

AQUASYSTEM PP-R and PP-RCT

Pipe Systems



+GF+

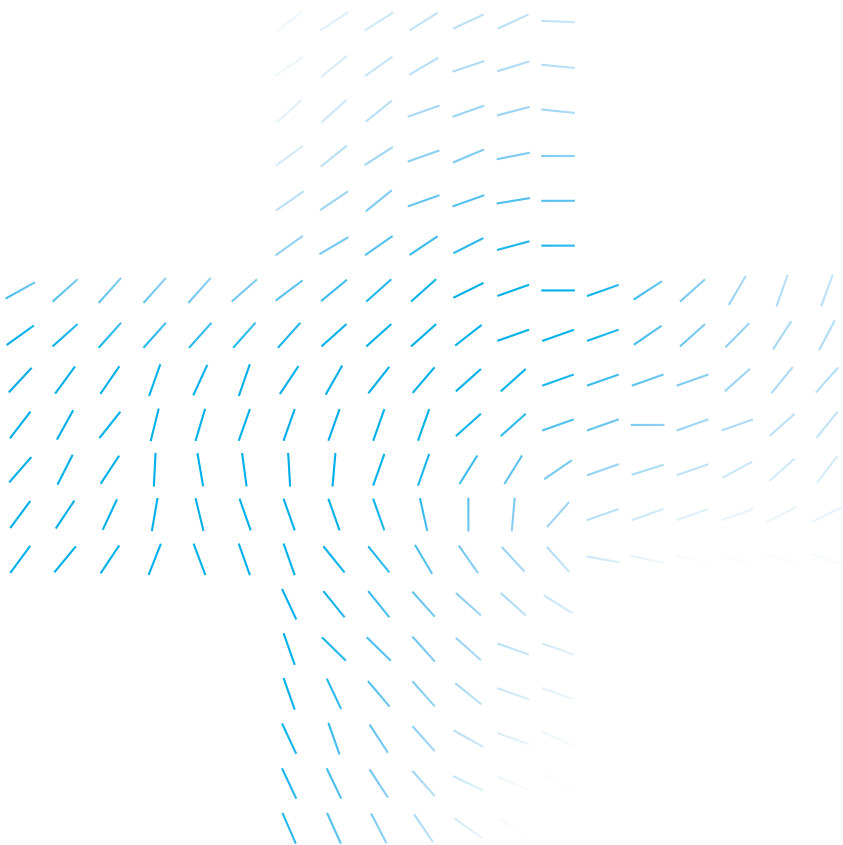


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About Us





Founded in Switzerland in 1802, Georg Fischer Corporation operates in 4 main business lines: GF Piping Systems, GF Building Flow Solutions, GF Casting Solutions and GF Machining Solutions. Georg Fischer is present in 34 countries with 57 production plants and 136 companies.

Georg Fischer's building division GF Building Flow Solutions is a leader in its sector and produces system solutions and high-quality components for the safe transport of water in public services and building technology. GF Building Flow Solutions is committed to finding new ways to protect and manage water responsibly. With more than 30 production facilities worldwide and reaching over 100 countries, GF acquired **Hakan Plastik** in 2013 and has maintained its leadership in its field.

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 production plant Çerkezköy with the acquisition by GF global GF Product and process standards applicable worldwide have started to be applied. GF Hakan Plastik operates in the field of Building Technology (BT) plastic piping sector.

GF Hakan Plastik Training and Technology Center provides all its business 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
- Utility Projects
- Industrial Buildings

+ Our Presence in the World

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

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.

+ 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 characteristics: thermoplastics, thermosetting plastics and elastomers.

+ 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.

Thermoplastics in turn can be split into two main categories as partially-regulated (semi-crystalline) and irregular (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

High density

- * Crane needed for transport
- * Widely spaced fixings
- * High anchoring forces, fixing required

Thermal conductivity

- * Insulation is always needed to limit heat loss
- Formation of condensation and resulting corrosion *

Corrosion Behaviors

- Galvanic corrosion may occur
- Internal diameter is reduced due to corrosion
Reduction in internal diameter leads to pressure losses

Chemical resistance

- * Low resistance to acids, requiring use of costly alloys
- * Damage from incrustation

Plastic Systems

Low density

- * Can be carried by hand up to d110
- * Closely spaced fixings
- * Limited anchoring forces, simple and economic

Low thermal conductivity

- * Limited heat loss
- Low levels of condensation and resistance to corrosion

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

High chemical resistance

- * In combination with correct jointing methods, at least 25 years of useful life can be warranted
- * No incrustation

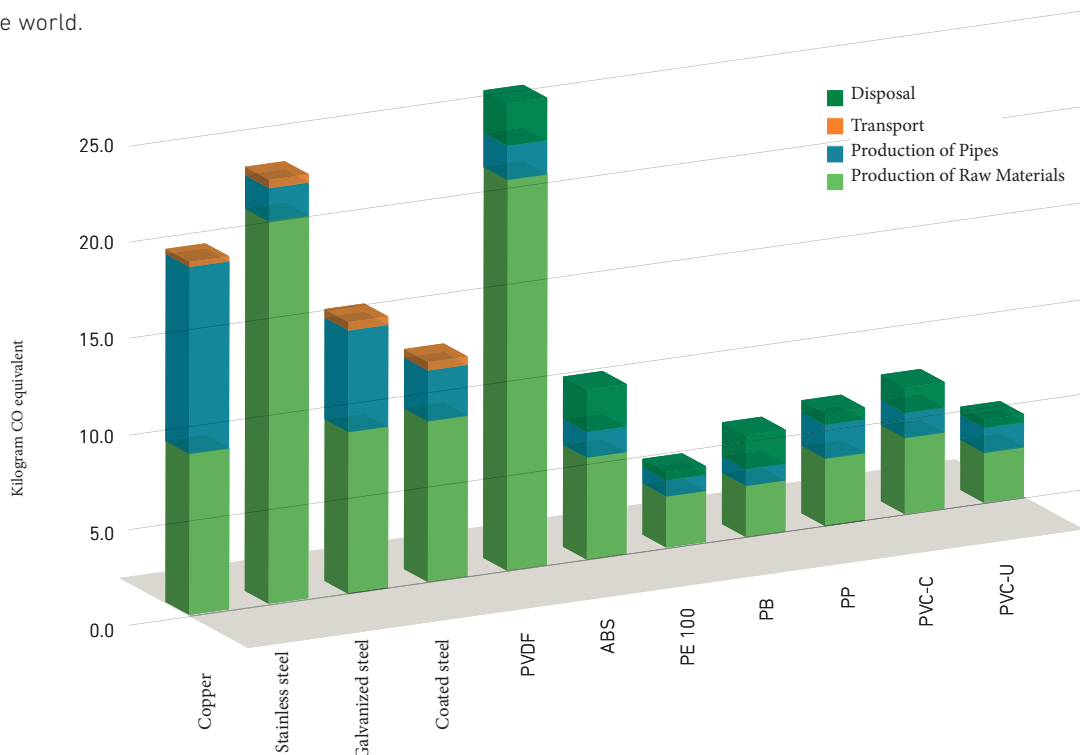
+ Service Life Analysis of Plastics

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.

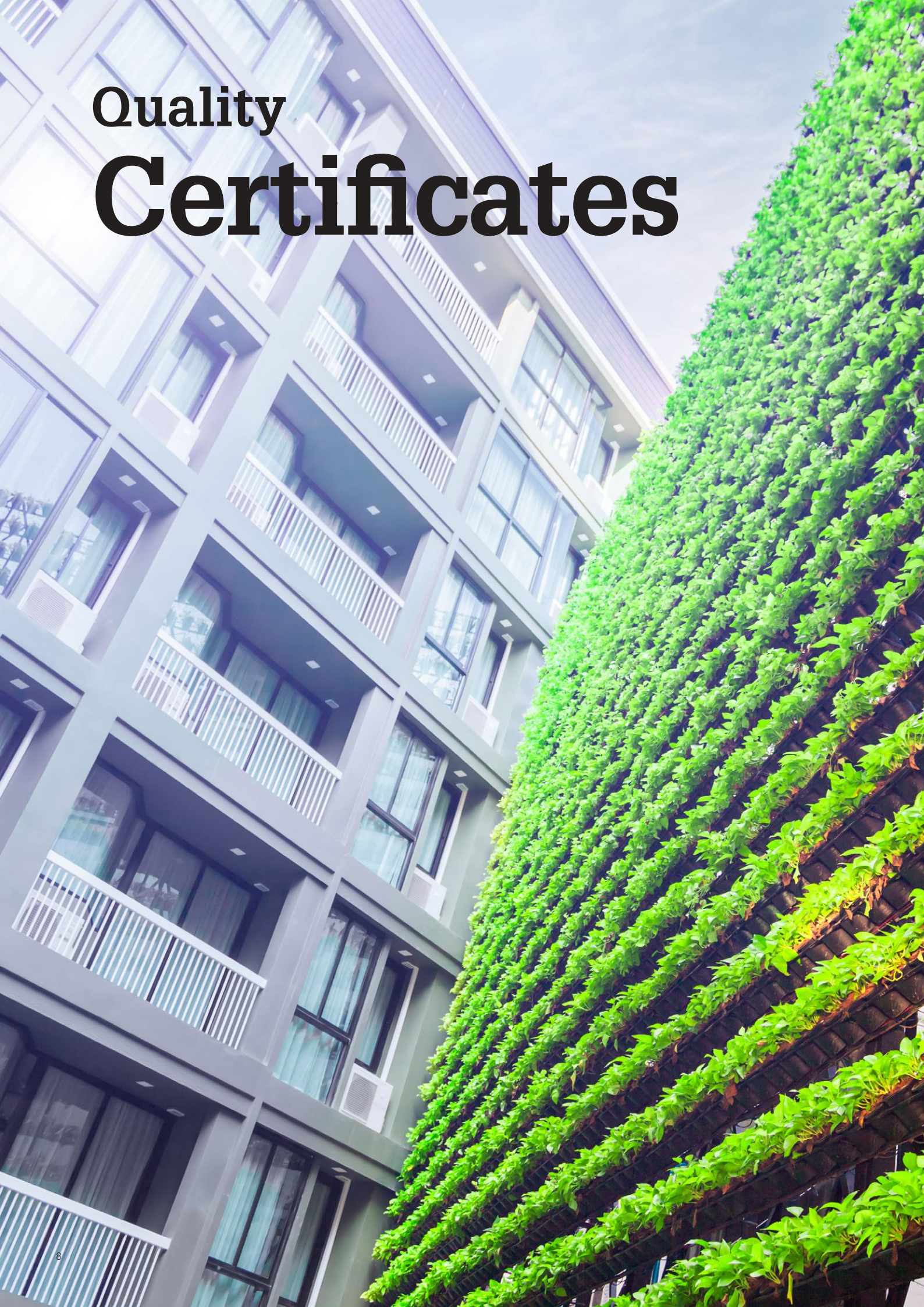
The following graphics indicate the assessment of the lifetime of thermoplastic piping systems in terms of the quality of their environmental performance and application of them in building technology, industry and water and gas distribution. In the analysis, the impacts of one meter long pipe was compared 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 continuous 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) - CSTB (France) - AENOR (Spain) - UkrSepro (Ukraine) - SGS (Switzerland) - TSE (Türkiye).

