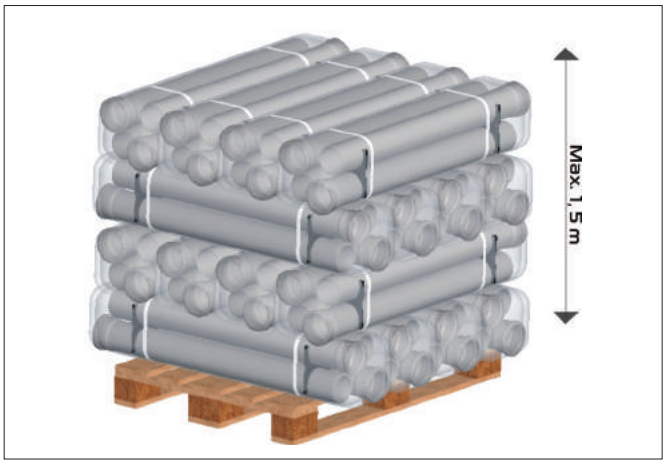
Short parts with the length of 150, 250 and 500 mm are packed in carton boxes like connection parts.



Pipes are packed by plastic clamps to hold them together. Stretch film is applied to protect pipes from pipes dust and stains.

All product ranges are identified in the Warehouse Management System (WMS) by barcode label. Barcode system ensures management of products and prevents complexity and errors during storage and loading.

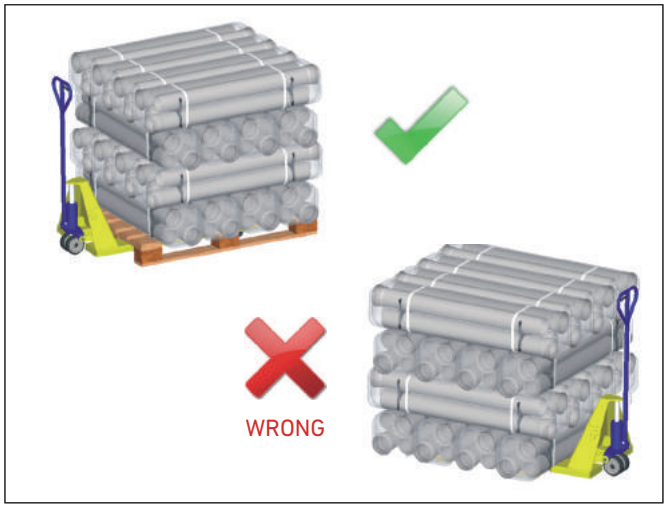
Storage



Method of storage should not cause any outflow and should not damage the pipes. As long as they are stored properly, no permanent deformations or damages will occur on the pipes and fittings. Pipes should not be stacked above 1,5 m. Pipes should be safe against sliding.

Pipes and fittings packed in carton boxes should be protected against moisture.
Carton boxes should be sealed and stored in a dry area.

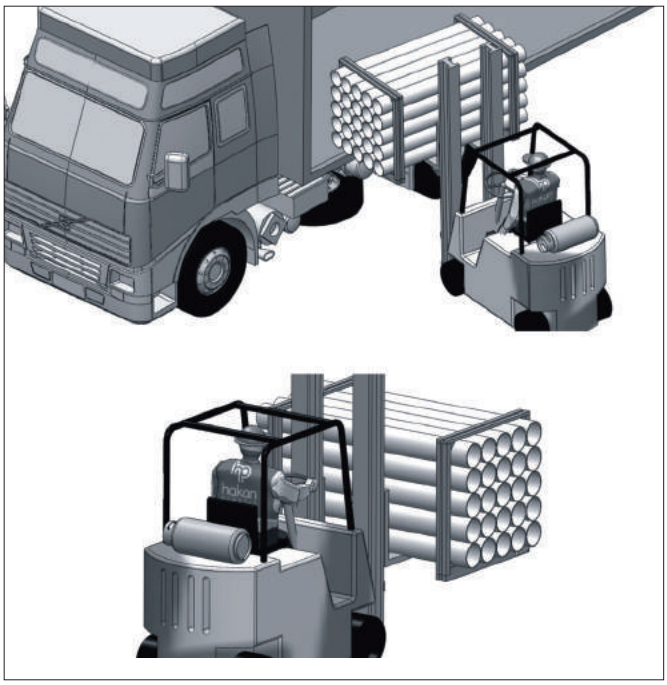
Pipes packed in the factory might be stacked on wooden frames. Appropriate materials such as pallet etc. should be used to prevent any damage on the socket parts of the pipes stored for a long time. This also makes it easier to lift the pipes by from the flor.



Products that are not resistant to UV should not be stored outdoors and should be protected against sunlight.

