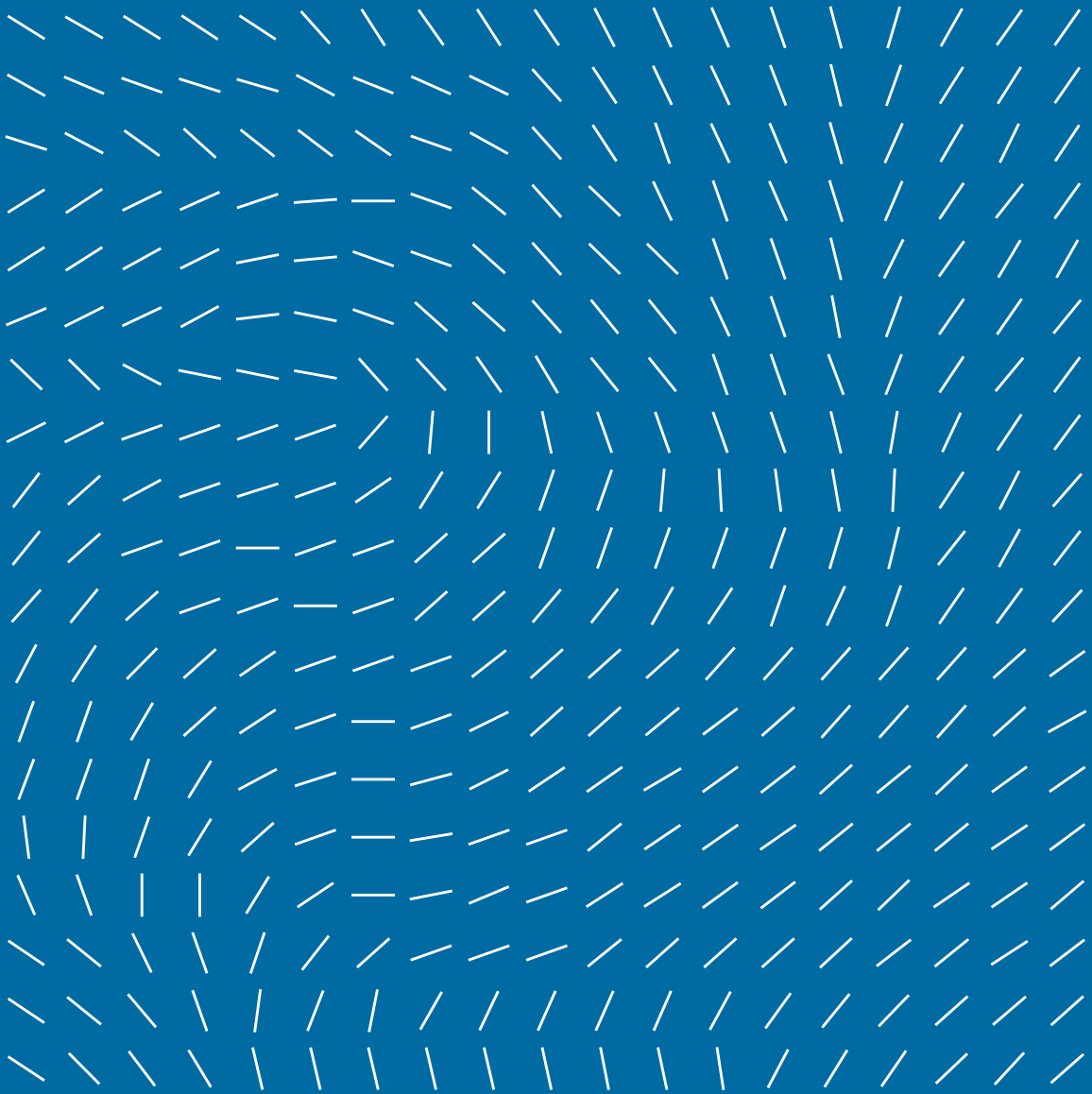
GF Building Flow Solutions

General Catalogue

Leading with Water



Contents

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Leading with Water

**We believe that the world is in constant flux.
At the heart of this flux is the driving force behind everything: water.**

The construction industry accounts for a large share of global carbon dioxide emissions, and as the population grows, we have set ourselves the goal of solving the challenges of our time: We are doing our part to meet the growing demand for energy-efficient and affordable buildings, comfortable and safe homes, and access to clean and safe drinking water.

Our motto "Leading with Water" reflects our goal to unlock the great potential of water as a resource that can make buildings better, promote sustainable development, and enable our customers to be more productive in their own businesses.

By combining our trusted brands GF, Uponor and JRG, based on Swiss, Finnish and German quality, we offer safe solutions for the use and distribution of hot and cold water, sound-absorbing building drainage and energy-efficient heating and cooling.

GF Building Flow Solutions

+ Partners
For designers, investors, contractors, dealers and installers, ensuring that every joint project stands the test of time.

+ Responsible production
Of solutions that protect and responsibly manage drinking water quality throughout the entire water system

+ Supplier
Products, solutions and services that help us build energy-efficient buildings that meet appropriate sustainability standards while ensuring maximum comfort

+ Enabler
For the efficient and professional planning and implementation of construction projects and for increasing profitability.

+ Industry Leader
In reducing emissions, recycling and transitioning to a sustainable development approach

+ Employer
That offers a diverse, inclusive and safe work environment

GF Building Flow Solutions, formerly Uponor, is a business division of the international industrial group Georg Fischer, which has sales companies in 30 countries and production facilities in 13 locations in both Europe and America.

About GF Hakan Plastik

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 eadership 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 t hat 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 standarts applicable worldwide have started to ve applied. GF Hakan Plastik operates in the field of Building Technology (BT) plastic piping sector.

Leading position in production

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.

Superior Supply Chain Processes

GF Building Flow Solutions, a division of GF, is a leading global provider of sustainable and innovative solutions, making water flow in buildings. The division, stemming from the 2023 acquisition of Uponor by GF, provides safe solutions for hot and cold water supply and control, noise-reducing waste water systems, as well as energy-efficient heating and cooling. Its focus is to enable its customers in the residential and commercial space to be more productive and sustainable, while ensuring comfort, health and efficiency. GF Building Flow Solutions has sales companies in 30 countries and production sites in 13 locations across Europe and the Americas.

Anticipating with expertise and trust

Reliability is essential in waste water management. Our advanced solutions exceed industry expectations. With cutting-edge materials and over 100 years of expertise, we offer systems that are durable, easy to install, and require minimal maintenance. From noise-reducing technology to odor-blocking valves, every feature is designed to enhance com-fort and usability.

C

Choosing GF Building Flow Solutions means embracing a future where waste water systems are not a challenge – they are a seamless part of modern, comfortable living.

The right choice for speed and excellence

The full GF Building Flow Solutions Waste Water competence

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

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.

The right solution for every application.

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.

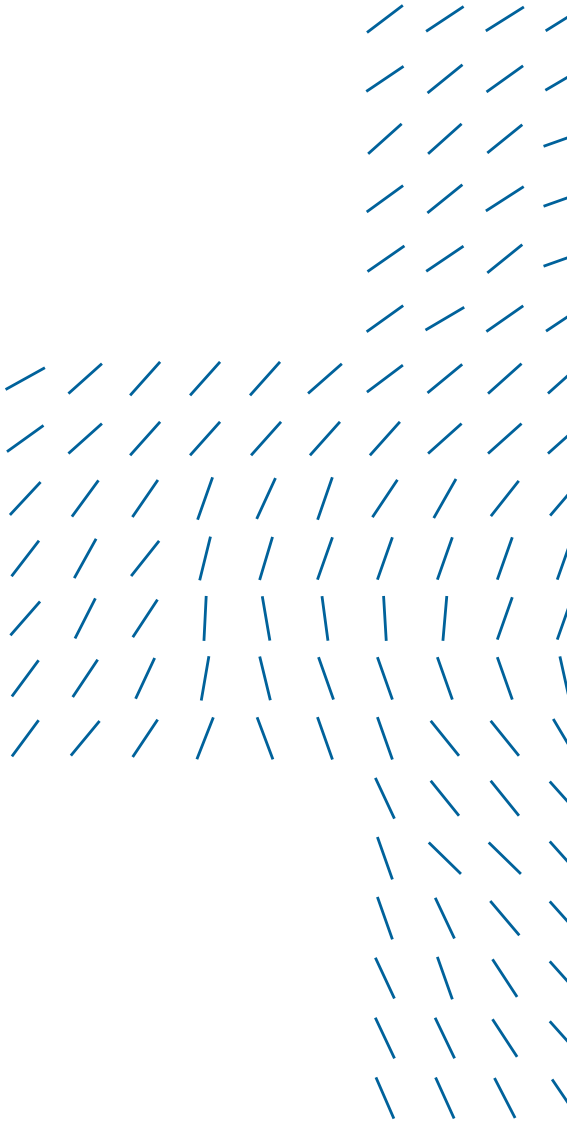
Plastics fall into three main categories on the basis of their internal structure and the resulting mechanical characteris tics: thermoplastics, thermosetting plastics and elastomers.

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, PVCC, etc.) and styrenes (ABS, polystyrene, etc.]

Semi crystalline materials are more suitable for hot welding, while amorphous thermoplastics are ideal for cement ing or cold welding (solvent cementing).



Advantages of Plastic Systems

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

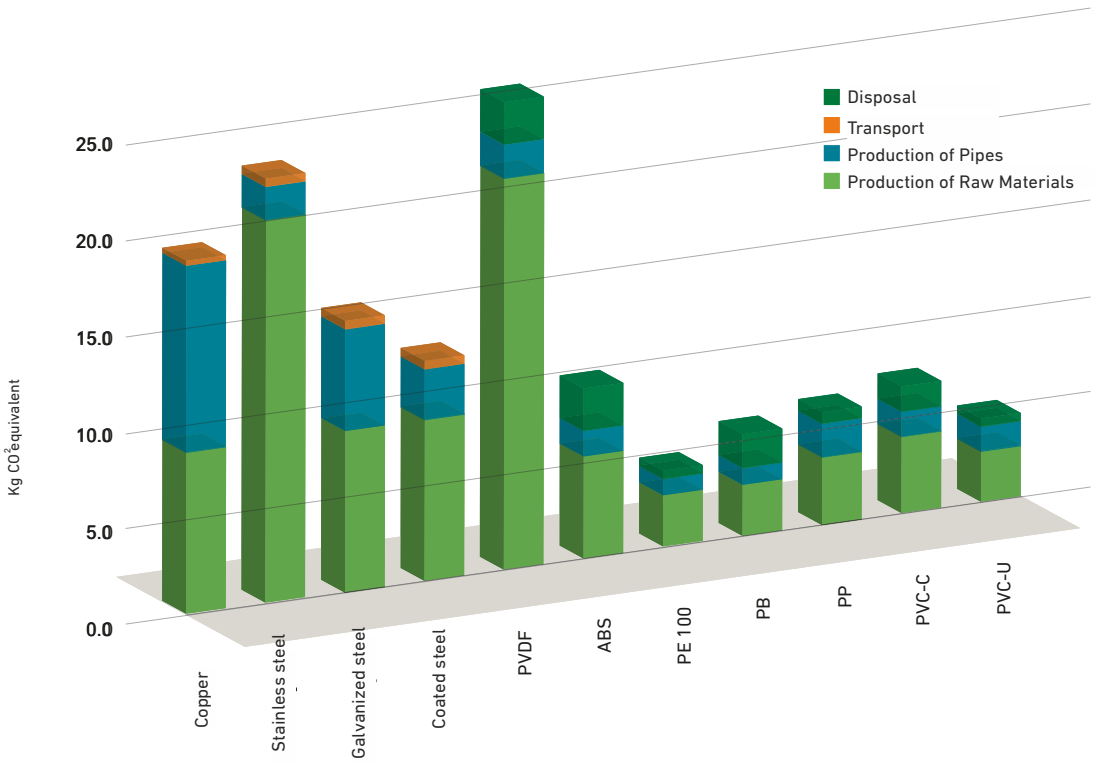
Service Life Analysis of Plastics

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.

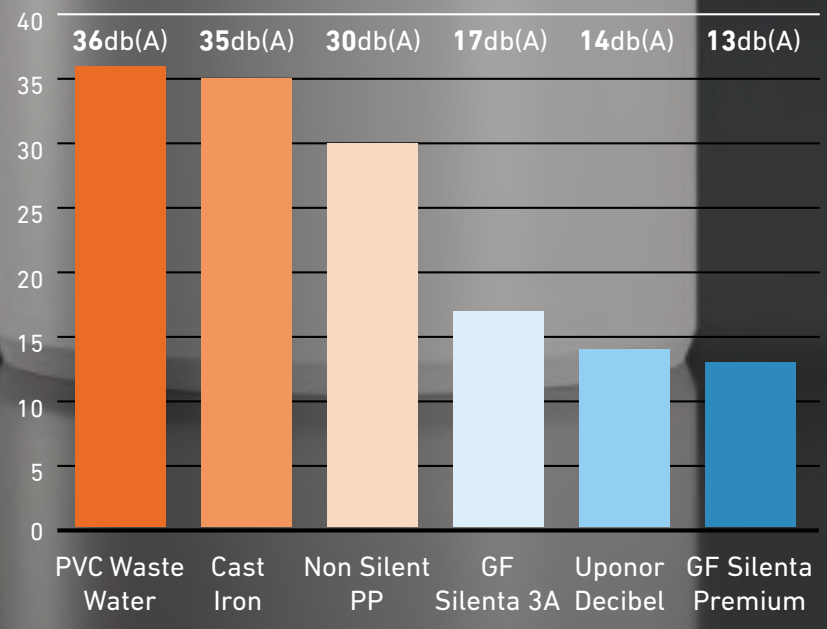
The main reason for high performance of thermoplastics is that they are lightweight. This ensures key benefits during transport and installation. Fully-plastic solutions are lighter than other piping systems of conventional materials, and this creates significant impacts on carbon footprint.



Quiet comfort, proven performance

Silenta Premium

Soundproof Pipe Systems



+GF+

Wastewater disposal can often result in unwanted noise, both structure-borne and air-borne. At GF Building Flow Solutions, we tackle this challenge head-on with our Acoustic In-House Drainage Pipes. Designed to reduce noise at the source, our pipes ensure a quieter, more comfortable living environment. Certified by the Fraunhofer Institute for Building Physics in Stuttgart, our systems deliver top-tier acoustic performance. The graph on this page illustrates the significant reduction in noise levels, highlighting the superior soundproofing of our solutions. With GF Building Flow Solutions, you choose silence, comfort, and proven quality.

Leader in low noise waste water systems

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.

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.