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 production plant in Çerkezköy have TS EN ISO/IEC 17024:2012 laboratory.

Certificates

 ISO 9001 BUREAU VERITAS	 ISO 14001 BUREAU VERITAS	 ISO 45001 BUREAU VERITAS
 ISO 50001 BUREAU VERITAS	 UNITED STATES OPERATIONAL CLEAN SWEEP	 I-REC STANDART
 TÜRKİYE ZERO WASTE	 SWITZERLAND SGS	 TÜRKİYE TÜRKAK
 TÜRKİYE TSE	 TÜRKİYE ENVIRONMENTAL PRODUCT DECLARATION	 AUSTRIA OFI HYGIENE
 UK WRAS	 GERMANY HYGENE INSTITUT	 UNITED STATES NSF
 SPAIN AENOR	 FRANCE CSTB	 GERMANY DVGW
 BULGARIA BULGARKONTROLA	 UKRAINIAN UKR - SEPRO	 POLAND PZH
 CZECH REPUBLIC ITC	 HUNGARY EMI	 UK LLOYD'S REGISTER
 UNITED STATES ABS MARINE	 KOREA KR MARINE	 NORWAY DNV MARINE

AQUASYSTEM PP-R and PP-RCT Pipe 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 electrofusion welding.
 - White, grey and green options available.
 - Hygienic and environmentally-friendly.
- 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 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 enhancement, AQUASYSTEM withstand higher operating pressures at extreme temperatures, higher flow rates and resistance to chlorine.

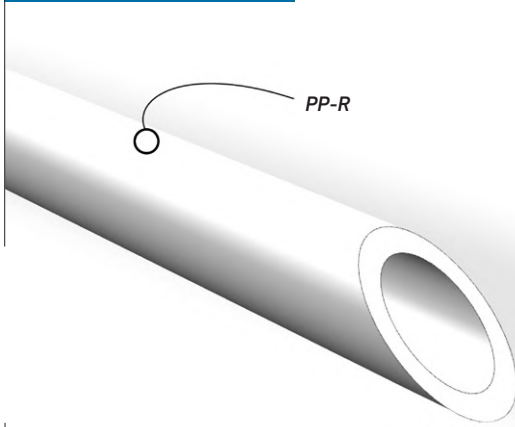
- PP-RCT Glass-Fiber Reinforced Piping Systems:
 - SDR9 - PN22
 - SDR7,4 - PN25

+ Fields of Application

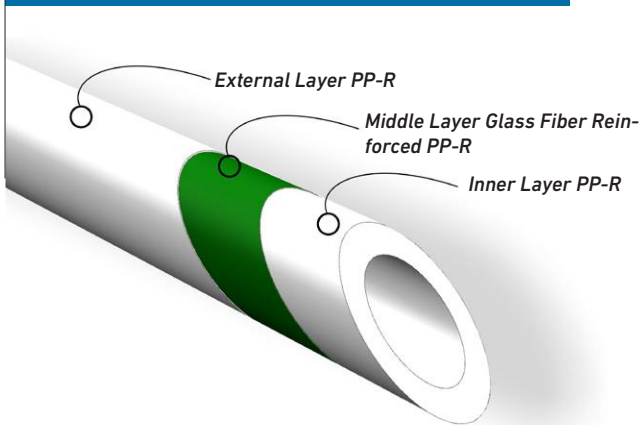
- Central heating systems
- Hot and cold water systems
- Drinking water and treated water supply systems
- Industrial Piping Systems (Transfer and discharge of chemicals)
- Air conditioner systems
- Solar Collectors



Standard PP-R Pipes



Glass Fiber Reinforced Composite PP-R Pipe



+ Technical Properties

Pipe Structure	One Layer-Standard Pipes Multi-Layer: Glass Fiber Reinforced 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 & Climafaser Pipes: PN10 (SDR11), PN20 (SDR7.4), PN25 (SDR6) PP-RCT Glass Fiber Reinforced Pipes (SDR9: PN22 – SDR7,4: PN25)
Pipe Length [mm]	4000 mm
Joining 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
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
Thermal Conductivity Coefficient	0.24 W/m°K

AQUASYSTEM PP-R and PP-RCT

PP-R Standard Pipe PN10 - SDR11



Dia. (mm)	Green Code		Packing		White Code		Packing		Grey Code		Packing	
	Type	Pc	Type	Pc	Type	Pc	Type	Pc	Type	Pc	Type	Pc
25									4001002502121		Bundle	80
32									4001003202221		Bundle	60
40									4001004002321		Bundle	40
50									4001005002421		Bundle	20
63									4001006302521		Bundle	16
75									4001007502621		Bundle	12
90									4001009002721		Bundle	8
110									4001011002821		Bundle	4

PP-R Standard Pipe PN16 - SDR7,4



Dia. (mm)	Green Code		Packing		White Code		Packing		Grey Code		Packing	
	Type	Pc	Type	Pc	Type	Pc	Type	Pc	Type	Pc	Type	Pc
20									4001002004021		Bundle	100
25									4001002504121		Bundle	80
32									4001003204221		Bundle	60
40									4001004004321		Bundle	40
50									4001005004421		Bundle	20
63									4001006304521		Bundle	16
75									4001007504621		Bundle	12
90									4001009004721		Bundle	8
200	4002020001121		Bundle	4	4000020001121		Bundle	4	4001020001121		Bundle	4

PP-R Standard Pipe PN20 – SDR6



Dia. (mm)	Green Code		Packing		White Code		Packing		Grey Code		Packing	
	Type	Pc	Type	Pc	Type	Pc	Type	Pc	Type	Pc	Type	Pc
20	4002002000121		Bundle	100	4000002000121		Bundle	100	4001002000121		Bundle	100
25	4002002500221		Bundle	80	4000002500221		Bundle	80	4001002500221		Bundle	80
32	4002003200321		Bundle	60	4000003200321		Bundle	60	4001003200321		Bundle	60
40	4002004000421		Bundle	40	4000004000421		Bundle	40	4001004000421		Bundle	40
50	4002005000521		Bundle	20	4000005000521		Bundle	20	4001005000521		Bundle	20
63	4002006300621		Bundle	16	4000006300621		Bundle	16	4001006300621		Bundle	16
75	4002007500721		Bundle	12	4000007500721		Bundle	12	4001007500721		Bundle	12
90	4002009000821		Bundle	8	4000009000821		Bundle	8	4001009000821		Bundle	8
110	4002011000921		Bundle	4	4000011000921		Bundle	4	4001011000921		Bundle	4
125	4002012501021	PCS		4	4000012501021		Bundle	4				
160	4002016001121		Bundle	4	4000016001021		Bundle	4				
200	4002020000221		Bundle	4								

PP-RCT Standard Pipe – SDR 7,4 PN25

Dia. (mm)	Green Code		Packing		White Code		Packing		Grey Code		Packing	
	Type	Pc	Type	Pc	Type	Pc	Type	Pc	Type	Pc	Type	Pc
20	4002002050021		Bundle	100					4001002060021		Bundle	100
25	4002002550021		Bundle	80					4001002560021		Bundle	80
32	4002003250021		Bundle	60					4001003260021		Bundle	60
40	4002004050021		Bundle	40					4001004060021		Bundle	40
50	4002005050021		Bundle	20					4001005060021		Bundle	20
63	4002006350021		Bundle	16					4001006360021		Bundle	16
75	4002007550021		Bundle	12					4001007560021		Bundle	12
90	4002009050021		Bundle	8								
110	4002011050021		Bundle	4								
125	4002012550021		Bundle	4								

AQUASYSTEM PP-R and PP-RCT

PP-RCT Standard Pipe – SDR 9 PN22

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4002002050121	Bundle	100				4001002060121	Bundle	100
25	4002002550121	Bundle	80				4001002560121	Bundle	80
32	4002003250121	Bundle	60				4001003260121	Bundle	60
40	4002004050121	Bundle	40				4001004060121	Bundle	40
50	4002005050121	Bundle	20				4001005060121	Bundle	20
63	4002006350121	Bundle	16				4001006360121	Bundle	16
75	4002007550121	Bundle	12				4001007560121	Bundle	12
90	4002009050121	Bundle	8						
110	4002011050121	Bundle	4						
125	4002012550121	Bundle	4						
160	4002016050121	Bundle	4						

PP-R Marine Pipe PN16 - SDR7,4



Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4002002001121	Bundle	100						
25	4002002501121	Bundle	80						
32	4002003201121	Bundle	60						
40	4002004001121	Bundle	40						
50	4002005001121	Bundle	20						
63	4002006301121	Bundle	16						

PP-R UV Resistant Standart Pipe – PN20



Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4002002010021	Bundle	100	4000002010021	Bundle	100			
25	4002002510021	Bundle	80	4000002510021	Bundle	80	4001002510021	Bundle	80
32	4002003210021	Bundle	60	4000003210021	Bundle	60	4001003210021	Bundle	60
40	4002004010021	Bundle	40				4001004010021	Bundle	40
50				4000005010021	Bundle	20	4001005010021	Bundle	20
63	4002006310021	Bundle	16	4000006310021	Bundle	16	4001006310021	Bundle	16