Transportation

Pipes should be carefully transported to prevent any damages. Avoid sudden and hard pressures on pipes and fittings that might cause freezing in cold weather conditions. Ensure that pipes are not slided and dropped on the floor. Loading and unloading and packing of pipes in a block should be carried out by means of forklifts having flat threads and extensions.



Notes

Worldwide at home

Our sales companies and representatives ensure local customer support in more than 100 countries.

www.gfps.com

Argentina / Southern South America
Georg Fischer Central Plastics Sudamérica S.R.L.
Buenos Aires / Argentina
Phone +54 11 4512 02 90
gfcentral.ps.ar@georgfischer.com
www.gfps.com/ar

Australia
George Fischer Pty Ltd
Riverwood NSW 2210
Phone +61 (0) 2 9502 8000
australia.ps@georgfischer.com
www.gfps.com/au

Austria
Georg Fischer Rohrleitungssysteme GmbH
3130 Herzogenburg
Phone +43 (0) 2782 856 43-0
austria.ps@georgfischer.com
www.gfps.com/at

Belgium / Luxembourg
Georg Fischer NV/SA
1600 Sint-Pieters-Leeuw / Belgium
Phone +32 (0) 2 556 40 20
Fax +32 (0) 2 524 34 26
be.ps@georgfischer.com
www.gfps.com/be

Brazil
Georg Fischer Sist. de Tub. Ltda.
04571-020 São Paulo/SP
Phone +55 (0) 11 5525 1311
br.ps@georgfischer.com
www.gfps.com/br

Canada
Georg Fischer Piping Systems Ltd
Mississauga, ON L5T 2B2
Phone +1 (905) 670 8005
Fax +1 (905) 670 8513
ca.ps@georgfischer.com
www.gfps.com/ca

China
Georg Fischer Piping Systems Ltd
Shanghai 201319
Phone +86 21 3899 3899
china.ps@georgfischer.com
www.gfps.com/cn

Denmark / Iceland
Georg Fischer A/S
2630 Taastrup / Denmark
Phone +45 (0) 70 22 19 75
info.dk.ps@georgfischer.com
www.gfps.com/dk

Finland
Georg Fischer AB
01510 Vantaa
Phone +358 (0) 9 586 58 25
Fax +358 (0) 9 586 58 29
info.fi.ps@georgfischer.com
www.gfps.com/fi

France
Georg Fischer SAS
95932 Roissy Charles de Gaulle Cedex
Phone +33 (0) 1 41 84 68 84
fr.ps@georgfischer.com
www.gfps.com/fr

Germany
Georg Fischer GmbH
73095 Albershausen
Phone +49 (0) 7161 302 0
info.de.ps@georgfischer.com
www.gfps.com/de

India
Georg Fischer Piping Systems Pvt. Ltd
400 083 Mumbai
Phone +91 22 4007 2000
Fax +91 22 4007 2020
branchoffice@georgfischer.com
www.gfps.com/in

Indonesia
PT Georg Fischer Indonesia
Karawang 41371, Jawa Barat
Phone +62 267 432 044
Fax +62 267 431 857
indonesia.ps@georgfischer.com
www.gfps.com/id

Italy
Georg Fischer S.p.A.
20864 Agrate Brianza (MB)
Phone +39 02 921 86 1
Fax +39 02 921 86 24 7
it.ps@georgfischer.com
www.gfps.com/it

Japan
Georg Fischer Ltd
530-0003 Osaka
Phone +81 (0) 6 6341 2451
jp.ps@georgfischer.com
www.gfps.com/jp

Korea
Georg Fischer Korea Co. Ltd
Unit 2501, U-Tower
120 Heungdeok Jungang-ro
(Yeongdeok-dong)
Giheung-gu, Yongin-si, Gyeonggi-do
Phone +82 31 8017 1450
Fax +82 31 217 1454
kor.ps@georgfischer.com
www.gfps.com/kr

Malaysia
George Fischer (M) Sdn. Bhd.
41200 Klang, Selangor Darul Ehsan
Phone +60 (0) 3 3122 5585
Fax +60 (0) 3 3122 5575
my.ps@georgfischer.com
www.gfps.com/my

Mexico / Northern Latin America
Georg Fischer S.A. de C.V.
CP 66603 Apodaca, Nuevo León / Mexico
Phone +52 (81) 1340 8586
Fax +52 (81) 1522 8906
mx.ps@georgfischer.com
www.gfps.com/mx

Middle East
Georg Fischer Piping Systems (Switzerland) Ltd
Dubai / United Arab Emirates
Phone +971 4 289 49 60
gcc.ps@georgfischer.com
www.gfps.com/int

Netherlands
Georg Fischer N.V.
8161 PA Epe
Phone +31 (0) 578 678 222
nl.ps@georgfischer.com
www.gfps.com/nl