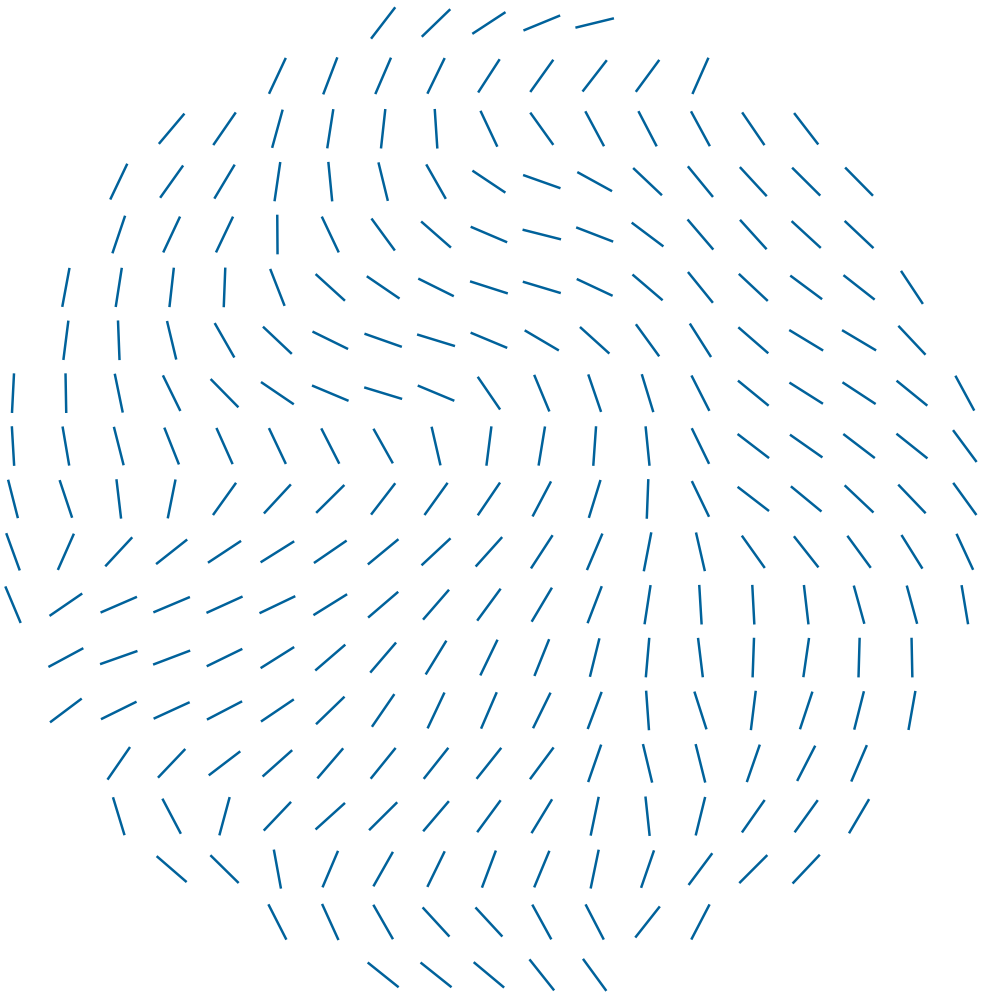
Our Company that places top priority on process and system quality also has TS EN ISO 14001:2015 and TS EN ISO 45001:2018 certificates. Our production plant in Çerkezköy have TS EN ISO/IEC 17024:2012 laboratory.

ISO 9001
BUREAU VERITAS

ISO 14001
BUREAU VERITAS

ISO 45001
BUREAU VERITAS

ISO 50001
BUREAU VERITAS



Worldwide Quality Compliance

Some certifications around the world

UNITED STATES
OPERATIONAL CLEAN SWEEP

TÜRKİYE
TÜRKAK

UK
WRAS

FRANCE
CSTB

POLAND
PZH

UNITED STATES
ABS MARINE

ITALY
RINA

SCANDINAVIAN COUNTRIES
INSTACERT

MALAYSIA
IKRAM QA

TÜRKİYE
EFECTIS ERA AVRASYA TEST LABORATUVARI

I-REC
STANDART

TÜRKİYE
TSE

GERMANY
HYGENE INSTITUT

GERMANY
DVGV

CZECH REPUBLIC
ITC

KOREA
KR MARINE

BULGARIA
NJN

GERMANY
FRAUNHOFER INSTITUTE

NETHERLANDS
KIWA

TÜRKİYE
ZERO WASTE

GERMANY
KTW BLG

UNITED STATES
NSF

BULGARIA
BULGARKONTROLA

HUNGARY
EMI

NORWAY
DNV MARINE

GERMANY
DIBT

GERMANY
SKZ

TÜRKİYE
ENVIRONMENTAL PRODUCT DECLARATION

SWITZERLAND
SGS

AUSTRIA
OFI HYGIENE

SPAIN
AENOR

UKRAINIAN
UKR - SEPRO

UK
LLOYDS REGISTER

FRANCE
BV MARINE

TÜRKİYE
TSEK

GERMANY
HOCH

SPAIN
AFITI LICOF

Worldwide Quality Compliance for Aquasystem

Some certifications around the world

TÜRKİYE
TSE

GERMANY
HYGENE INSTITUT

GERMANY
DVGW

CZECH REPUBLIC
ITC

KOREA
KR MARINE

TÜRKİYE
ENVIRONMENTAL
PRODUCT
DECLARATION

UNITED STATES
NSF

BULGARIA
BULGARKONTROLA

HUNGARY
EMI

NORWAY
DNV MARINE

AUSTRIA
OFI HYGIENE

SPAIN
AENOR

UKRAINIAN
UKR - SEPRO

UK
LLOYDS REGISTER

UK
WRAS

FRANCE
CSTB

POLAND
PZH

UNITED STATES
ABS 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 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)

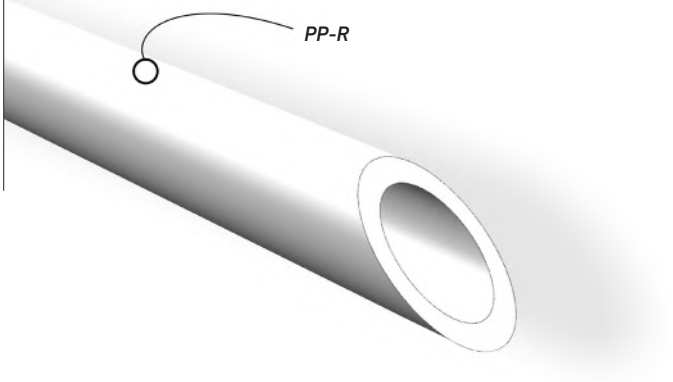
PP-RCT is a new generation raw material which is developed for polypropylene by using a special β-nucleation process.

Thanks to this enchancement, 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

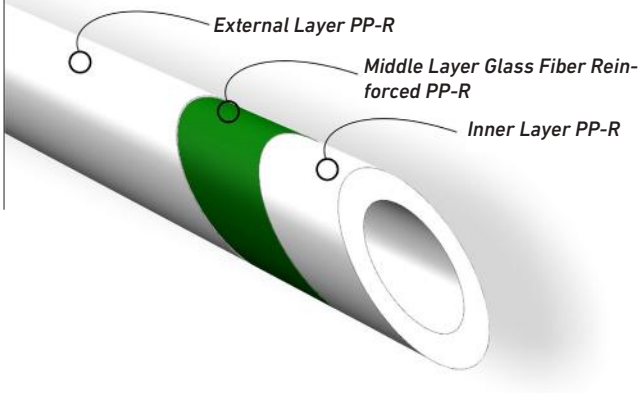
Fields of Application

• 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
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
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 Type	Pc	White Code	Packing Type	Pc	Grey Code	Packing 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 Type	Pc	White Code	Packing Type	Pc	Grey Code	Packing 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 Type	Pc	White Code	Packing Type	Pc	Grey Code	Packing 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 Type	Pc	White Code	Packing Type	Pc	Grey Code	Packing 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						
160	**4002016050021**	Bundle	4						

AQUASYSTEM PP-R and PP-RCT

PP-RCT Standard Pipe – SDR 9 PN22

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

PP-R Elbow 90°

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

PP-R Male to Female Elbow 90°

Dia. (mm)	Green Code	Packing Type	Pc	White Code	Packing Type	Pc	Grey Code	Packing 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 Type	Pc	White Code	Packing Type	Pc	Grey Code	Packing 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 Type	Pc	White Code	Packing Type	Pc	Grey Code	Packing 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 Type	Pc	White Code	Packing Type	Pc	Grey Code	Packing 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
125-90				**4300412512122**	Cartonbox	12			
160-110	**4302416011921**	Cartonbox	7	**4300416011921**	Cartonbox	7	**4301416011921**	Cartonbox	7
*160-125	**4302416012322**	Cartonbox	3	**4300416012322**	Cartonbox	3			

* Butt Weld

PP-R Reducing Cross

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

PP-R Crossover w Socket

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

AQUASYSTEM PP-R and PP-RCT

PP-R Pipe Clamp Single

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

PP-R Union - PN10

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

AQUASYSTEM PP-R and PP-RCT

PP-R Female Coupler (Round)

Dia. (mm)	Green Code	Packing Type	Pc	White Code	Packing Type	Pc	Grey Code	Packing 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 Type	Pc	White Code	Packing Type	Pc	Grey Code	Packing 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	**4300703227321**	Cartonbox	100	**4301703227321**	Cartonbox	100
32-1"	**4302703232421**	Cartonbox	100	**4300703232421**	Cartonbox	100	**4301703232421**	Cartonbox	100

PP-R Male Coupler (Hexagonal)

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

PP-R Female Coupler (Hexagonal)

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

AQUASYSTEM PP-R and PP-RCT

PP-R Union Socket Female

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

PP-R Female Tee

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

PP-R Tee

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

AQUASYSTEM PP-R and PP-RCT

PP-R Backplate Elbow Male

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

PP-R Backplate Elbow Female

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

PP-R Female Elbow

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

Internal Threaded Elbow with PP-R Connection

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

AQUASYSTEM PP-R and PP-RCT

PP-R Double Internal Threaded Battery Connector

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

PP-R Faucet Connection – Bidet

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

PP-RCT Saddle

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

PP-R Check Valve - PN10

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

PP-R Gate Valve

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

AQUASYSTEM PP-R and PP-RCT

Union Ball Valve – PN10

Dia. (mm)	Green Code	Packing Type	Pc	White Code	Packing Type	Pc	Grey Code	Packing Type	Pc
20	**4302802042522**	Cartonbox	70	**4300802042522**	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			
50	**4302805043222**	Cartonbox	12	**4300805043222**	Cartonbox	12			
63	**4302806343322**	Cartonbox	8	**4300806343322**	Cartonbox	8			

PP-R Lux Chromium Valve Long

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

PP-R Chromium Valve Long

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

AQUASYSTEM PP-R and PP-RCT

PP-R Chromium Valve Short

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

Welding Machine Box

Dia. (mm)	Code	Packing Type	Pc
-	**4301900044182**	Cartonbox	5

Welding Machine Single

Dia. (mm)	Code	Packing Type	Pc
-	**4301900044482**	Cartonbox	1

Welding Machine

Dia. (mm)	Code	Packing Type	Pc
Set - 120V	**4301900044682**	Cartonbox	1
Single - 120V	**4301900044782**	Cartonbox	1

Welding Machine Set

Dia. (mm)	Code	Packing Type	Pc
50-125	**4301900045082**	Cartonbox	1

PP-R Welding Machine - Bag Type

Dia. (mm)	Code	Packing Type	Pc
160	**4301900046082**	Cartonbox	1

Welding Machine Set

Volt (V)	Code	Packing Type	Pc
110-120	**4301900045582**	Cartonbox	1

PP-R Flange Adaptor

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

AQUASYSTEM PP-R and PP-RCT

Fml Saddle wSpgt PP-RCT

Dia. (mm)	Green Code	Packing Type	Pc	White Code	Packing Type	Pc	Grey Code	Packing Type	Pc
d63-d25x3/4"	**4302906392022**	Cartonbox	150						
d110-25-1/2"	**4302911091132**	Cartonbox	150						

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

PPR Pipe Clipper

Dia. (mm)	Code	Packing Type	Pc
20-40	**4301900043082**	Cartonbox	4

PP-R Pipe Sharpener Plastic

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

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

Tempilstick

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

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

Gloves

Size	Code	Packing Type	Pc
Standard	**4301900000122**	Piece	1

Welding Depth Gauge

Size	Code	Packing Type	Pc
Standard	**4301900000282**	Piece	1

Worldwide Quality Compliance for Silenta Premium

Some certifications around the world

GERMANY
DIBT

GERMANY
SKZ

TÜRKİYE
TSEK

TÜRKİYE
ENVIRONMENTAL
PRODUCT
DECLARATION

GERMANY
HOCH

GERMANY
FRAUNHOFER
INSTITUTE

Silenta Premium

Sound-Insulated Pipe Systems

Silenta Premium is a sound-insulating 3-layered sewer pipe system made of PP material which is specially formulated and reinforced for non-pressurized domestic drainage in accordance with System Standards of EN 1451, DIN 4109 and DIN 4102.

- Silenta Premium Sound-Insulated Pipe Systems providing a complete solution with advanced level durability, impact resistance, low sound level and easy installation features have considerably wide product range
- It reached 13 dB(A) sound intensity level at the flow rate of 4 l/s in the tests conducted by the German Fraunhofer Institute according to EN 14366
- It can be used in the underground and aboveground drainage systems even in the areas having high traffic load
- Provides excellent sound insulation, creates ideal conditions for buildings and contributes to an increase in the property value along with the quality of life. Reduces the vibrations and unfamiliar sounds coming from the plumbing system
- It is suitable for hot/cold water and acidic liquid transfers.
- No corrosion, durable
- Alternative to cast iron pipes
- Does not contain halogen and emit lethal and poisonous gases
- 100% recyclable and environmentally friendly

Fields of Application

- Office buildings, conference halls etc
- Schools, libraries, hospitals, hotels, houses
- All underground drainage systems between the building and the main pipeline
- Sustainable / green buildings
- Industrial areas (short and long-term use)

13 dB(A)

STRUCTURE

Inner Layer
It provides a perfect flow performance with its structure. The superior chemical resistance prevents corrosion and abrasion. It is resistant to high water temperatures.

Middle Layer
With its high molecular structure and special composite formula, the sound waves are absorbed and prevented.

Outer Layer
It is resistant to high temperatures and impacts.

Special Gasket System
It guarantees water tightness with its special gasket structure providing ease of montage. The geometrical properties of the gasket groove ensure fast and easy installation.