PP-R Glass Fiber Reinforced Pipe PN20 - SDR 7,4



Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4202002000121	Bundle	100	4200002000121	Bundle	100	4201002000121	Bundle	100
25	4202002500221	Bundle	80	4200002500221	Bundle	80	4201002500221	Bundle	80
32	4202003200321	Bundle	60	4200003200321	Bundle	60	4201003200321	Bundle	60
40	4202004000421	Bundle	40	4200004000421	Bundle	40	4201004000421	Bundle	40
50	4202005000521	Bundle	20	4200005000521	Bundle	20	4201005000521	Bundle	20
63	4202006300621	Bundle	16	4200006300621	Bundle	16	4201006300621	Bundle	16
75	4202007500721	Bundle	12	4200007500721	Bundle	12	4201007500721	Bundle	12
90	4202009000821	Bundle	8	4200009000821	Bundle	8	4201009000821	Bundle	8
110	4202011000921	Bundle	4	4200011000921	Bundle	4	4201011000921	Bundle	4
125	4202012500121	Bundle	4	4200012500121	Bundle	4			
160	4202016000321	Bundle	4	4200016000121	Bundle	4	4201016000121	Bundle	4

AQUASYSTEM PP-R and PP-RCT



PP-R Glass Fiber Reinforced Pipe PN25 - SDR 6

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4202002001021	Bundle	100	4200002002021	Bundle	100	4201002002021	Bundle	100
25	4202002501121	Bundle	80	4200002502121	Bundle	80	4201002502121	Bundle	80
32	4202003201221	Bundle	60	4200003202221	Bundle	60	4201003202221	Bundle	60
40	4202004000621	Bundle	40	4200004002321	Bundle	40	4201004002321	Bundle	40
50	4202005000721	Bundle	20	4200005002421	Bundle	20	4201005002421	Bundle	20
63	4202006300821	Bundle	16	4200006302521	Bundle	16	4201006302521	Bundle	16
75	4202007500921	Bundle	12	4200007506521	Bundle	12	4201007506521	Bundle	12
90	4202009001021	Bundle	8	4200009006621	Bundle	8	4201009006621	Bundle	8
110	4202011001121	Bundle	4	4200011006421	Bundle	4	4201011006421	Bundle	4
125				4200012500221	Bundle	4			
160	4202016000531	Bundle	4	4200016000221	Bundle	4	4201016000221	Bundle	4



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

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
32	4202003230121	Bundle	60						
40	4202004030021	Bundle	40						
50	4202005030021	Bundle	20						
63	4202006330121	Bundle	16						
75	4202007530021	Bundle	12						
90	4202009030021	Bundle	8						
110	4202011030021	Bundle	4						
125	4202012530021	Bundle	4						
160	4202016000221	Bundle	4						

PP-R Glass Fiber Reinforced Climafaser Pipe PN20 - SDR 7,4

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4202002030021	Bundle	100						
25	4202002530021	Bundle	80						
32	4202003230021	Bundle	60						



PP-RCT Glass Fiber Reinforced Pipe PN20 - SDR7,4

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4202002050021	Bundle	100				4201002060021	Bundle	100
25	4202002550021	Bundle	80				4201002560021	Bundle	80
32	4202003250021	Bundle	60				4201003260021	Bundle	60
40	4202004050021	Bundle	40				4201004060021	Bundle	40
50	4202005050021	Bundle	20				4201005060021	Bundle	20
63	4202006350021	Bundle	16				4201006360021	Bundle	16
75	4202007550021	Bundle	12				4201007560021	Bundle	12
90	4202009050021	Bundle	8				4201009060021	Bundle	8
110	4202011050021	Bundle	4				4201011060021	Bundle	4
125	4202012550021	Bundle	4				4201012560021	Bundle	4
160	4202016050021	Bundle	4				4201016060021	Bundle	4

AQUASYSTEM PP-R and PP-RCT



PP-RCT Glass Fiber Reinforced Pipe PN22 - SDR9

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4202002050121	Bundle	100				4201002060121	Bundle	100
25	4202002550121	Bundle	80				4201002560121	Bundle	80
32	4202003250121	Bundle	60				4201003260121	Bundle	60
40	4202004050121	Bundle	40				4201004060121	Bundle	40
50	4202005050121	Bundle	20				4201005060121	Bundle	20
63	4202006350121	Bundle	16				4201006360121	Bundle	16
75	4202007550121	Bundle	12				4201007560121	Bundle	12
90	4202009050121	Bundle	8				4201009060121	Bundle	8
110	4202011050121	Bundle	4				4201011060121	Bundle	4
125	4202012550121	Bundle	4				4201012560121	Bundle	4
160	4202016050121	Bundle	4				4201016060121	Bundle	4



PP-R Elbow 45°

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4302102000121	Cartonbox	400	4300102000121	Cartonbox	400	4301102000121	Cartonbox	400
25	4302102500221	Cartonbox	300	4300102500221	Cartonbox	300	4301102500221	Cartonbox	300
32	4302103200321	Cartonbox	175	4300103200321	Cartonbox	175	4301103200321	Cartonbox	175
40	4302104000421	Cartonbox	75	4300104000421	Cartonbox	30	4301104000421	Cartonbox	75
50	4302105000521	Cartonbox	40	4300105000521	Cartonbox	20	4301105000521	Cartonbox	40
63	4302106300621	Cartonbox	20	4300106300621	Cartonbox	8	4301106300621	Cartonbox	20
75	4302107501221	Cartonbox	16	4300107501221	Cartonbox	8	4301107501221	Cartonbox	16
90				4300109001322	Cartonbox	6	4301109001322	Cartonbox	6
110				4300111001422	Cartonbox	4	4301111001422	Cartonbox	4
160	4302116001621	Cartonbox	2	4300116001621	Cartonbox	2	4301116001621	Cartonbox	2
*160	4302116001622	Cartonbox	1						
*200	4302120001322	Cartonbox	1						

* Butt Fusion



PP-R Elbow 90°

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4302102000721	Cartonbox	400	4300102000721	Cartonbox	400	4301102000721	Cartonbox	400
25	4302102500821	Cartonbox	250	4300102500821	Cartonbox	250	4301102500821	Cartonbox	250
32	4302103200921	Cartonbox	125	4300103200921	Cartonbox	125	4301103200921	Cartonbox	125
40	4302104001021	Cartonbox	75	4300104001021	Cartonbox	75	4301104001021	Cartonbox	75
50	4302105001121	Cartonbox	40	4300105001121	Cartonbox	40	4301105001121	Cartonbox	40
63	4302106301221	Cartonbox	20	4300106301221	Cartonbox	20	4301106301221	Cartonbox	20
75	4302107501321	Cartonbox	16	4300107501321	Cartonbox	4	4301107501321	Cartonbox	16
90	4302109001421	Cartonbox	8	4300109001421	Cartonbox	3	4301109001421	Cartonbox	8
110	4302111001521	Cartonbox	3	4300111001521	Cartonbox	3	4301111001521	Cartonbox	3
160	4302116001421	Cartonbox	2	4300116001421	Cartonbox	2	4301116001421	Cartonbox	2
*160	4302116001422	Cartonbox	1						
*200	4302120001422	Cartonbox	1						

* Butt Fusion



PP-R Male to Female Elbow 90°

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4302102005021	Cartonbox	350	4300102005021	Cartonbox	100	4301102005021	Cartonbox	350
25	4302102505121	Cartonbox	200	4300102505121	Cartonbox	80	4301102505121	Cartonbox	200



PP-R Reducing Elbow

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-25	4302402011021	Cartonbox	250	4300402011021	Cartonbox	100	4301402011021	Cartonbox	250
25-32	4302402511121	Cartonbox	150	4300402511121	Cartonbox	75	4301402511121	Cartonbox	150

AQUASYSTEM PP-R and PP-RCT



PP-R Socket

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4302502020021	Cartonbox	500	4300502020021	Cartonbox	500	4301502020021	Cartonbox	500
25	4302502520121	Cartonbox	350	4300502520121	Cartonbox	350	4301502520121	Cartonbox	350
32	4302503220221	Cartonbox	200	4300503220221	Cartonbox	200	4301503220221	Cartonbox	200
40	4302504020321	Cartonbox	125	4300504020321	Cartonbox	125	4301504020321	Cartonbox	125
50	4302505020421	Cartonbox	70	4300505020421	Cartonbox	30	4301505020421	Cartonbox	70
63	4302506320521	Cartonbox	45	4300506320521	Cartonbox	18	4301506320521	Cartonbox	45
75	4302507520621	Cartonbox	30	4300507520621	Cartonbox	10	4301507520621	Cartonbox	30
90	4302509020721	Cartonbox	20	4300509020721	Cartonbox	8	4301509020721	Cartonbox	20
110	4302511020821	Cartonbox	10	4300511020821	Cartonbox	4	4301511020821	Cartonbox	10
160	4302516000121	Cartonbox	4	4300516000121	Cartonbox	4	4301516000121	Cartonbox	4



PP-R Reducer

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
25-20	4302402510021	Cartonbox	500	4300402510021	Cartonbox	500	4301402510021	Cartonbox	500
32-20	4302403210121	Cartonbox	400	4300403210121	Cartonbox	200	4301403210121	Cartonbox	400
32-25	4302403210221	Cartonbox	350	4300403210221	Cartonbox	150	4301403210221	Cartonbox	350
40-20	4302404010321	Cartonbox	250	4300404010321	Cartonbox	100	4301404010321	Cartonbox	250
40-25	4302404010421	Cartonbox	250	4300404010421	Cartonbox	100	4301404010421	Cartonbox	250
40-32	4302404010521	Cartonbox	175	4300404010521	Cartonbox	75	4301404010521	Cartonbox	175
50-20	4302405010621	Cartonbox	150	4300405010621	Cartonbox	75	4301405010621	Cartonbox	150
50-25	4302405010721	Cartonbox	150	4300405010721	Cartonbox	50	4301405010721	Cartonbox	150
50-32	4302405010821	Cartonbox	150	4300405010821	Cartonbox	75	4301405010821	Cartonbox	150
50-40	4302405010921	Cartonbox	100	4300405010921	Cartonbox	40	4301405010921	Cartonbox	100
63-25	4302406311021	Cartonbox	75	4300406311021	Cartonbox	30	4301406311021	Cartonbox	75
63-32	4302406311121	Cartonbox	75	4300406311121	Cartonbox	30	4301406311121	Cartonbox	75
63-40	4302406311221	Cartonbox	75	4300406311221	Cartonbox	30	4301406311221	Cartonbox	75
63-50	4302406311321	Cartonbox	50	4300406311321	Cartonbox	20	4301406311321	Cartonbox	50
75-50	4302407511421	Cartonbox	40	4300407511421	Cartonbox	16	4301407511421	Cartonbox	40
75-63	4302407511521	Cartonbox	40	4300407511521	Cartonbox	16	4301407511521	Cartonbox	40
90-50	4302409011521	Cartonbox	20	4300409011521	Cartonbox	10	4301409011521	Cartonbox	20
90-63	4302409011621	Cartonbox	20	4300409011621	Cartonbox	20	4301409011621	Cartonbox	20
90-75	4302409011721	Cartonbox	16	4300409011721	Cartonbox	4	4301409011721	Cartonbox	16
110-63	4302411011721	Cartonbox	16	4300411011721	Cartonbox	16	4301411011721	Cartonbox	16
110-75	4302411011821	Cartonbox	16	4300411011821	Cartonbox	8	4301411011821	Cartonbox	16
110-90	4302411011921	Cartonbox	16	4300411011921	Cartonbox	16	4301411011921	Cartonbox	16
125-75	4302412512022	Cartonbox	12						
125-90	4302412512422	Cartonbox	6						
125-110	4302412512522	Cartonbox	5						
160-110	4302416011921	Cartonbox	7	4300416011921	Cartonbox	7	4301416011921	Cartonbox	7
*160-125	4302416012322	Cartonbox	3						
*200-160	4302420012322	Cartonbox	1						