New Zealand
Georg Fischer Ltd
5018 Upper Hutt
Phone +04 527 9813
Fax +04 527 9834
nz.ps@georgfischer.com
www.gfps.com/nz

Norway
Georg Fischer AS
1351 Rud
Phone +47 67 18 29 00
no.ps@georgfischer.com
www.gfps.com/no

Philippines
George Fischer Pte. Ltd.
Philippines Representative Office
1500 San Juan City
Phone +632 571 2365
Fax +632 571 2368
sgp.ps@georgfischer.com
www.gfps.com/sg

Poland
Georg Fischer Sp. z o.o.
05-090 Sekocin Nowy
Phone +48 (0) 22 31 31 0 50
poland.ps@georgfischer.com
www.gfps.com/pl

Romania
Georg Fischer Piping Systems (Switzerland) Ltd
020257 Bucharest - Sector 2
Phone +40 (0) 21 230 53 80
ro.ps@georgfischer.com
www.gfps.com/int

Russia
Georg Fischer Piping Systems (Switzerland) Ltd
Moscow 125040
Phone +7 495 748 11 44
ru.ps@georgfischer.com
www.gfps.com/ru

Singapore
George Fischer Pte Ltd
528 872 Singapore
Phone +65 6747 0611
Fax +65 6747 0577
sgp.ps@georgfischer.com
www.gfps.com/sg

Spain / Portugal
Georg Fischer S.A.
28046 Madrid / Spain
Phone +34 (0) 91 781 98 90
es.ps@georgfischer.com
www.gfps.com/es

Sweden
Georg Fischer AB
117 43 Stockholm
Phone +46 (0) 8 506 775 00
info.se.ps@georgfischer.com
www.gfps.com/se

Switzerland
Georg Fischer Rohrleitungssysteme (Schweiz) AG
8201 Schaffhausen
Phone +41 (0) 52 631 3026
ch.ps@georgfischer.com
www.gfps.com/ch

Taiwan
Georg Fischer Co. Ltd
San Chung Dist., New Taipei City
Phone +886 2 8512 2822
Fax +886 2 8512 2823
www.gfps.com/tw

United Kingdom / Ireland
George Fischer Sales Limited
Coventry, CV2 2ST / United Kingdom
Phone +44 (0) 2476 535 535
uk.ps@georgfischer.com
www.gfps.com/uk

USA / Caribbean
Georg Fischer LLC
92618 Irvine, CA / USA
Phone +1 714 731 8800
Fax +1 714 731 6201
us.ps@georgfischer.com
www.gfps.com/us

Vietnam
George Fischer Pte Ltd
Representative Office
Ho Chi Minh City
Phone + 84 28 3948 4000
Fax + 84 28 3948 4010
sgp.ps@georgfischer.com
www.gfps.com/vn

International
Georg Fischer Piping Systems (Switzerland) Ltd
8201 Schaffhausen / Switzerland
Phone +41 (0) 52 631 3003
Fax +41 (0) 52 631 2893
info.export@georgfischer.com
www.gfps.com/int

+GF+

GF Piping Systems

Georg Fischer Hakan Plastik Boru ve Profil San. Tic. A.Ş.

www.gfps.com/tr

/ gfhakanplastik

Regional Directorates

İstanbul
Ofishane Plaza
Merkez Mahallesi Cendere Caddesi
No:22 Kat:11
34400 Kağıthane / İSTANBUL
Tel: +90 212 809 20 33 (pbx)
Fax: +90 212 809 20 37

Antalya
İnci Plaza Yenigün Mh. 1054. Sok.
No:15 Ofis No:8
Muratpaşa / ANTALYA
Tel: +90 242 321 58 03
Fax: +90 242 321 58 53

Diyarbakır
Şanlıurfa Bulvarı Fırat Mh.
Ahmede Hani Cd. No:4
Yektower İş Merkezi No:13/39
Kayapınar / DİYARBAKIR
Tel: +90 412 251 18 20
Fax: +90 412 251 18 25

Samsun
Kuzey Yıldızı Mah. 100.Yıl Bulv.
No:38 Kat:4 Daire:23 Baran Plaza
Canik / SAMSUN
Tel: +90 362 256 02 33 - 03 33

Production Facilities

Tekirdağ / Çerkezköy
Organize San. Bölgesi Gaziosmanpaşa
Mh. 3. Cd. No:11-13
Çerkezköy / TEKİRDAĞ
Tel: +90 282 726 64 43 (pbx)
Fax: +90 282 726 99 33

Şanlıurfa
Şanlıurfa-Gaziantep Karayolu 16. Km
2. Organize San. Bölgesi 1. Cd. No:3
ŞANLIURFA
Tel: +90 414 369 18 30
Fax: +90 414 369 17 96

+GF+