Technical Properties

Pipe Structure	3-Layered (Special PP-Mineral reinforced composite)
Diameters [mm]	d58, d78, d90, d110, d135, d160, d200
Pipe length [mm]	150, 250, 500, 1000, 2000, 3000
Sound transmission	13 dB(A) at 4 l/s (EN 14366)
Fire class	B2 (DIN 4102)
Jointing method	Jointing with Rubber Gasket and Socket (Push-Fit)
Clamping	With GF Hakan Silent pipe clamps
Color	Light Grey (Halogen-free and Cadmium-free)
Installation	Very easy to install thanks to its weight lower than cast-iron pipes
Thermal expansion coefficient	0.04 mm/m°K
Tensile strength	13 N/mm^2
Chemical resistance	Resistant to organic and inorganic chemical environments for pH values between 2 and 12
Installation temperature	Minimum: -10°C Maximum: 60°C
Operating temperature	Minimum: -10°C Maximum: 97°C
Application class	B/D (building / drainage)
Ring Stifness	ISO/DIN 9969, The ring stiffness is at least 4.0 kN / m^2 over the entire range of – dimensions: 58 mm – 200 mm
Impact strength	Complies with EN 1451

Superior Sound-Proof Performance

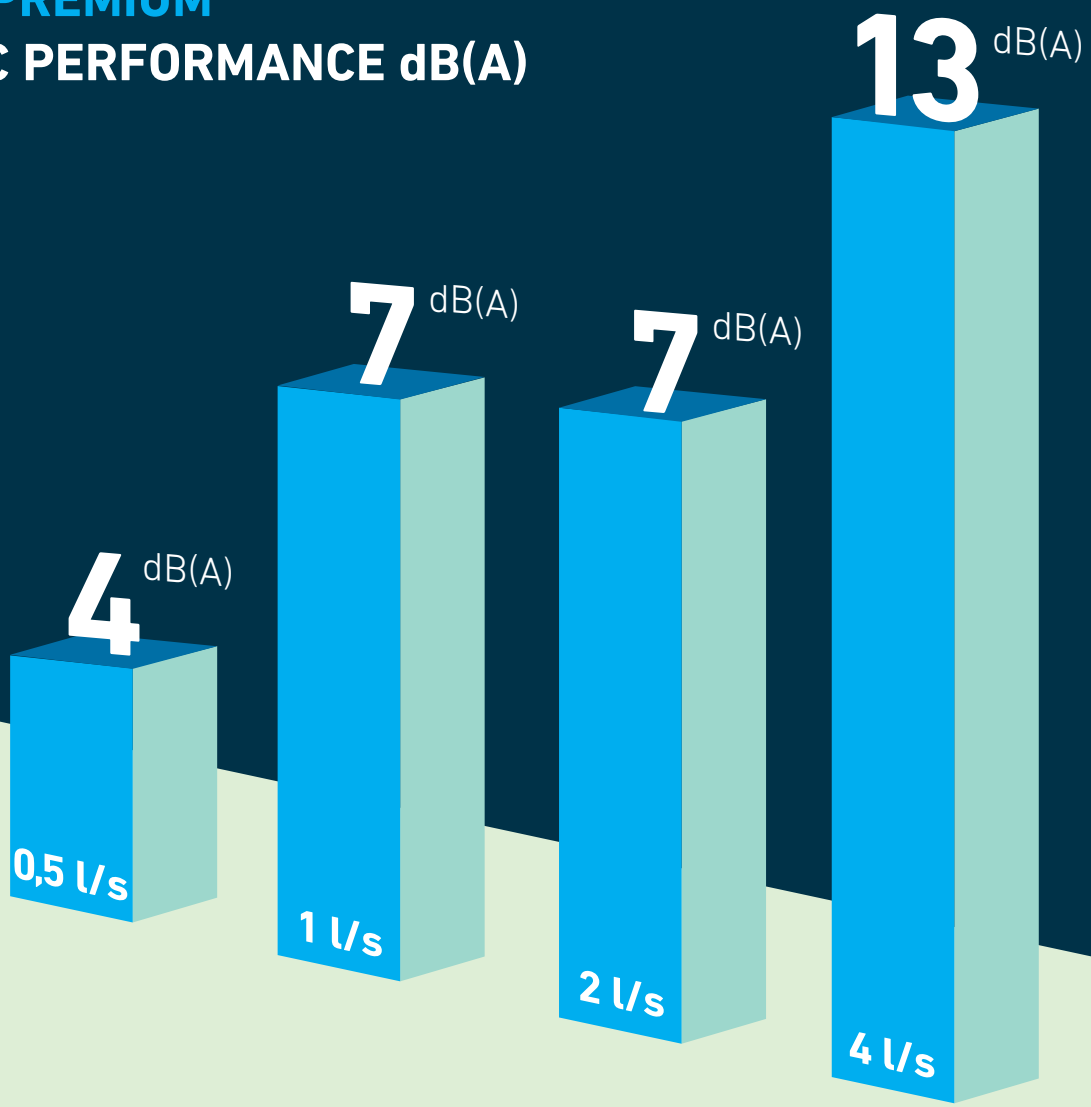
Sound-insulated soil and waste water pipe system **Silenta Premium** guarantees quality, peace of mind and living comfort.

Acoustic performance of Silenta Premium was accredited by the famous German Fraunhofer Institute, in compliance with DIN 4109 and EN 14366.

Noise measurement tests were carried out at Fraunhofer Physical Constructions Institute in Stuttgart, the most accredited European laboratory on noise studies on buildings. The acoustic performance tests were conducted in compliance with the standard DIN EN 14366.

The emitted noise level at **4l/s** flow rate, with special GF Hakan Silent clamps, is only **13 dB(A)** according to **DIN EN 14366.**

SILENTA PREMIUM
ACOUSTIC PERFORMANCE dB(A)



Water flow (l/s)

Silenta Premium

Silenta Premium Pipe with Socket

Dia. (mm)	Leng. (mm)	Code	Packing Type	Pc
58	150	**4501005800121**	Cartonbox	30
58	250	**4501005800221**	Cartonbox	25
58	500	**4401005800321**	Cartonbox	30
58	1000	**4401005800421**	Bundle	8
58	2000	**4401005800521**	Bundle	8
58	3000	**4401005800621**	Bundle	8
78	150	**4501007801021**	Cartonbox	40
78	250	**4501007801121**	Cartonbox	12
78	500	**4401007801221**	Cartonbox	16
78	1000	**4401007801321**	Bundle	6
78	2000	**4401007801421**	Bundle	6
78	3000	**4401007801521**	Bundle	6
90	500	**4401009002221**	Cartonbox	12
90	1000	**4401009002321**	Bundle	6
90	2000	**4401009002421**	Bundle	6
90	3000	**4401009003321**	Bundle	6
110	150	**4501011003021**	Cartonbox	9
110	250	**4501011003121**	Cartonbox	12
110	500	**4501011003221**	Cartonbox	8
110	1000	**4401011003321**	Bundle	4
110	2000	**4401011003421**	Bundle	4
110	3000	**4401011003521**	Bundle	4
135	150	**4401013504021**	Cartonbox	12
135	250	**4401013504121**	Cartonbox	8
135	500	**4401013504221**	Cartonbox	5
135	1000	**4401013504321**	Bundle	4
135	2000	**4401013504421**	Bundle	4
135	3000	**4401013504521**	Bundle	4
160	150	**4401016005021**	Cartonbox	10
160	250	**4401016005121**	Cartonbox	6
160	500	**4401016005221**	Cartonbox	4
160	1000	**4401016005321**	Piece	1
160	2000	**4401016005421**	Piece	1
160	3000	**4401016005521**	Piece	1
200	500	**4401020006021**	Cartonbox	5
200	1000	**4401020006121**	Piece	1
200	2000	**4401020006221**	Piece	1
200	3000	**4401020006321**	Piece	1

Silenta Premium Pipe without Socket

Dia. (mm)	Leng. (mm)	Code	Packing Type	Pc
58	3000	**4401005810621**	Bundle	8
58	5000	**4401005810821**	Bundle	8
78	3000	**4401007811521**	Bundle	6
78	5000	**4401007811721**	Bundle	6
90	1000	**4401009003121**	Bundle	10
110	3000	**4401011013521**	Bundle	4
110	5000	**4401011013721**	Bundle	4
160	3000	**4401016015521**	Piece	1
200	5000	**4401020016321**	Piece	1

Silenta Premium Elbow 15°

Dia. (mm)	Code	Packing Type	Pc
78	**4501107800121**	Cartonbox	70
90	**4501109000121**	Cartonbox	39
110	**4501111000521**	Cartonbox	20

Silenta Premium Elbow 30°

Dia. (mm)	Code	Packing Type	Pc
58	**4501105800421**	Cartonbox	120
78	**4501107800221**	Cartonbox	70
90	**4501109000221**	Cartonbox	39
110	**4501111000621**	Cartonbox	20

Silenta Premium Elbow 45°

Dia. (mm)	Code	Packing Type	Pc
58	**4501105800121**	Cartonbox	50
78	**4501107800321**	Cartonbox	60
90	**4501109000321**	Cartonbox	32
110	**4501111000721**	Cartonbox	20
135	**4501113501021**	Cartonbox	5
160	**4501116001221**	Cartonbox	8
200	**4501120001421**	Cartonbox	4

Silenta Premium Elbow 67,5°

Dia. (mm)	Code	Packing Type	Pc
58	**4501105800521**	Cartonbox	32
78	**4501107800521**	Cartonbox	40
110	**4501111000821**	Cartonbox	16

Silenta Premium Elbow 87,5°

Dia. (mm)	Code	Packing Type	Pc
58	**4501105800221**	Cartonbox	40
78	**4501107800421**	Cartonbox	20
90	**4501109000421**	Cartonbox	32
110	**4501111000921**	Cartonbox	16
135	**4501113501121**	Cartonbox	12
160	**4501116001321**	Cartonbox	6
200	**4501120001521**	Cartonbox	3

Silenta Premium

Silenta Premium Long Elbow 45°

Dia. (mm)	Code	Packing Type	Pc
110	**4501111001321**	Cartonbox	8

Silenta Premium Clean Out Elbow 87,5°

Dia. (mm)	Code	Packing Type	Pc
110	**4501311001121**	Cartonbox	15

Silenta Premium Branch 45°

Dia. (mm)	Code	Packing Type	Pc
58-58	**4501205800121**	Cartonbox	20
78-58	**4501207800221**	Cartonbox	30
78-78	**4501207800321**	Cartonbox	20
90-58	**4501209000121**	Cartonbox	14
90-90	**4501209000321**	Cartonbox	14
110-58	**4501211000421**	Cartonbox	18
110-78	**4501211000521**	Cartonbox	14
110-110	**4501211000621**	Cartonbox	10
135-78	**4501213500721**	Cartonbox	10
135-110	**4501213500821**	Cartonbox	6
135-135	**4501213500921**	Cartonbox	5
160-110	**4501216001021**	Cartonbox	5
160-135	**4501216001121**	Cartonbox	4
160-160	**4501216001221**	Cartonbox	3
200-110	**4501220001421**	Cartonbox	2
200-135	**4501220001521**	Cartonbox	2
200-160	**4501220001621**	Cartonbox	1
200-200	**4501220001721**	Cartonbox	3

Silenta Premium Branch 67,5°

Dia. (mm)	Code	Packing Type	Pc
110-110	**4501211000721**	Cartonbox	12

Silenta Premium Branch 87,5°

Dia. (mm)	Code	Packing Type	Pc
58-58	**4501205806021**	Cartonbox	15
78-58	**4501207806121**	Cartonbox	8
78-78	**4501207806221**	Cartonbox	7
90-58	**4501209006121**	Cartonbox	18
90-78	**4501209006221**	Cartonbox	15
90-90	**4501209006321**	Cartonbox	12
110-58	**4501211006321**	Cartonbox	18
110-78	**4501211006421**	Cartonbox	15
110-90	**4501211006621**	Cartonbox	15
110-110	**4501211006521**	Cartonbox	12
135-110	**4501213506621**	Cartonbox	8
135-135	**4501213506721**	Cartonbox	6
160-110	**4501216006621**	Cartonbox	5
160-160	**4501216006921**	Cartonbox	4

Silenta Premium Double Branch 45°

Dia. (mm)	Code	Packing Type	Pc
110-110	**4501211004121**	Cartonbox	6
135-110	**4501213504221**	Cartonbox	4
160-110	**4501216004321**	Cartonbox	3

Silenta Premium Double Branch 87,5°

Dia. (mm)	Code	Packing Type	Pc
110-110	**4501211007021**	Cartonbox	10

Silenta Premium Collector

Dia. (mm)	Code	Packing Type	Pc
110-78-58 (Short)	**4501911030322**	Cartonbox	12
110-78-58 (Middle)	**4501911030622**	Cartonbox	12
110-78-58 (Long)	**4501911030822**	Cartonbox	12

Silenta Premium Clean Out Tee

Dia. (mm)	Code	Packing Type	Pc
110-110	**4501311002121**	Cartonbox	10
160-110	**4501316002321**	Cartonbox	5

Silenta Premium

Silenta Premium Corner Double Branch 87,5°

Dia. (mm)	Code	Packing Type	Pc
110-110	**4501211007121**	Cartonbox	10

Silenta Premium Socket Plug

Dia. (mm)	Code	Packing Type	Pc
58	**4501905800121**	Cartonbox	25
78	**4501907800221**	Cartonbox	50
90	**4501909000321**	Cartonbox	50
110	**4501911000321**	Cartonbox	20
135	**4501913500421**	Cartonbox	40
160	**4501916000521**	Cartonbox	12

Silenta Premium Reducer

Dia. (mm)	Code	Packing Type	Pc
58-40	**4501405800221**	Cartonbox	175
58-50	**4501405800121**	Cartonbox	60
78-50	**4501407802421**	Cartonbox	50
78-58	**4501407800221**	Cartonbox	40
78-75	**4501407800321**	Cartonbox	25
90-58	**4501409000121**	Cartonbox	80
90-78	**4501409000221**	Cartonbox	32
110-58	**4501411000421**	Cartonbox	25
110-78	**4501411000521**	Cartonbox	50
110-90	**4501411000621**	Cartonbox	40
135-110	**4501413500621**	Cartonbox	10
160-110	**4501416000821**	Cartonbox	20
160-135	**4501416000921**	Cartonbox	12
200-160	**4501420001121**	Cartonbox	10

Silenta Premium Socket with Central Register

Dia. (mm)	Code	Packing Type	Pc
58	**4501505803021**	Cartonbox	25
78	**4501507803121**	Cartonbox	15
90	**4501509003121**	Cartonbox	45
110	**4501511003221**	Cartonbox	36
135	**4501513503321**	Cartonbox	20
160	**4501516003421**	Cartonbox	6
200	**4501520003521**	Cartonbox	4

Silenta Premium Sliding Socket

Dia. (mm)	Code	Packing Type	Pc
58	**4501505804021**	Cartonbox	12
78	**4501507804121**	Cartonbox	16
90	**4501509004121**	Cartonbox	45
110	**4501511004221**	Cartonbox	18
135	**4501513504521**	Cartonbox	10
160	**4501516004321**	Cartonbox	6
200	**4501520004421**	Cartonbox	4

Silenta Premium Adaptor

Dia. (mm)	Code	Packing Type	Pc
58-50	**4501905801021**	Cartonbox	150
78-75	**4501907801021**	Cartonbox	75
135-125	**4501913501021**	Cartonbox	22

Silenta Premium Repair Pipe (Long Socket)

Dia. (mm)	Code	Packing Type	Pc
110	**4501911001221**	Cartonbox	15

Silenta Premium Clean Out (Circular)

Dia. (mm)	Code	Packing Type	Pc
58	**4501305800421**	Cartonbox	50
78	**4501307800521**	Cartonbox	5
90	**4501309000121**	Cartonbox	12
110	**4501311000221**	Cartonbox	6

Silenta Premium Clean Out (Rectangular)

Dia. (mm)	Code	Packing Type	Pc
110	**4501311000121**	Cartonbox	10
135	**4501313500221**	Cartonbox	6
160	**4501316000321**	Cartonbox	2

Silenta Premium

Silenta Premium S Siphon 45°

Dia. (mm)	Code	Packing Type	Pc
110	**4501611000121**	Cartonbox	8

Silenta Premium S Siphon 87,5°

Dia. (mm)	Code	Packing Type	Pc
110	**4501611000221**	Cartonbox	7

Silenta Premium Siphon Branch 90°

Dia. (mm)	Code	Packing Type	Pc
58-40	**4501105830621**	Cartonbox	140

Silenta Premium Double Branch with Radius 87,5°

Dia. (mm)	Code	Packing Type	Pc
90-90	**4501109007021**	Cartonbox	8
110-110	**4501111031221**	Cartonbox	4

Silence Clamp Metal - Vertical Set

Dia. (mm)	Code	Packing Type	Pc
50	**1300905030412**	Cartonbox	20
58	**1300905830412**	Cartonbox	20
75-78	**1300907530412**	Cartonbox	15
110	**1300911030412**	Cartonbox	10
125	**1300912530412**	Cartonbox	10
135	**1300913530412**	Cartonbox	10
160	**1300916030412**	Cartonbox	7
200	**1300920030412**	Cartonbox	5

Silenta Premium Aerator

Dia. (mm)	Code	Packing Type	Pc
110-78	**4501911000121**	Cartonbox	2

Silenta Premium Adapter Gasket

Dia. (mm)	Code	Packing Type	Pc
58	**1410905802092**	Cartonbox	600

Silenta Premium Floor Trap

Dia. (mm)	Code	Packing Type	Pc
58-110	**4501911031021**	Cartonbox	12

Silenta Premium P-Trap With Stand

Dia. (mm)	Code	Packing Type	Pc
110	**4501611000521**	Cartonbox	12

Silenta Premium P - Trap

Dia. (mm)	Code	Packing Type	Pc
110	**4501611000621**	Cartonbox	12

Silence Clamp Metal - Horizontal

Dia. (mm)	Code	Packing Type	Pc
50	**1300905030612**	Cartonbox	150
58	**1300905830612**	Cartonbox	30
75-78	**1300907530612**	Cartonbox	30
110	**1300911030612**	Cartonbox	25
125	**1300912530612**	Cartonbox	25
135	**1300913530612**	Cartonbox	25
160	**1300916030612**	Cartonbox	25
200	**1300920030612**	Cartonbox	20

Silenta Premium Clamp Metal

Dia. (mm)	Code	Packing Type	Pc
160	**4501916026582**	Piece	1

Silenta Premium Standard Clamp Metal

Dia. (mm)	Code	Packing Type	Pc
50	**4701905002022**	Piece	100

What is Sound Insulation Performance?