* Butt Weld



PP-R Reducing Cross

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
25-20				4300902560222	Cartonbox	150	4301902560222	Cartonbox	150
32-25				4300903260322	Cartonbox	75	4301903260322	Cartonbox	75
40-32				4300904060422	Cartonbox	40	4301904060422	Cartonbox	40

AQUASYSTEM PP-R and PP-RCT



PP-R Cross

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4302902060022	Cartonbox	200	4300902060022	Cartonbox	100	4301902060022	Cartonbox	200
25	4302902560122	Cartonbox	150	4300902560122	Cartonbox	50	4301902560122	Cartonbox	150
32	4302903260222	Cartonbox	75	4300903260222	Cartonbox	30	4301903247222	Cartonbox	75
40	4302904060322	Cartonbox	40	4300904060322	Cartonbox	40	4301904060322	Cartonbox	40



PP-R Reducing Tee

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
25-20-20	4302902520021	Cartonbox	200	4300902520021	Cartonbox	100	4301902520021	Cartonbox	200
25-20-25	4302902520121	Cartonbox	175	4300902520121	Cartonbox	175	4301902520121	Cartonbox	175
32-20-20	4302903220221	Cartonbox	125	4300903220221	Cartonbox	50	4301903220221	Cartonbox	125
32-20-25	4302903220321	Cartonbox	125	4300903220321	Cartonbox	50	4301903220321	Cartonbox	125
32-20-32	4302903220421	Cartonbox	100	4300903220421	Cartonbox	100	4301903220421	Cartonbox	100
32-25-20	4302903220521	Cartonbox	125	4300903220521	Cartonbox	50	4301903220521	Cartonbox	125
32-25-32	4302903220621	Cartonbox	100	4300903220621	Cartonbox	100	4301903220621	Cartonbox	100
40-20-40	4302904020721	Cartonbox	50	4300904020721	Cartonbox	25	4301904020721	Cartonbox	50
40-25-40	4302904020821	Cartonbox	50	4300904020821	Cartonbox	50	4301904020821	Cartonbox	50
40-32-40	4302904020921	Cartonbox	50	4300904020921	Cartonbox	20	4301904020921	Cartonbox	50
50-20-50	4302905021021	Cartonbox	40	4300905021021	Cartonbox	10	4301905021021	Cartonbox	40
50-25-50	4302905021221	Cartonbox	30	4300905021221	Cartonbox	10	4301905021221	Cartonbox	30
50-32-50	4302905021321	Cartonbox	30	4300905021321	Cartonbox	10	4301905021321	Cartonbox	30
50-40-50	4302905021421	Cartonbox	30	4300905021421	Cartonbox	30	4301905021421	Cartonbox	30
63-20-63	4302906321321	Cartonbox	24	4300906321321	Cartonbox	24	4301906321321	Cartonbox	24
63-25-63	4302906321421	Cartonbox	24	4300906321421	Cartonbox	24	4301906321421	Cartonbox	24
63-32-63	4302906321521	Cartonbox	24	4300906321521	Cartonbox	12	4301906321521	Cartonbox	24
63-40-63	4302906321621	Cartonbox	16	4300906321621	Cartonbox	8	4301906321621	Cartonbox	16
63-50-63	4302906321721	Cartonbox	16	4300906321721	Cartonbox	16	4301906321721	Cartonbox	16
75-20-75	4302907521621	Cartonbox	10	4300907521621	Cartonbox	10	4301907521621	Cartonbox	10
75-25-75	4302907521721	Cartonbox	10	4300907521721	Cartonbox	10	4301907521721	Cartonbox	10
75-32-75	4302907521821	Cartonbox	10	4300907521821	Cartonbox	10	4301907521821	Cartonbox	10
75-40-75	4302907521921	Cartonbox	10	4300907521921	Cartonbox	10	4301907521921	Cartonbox	10
75-50-75	4302907522021	Cartonbox	10	4300907522021	Cartonbox	10	4301907522021	Cartonbox	10
75-63-75	4302907522121	Cartonbox	10	4300907522121	Cartonbox	10	4301907522121	Cartonbox	10
90-63-90	4302409021622	Cartonbox	12	4300909021622	Cartonbox	5	4301909021622	Cartonbox	5
90-75-90	4302909021722	Cartonbox	5	4300909021722	Cartonbox	5	4301909021722	Cartonbox	5
110-63-110	4302411021522	Cartonbox	3	4300911021522	Cartonbox	2	4301911021522	Cartonbox	2
110-75-110	4302911021622	Cartonbox	3	4300911021622	Cartonbox	2	4301911021622	Cartonbox	3
110-90-110				4300911021722	Cartonbox	2	4301911021722	Cartonbox	2
125-75-125	4302412521622	Cartonbox	2						
125-90-125	4302412521722	Cartonbox	2						
*160-110-160	4302916021922	Cartonbox	2						

* Butt Fusion



PP-R Crossover w Socket Short

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4302902000321	Cartonbox	200	4300902000321	Cartonbox	100	4301902000321	Cartonbox	200
25	4302902500321	Cartonbox	125	4300902500321	Cartonbox	125	4301902500321	Cartonbox	125

AQUASYSTEM PP-R and PP-RCT

PP-R Crossover w Socket



Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4302902000121	Cartonbox	120	4300902000121	Cartonbox	120	4301902000121	Cartonbox	120
25	4302902500221	Cartonbox	80	4300902500221	Cartonbox	80	4301902500221	Cartonbox	80
32	4302903200321	Cartonbox	30	4300903200321	Cartonbox	30	4301903200321	Cartonbox	30

PP-R Pipe Clamp Single



Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4302902025021	Cartonbox	1000	4300902025021	Cartonbox	500	4301902025021	Cartonbox	1000
25	4302902525121	Cartonbox	700	4300902525121	Cartonbox	300	4301902525121	Cartonbox	700
32	4302903225221	Cartonbox	500	4300903225221	Cartonbox	500	4301903225221	Cartonbox	500
40	4302904025322	Cartonbox	800	4300904025322	Cartonbox	300	4301904025322	Cartonbox	800
50	4302905025422	Cartonbox	100	4300905025422	Cartonbox	25	4301905025422	Cartonbox	100
63	4302906331622	Cartonbox	100	4300906331622	Cartonbox	300	4301906331622	Cartonbox	100
75	4302907525522	Cartonbox	200	4300907532022	Cartonbox	200	4301907525522	Cartonbox	200
90	4302909009022	Cartonbox	100	4300909032022	Cartonbox	100	4301909032022	Cartonbox	100
110	4302911009022	Cartonbox	100	4300911009022	Cartonbox	150	4301911009022	Cartonbox	150

PP-R Pipe Double Clamp



Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4302902025521	Cartonbox	400	4300902025521	Cartonbox	200	4301902025521	Cartonbox	400
25	4302902525621	Cartonbox	250	4300902525621	Cartonbox	250	4301902525621	Cartonbox	250
32	4302903225722	Cartonbox	200	4300903225722	Cartonbox	200	4301903225722	Cartonbox	200

PP-R Blind Cap



Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4302902014021	Cartonbox	700	4300902014021	Cartonbox	700	4301902014021	Cartonbox	700
25	4302902514121	Cartonbox	500	4300902514121	Cartonbox	300	4301902514121	Cartonbox	500

PP-R End Cap



Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4302902006021	Cartonbox	1000	4300902006021	Cartonbox	500	4301902006021	Cartonbox	1000
25	4302902506121	Cartonbox	600	4300902506121	Cartonbox	300	4301902506121	Cartonbox	600
32	4302903206221	Cartonbox	300	4300903206221	Cartonbox	100	4301903206221	Cartonbox	300
40	4302904006321	Cartonbox	175	4300904006321	Cartonbox	75	4301904006321	Cartonbox	175
50	4302905006421	Cartonbox	100	4300905006421	Cartonbox	40	4301905006421	Cartonbox	100
63	4302906306521	Cartonbox	50	4300906306521	Cartonbox	20	4301906306521	Cartonbox	50
75	4302907506621	Cartonbox	25	4300907506621	Cartonbox	25	4301907506621	Cartonbox	25
90	4302909006821	Cartonbox	18	4300909006821	Cartonbox	18	4301909006821	Cartonbox	18
110	4302911006721	Cartonbox	9	4300911006721	Cartonbox	3	4301911006721	Cartonbox	9
160	4302916006722	Cartonbox	1						

AQUASYSTEM PP-R and PP-RCT



PP-R Union - PN10

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4302902028021	Cartonbox	200	4300902028021	Cartonbox	100	4301902028021	Cartonbox	200
25	4302902528121	Cartonbox	125	4300902528121	Cartonbox	50	4301902528121	Cartonbox	125
32	4302903228221	Cartonbox	80	4300903228221	Cartonbox	80	4301903228221	Cartonbox	80
40	4302904028321	Cartonbox	50	4300904028321	Cartonbox	20	4301904028321	Cartonbox	50
50	4302905028421	Cartonbox	30	4300905028421	Cartonbox	15	4301905028421	Cartonbox	30
63	4302906328521	Cartonbox	20	4300906328521	Cartonbox	20	4301906328521	Cartonbox	20
75	4302907528621	Cartonbox	16	4300907528621	Cartonbox	16	4301907528621	Cartonbox	16
90	4302909032521	Cartonbox	8	4300909032521	Cartonbox	8			