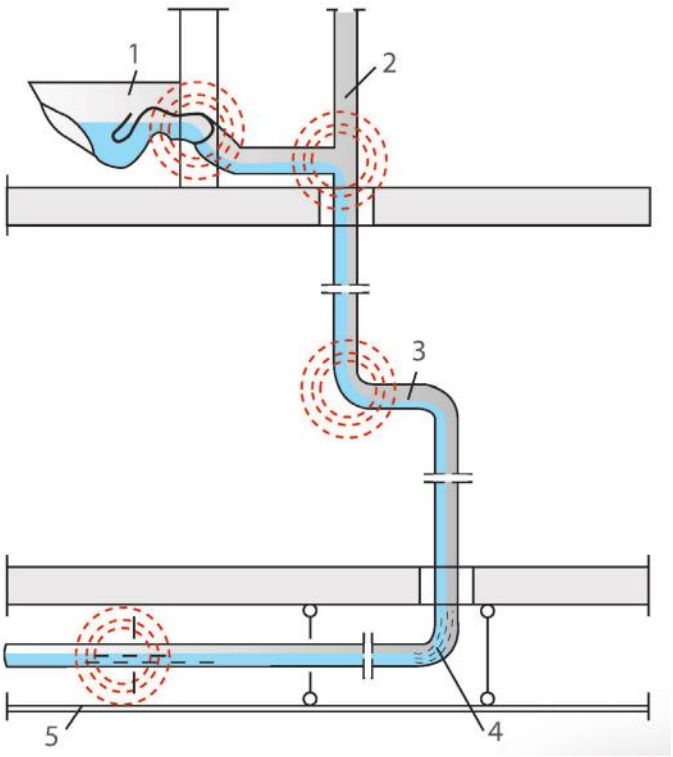
Sound insulation performance is the sound insulation capability of the system against the vibrations that occur between the pipes used in the waste water installation and the fluids transmitted through these pipes. With Silenta Premium, Silenta 3A and Silenta FR Piping Systems, GF Hakan Plastik offers ultimate solutions against the sounds created in the installations.

Sources of sounds in the buildings can be listed as follows:

- Flushing
- Clogging of the flowing direction
- High water speeds
- Joints
- Discharge
- Wrong planning
- Faulty design

Due to critical drainage conditions, local vibrations occur in the piping system passages. They could have adverse impacts on sound characteristics.

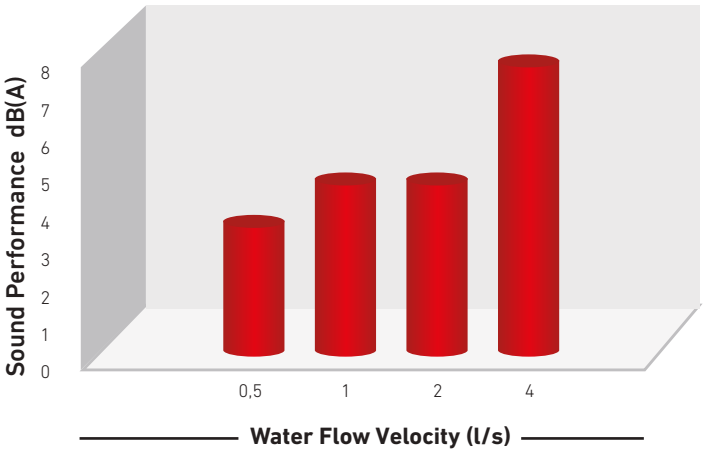
To minimize and eliminate these impacts, Silenta Product Ranges reduce noise in the sound-critical areas with elbows having nominal widths of DN 58-DN 200, and ensures better noise reduction in the affected areas.



Why is Sound Protection Necessary?

Sound protection measures in a building aims to minimize the noise pollution in the rooms. Residents need to be protected against the noises emitted through air or caused by the building.

Unpleasant noises within the building as caused directly (created by the building) or indirectly (for example due to the construction engineering systems) can be easily resolved with the use of Silenta Product Range.



The above graphics indicate the results of the acoustic tests conducted by Fraunhofer Building Physics Institute.

Silenta Premium 13 dB(A) at 4 l/s flow
Silenta 3A 16 dB(A) at 4 l/s flow
Silenta FR 12 dB(A) at 4 l/s flow

Worldwide Quality Compliance for Silenta 3A

Some certifications around the world

TÜRKİYE
TSE

MALAYSIA
IKRAM QA

UK
LLOYDS REGISTER

SPAIN
AENOR

TÜRKİYE
ENVIRONMENTAL
PRODUCT
DECLARATION

NETHERLANDS
KIWA

GERMANY
FRAUNHOFER
INSTITUTE

GERMANY
HOCH

TÜRKİYE
EFECTIS ERA AVRASYA
TEST LABORATUVARI

Silenta 3A

Sound-Insulated Pipe Systems

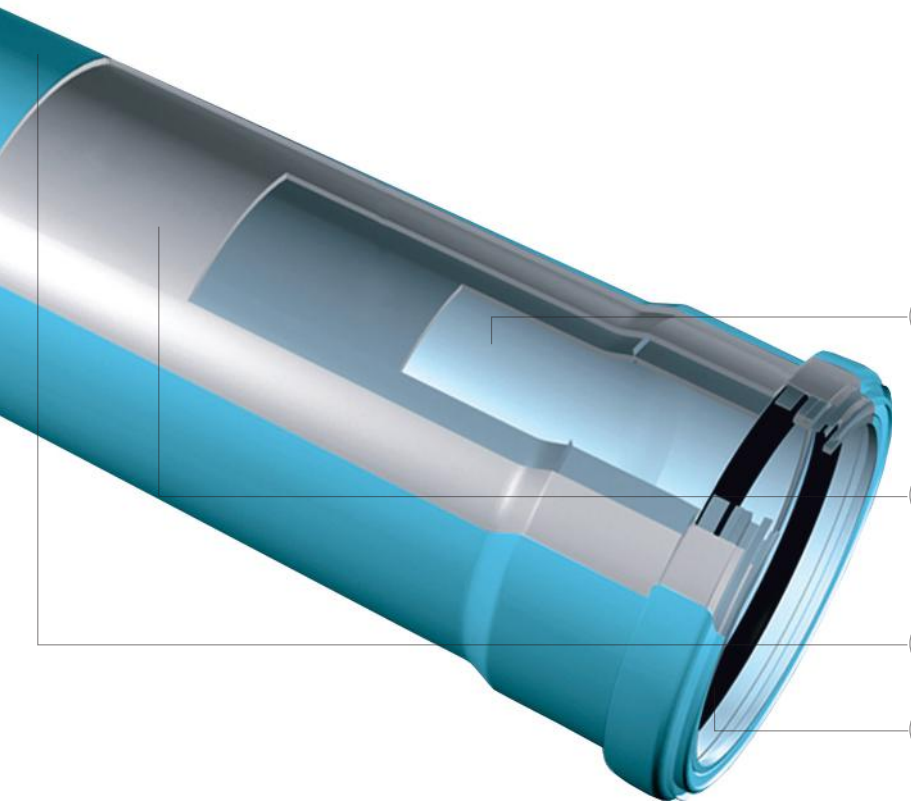
Silenta 3A is a sound-insulating 3-layered soil and waste water pipe system made of PP material which is specially formulated and reinforced for non-pressurized domestic drainage in accordance with System Standards of DIN EN 1451, DIN 4109 and DIN 4102. Silenta 3A has high performance in all places that require impact, durability and sound protection.

- Silenta 3A Sound-Insulated Piping System reached 17 dB(A) sound intensity level at the flow rate of 4 l/s in the tests conducted by the German Fraunhofer Institute according to EN 14366
- Suitable for hot/cold water and acidic liquid transfers
- It can be used in the underground and aboveground drainage systems even in the areas having high traffic load. It has high impact resistance
- Alternative to cast iron
- No corrosion, durability
- It has a wide product range
- Does not contain halogen and emit lethal and poisonous gases in case of fire
- 100% recyclable and environmentally friendly

Fields of Application

- Office buildings, conference halls etc
- Schools, libraries, hospitals, hotels, houses
- All underground drainage systems between the building and the main pipeline
- Sustainable / green buildings
- Industrial areas (short and long-term use)

16 dB(A)



Structure

1 **Inner Layer**
It provides a perfect flow performance with its structure. The superior chemical resistance prevents corrosion and abrasion. It is resistant to high water temperatures.

2 **Middle Layer**
With its high molecular structure and special composite formula, the sound waves are absorbed and prevented.

3 **Outer Layer**
It is resistant to high temperatures and impacts.

4 **Special Gasket System**
It guarantees water tightness with its special gasket structure providing ease of montage. The geometrical properties of the gasket groove ensure fast and easy installation.

Technical Properties

Pipe Structure	3-Layered (Special PP-Mineral reinforced composite)
Diameters [mm]	d40, d50, d75, d110, d125, d160, d200
Pipe length [mm]	150, 250, 500, 1000, 2000, 3000
Sound transmission	17 dB(A) at 4 l/s (TS EN 14366)
Fire class	B2 (DIN 4102)
Jointing method	Jointing with Rubber Gasket and Socket (Push-Fit)
Clamping	With GF Hakan Plastic silent pipe clamps
Color	Light Blue (Halogen-free and Cadmium-free)
Installation	Very easy to install thanks to its weight lower than cast-iron pipes
Thermal expansion coefficient	0.06 mm/m°K
Tensile strength	13 N/mm^2
Chemical resistance	Resistant to organic and inorganic chemical environments for pH values between 2 and 12
Installation temperature	Minimum: -10°C Maximum: 60°C
Operating temperature	Minimum: -10°C Maximum: 97°C
Application class	B/D (building / drainage)
Ring Stifness	ISO/DIN 9969, The ring stiffness is at least 4.0 kN / m2 over the entire range of – dimensions: 40 mm – 200 mm
Impact strength	Complies with EN 1451

Superior Sound Proof Performance

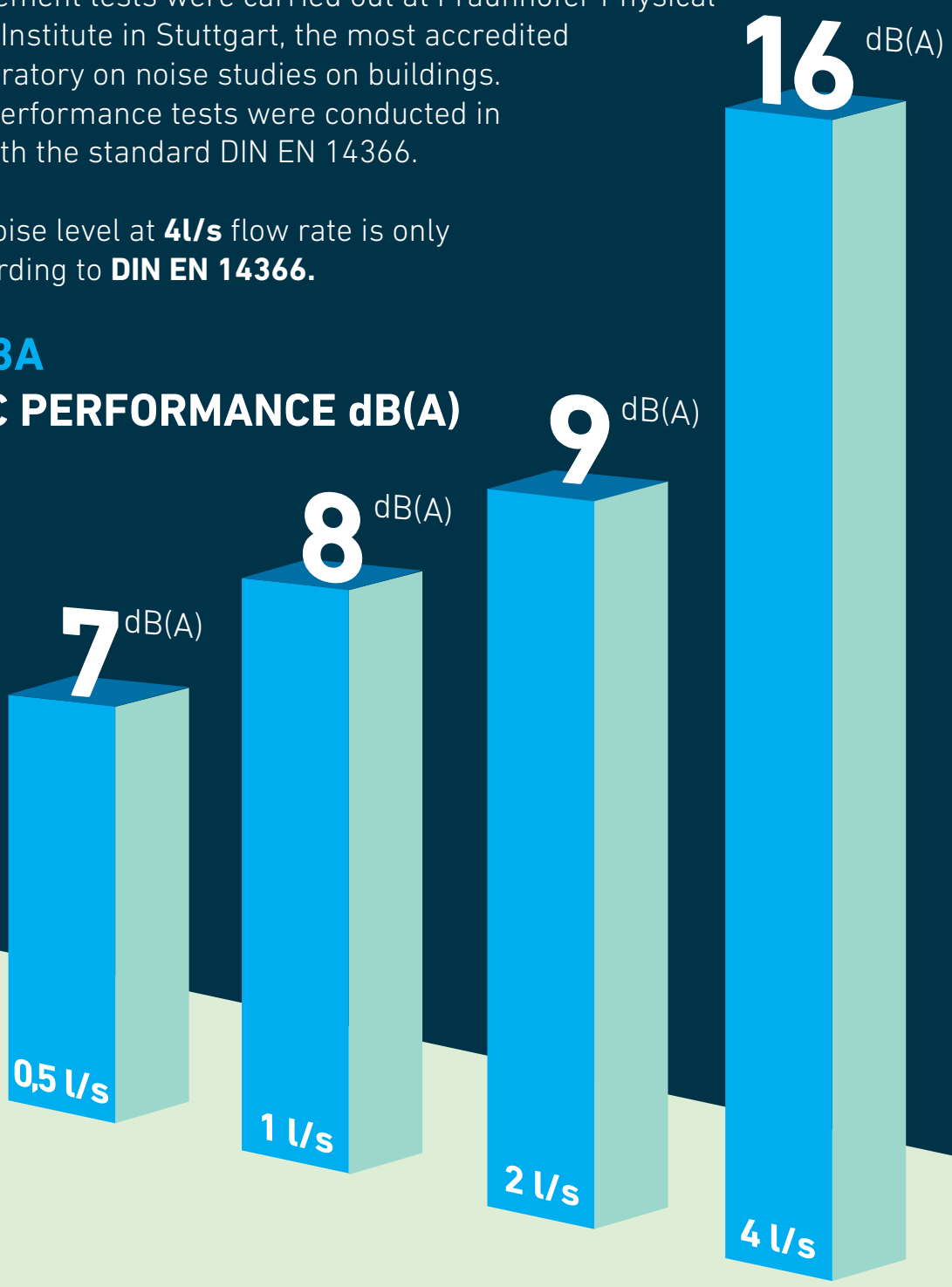
Sound-insulated soil and waste piping system Silenta 3A guarantees quality, peace of mind and living comfort.

Acoustic performance of Silenta 3A was accredited by the famous German Fraunhofer Institute, in compliance with DIN 4109 and EN 14366.

Noise measurement tests were carried out at Fraunhofer Physical Constructions Institute in Stuttgart, the most accredited European laboratory on noise studies on buildings. The acoustic performance tests were conducted in compliance with the standard DIN EN 14366.

The emitted noise level at **4l/s** flow rate is only **17 dB(A)** according to **DIN EN 14366.**

SILENTA 3A
ACOUSTIC PERFORMANCE dB(A)



Silenta 3A

Silenta 3A Pipe with Socket

Dia. (mm)	Leng. (mm)	Kod	Packing Type	Pc
32	3000	**4604003200621**	Bundle	10
40	150	**4604004000121**	Cartonbox	300
40	500	**4604004000321**	Cartonbox	150
40	1000	**4604004000421**	Bundle	10
40	2000	**4604004000521**	Bundle	10
40	3000	**4604004000621**	Bundle	10
50	150	**4704005000121**	Cartonbox	30
50	250	**4704005000221**	Cartonbox	30
50	500	**4604005000321**	Cartonbox	35
50	1000	**4604005000421**	Bundle	10
50	2000	**4604005000521**	Bundle	10
50	3000	**4604005000621**	Bundle	10
50	6000	**4604005000721**	Bundle	10
75	150	**4704007501021**	Cartonbox	40
75	250	**4704007501121**	Cartonbox	30
75	500	**4604007501221**	Cartonbox	40
75	1000	**4604007501321**	Bundle	10
75	2000	**4604007501421**	Bundle	10
75	3000	**4604007501521**	Bundle	10
75	6000	**4604007501621**	Bundle	10
110	150	**4704011002021**	Cartonbox	20
110	250	**4704011002121**	Cartonbox	35
110	500	**4704011002221**	Cartonbox	20
110	1000	**4604011002321**	Bundle	4
110	2000	**4604011002421**	Bundle	4
110	3000	**4604011002521**	Bundle	4
110	6000	**4604011002621**	Bundle	4
125	150	**4604012503021**	Cartonbox	15
125	250	**4604012503121**	Cartonbox	5
125	500	**4604012503221**	Cartonbox	6
125	1000	**4604012503321**	Bundle	4
125	2000	**4604012503421**	Bundle	4
125	3000	**4604012503521**	Bundle	4
160	150	**4604016004021**	Cartonbox	24
160	250	**4604016004121**	Cartonbox	6
160	500	**4604016004221**	Cartonbox	8
160	1000	**4604016004321**	Piece	1
160	2000	**4604016004421**	Piece	1
160	3000	**4604016004521**	Piece	1
160	6000	**4604016004621**	Piece	1
200	500	**4604020006321**	Cartonbox	5
200	1000	**4604020006421**	Piece	1
200	2000	**4604020005621**	Piece	1
200	3000	**4604020005721**	Piece	1
200	6000	**4604020006521**	Piece	1

Silenta 3A Pipe without Socket

Dia. (mm)	Leng. (mm)	Kod	Packing Type	Pc
160	3000	**4604016003021**	Piece	1
200	250	**4604020005121**	Piece	1
200	500	**4604020005221**	Cartonbox	8
200	1000	**4604020005321**	Piece	1
200	2000	**4604020005421**	Piece	1
200	3000	**4604020005521**	Piece	1

Silenta 3A Double Socket

Dia. (mm)	Leng. (mm)	Code	Packing Type	Pc
50	500	**4604005020021**	Cartonbox	50
50	1000	**4604005020121**	Bundle	10
50	2000	**4604005020321**	Bundle	10
50	3000	**4604005020421**	Bundle	10
75	1000	**4604007520121**	Bundle	10
75	2000	**4604007520321**	Bundle	10
75	3000	**4604007520421**	Bundle	10
110	1000	**4604011020221**	Bundle	4
110	2000	**4604011020421**	Bundle	4
110	3000	**4604011020521**	Bundle	4

Silenta 3A Clamp

Dia. (mm)	Kod	Packing Type	Pc
50	**4701905001022**	Cartonbox	100
75	**4701907501122**	Cartonbox	200
110	**4701911001222**	Cartonbox	100
125	**4701912501322**	Cartonbox	100
160	**4701916001422**	Cartonbox	50

Silenta 3A Elbow 15°

Dia. (mm)	Kod	Packing Type	Pc
32	**4704103200121**	Cartonbox	500
40	**4704104000121**	Cartonbox	500
50	**4704105000121**	Cartonbox	300
75	**4704107500621**	Cartonbox	150
110	**4704111001121**	Cartonbox	60
160	**4704116001121**	Cartonbox	20

Silenta 3A Elbow 30°

Dia. (mm)	Code	Packing Type	Pc
50	**4704105000221**	Cartonbox	350
75	**4704107500721**	Cartonbox	150
110	**4704111001221**	Cartonbox	60
160	**4704116001221**	Cartonbox	20

Silenta 3A Elbow 45°

Dia. (mm)	Code	Packing Type	Pc
32	**4704103200321**	Cartonbox	1000
40	**4704104000321**	Cartonbox	30
50	**4704105000321**	Cartonbox	150
75	**4704107500921**	Cartonbox	50
110	**4704111001321**	Cartonbox	50
125	**4704112501621**	Cartonbox	15
160	**4704116001821**	Cartonbox	6
200	**4704120002021**	Cartonbox	10

Silenta 3A

Silenta 3A Elbow 67.5°

Dia. (mm)	Code	Packing Type	Pc
50	**4704105000421**	Cartonbox	300
75	**4704107500821**	Cartonbox	150
110	**4704111001421**	Cartonbox	50

Silenta 3A Elbow 87.5°

Dia. (mm)	Code	Packing Type	Pc
32	**4704103200421**	Cartonbox	500
40	**4704104000521**	Cartonbox	450
50	**4704105000521**	Cartonbox	140
75	**4704107501021**	Cartonbox	50
110	**4704111001521**	Cartonbox	40
125	**4704112501721**	Cartonbox	10
160	**4704116001921**	Cartonbox	6
200	**4704120002121**	Cartonbox	6

Silenta 3A Double Branch 45°

Dia. (mm)	Code	Packing Type	Pc
50-50	**4704205003021**	Cartonbox	15
75-50	**4704207503121**	Cartonbox	15
110-50	**4704211003221**	Cartonbox	7
110-110	**4704211003421**	Cartonbox	6
160-110	**4704216003621**	Cartonbox	8

Silenta 3A Double Branch 87,5°

Dia. (mm)	Code	Packing Type	Pc
110-110	**4704211002521**	Cartonbox	20

Silenta 3A Branch 45°

Dia. (mm)	Code	Packing Type	Pc
32-32	**4704203200121**	Cartonbox	250
40-40	**4704204000121**	Cartonbox	30
50-50	**4704205000121**	Cartonbox	50
75-50	**4704207500221**	Cartonbox	20
75-75	**4704207500321**	Cartonbox	10
110-50	**4704211000421**	Cartonbox	40
110-75	**4704211000521**	Cartonbox	30
110-110	**4704211000621**	Cartonbox	20
125-50	**4704212500721**	Cartonbox	15
125-75	**4704212500821**	Cartonbox	10
125-110	**4704212500921**	Cartonbox	8
125-125	**4704212501021**	Cartonbox	6
160-110	**4704216001121**	Cartonbox	10
160-125	**4704216001221**	Cartonbox	10
160-160	**4704216001321**	Cartonbox	8
200-110	**4704220001421**	Cartonbox	4
200-125	**4704220001521**	Cartonbox	4
200-160	**4704220001621**	Cartonbox	4
200-200	**4704220001721**	Cartonbox	4

Silenta 3A Branch 87,5°

Dia. (mm)	Code	Packing Type	Pc
40-40	**4704204000221**	Cartonbox	200
50-50	**4704205001821**	Cartonbox	30
75-50	**4704207501921**	Cartonbox	10
75-75	**4704207502021**	Cartonbox	15
110-50	**4704211002121**	Cartonbox	50
110-75	**4704211002221**	Cartonbox	15
110-110	**4704211002321**	Cartonbox	10
125-125	**4704212503921**	Cartonbox	4
160-110	**4704216002621**	Cartonbox	14
160-125	**4704216004022**	Cartonbox	10
160-160	**4704216001421**	Cartonbox	10

Silenta 3A Corner Parallel Branch 87,5°

Dia. (mm)	Code	Packing Type	Pc
110-110	**4704211001121**	Cartonbox	4

Silenta 3A Corner Double Branch 87,5°

Dia. (mm)	Code	Packing Type	Pc
110-110	**4704211003021**	Cartonbox	20

Silenta 3A Clean Out (Circular)

Dia. (mm)	Code	Packing Type	Pc
75	**4704311000421**	Cartonbox	15
110	**4704311000121**	Cartonbox	6

Silenta 3A Clean Out (Rectangular)

Dia. (mm)	Code	Packing Type	Pc
160	**4704316000221**	Cartonbox	8

Silenta 3A Reducer

Dia. (mm)	Code	Packing Type	Pc
40-32	**4704404000521**	Cartonbox	750
50-32	**4704405000021**	Cartonbox	500
50-40	**4704405000121**	Cartonbox	30
75-50	**4704407500121**	Cartonbox	100
110-50	**4704411000221**	Cartonbox	50
110-75	**4704411000321**	Cartonbox	40
125-110	**4704412500421**	Cartonbox	25
160-110	**4704416000521**	Cartonbox	20
160-125	**4704416000721**	Cartonbox	20
200-160	**4704420000621**	Cartonbox	10

Silenta 3A

Silenta 3A Sliding Socket

Dia. (mm)	Code	Packing Type	Pc
50	**4704505000221**	Cartonbox	50
75	**4704507500321**	Cartonbox	35
110	**4704511000421**	Cartonbox	8
125	**4704512506122**	Cartonbox	4
160	**4704516000621**	Cartonbox	6
200	**4704520000721**	Cartonbox	4

Silenta 3A Socket with Central Register

Dia. (mm)	Code	Packing Type	Pc
32	**4704503200121**	Cartonbox	600
40	**4704504000121**	Cartonbox	600
50	**4704505000121**	Cartonbox	50
75	**4704507500221**	Cartonbox	20
110	**4704511000321**	Cartonbox	10
125	**4704512506022**	Cartonbox	40
160	**4704516000421**	Cartonbox	6
200	**4704520000521**	Cartonbox	12

Silenta 3A S Siphon 45°

Dia. (mm)	Code	Packing Type	Pc
75	**4704607500121**	Cartonbox	20
110	**4704611000121**	Cartonbox	6

Silenta 3A S Siphon 87,5°

Dia. (mm)	Code	Packing Type	Pc
75	**4704607500221**	Cartonbox	50
110	**4704611000221**	Cartonbox	5

Silenta 3A P-Trap

Dia. (mm)	Code	Packing Type	Pc
110	**4704611000521**	Cartonbox	25

Silenta 3A Pipe Socket Plug

Dia. (mm)	Code	Packing Type	Pc
40	**4704904000221**	Cartonbox	1000
50	**4704905000421**	Cartonbox	125
75	**4704907500121**	Cartonbox	50
110	**4704911000221**	Cartonbox	25
125	**4704912508122**	Cartonbox	20
160	**4704916000321**	Cartonbox	12

Silenta 3A Floor Trap

Dia. (mm)	Code	Packing Type	Pc
110-75-50-50(*)	**4704911002022**	Cartonbox	12
110-75-50-50(**)	**4704911002122**	Cartonbox	12
110-75-50-50(***)	**4704911002322**	Cartonbox	12

(*) Short - (**) Middle - (***) Long

Silenta 3A Repair Pipe

Dia. (mm)	Code	Packing Type	Pc
110	**4704911002221**	Cartonbox	15

Worldwide Quality Compliance for Silenta FR

Some certifications around the world

Fraunhofer IGB
GERMANY
FRAUNHOFER INSTITUTE

TSE
TÜRKİYE
TSE

Efectis
TÜRKİYE
EFECTIS ERA AVRASYA TEST LABORATUVARI

Silenta FR

Fire Resistant and Sound-Insulated Pipe Systems

Silenta FR is a Fire Resistant Sound-Insulated soil and waste water pipe system in compliance with TS EN13501, DIN4102 fire tests to building materials standards and acoustic performance of waste water installations measured acc. to EN 14366 standard.

- Silenta FR Fire Resistant Sound-Insulated Piping System reached 12 dB(A) sound intensity level at the flow rate of 4 l/s in the tests conducted by the German Fraunhofer Institute according to EN 14366
- Its fire class value is B-s1, d0 according to TS EN 13501-1
- Produced by mineral additive special formulation
- Made of PVC-U composite material in single layer. This composite layer increases the strength and chemical and physical resistance of pipes and fittings
- High-quality gaskets are used
- Smooth inner and outer surface ensures ease of installation
- No clogging because it does not create residues and lime
- Ensures fast and smooth flow in the system
- Resistant to corrosion
- 100% recyclable and environmentally friendly

+ Fields of Application

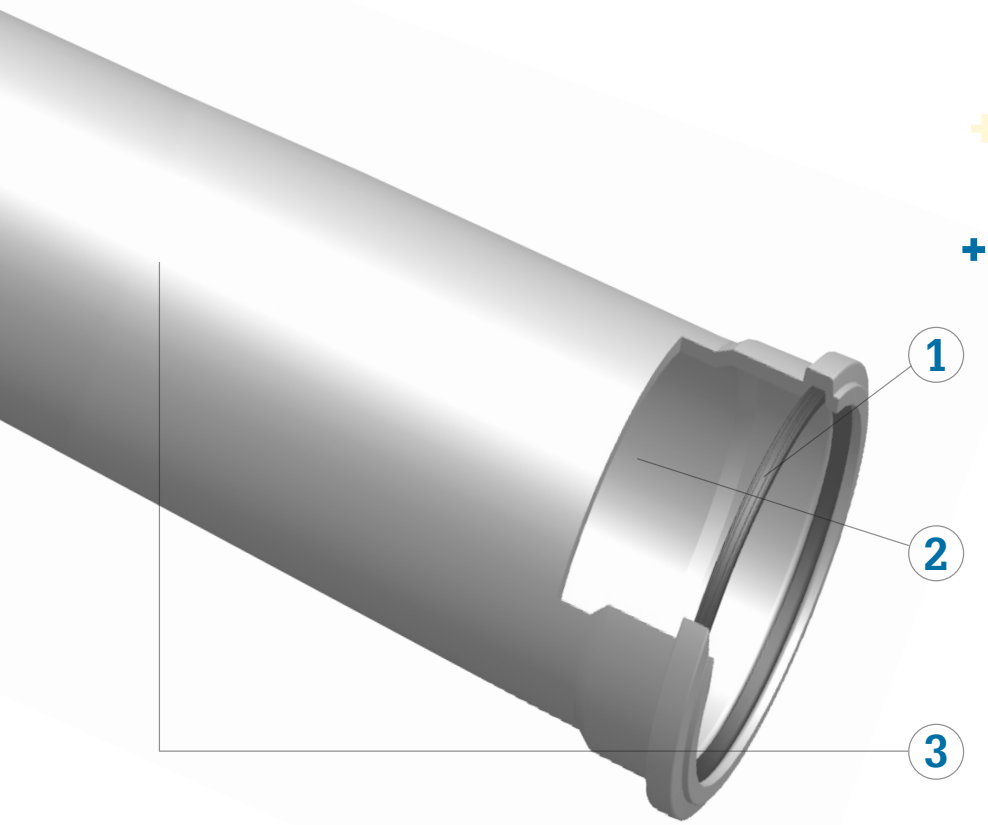
- Office buildings, conference halls etc
- Schools, libraries, hospitals, hotels, houses
- All underground drainage systems between the building and the main pipeline
- Sustainable / green buildings
- Industrial areas (short and long-term use)

Fire Classifaction (acc. to EN 13501-1)

B : Hardly Combustible
s1 : No Smoke formation
d0 : No Burning Droplets formation

B-s1, d0

12 dB(A)



Structure

Special Gasket System
It guarantees water tightness with its special gasket structure providing ease of montage. The geometrical properties of the gasket groove ensure fast and easy installation.

Inner Surface
It ensures superior flow performance with its smooth structure. Thanks to chemical durability, it prevents corrosion that occurs in pipe.

Outer Surface
Resistant against impacts and fire. Prevents the spread of fire thanks to its special composite fire-retarding formulation.