PP-R Female Coupler (Round)

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302702030021	Cartonbox	325	4300702030021	Cartonbox	325	4301702030021	Cartonbox	325
20-3/4"	4302702030121	Cartonbox	250	4300702030121	Cartonbox	100	4301702030121	Cartonbox	250
25-1/2"	4302702530221	Cartonbox	225	4300702530221	Cartonbox	225	4301702530221	Cartonbox	225
25-3/4"	4302702530321	Cartonbox	225	4300702530321	Cartonbox	225	4301702530321	Cartonbox	225
32-3/4"	4302703225321	Cartonbox	100	4300703225321	Cartonbox	40	4301703225321	Cartonbox	100
32-1"	4302703230421	Cartonbox	125	4300703230421	Cartonbox	125	4301703230421	Cartonbox	125



PP-R Male Coupler (Round)

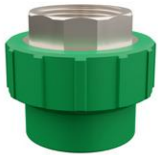
Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-3/4"	4302702032121	Cartonbox	200	4300702032121	Cartonbox	50	4301702032121	Cartonbox	200
25-1/2"	4302702532221	Cartonbox	200						
25-3/4"	4302702532321	Cartonbox	200	4300702532321	Cartonbox	200	4301702532321	Cartonbox	200
32-3/4"	4302703227421	Cartonbox	100	4300703227421	Cartonbox	100	4301703227421	Cartonbox	100
32-1"	4302703232421	Cartonbox	100	4300703232421	Cartonbox	100	4301703232421	Cartonbox	100



PP-R Male Coupler (Hexagonal)

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302702032921	Cartonbox	250	4300702032921	Cartonbox	250	4301702032921	Cartonbox	250
25-1/2"	4302702532921	Cartonbox	200	4300702532921	Cartonbox	200	4301702532921	Cartonbox	200
32-1"	4302703227121	Cartonbox	80	4300703227021	Cartonbox	40	4301703227121	Cartonbox	80
40-1.1/4"	4302704027121	Cartonbox	50	4300704027121	Cartonbox	50	4301704027221	Cartonbox	50
50-1.1/2"	4302705027221	Cartonbox	40	4300705027221	Cartonbox	20	4301705027321	Cartonbox	40
63-2"	4302706327321	Cartonbox	20	4300706327321	Cartonbox	20	4301706327421	Cartonbox	20
75-2.1/2"	4302707527421	Cartonbox	16	4300707527421	Cartonbox	16	4301707527521	Cartonbox	16
90-3"	4302709029421	Cartonbox	10	4300709027521	Cartonbox	4	4301709027721	Cartonbox	10
110-4"	4302711027621	Cartonbox	4	4300711027621	Cartonbox	4	4301711027621	Cartonbox	4

AQUASYSTEM PP-R and PP-RCT



PP-R Female Coupler (Hexagonal)

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
32-1"	4302703227021	Cartonbox	80	4300703225021	Cartonbox	40	4301703227021	Cartonbox	80
40-1.1/4"	4302704025121	Cartonbox	50	4300704025121	Cartonbox	30	4301704025121	Cartonbox	50
50-1.1/2"	4302705025221	Cartonbox	40	4300705025221	Cartonbox	10	4301705025221	Cartonbox	40
63-2"	4302706325321	Cartonbox	20	4300706325321	Cartonbox	5	4301706325321	Cartonbox	20
75-2.1/2"	4302707525421	Cartonbox	16	4300707525421	Cartonbox	16	4301707525421	Cartonbox	16
90-3"	4302709028421	Cartonbox	10	4300709025621	Cartonbox	10	4301709025621	Cartonbox	10
110-4"	4302711025521	Cartonbox	6	4300711025521	Cartonbox	3	4301711025521	Cartonbox	6



PPR Male Elbow

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302102007021	Cartonbox	200	4300102007021	Cartonbox	200	4301102007021	Cartonbox	200
20-3/4"	4302102007121	Cartonbox	180	4300102007121	Cartonbox	80	4301102007121	Cartonbox	180
25-1/2"	4302102507221	Cartonbox	180	4300102507221	Cartonbox	180	4301102507221	Cartonbox	180
25-3/4"	4302102507321	Cartonbox	100	4300102507321	Cartonbox	100	4301102507321	Cartonbox	100
32-3/4"	4302103207421	Cartonbox	75	4300103207421	Cartonbox	30	4301103207421	Cartonbox	75
32-1"	4302103207521	Cartonbox	80	4300103207521	Cartonbox	80	4301103207521	Cartonbox	80



PP-R Union Socket Female

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302702003021	Cartonbox	300	4300902003021	Cartonbox	100	4301902003021	Cartonbox	300
20-3/4"	4302902003121	Cartonbox	150	4300902003121	Cartonbox	150	4301902003121	Cartonbox	150
25-3/4"	4302702503121	Cartonbox	150	4300902503321	Cartonbox	50	4301902503321	Cartonbox	150
32-1"	4302703203521	Cartonbox	150	4300903203521	Cartonbox	50	4301903203521	Cartonbox	150
40-1.1/4"	4302904005021	Cartonbox	50	4300904005021	Cartonbox	20	4301904005021	Cartonbox	50
50-1.1/2"	4302905005121	Cartonbox	30	4300905005121	Cartonbox	15	4301905005121	Cartonbox	30
63-2"	4302906305221	Cartonbox	20	4300906305221	Cartonbox	4	4301906305221	Cartonbox	20



PP-R Union Socket Male

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302702004021	Cartonbox	300	4300902004021	Cartonbox	150	4301902004021	Cartonbox	300
20-3/4"	4302902004121	Cartonbox	150	4300902004121	Cartonbox	50	4301902004121	Cartonbox	150
25-3/4"	4302702504321	Cartonbox	150	4300902504321	Cartonbox	150	4301902504321	Cartonbox	150
32-1"	4302703204521	Cartonbox	125	4300903204521	Cartonbox	50	4301903204521	Cartonbox	125
40-1.1/4"	4302904005321	Cartonbox	50	4300904005321	Cartonbox	20	4301904005321	Cartonbox	50
50-1.1/2"	4302905005421	Cartonbox	30	4300905005421	Cartonbox	15	4301905005421	Cartonbox	30
63-2"	4302906305521	Cartonbox	20	4300906305521	Cartonbox	10	4301906305521	Cartonbox	20

AQUASYSTEM PP-R and PP-RCT



PP-R Female Tee

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302902010021	Cartonbox	160	4300902010021	Cartonbox	160	4301902010021	Cartonbox	160
20-3/4"	4302902010121	Cartonbox	160	4300902010121	Cartonbox	80	4301902010121	Cartonbox	160
25-1/2"	4302902510221	Cartonbox	120	4300902510221	Cartonbox	120	4301902510221	Cartonbox	120
25-3/4"	4302902510321	Cartonbox	120	4300902510321	Cartonbox	60	4301902510321	Cartonbox	120
32-3/4"	4302903210421	Cartonbox	60	4300903210421	Cartonbox	30	4301903210421	Cartonbox	60
32-1"	4302903210521	Cartonbox	70	4300903210521	Cartonbox	30	4301903210521	Cartonbox	70



PP-R Male Tee

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302902012021	Cartonbox	150	4300902012021	Cartonbox	60	4301902012021	Cartonbox	150



PP-R Tee

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4302902008021	Cartonbox	250	4300902008021	Cartonbox	250	4301902008021	Cartonbox	250
25	4302902508121	Cartonbox	150	4300902508121	Cartonbox	150	4301902508121	Cartonbox	150
32	4302903208221	Cartonbox	100	4300903208221	Cartonbox	100	4301903208221	Cartonbox	100
40	4302904008321	Cartonbox	50	4300904008321	Cartonbox	20	4301904008321	Cartonbox	50
50	4302905008421	Cartonbox	30	4300905008421	Cartonbox	30	4301905008421	Cartonbox	30
63	4302906308521	Cartonbox	20	4300906308521	Cartonbox	8	4301906308521	Cartonbox	20
75	4302907508621	Cartonbox	10	4300907508621	Cartonbox	4	4301907508621	Cartonbox	10
90	4302909008721	Cartonbox	6	4300909008721	Cartonbox	2	4301909008721	Cartonbox	6
110	4302911008821	Cartonbox	3	4300911008821	Cartonbox	3	4301911008821	Cartonbox	3
160	4302916009021	Cartonbox	1	4300916009021	Cartonbox	1	4301916009021	Cartonbox	1



PP-R Backplate Elbow Male

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
25-3/4"	4302102509221	Cartonbox	100	4300102509221	Cartonbox	100	4301102509221	Cartonbox	100



PP-R Backplate Elbow Female

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302902002021	Cartonbox	150	4300902002021	Cartonbox	150	4301902002021	Cartonbox	150



PP-R Female Elbow

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302102006021	Cartonbox	200	4300102006021	Cartonbox	200	4301102006021	Cartonbox	200
20-3/4"	4302102006121	Cartonbox	200	4300102006121	Cartonbox	80	4301102006121	Cartonbox	200
25-1/2"	4302102506221	Cartonbox	175	4300102506221	Cartonbox	175	4301102506221	Cartonbox	175
25-3/4"	4302102506321	Cartonbox	140	4300102506321	Cartonbox	140	4301102506321	Cartonbox	140
32-3/4"	4302103206421	Cartonbox	75	4300103206421	Cartonbox	30	4301103206421	Cartonbox	75
32-1"	4302103206521	Cartonbox	75	4300103206521	Cartonbox	30	4301103206521	Cartonbox	75

AQUASYSTEM PP-R and PP-RCT



Internal Threaded Elbow with PP-R Connection

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302102008021	Cartonbox	100	4300102008021	Cartonbox	100			
20-3/4"	4302102008121	Cartonbox	100	4300102008121	Cartonbox	100	4301102008121	Cartonbox	100
25-1/2"	4302102508221	Cartonbox	100	4300102508221	Cartonbox	100	4301102508221	Cartonbox	100
25-3/4"	4302102508321	Cartonbox	100	4300102508321	Cartonbox	60	4301102508321	Cartonbox	100



PP-R Backplate Elbow Double Female

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
25-1/2"	4302902502121	Cartonbox	80	4300902502121	Cartonbox	40	4301902502121	Cartonbox	80



PP-R Backplate Elbow - 2 Connected

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302902002121	Cartonbox	150	4300902002121	Cartonbox	150	4301902002121	Cartonbox	150



PP-R Transition w Loose Nut

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302902013021	Cartonbox	300	4300902013021	Cartonbox	100	4301902013021	Cartonbox	300
25-3/4"	4302902513221	Cartonbox	200	4300902513221	Cartonbox	100	4301902513221	Cartonbox	200
25-1"	4302902513321	Cartonbox	150	4300902513321	Cartonbox	50	4301902513321	Cartonbox	150



PP-R Double Internal Threaded Battery Connector

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302902011021	Cartonbox	50	4300902011021	Cartonbox	50	4301902011021	Cartonbox	50
25-1/2"	4302902503121	Cartonbox	50	4300902503121	Cartonbox	50	4301902503121	Cartonbox	50



PP-R Distribution Manifold

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302902002321	Cartonbox	15	4300902002321	Cartonbox	15	4301902002321	Cartonbox	15



PP-R Faucet Connection – Bidet

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302902012321	Cartonbox	50	4300902012121	Cartonbox	50	4301902012121	Cartonbox	50

AQUASYSTEM PP-R and PP-RCT

PP-RCT Saddle

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
40-50-25	4302906390132	Cartonbox	240						
75-125-40	4302912590622	Cartonbox	30						



PP-R Check Valve - PN10

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20				4300902031022	Cartonbox	20	4301902031022	Cartonbox	100
25	4302902531122	Cartonbox	50	4300902531122	Cartonbox	50	4301902531122	Cartonbox	50
32	4302903231222	Cartonbox	40	4300903231222	Cartonbox	40	4301903231222	Cartonbox	40
40	4302904031322	Cartonbox	24	4300904031322	Cartonbox	24	4301904031322	Cartonbox	24
50	4302905031422	Cartonbox	15	4300905031422	Cartonbox	15			
63	4302906331522	Cartonbox	8						
75	4302907531622	Cartonbox	4				4301907531622	Cartonbox	4
90	4302909031722	Cartonbox	2				4300909031722	Cartonbox	2



PP-R Gate Valve

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302802035021	Cartonbox	75	4300802035021	Cartonbox	75	4301802035021	Cartonbox	75
25-3/4"	4302802535121	Cartonbox	60	4300802535121	Cartonbox	20	4301802535121	Cartonbox	60
32-1"	4302803235221	Cartonbox	40	4300803235221	Cartonbox	15	4301803235221	Cartonbox	40

PP-R Gate Valve Cap

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302802035121	Cartonbox	75						
25-3/4"	4302802535221	Cartonbox	60						



Union Ball Valve - PN10

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4302802042522	Cartonbox	70	4300802042522	Cartonbox	70	4301802042522	Cartonbox	70
25	4302802542622	Cartonbox	50	4300802542622	Cartonbox	50	4301802542622	Cartonbox	50
32	4302803242722	Cartonbox	30	4300803242722	Cartonbox	30	4301803242722	Cartonbox	30
40	4302804043122	Cartonbox	15	4300804043122	Cartonbox	15	4301804043122	Cartonbox	15
50	4302805043222	Cartonbox	12	4300805043222	Cartonbox	12	4301805043222	Cartonbox	12
63	4302806343322	Cartonbox	8	4300806343322	Cartonbox	8	4301806343322	Cartonbox	8
75							4301807543422	Cartonbox	4
90							4301809043522	Cartonbox	2



PP-R Lux Chromium Valve Long

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302802040221	Cartonbox	50	4300802060721	Cartonbox	20	4301802040621	Cartonbox	50
25-3/4"	4302802540421	Cartonbox	40	4300802560821	Cartonbox	40	4301802540721	Cartonbox	40
32-1"	4302803240621	Cartonbox	40	4300803240621	Cartonbox	40			

AQUASYSTEM PP-R and PP-RCT



PP-R Chromium Valve Long

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302802040121	Cartonbox	50	4300802040121	Cartonbox	50	4301802040121	Cartonbox	50
25-3/4"	4302802540321	Cartonbox	40	4300802540321	Cartonbox	20	4301802540321	Cartonbox	40
32-1"	4302803240521	Cartonbox	40	4300803240521	Cartonbox	40	4301803240521	Cartonbox	40

PP-R Locket Valve

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302802070721	Cartonbox	36						
25-3/4"	4302802570821	Cartonbox	36						
32-1"	4302803270921	Cartonbox	36						

Ball Valve New (Welt-In) - PN20

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4302802042822	Cartonbox	100	4300802042822	Cartonbox	30	4301802042822	Cartonbox	100
25	4302802542922	Cartonbox	70	4300802542922	Cartonbox	30	4301802542922	Cartonbox	70
32	4302803243022	Cartonbox	45	4300803243022	Cartonbox	45	4301803243022	Cartonbox	45
40	4302804043622	Cartonbox	25	4300804043622	Cartonbox	10	4301804060422	Cartonbox	25
50	4302805043722	Cartonbox	20	4300805043722	Cartonbox	20	4301805060522	Cartonbox	20
63	4302806343822	Cartonbox	15	4300806343822	Cartonbox	3	4301806343822	Cartonbox	15
75	4302807543922	Cartonbox	8	4300807543322	Cartonbox	8	4301807543522	Cartonbox	8

PP-R Valve Body

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20	4302802042021	Cartonbox	160						
25	4302802542121	Cartonbox	100						
32	4302803242221	Cartonbox	60						



PP-R Chromium Valve Short

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
20-1/2"	4302802040021	Cartonbox	50	4300802040021	Cartonbox	20	4301802040021	Cartonbox	50
25-3/4"	4302802540221	Cartonbox	40	4300802540221	Cartonbox	20	4301802540221	Cartonbox	40
32-1"	4302803240421	Cartonbox	40	4300803240421	Cartonbox	10	4301803240421	Cartonbox	40



Welding Machine Set Economic

Dia. (mm)	Code	Packing	
		Type	Pc
20-63	4301900044082	Piece	1



Welding Machine Set

Dia. (mm)	Code	Packing	
		Type	Pc
20-63	4301900044282	Piece	1



Welding Machine

Dia. (mm)	Code	Packing	
		Type	Pc
75-100	4301900044382	Piece	1



Welding Machine Car Type

Dia. (mm)	Code	Packing	
		Type	Pc
63-160	4301900045982	Piece	1

AQUASYSTEM PP-R and PP-RCT

PP-R Collector

Dia. (mm)	Code	Packing	
		Type	Pc
63 (3 output)	4300906309921	Piece	1
63 (4 output)	4300906310021	Piece	1
63 (5 output)	4300906310121	Piece	1
63 (6 output)	4300906310221	Piece	1
63 (7 output)	4300906310321	Piece	1

PP-R Electrofusion Fitting

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		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						



PP-R Flange Adaptor

Dia. (mm)	Green Code	Packing		White Code	Packing		Grey Code	Packing	
		Type	Pc		Type	Pc		Type	Pc
75				4300907533022	Cartonbox	48	4301907533022	Cartonbox	45
90				4300909033022	Cartonbox	24	4301909033022	Cartonbox	28
110				4300911033022	Cartonbox	12	4301911033022	Cartonbox	13



PP-R Pipe Sharpener Metal

Dia. (mm)	Code	Packing	
		Type	Pc
20-25	4301902040082	Cartonbox	1
32-40	4301903240182	Cartonbox	50
50-63	4301905040282	Cartonbox	15
75-90	4301907540382	Cartonbox	8
110	4301911042482	Cartonbox	8



PP-R Pipe Sharpener Plastic

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



PP-R Pipe Welding Mould

Dia. (mm)	Code	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	1

Tempilstick

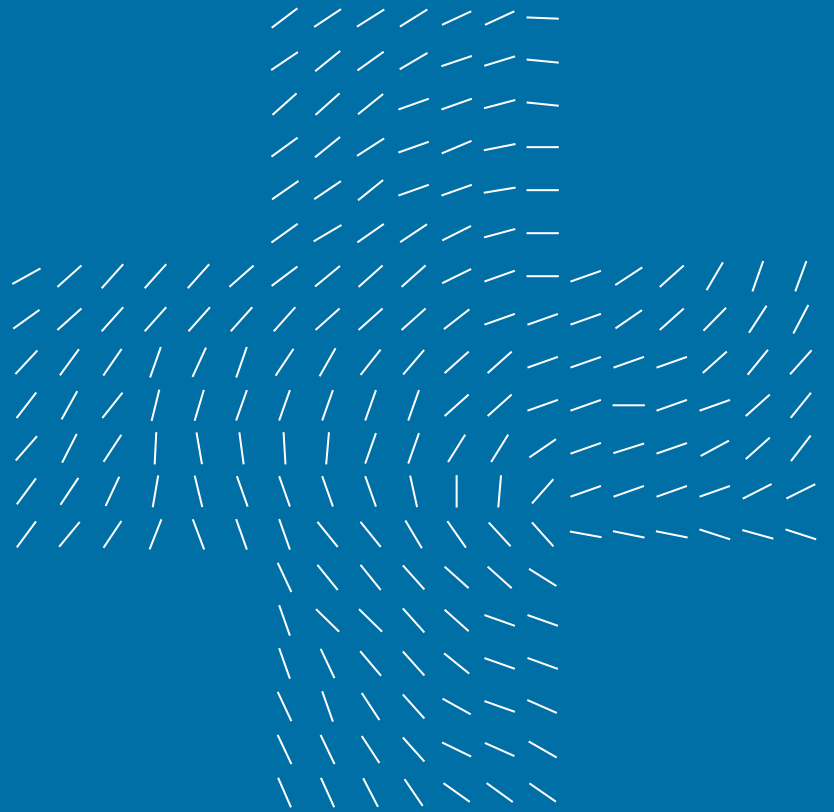
Temp. (°C)	Code	Packing	
		Type	Pc
253	4301900000082	Piece	1
274	4301900000182	Piece	1

Gloves

Size	Code	Packing	
		Type	Pc
Standard	4301900000122	Piece	1

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 & Climafaser 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			

PE-RT, PE-XB Pipes:

Class 1-2-4/10 bar	class 5/8bar
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Glass Reinforced 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			