Technical Properties

Pipe Structure	One Layered (Special PVC composite formulation with fire-retardent and sound absorbing additives)
Diameters [mm]	d50, d75, d110, d125, d160, d200, d250
Pipe Length [mm]	150, 250, 500, 1000, 2000, 3000
Sound Transmission	12 dB(A) at 4 l/s (EN 14366)
Fire class	B1 (DIN 4102), B-s1, d0 (TS EN 13501)
Jointing method	Jointing with Rubber Gasket and Socket (Push-Fit)
Clamping	With GF Hakan Silent pipe clamps
Color	Light Grey
Installation	Very easy to install thanks to its weight lower than cast-iron pipes
Chemical Resistance	Resistant to organic and inorganic chemical environments for pH values between 2 and 12
Installation Temperature	Minimum: -10°C Maximum: 60°C
Operating Temperature	Minimum: -10°C Maximum: 60°C
Application Class	B/D (building / drainage)
Ring Stifness	ISO/DIN 9969, The ring stiffness is at least 4.0 kN / m^2 over the entire range of – dimensions: 50 mm – 250 mm
Impact Strength	Compiles with EN 1451

Superior Sound-Proof And Non-Flammable Performance

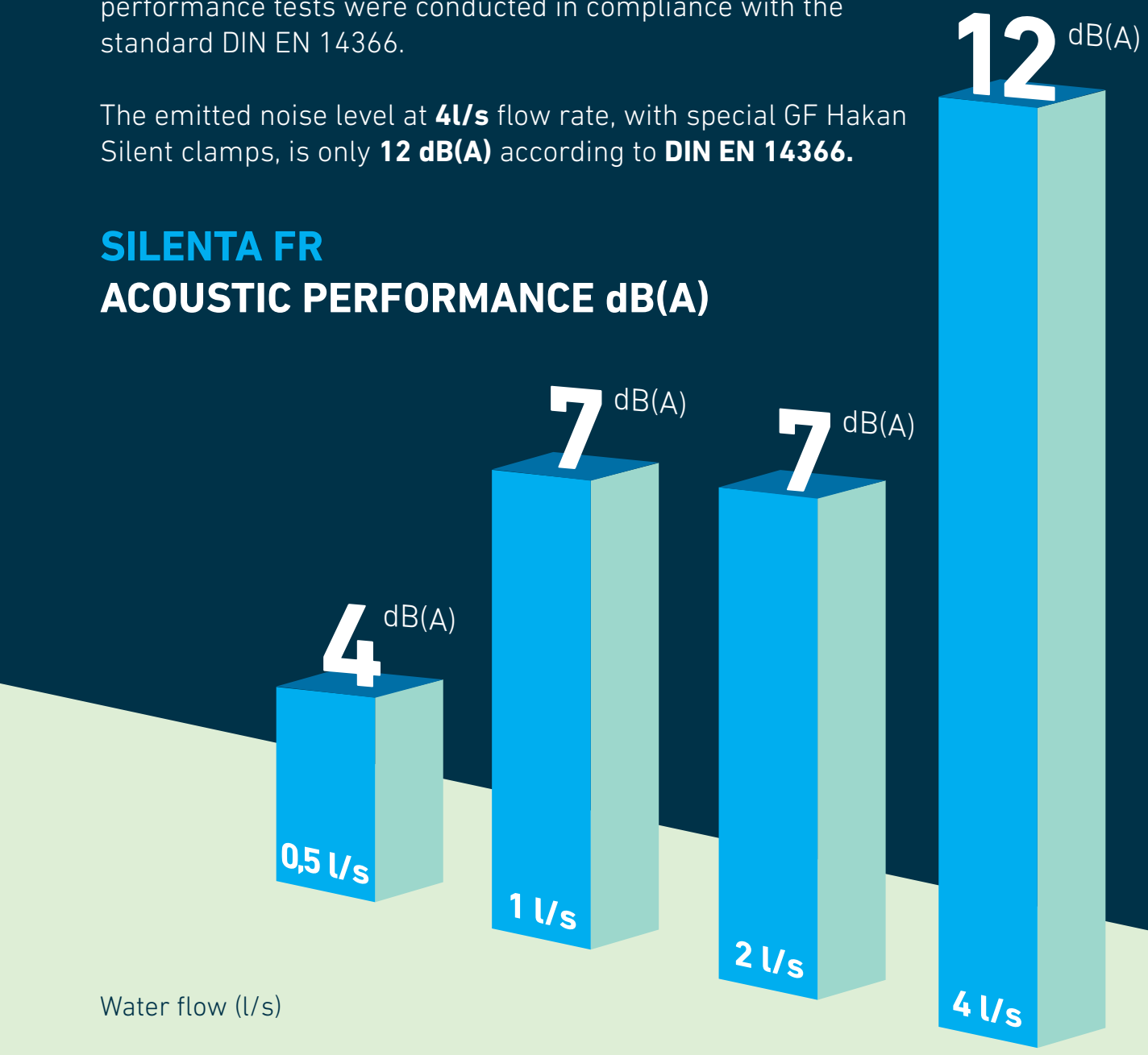
Silenta FR Fire Resistant and Sound-Insulated Pipes guarantee quality, peace of mind and living comfort.

Acoustic performance of Silenta FR was accredited by the famous German Fraunhofer Institute, in compliance with DIN 4109 and EN 14366.

Noise measurement tests were carried out at Fraunhofer Physical Constructions Institute in Stuttgart, the most accredited European laboratory on noise studies on buildings. The acoustic performance tests were conducted in compliance with the standard DIN EN 14366.

The emitted noise level at **4l/s** flow rate, with special GF Hakan Silent clamps, is only **12 dB(A)** according to **DIN EN 14366.**

SILENTA FR
ACOUSTIC PERFORMANCE dB(A)



Silenta FR

Silenta FR Pipe with Socket

Dia. (mm)	Leng. (mm)	Code	Packing Type	Pc
50	150	**1000005020111**	Cartonbox	30
50	250	**1000005020211**	Cartonbox	30
50	500	**1000005020311**	Cartonbox	40
50	1000	**1000005020411**	Bundle	10
50	2000	**1000005020511**	Piece	1
50	3000	**1000005020611**	Piece	1
75	150	**1000007513111**	Cartonbox	10
75	250	**1000007513211**	Cartonbox	15
75	500	**1000007513311**	Cartonbox	19
75	1000	**1000007513411**	Bundle	10
75	2000	**1000007513511**	Piece	1
75	3000	**1000007513611**	Piece	1
110	150	**1000011015111**	Cartonbox	9
110	250	**1000011015211**	Cartonbox	6
110	500	**1000011015311**	Cartonbox	9
110	1000	**1000011015411**	Bundle	4
110	2000	**1000011015511**	Piece	1
110	3000	**1000011015611**	Piece	1
125	250	**1000012517211**	Cartonbox	11
125	500	**1000012517311**	Cartonbox	6
125	1000	**1000012517411**	Bundle	4
125	2000	**1000012517511**	Piece	1
125	3000	**1000012517611**	Piece	1
160	250	**1000016018211**	Cartonbox	6
160	500	**1000016018311**	Cartonbox	4
160	1000	**1000016018411**	Bundle	3
160	2000	**1000016018511**	Piece	1
160	3000	**1000016018611**	Piece	1
200	500	**1000020021211**	Piece	1
200	1000	**1000020021311**	Piece	1
200	2000	**1000020021411**	Piece	1
200	3000	**1000020021511**	Piece	1
200	3000	**1000020021611**	Piece	1

Silenta FR Pipe without Socket

Dia. (mm)	Leng. (mm)	Code	Packing Type	Pc
200	250	**1000020020111**	Piece	1
200	1000	**1000020020311**	Piece	1
200	2000	**1000020020411**	Piece	1
200	3000	**1000020020511**	Piece	1
250	1000	**1000025020311**	Piece	1
250	2000	**1000025020411**	Piece	1
250	3000	**1000025020511**	Piece	1

Silenta FR Elbow 45°

Dia. (mm)	Code	Packing Type	Pc
50	**1300105000511**	Cartonbox	40
75	**1300107501011**	Cartonbox	30
110	**1300111001811**	Cartonbox	20
125	**1300112502011**	Cartonbox	8
160	**1300116002811**	Cartonbox	8
200	**1300120002711**	Cartonbox	4
250	**1300125003011**	Cartonbox	1

Silenta FR Elbow 87,5°

Dia. (mm)	Code	Packing Type	Pc
50	**1300105000611**	Cartonbox	60
75	**1300107501111**	Cartonbox	25
110	**1300111001911**	Cartonbox	8
125	**1300112502111**	Cartonbox	15
160	**1300116002911**	Cartonbox	6
200	**1300120002811**	Cartonbox	3

Silenta FR Branch 45°

Dia. (mm)	Code	Packing Type	Pc
50-50	**1300205004611**	Cartonbox	20
75-50	**1300207504511**	Cartonbox	20
75-75	**1300207504611**	Cartonbox	10
110-50	**1300211004911**	Cartonbox	15
110-75	**1300211005011**	Cartonbox	10
110-110	**1300211005111**	Cartonbox	10
125-50	**1300212505411**	Cartonbox	10
125-75	**1300212505511**	Cartonbox	10
125-110	**1300212505211**	Cartonbox	6
125-125	**1300212505311**	Cartonbox	6
160-110	**1300216006011**	Cartonbox	5
160-125	**1300216006111**	Cartonbox	3
160-160	**1300216006211**	Cartonbox	3
200-110	**1300220006011**	Cartonbox	3

Silenta FR Branch 87,5°

Dia. (mm)	Code	Packing Type	Pc
50-50	**1300205008611**	Cartonbox	40
75-50	**1300207508511**	Cartonbox	40
75-75	**1300207508611**	Cartonbox	30
110-50	**1300211009111**	Cartonbox	18
110-75	**1300211009211**	Cartonbox	18
110-110	**1300211009311**	Cartonbox	5
160-110	**1300216009411**	Cartonbox	5
160-160	**1300216009111**	Cartonbox	4

Silenta FR

Silenta FR Double Branch 45°

Dia. (mm)	Code	Packing Type	Pc
110-50	**1300211012911**	Cartonbox	15
110-110	**1300211012711**	Cartonbox	6

Silenta FR Socket with Central Register

Dia. (mm)	Code	Packing Type	Pc
75	**1300507520311**	Cartonbox	90
125	**1300512520511**	Cartonbox	22
160	**1300516020611**	Cartonbox	2

Silenta FR Reducer

Dia. (mm)	Code	Packing Type	Pc
75-50	**1300407518211**	Cartonbox	50
110-50	**1300411017911**	Cartonbox	25
110-75	**1300411018411**	Cartonbox	25
125-110	**1300412518611**	Cartonbox	12
160-110	**1300416018711**	Cartonbox	8
160-125	**1300416018811**	Cartonbox	14

Silenta FR Clean Out (Circular)

Dia. (mm)	Code	Packing Type	Pc
110	**1300311017311**	Cartonbox	15
125	**1300312517311**	Cartonbox	10
160	**1300316017411**	Cartonbox	5

Silenta FR Clamp Metal

Dia. (mm)	Code	Packing Type	Pc
50 - 1-1/2"	**1300905030012**	Cartonbox	20
160 - 5-1/2"	**1300916030012**	Cartonbox	7

Silenta FR Short Trifon Clamp - Horizontal

Dia. (mm)	Code	Packing Type	Pc
50 - 1 ½"	**1300905030312**	Cartonbox	20
75 - 2 ½"	**1300907530312**	Cartonbox	15
125 - 4 ½"	**1300912530312**	Cartonbox	10

Silenta FR Short Trifon Clamp - Vertical

Dia. (mm)	Code	Packing Type	Pc
75 - 2 ½"	**1300907530112**	Cartonbox	30
110 - 4"	**1300911030112**	Cartonbox	25
125 - 4 ½"	**1300912530112**	Cartonbox	25
160 - 5 ½"	**1300916030112**	Cartonbox	25

Silence Clamp Metal - Horizontal

Dia. (mm)	Code	Packing Type	Pc
50	**1300905030412**	Cartonbox	20
58	**1300905830412**	Cartonbox	20
75-78	**1300907530412**	Cartonbox	15
110	**1300911030412**	Cartonbox	10
125	**1300912530412**	Cartonbox	10
135	**1300913530412**	Cartonbox	10
160	**1300916030412**	Cartonbox	7
200	**1300920030412**	Cartonbox	5

Silenta Clamp Metal - Vertical Set

Dia. (mm)	Code	Packing Type	Pc
50	**1300905030612**	Cartonbox	150
58	**1300905830612**	Cartonbox	30
75-78	**1300907530612**	Cartonbox	30
110	**1300911030612**	Cartonbox	25
125	**1300912530612**	Cartonbox	25
135	**1300913530612**	Cartonbox	25
160	**1300916030612**	Cartonbox	25
200	**1300920030612**	Cartonbox	20

What is Sound Insulation Performance?

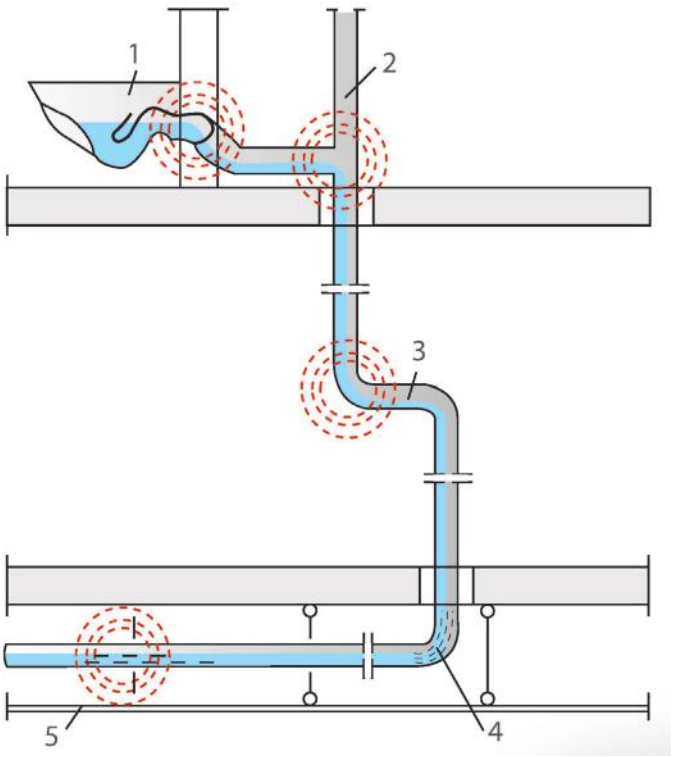
Sound insulation performance is the sound insulation capability of the system against the vibrations that occur between the pipes used in the waste water installation and the fluids transmitted through these pipes. With Silenta Premium, Silenta 3A and Silenta FR Piping Systems, GF Hakan Plastik offers ultimate solutions against the sounds created in the installations.

Sources of sounds in the buildings can be listed as follows:

- Flushing
- Clogging of the flowing direction
- High water speeds
- Joints
- Discharge
- Wrong planning
- Faulty design

Due to critical drainage conditions, local vibrations occur in the piping system passages. They could have adverse impacts on sound characteristics.

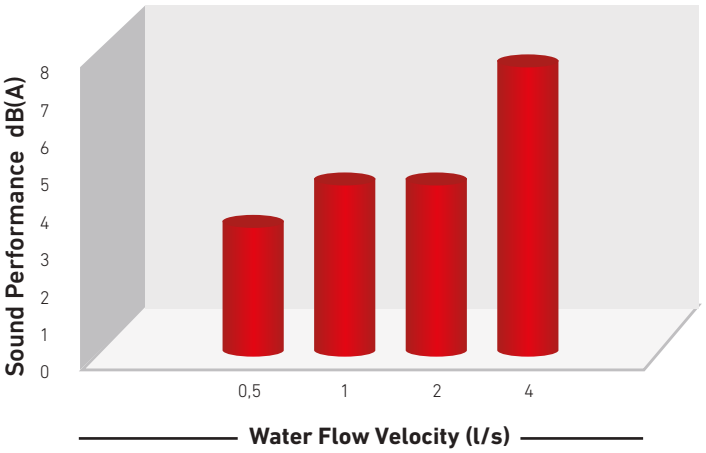
To minimize and eliminate these impacts, Silenta Product Ranges reduce noise in the sound-critical areas with elbows having nominal widths of DN 58-DN 200, and ensures better noise reduction in the affected areas.



Why is Sound Protection Necessary?