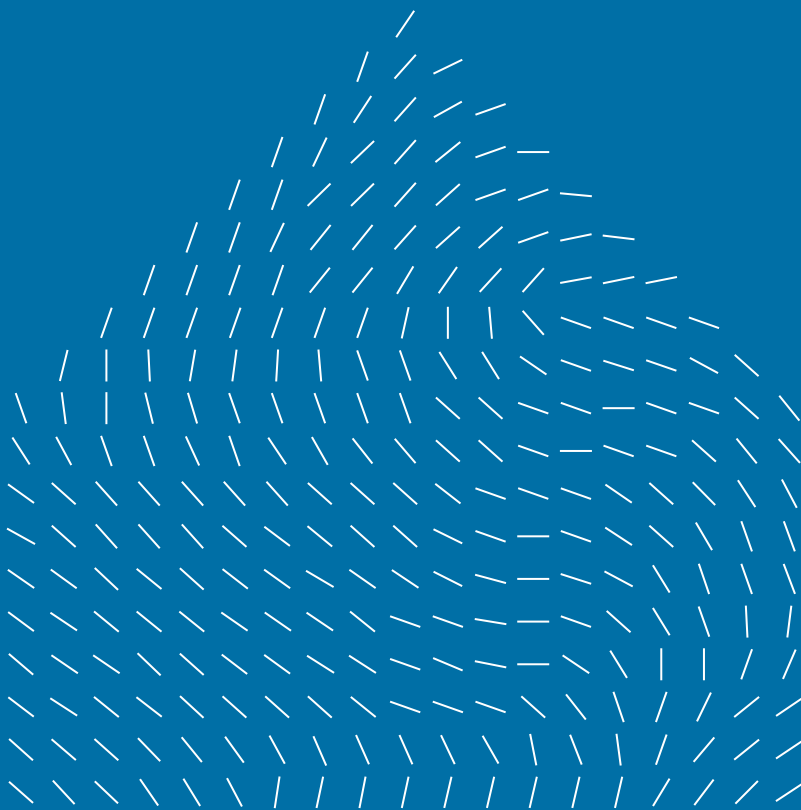
According to DIN 8077 Standard:

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
20 °C*	50	15,2	24,1	30,3	22,2	28
	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
30 °C	25	13,3	21	26,5	19,6	24,6
	50	12,9	20,4	25,8	19,3	24,3
	1	12,8	20,2	25,5	18,1	22,7
	5	12	18,9	23,9	17,4	22
40 °C	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
	1	10,8	17,2	21,5	15,5	19,6
50 °C	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
60 °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
70 °C	50	7,8	12,3	15,4	12,1	15,2
	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
80 °C	25	6,7	10,6	13,3	10,4	13,1
	50	6,4	10,3	12,8	10,2	12,8
	1	6,5	10,3	13	9,4	11,9
	5	6	9,5	11,9	9,1	11,4
95 °C	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
	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
	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.

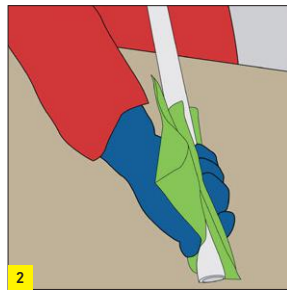
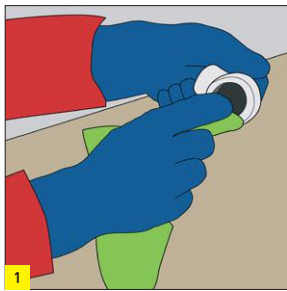
Building Technology (BT) Product Range Installation Instructions

- AQUASYSTEM PP-R and PP-RCT Piping Systems

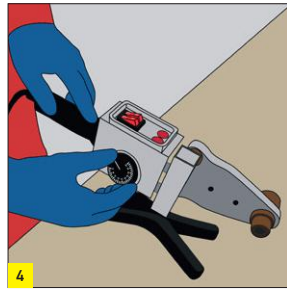
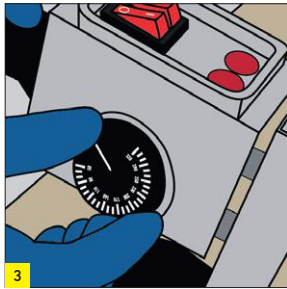


Installation

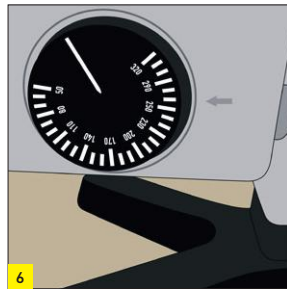
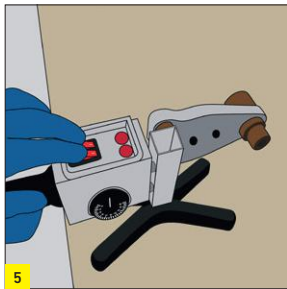
Aquasystem PP-R and PP-RCT Piping Systems



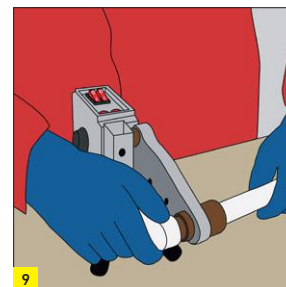
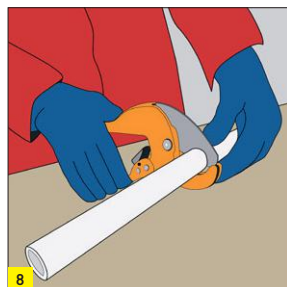
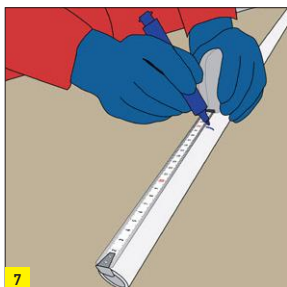
Make sure that pipes, fittings and welding machine are clean.



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.

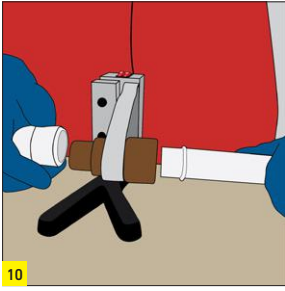
Diameter [mm]	Welding Depth [mm]	Heating Time [mm]	Welding Time [s]	Cooling Time [m]
20	14	5	4	2
25	15	7	4	2
32	16,5	8	5	3
40	18	12	6	4
50	20	18	7	4
63	24	24	8	6
75	28	30	8	6
90	29	40	8	8
110	32,5	50	10	8
125	40	70	10	8
160	45	90	12	10

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.

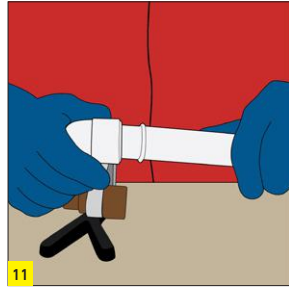
PP-RCT Pipes are fully compatible and weldable with our PP-R fittings:

- Same tooling/equipments
- Same welding parameters
- Same assembling instructions

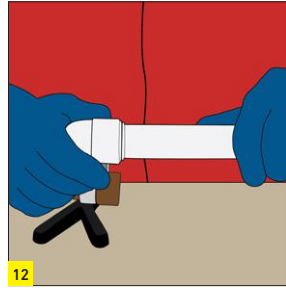
Installation



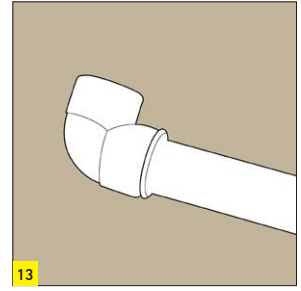
After heating, take out the pipes and fittings from the welding mould carefully.



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**.

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:

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

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

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

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] $\alpha = 0.150 \text{ mm/m}^\circ\text{K}$						
		Temperature Differences ($^\circ\text{C}$)						
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] $\alpha = 0.035 \text{ mm/m}^\circ\text{K}$						
		Temperature Differences ($^\circ\text{C}$)						
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

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.

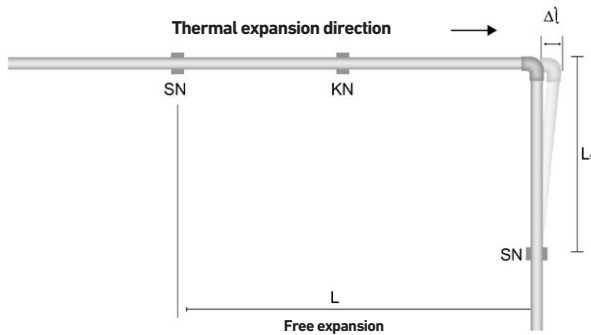
Free Expansion

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:

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

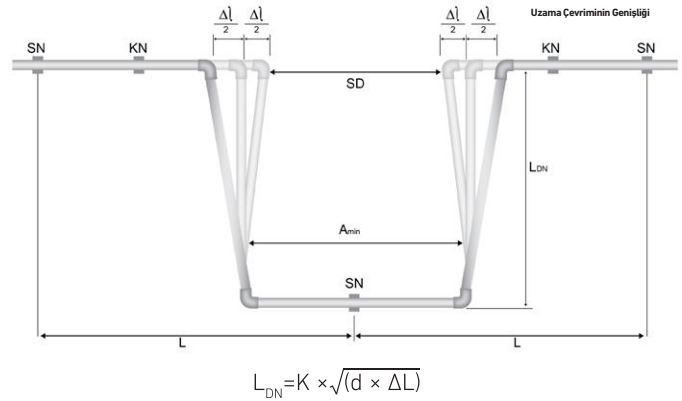
- A_{min} : Minimum thermal expansion compensation width (mm)
- SD: Safety gap (150 mm)
- ΔL : Total elongation of the system from fixed point (mm)



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.