Sound protection measures in a building aims to minimize the noise pollution in the rooms. Residents need to be protected against the noises emitted through air or caused by the building.

Unpleasant noises within the building as caused directly (created by the building) or indirectly (for example due to the construction engineering systems) can be easily resolved with the use of Silenta Product Range.



The above graphics indicate the results of the acoustic tests conducted by Fraunhofer Building Physics Institute.

Silenta Premium 13 dB(A) at 4 l/s flow
Silenta 3A 16 dB(A) at 4 l/s flow
Silenta FR 12 dB(A) at 4 l/s flow

Worldwide Quality Compliance for PVC-U

Some certifications around the world

TÜRKİYE
TSE

UKRAINIAN
UKR - SEPRO

TÜRKİYE
FLAME RETARDANCY
TEST

PVC-U

Waste Water Pipe and Fitting Systems

PVC-U Piping and Fitting Systems are made in single layer out of specifically-formulated and strengthened PVC-U material with high fire resistance, for non-pressurized soil and waste water piping systems in compliance with EN 1329-1 System Standards.

•• Not flammable:
Its fire class value is B-s2, d0 according to TS EN 13501.

•• Easy to install and handle:
Smooth and bright internal and external surfaces of GF Hakan Plastik PVC-U help installation. They don't get blocked by minimizing the sediment and lime level. They also provide fast and proper flow.

•• Lightweight and cost effective:
PVC-U is lightweight and is extremely easy to install which can save both time and money.

•• Does not leak:
GF HAKAN PLASTIK PVC-U Waste Water Pipe Systems and Fittings are equipped with high quality seal rings.

•• Environmentally friendly and corrosion resistant:
PVC-U allows the safe transportation of many acids, alkalis and chemical concentrates without fear of corrosion and environmental pollution. %100 recyclable and environmentally friendly.

•• Long service life
Durable and maintenance-free.

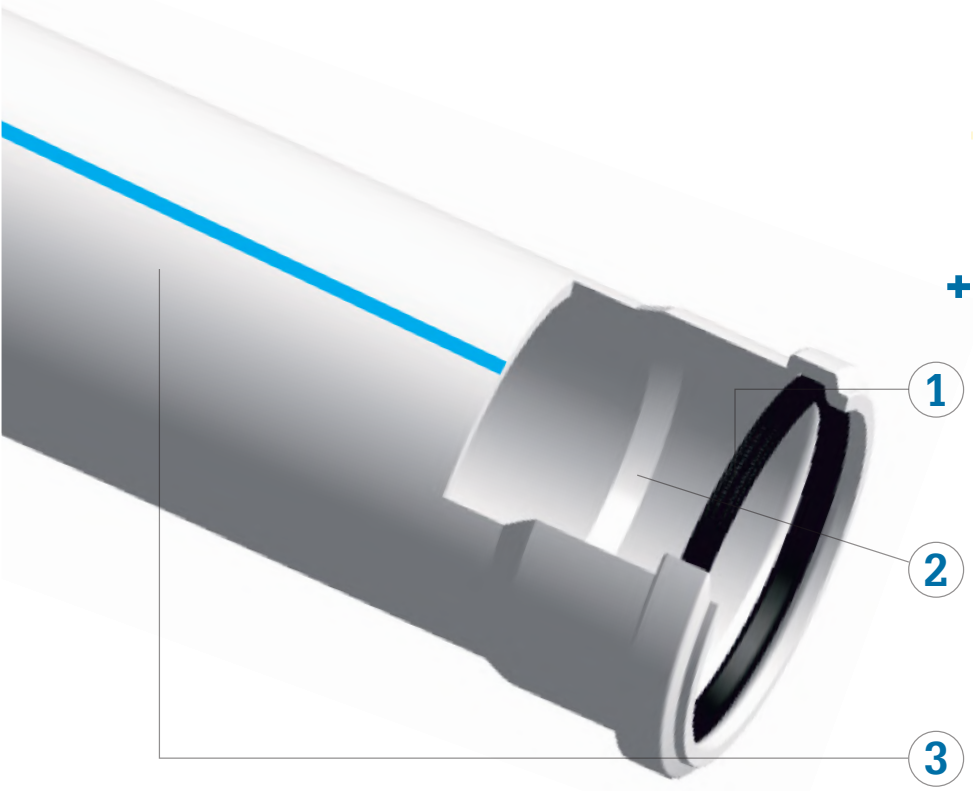
+ Fields of Application

- Office buildings, conference halls etc
- Schools, libraries, hospitals, hotels, houses
- All underground drainage systems between the building and the main pipeline
- Sustainable / green buildings
- Industrial areas (short and long-term use)

Fire Classifaction (acc. to EN 13501-1) **B-s2, d0**

B : Hardly Combustible
s2 : Minimum Smoke formation
d0 : No Burning Droplets formation

B-s2, d0



Structure

Special Gasket System
The push-fit socket with lip seal guarantees water tightness and allows movement of the pipe due to thermal expansion. The geometric characteristics of the socket ensure installation speed and simplicity.

Inner Surface
It provides a perfect flow performance with its structure. The superior chemical resistance prevents corrosion and abrasion. It is resistant to high water temperatures.

Outer Surface
Resistant against impacts and fire. Prevents the spread of fire, thanks to its special Flame Retarding composite structure.

Special, one-layered PVC-U formulation that ensures increased chemical and physical resistance with non-flammable properties of pipes and fittings

Technical Properties

Pipe Structure	One Layered (Special PVC composite formulation with fire-retarding additives)
Diameters [mm]	d50, d75, d110, d125, d160, d200, d250
Pipe Length [mm]	150, 250, 500, 1000, 2000, 3000
Fire class	B1 (DIN 4102), B-s2, d0 (EN 13501-1)
Jointing method	Jointing with Rubber Gasket and Socket (Push-Fit)
Clamping	With GF Hakan Standard Clamps
Color	Light Grey
Installation	Very easy to install thanks to its weight lower than cast-iron pipes
Chemical Resistance	Resistant to organic and inorganic chemical environments for pH values between 2 and 12
Installation Temperature	Minimum: -10°C Maximum: +60°C
Operating Temperature	Minimum: -10°C Maximum: +60°C
Application Class	B/D (building / drainage)
Standart	EN 1329-1
Ring Stifness	ISO/DIN 9969, The ring stiffness is at least 4.0 kN / m^2 over the entire range of – dimensions: 50 mm – 250 mm

PVC Waste Water Pipes

PVC Waste Water Pipe

Dia. (mm)	Leng. (mm)	Grey Code	Packing Type	Packing Pc	Orange Code	Packing Type	Packing Pc
50	150	**1000005090011**	Bag	100			
50	250	**1000005091011**	Bag	70			
50	500	**1000005092011**	Bag	30			
50	1000	**1000005093011**	Bundle	10			
50	2000	**1000005094011**	Bundle	10			
50	3000	**1000005095011**	Bundle	10			
75	150	**1000007590011**	Bag	30			
75	250	**1000007591011**	Bag	40			
75	500	**1000007592011**	Bag	20			
75	1000	**1000007593011**	Bundle	10			
75	2000	**1000007594011**	Bundle	10			
75	3000	**1000007595011**	Bundle	5			
110	150	**1000011090011**	Bag	30			
110	250	**1000011091011**	Bag	20			
110	500	**1000011092011**	Bag	10			
110	1000	**1000011093011**	Bundle	4			
110	2000	**1000011094011**	Bundle	4			
110	3000	**1000011095011**	Bundle	4			
125	150	**1000012590011**	Bag	20			
125	250	**1000012591011**	Bag	15			
125	500	**1000012592011**	Bag	8			
125	1000	**1000012593011**	Bundle	5			
125	2000	**1000012594011**	Bundle	5			
125	3000	**1000012595011**	Bundle	3			
160	150	**1000016090011**	Bag	12			
160	250	**1000016091011**	Bag	8			
160	500	**1000016092011**	Bag	4			
160	1000	**1000016093011**	Bundle	3			
160	2000	**1000016094011**	Piece	1			
160	3000	**1000016095011**	Piece	1			
200	500	**1000020092011**	Piece	1			
200	1000	**1000020093011**	Bundle	3			
200	2000	**1000020094011**	Piece	1			
200	3000	**1000020095011**	Piece	1			
250	2000	**1000025094011**	Piece	1			
250	3000	**1000025095011**	Piece	1			

PVC Elbow 15°

Dia. (mm)	Grey Code	Packing Type	Packing Pc	Orange Code	Packing Type	Packing Pc
110	**1300111001111**	Bag	35	**1308116002311**	Bag	35

PVC Elbow 30°

Dia. (mm)	Grey Code	Packing Type	Packing Pc	Orange Code	Packing Type	Packing Pc
110	**1300111001211**	Bag	35	**1308116002411**	Bag	35

PVC Waste Water Pipes

PVC Elbow 45°

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
50	**1300105000311**	Bag	150	**1308105000111**	Bag	150
75	**1300107500811**	Bag	35	**1308107500611**	Bag	75
110	**1300111001611**	Bag	30	**1308111001311**	Bag	30
125	**1300112501811**	Bag	20	**1308112501611**	Bag	20
160	**1300116002311**	Bag	10	**1308116002111**	Bag	10
200	**1300120002511**	Bag	5	**1308120002511**	Bag	5
250	**1300125002511**	Bag	3	**1308125002511**	Bag	3

PVC Elbow 67,5°

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
110	**1300111001511**	Bag	30			

PVC Elbow 87,5°

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
50	**1300105000411**	Bag	150	**1308105000211**	Bag	150
75	**1300107500911**	Bag	60	**1308107500711**	Bag	60
110	**1300111001711**	Bag	25	**1308111001411**	Bag	25
125	**1300112501911**	Bag	20	**1308112501711**	Bag	20
160	**1300116002411**	Bag	10	**1308116002211**	Bag	10
200	**1300120002611**	Bag	5	**1308120002611**	Bag	5
250	**1300125002612**	Bag	2	**1308125002612**	Bag	2

PVC Branch 45°

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
50-50	**1300205004511**	Bag	35	**1308205004011**	Bag	75
75-50	**1300207504311**	Bag	50			
75-75	**1300207504411**	Bag	30	**1308207504211**	Bag	30
110-50	**1300211004611**	Bag	20	**1308211004311**	Bag	20
110-75	**1300211004711**	Bag	15			
110-110	**1300211004811**	Bag	10	**1308211004511**	Bag	10
125-50	**1300212504611**	Bag	15			
125-75	**1300212504711**	Bag	10			
125-110	**1300212505011**	Bag	10	**1308212504911**	Bag	10
125-125	**1300212505111**	Bag	10	**1308212504811**	Bag	10
160-50	**1300216005012**	Bundle	10			
160-75	**1300216005112**	Bundle	10			
160-110	**1300216005211**	Bag	6	**1308216005211**	Bag	6
160-125	**1300216005311**	Bag	5			
160-160	**1300216005411**	Bag	4	**1308216005411**	Bag	4
200-110	**1300220005511**	Bag	4			
200-125	**1300220005612**	Bundle	5			
200-160	**1300220005712**	Bundle	4			
200-200	**1300220005812**	Bundle	4			
250-110	**1300225005912**	Bundle	1			
250-125	**1300225006012**	Bundle	1			
250-160	**1300225006112**	Bundle	3			
250-200	**1300225006212**	Bundle	1			
250-250	**1300225006312**	Bundle	1			

PVC Waste Water Pipes

PVC Branch 87,5°

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
50-50	**1300205008511**	Bag	35	**1308205008011**	Bag	75
75-50	**1300207508311**	Bag	50	**1308207508111**	Bag	50
75-75	**1300207508411**	Bag	40	**1308207508211**	Bag	40
110-50	**1300211008611**	Bag	20	**1308211008311**	Bag	20
110-75	**1300211008811**	Bag	20			
110-110	**1300211008711**	Bag	15	**1308211008511**	Bag	15
125-50	**1300212508612**	Bag	15			
125-110	**1300212508812**	Bag	10			
125-125	**1300212508912**	Bag	10			
160-50	**1300216009012**	Bundle	10			
160-75	**1300216009112**	Bundle	10			
160-110	**1300216009311**	Bag	8			
160-125	**1300216009312**	Bundle	5			
160-160	**1300216009011**	Bag	6	**1308216009411**	Bag	6
200-110	**1300220009512**	Bundle	5			
200-125	**1300220009612**	Bundle	5			
200-160	**1300220009712**	Bundle	5			
200-200	**1300220009812**	Bundle	4	**1308220009812**	Bundle	4
250-110	**1300225009912**	Bundle	3			
250-160	**1300225010112**	Bundle	1			
250-200	**1300225010212**	Bundle	1			

PVC Double Branch 45°

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
50-50	**1300205012012**	Bag	50	**1308205012012**	Bag	50
75-50	**1300207512112**	Bag	30			
75-75	**1300207512212**	Bag	20	**1308207512212**	Bag	20
110-50	**1300211012811**	Bag	20			
110-75	**1300211012412**	Bag	10			
110-110	**1300211012611**	Bag	10	**1308211012511**	Bag	10
125-50	**1300212512612**	Bag	6			
125-75	**1300212512712**	Bundle	10			
125-110	**1300212512812**	Bundle	10			
125-125	**1300212512912**	Bundle	10			
160-50	**1300216013012**	Bundle	5			
160-75	**1300216013112**	Bundle	5			
160-110	**1300216013212**	Bundle	5			
160-125	**1300216013312**	Bundle	5			
160-160	**1300216013412**	Bundle	4			
200-110	**1300220013512**	Bundle	5			
200-125	**1300220013612**	Bundle	5			
200-160	**1300220013712**	Bundle	4			
200-200	**1300220013812**	Bundle	4			
250-125	**1300225014012**	Bundle	1			
250-250	**1300225014312**	Bundle	3			

PVC Socket with Central Register

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
110	**1300511020111**	Bag	30			
125	**1300512520211**	Bag	30			
160	**1300516020311**	Bag	15			

PVC Waste Water Pipes

PVC Reducer

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
75-50	**1300407518111**	Bag	50	**1308407518011**	Bag	100
110-50	**1300411018011**	Bag	25	**1308411018111**	Bag	50
110-75	**1300411018311**	Bag	25	**1308411018211**	Bag	50
125-75	**1300412518312**	Bag	20			
125-110	**1300412518511**	Bag	25	**1308412518411**	Bag	25
160-75	**1300416018412**	Bag	30			
160-110	**1300416018511**	Bag	10	**1308416018511**	Bag	20
160-125	**1300416018911**	Bag	20			
200-110	**1300420018712**	Bag	5	**1308420018712**	Bag	15
200-125	**1300420018812**	Bag	15			
200-160	**1300420018912**	Bag	15	**1308420018912**	Bag	15
250-110	**1300425019012**	Bag	5			
250-125	**1300425019112**	Bag	5			
250-160	**1300425019212**	Bag	5			
250-200	**1300425019312**	Bag	5			

PVC Sliding Socket

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
50	**1300505020111**	Bag	75	**1308505020011**	Bag	200
75	**1300507520211**	Bag	75	**1308507520111**	Bag	75
110	**1300511020211**	Bag	30	**1308511020211**	Bag	30
125	**1300512520311**	Bag	10	**1308512520311**	Bag	30
160	**1300516020411**	Bag	5	**1308516020411**	Bag	15
200	**1300520020512**	Bag	6	**1308520020512**	Bag	6
250	**1300525020612**	Bag	3			

PVC Pipe Socket Plug

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
50	**1300905025011**	Bag	500	**1308905022011**	Bag	500
75	**1300907522211**	Bag	125	**1308907522111**	Bag	250
110	**1300911022311**	Bag	150	**1308911022211**	Bag	150
160				**1308916022412**	Cartonbox	70
200				**1308920022512**	Cartonbox	25