- 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)

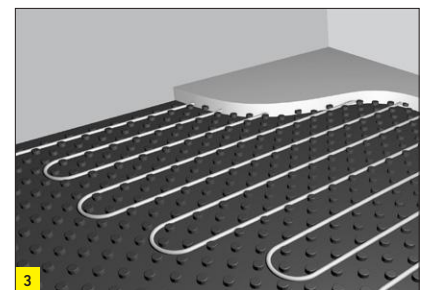
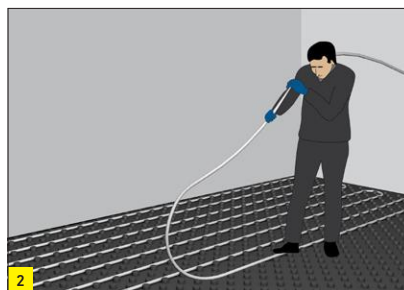
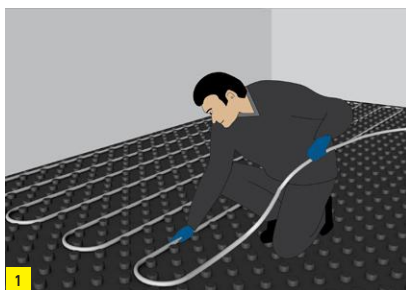
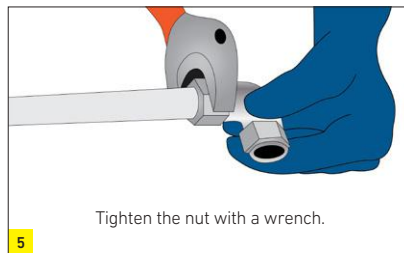
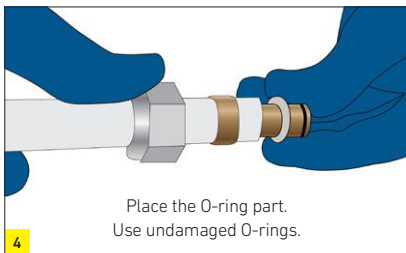
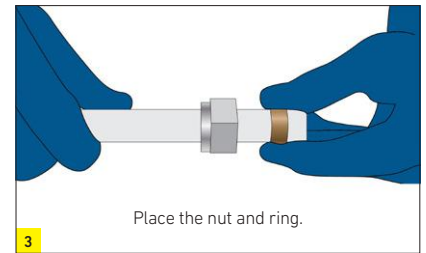
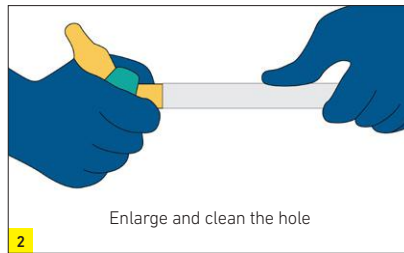
Distances Between Clamps in PP-R Installation:

Standard PP-R Pipes	Temperature Difference	Clamp Distances (cm)										
	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

PE-XB, PE-RT Piping Systems

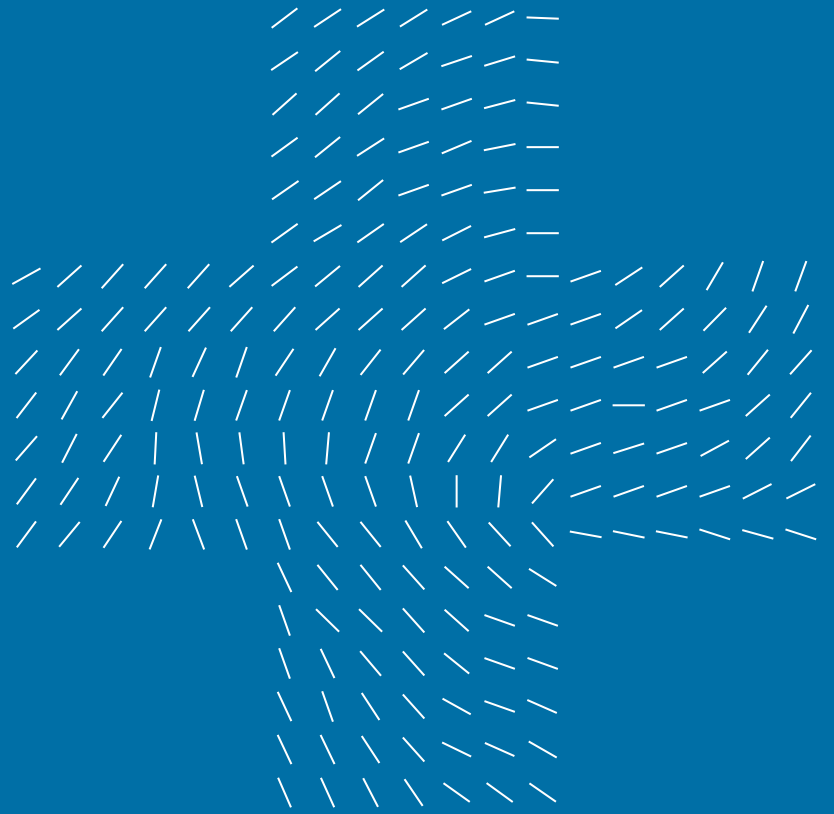


1. PE-Xb pipes should be supported with 90°C edge turner. Edge turner compensates the expansion of pipe and removes internal stress. This prevents cracks that might result in water leakage.

2. Edger legs could be added to each other and could be fixed to the floor.

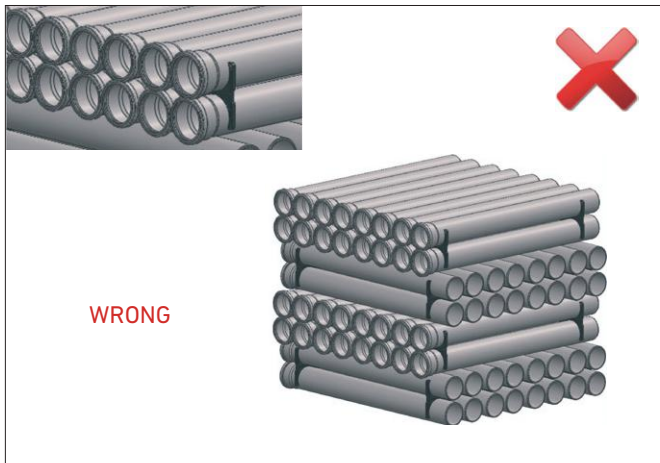
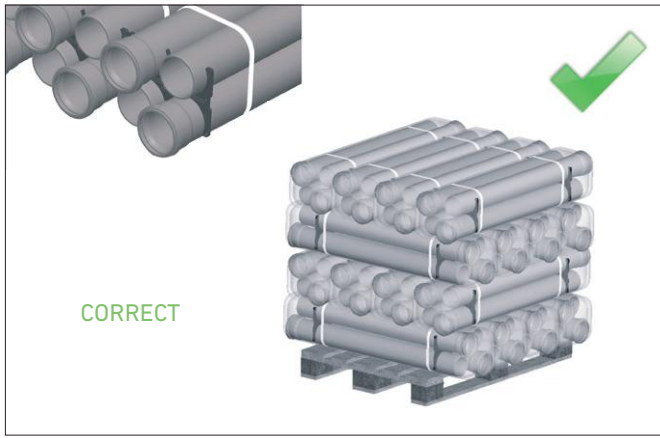
3. After the tightness test, the system is ready for cement finish.

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.



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



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



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



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



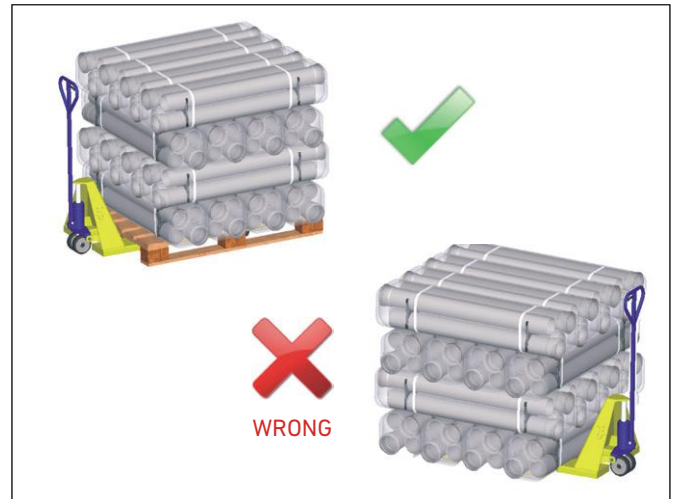
All product ranges are identified in the Warehouse Management System (WMS) by barcode label. Barcode system ensures management of products and prevents complexity and errors during storage and loading.

Storage

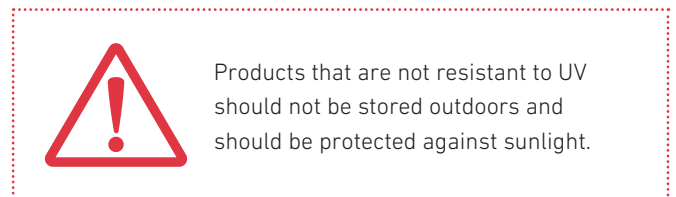


Method of storage should not cause any outflow and should not damage the pipes. As long as they are stored properly, no permanent deformations or damages will occur on the pipes and fittings. Pipes should not be stacked above 1,5 m. Pipes should be safe against sliding.

Pipes 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 floor.

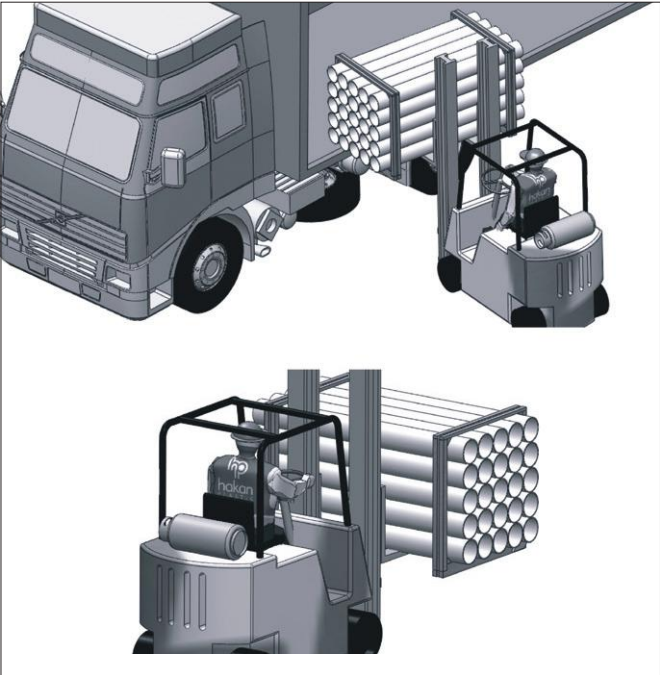


Pipes and fittings packed in carton boxes should be protected against moisture. Carton boxes should be sealed and stored in a dry area.



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 slid 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.



Leading with Water

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