PVC S Siphon 45°

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
75	**1300607521111**	Bag	30			
110	**1300611021311**	Bag	10	**1308611021311**	Bag	10

PVC S Siphon 87,5°

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
75	**1300607521211**	Bag	30	**1308607521311**	Bag	30
110	**1300611021411**	Bag	10	**1308611021411**	Bag	10

PVC Waste Water Pipes

PVC Repair Pipe

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
110	**1000011030211**	Bag	20			

PVC Clamp

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
50	**1300905024012**	Cartonbox	100			
75	**1300907524112**	Cartonbox	300			
110	**1300911024212**	Cartonbox	150			
125	**1300912524312**	Cartonbox	100			
160	**1300916024412**	Cartonbox	60			
200	**1300920024512**	Cartonbox	35			

PVC Toilet Pan Connector

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
110	**1300911030222**	Cartonbox	36			

PVC Vertical Check Valve

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
50	**1300905023512**	Cartonbox	20			

PVC Check Valve

Dia. (mm)	Code	Packing Type	Pc
110	**1300911023512**	Cartonbox	8
125	**1300912523612**	Cartonbox	8
160	**1300916023712**	Cartonbox	8
200	**1300920023812**	Cartonbox	1

PVC Horizontal Check Valve

Dia. (mm)	Code	Packing Type	Pc
50	**1300905023312**	Cartonbox	20
75	**1300907523412**	Cartonbox	16

PVC Spare Gasket

Dia. (mm)	Code	Packing Type	Pc
50	**1410905000192**	Pcs	1
75	**1410907500292**	Pcs	1
110	**1410911000392**	Pcs	1
125	**1410912500492**	Pcs	1
160	**1410916000592**	Pcs	1
200	**1410920000692**	Pcs	1
250	**1410925000792**	Pcs	1

Adapter Gasket

Dia. (mm)	Code	Packing Type	Pc
50	**1410900002192**	Cartonbox	1000

PVC Ventilation Chimney

Dia. (mm)	Brown Code	Packing Type	Pc
75	**1300907530082**	Cartonbox	30
110	**1300911030182**	Cartonbox	18

Standard Rubber Lined Metal Clamp with Nut

Dia. (mm)	Code	Packing Type	Pc
58	**4501905820082**	Cartonbox	100
75	**4501757526682**	Cartonbox	40
78	**4501907820182**	Cartonbox	75
90	**4501909026682**	Cartonbox	40
110	**4501911020282**	Cartonbox	40
125	**1300912530212**	Cartonbox	25
135	**4501913520382**	Cartonbox	25
160	**4501916020482**	Cartonbox	40
200	**4501920020582**	Cartonbox	25

PVC Waste Water Pipes

PVC Clean Out

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
50	**1300305017012**	Bag	50			
75	**1300307517012**	Bag	15			
110	**1300311017211**	Bag	15			
125	**1300312517211**	Bag	10			
160	**1300316017311**	Bag	6			
200	**1300320017412**	Bonded	4			
250	**1300325017512**	Bonded	3			

Branch Right 87,5°

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
110-110	**1300211008612**	Bag	10			

Branch Left 87,5°

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
110-110	**1300211008712**	Bag	10			

PVC Profile to Pipe Transition Piece - Without Socket

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
75	**1300907525212**	Bag	50			
110	**1300911025312**	Bag	40			

PVC Pipe to Profile Transition Piece - With Socket

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
75	**1300907525412**	Bag	25			
110	**1300911025512**	Bag	20			

PVC Corner Te

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
110-110	**1300211008812**	Bonded	10			

Double Branch WC 87,5°

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
110-90-90	**1300211000012**	Cartonbox	10			

Double Branch 87,5°

Dia. (mm)	Grey Code	Packing Type	Pc	Orange Code	Packing Type	Pc
50-50	**1300205016012**	Bag	50			
110-50	**1300211016112**	Bag	15			
110-110	**1300211016212**	Bag	10			

Worldwide Quality Compliance for HT-PP

Some certifications around the world

TÜRKİYE
TSE

SCANDINAVIAN
COUNTRIES
INSTACERT

GERMANY
HOCH

HT-PP

Waste Water Pipe Systems

GF Hakan HT-PP Pipes and Fittings are made of polypropylene that guarantees lightweight, high resistance to chemical agents, excellent resistance to abrasion. These perfect characteristics are suitable for the construction of waste and drainage systems of buildings and other underground systems in accordance with EN1451-1 and they have B2 flammability class resistance to fire with DIN 4102.

•• High Impact Resistance

Because of the flexible molecular structure of its raw material, it has higher stroke and impact resistance than other rigid plastic pipelines under low temperature environments.

•• High Temperature Resistance

It can be used confidently in installments which produce waste at high temperature in short time like washing machine, dishwasher and alike.

•• Smooth Inside Surface

Having smooth inner surface, it provides smooth flow and prevents deposits formation.

•• No Poisonous Gas Exhaust

When GF Hakan HT-PP pipelines caught fire, there will be no gas exhaust other than carbon dioxide and steam. There is no poisonous and lethal waste org as exhaust dangerous to human health, due to products are Halogen-free. Products are %100 recyclable and environmentally friendly.

•• Easy Montage and Installation

Special lip designed sealed bell-mouth system ensures tight and enduring montage. It is light, easy portable and provides fast montage.

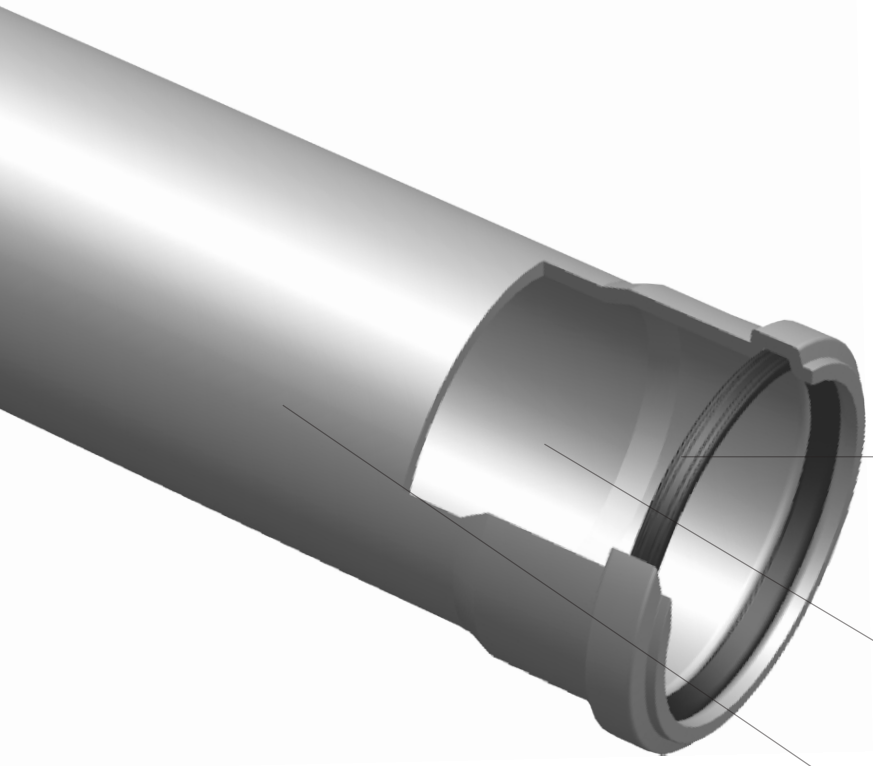
It does not need any special tools.

•• Superior Chemical Resistance

GF Hakan HT-PP system has highest resistance to chemical agents dissolved in waste waters. Accordingly, GF Hakan HT-PP waste water pipeline and joints provide the most suitable installment solution in chemical waste drainage. They have corrosion and abrasion resistance.

+ Fields of Application

- Office buildings, conference halls etc
- Schools, libraries, hospitals, hotels, houses
- All underground drainage systems betweenthe building and the main pipeline
- Sustainable / green buildings
- Industrial areas (short and long-term use)



Structure

1 Special Gasket System
The push-fit socket with lip seal guarantees water tightness and allows movement of the pipe due to thermal expansion. The geometric characteristics of the socket ensure installation speed and simplicity.

2 Inner Surface
It provides a perfect flow performance with its structure. The superior chemical resistance prevents corrosion and abrasion. It is resistant to high water temperatures.

3 Outer Surface
Resistant against impacts and high temperatures.

Technical Properties

Pipe Structure	One Layered Solid Structure
Diameters [mm]	d32, d40, d50, d75, d110, d125, d160, d200
Pipe Length [mm]	150, 250, 500, 1000, 2000, 3000
Fire class	B2 (DIN 4102)
Jointing method	Jointing with Rubber Gasket and Socket (Push-Fit)
Clamping	With GF Hakan Standard Pipe Clamps
Color	Dark Grey
Installation	Very easy to install thanks to its weight lower than cast-iron pipes
Chemical Resistance	Resistant to organic and inorganic chemical environments for pH values between 2 and 12
Installation Temperature	Minimum: -10°C Maximum: 60°C
Operating Temperature	Minimum: -10°C Maximum: 97°C
Application Class	B/D (building / drainage)
Impact Strength	Complies with EN 1451
Ring Stifness	ISO/DIN 9969, The ring stiffness is at least 4.0 kN / m^2 over the entire range of – dimensions: 32 mm – 200 mm

HT-PP

HT-PP Pipe with Socket (S 20)

Dia. (mm)	Leng. (mm)	Code	Packing Type	Pc
32	250	**4801003200221**	Cartonbox	300
32	500	**4801003200321**	Cartonbox	150
32	1000	**4801003200421**	Bundle	10
32	2000	**4801003200621**	Bundle	10
32	3000	**4801003200721**	Bundle	10
40	500	**4801004001221**	Cartonbox	140
40	1000	**4801004001321**	Bundle	10
40	1500	**4801004001421**	Bundle	10
40	2000	**4801004001521**	Bundle	10
40	3000	**4801004001621**	Bundle	10
50	150	**4801005002021**	Cartonbox	200
50	250	**4801005002121**	Cartonbox	150
50	500	**4801005002221**	Cartonbox	90
50	1000	**4801005002321**	Bundle	10
50	1500	**4801005002421**	Bundle	10
50	2000	**4801005002521**	Bundle	10
50	3000	**4801005002621**	Bundle	10
50	6000	**4801005002721**	Bundle	10
75	150	**4801007503021**	Cartonbox	100
75	250	**4801007503121**	Cartonbox	70
75	500	**4801007503221**	Cartonbox	40
75	1000	**4801007503321**	Bundle	10
75	150	**4801007503421**	Bundle	10
75	2000	**4801007503521**	Bundle	10
75	3000	**4801007503621**	Bundle	10
75	6000	**4801007503721**	Bundle	10
90	500	**4801009004221**	Cartonbox	30
110	150	**4801011004021**	Cartonbox	45
110	250	**4801011004121**	Cartonbox	35
110	500	**4801011004221**	Cartonbox	20
110	1000	**4801011004321**	Bundle	4
110	1500	**4801011004421**	Bundle	4
110	2000	**4801011004521**	Bundle	4
110	3000	**4801011004621**	Bundle	4
110	6000	**4801011004721**	Bundle	4
125	150	**4801012505021**	Cartonbox	40
125	250	**4801012505121**	Cartonbox	20
125	500	**4801012505221**	Cartonbox	16
125	1000	**4801012505321**	Bundle	4
125	2000	**4801012505421**	Bundle	4
125	3000	**4801012505521**	Bundle	4
125	6000	**4801012505621**	Piece	1
160	250	**4801016006121**	Cartonbox	14
160	500	**4801016006221**	Cartonbox	8
160	1000	**4801016006321**	Piece	1
160	2000	**4801016006421**	Piece	1
160	3000	**4801016006521**	Piece	1
160	6000	**4801016006621**	Piece	1

HT-PP Pipe with Double Socket (S 20)

Dia. (mm)	Leng. (mm)	Code	Packing Type	Pc
50	500	**4801005020121**	Cartonbox	50
50	1000	**4801005020421**	Bundle	10
50	2000	**4801005020221**	Bundle	10
50	3000	**4801005020321**	Bundle	10
75	3000	**4801007520621**	Bundle	10
110	500	**4801011020621**	Cartonbox	15
110	1000	**4801011020721**	Bundle	4
110	2000	**4801011020821**	Bundle	4
110	3000	**4801011020921**	Bundle	4
125	1000	**4801012521121**	Bundle	4
125	2000	**4801012521221**	Bundle	4
125	3000	**4801012521321**	Bundle	4

HT-PP Elbow 15°

Dia. (mm)	Code	Packing Type	Pc
32	**4901103200121**	Cartonbox	1000
40	**4901104001021**	Cartonbox	500
50	**4901105002021**	Cartonbox	300
75	**4901107503021**	Cartonbox	150
110	**4901111004021**	Cartonbox	60

HT-PP Elbow 30°

Dia. (mm)	Code	Packing Type	Pc
32	**4901103200221**	Cartonbox	1000
40	**4901104001121**	Cartonbox	500
50	**4901105002121**	Cartonbox	300
75	**4901107503121**	Cartonbox	150
110	**4901111004121**	Cartonbox	60
160	**4901116005621**	Cartonbox	20

HT-PP

HT-PP Elbow 45°

Dia. (mm)	Code	Packing Type	Pc
32	**4901103200321**	Cartonbox	1000
40	**4901104001221**	Cartonbox	500
50	**4901105002221**	Cartonbox	300
75	**4901107503221**	Cartonbox	150
110	**4901111004221**	Cartonbox	50
125	**4901112505021**	Cartonbox	40
160	**4901116006021**	Cartonbox	20
200	**4901120002021**	Cartonbox	10

HT-PP Double Branch 87.5°

Dia. (mm)	Code	Packing Type	Pc
110-110	**4901211014121**	Cartonbox	20

HT-PP Elbow 67.5°

Dia. (mm)	Code	Packing Type	Pc
40	**4901104001421**	Cartonbox	500
50	**4901105002321**	Cartonbox	300
75	**4901107503321**	Cartonbox	150
110	**4901111004321**	Cartonbox	50

HT-PP Branch 45°

Dia. (mm)	Code	Packing Type	Pc
32-32	**4901203200121**	Cartonbox	500
40-40	**4901204001021**	Cartonbox	250
50-32	**4901205042721**	Cartonbox	250
50-50	**4901205002021**	Cartonbox	150
75-50	**4901207503021**	Cartonbox	75
75-75	**4901207503121**	Cartonbox	60
110-50	**4901211004021**	Cartonbox	40
110-75	**4901211004121**	Cartonbox	30
110-110	**4901211004221**	Cartonbox	20
125-75	**4901212505121**	Cartonbox	24
125-110	**4901212505221**	Cartonbox	15
125-125	**4901212505321**	Cartonbox	16
160-110	**4901216006021**	Cartonbox	10
160-125	**4901216006121**	Cartonbox	10
160-160	**4901216006221**	Cartonbox	8
200-160	**4901220001621**	Cartonbox	4
200-200	**4901220001721**	Cartonbox	4

HT-PP Elbow 87.5°

Dia. (mm)	Code	Packing Type	Pc
32	**4901103200421**	Cartonbox	1000
40	**4901104001321**	Cartonbox	500
50	**4901105002421**	Cartonbox	300
75	**4901107503421**	Cartonbox	100
110	**4901111004421**	Cartonbox	40
125	**4901112505121**	Cartonbox	30
160	**4901116006121**	Cartonbox	15
200	**4901120002121**	Cartonbox	6

HT-PP Double Branch 45°

Dia. (mm)	Code	Packing Type	Pc
50-50	**4901205012021**	Cartonbox	100
75-50	**4901207513021**	Cartonbox	80
110-50	**4901211042621**	Cartonbox	35
110-110	**4901211014021**	Cartonbox	16
160-110	**4901216042021**	Cartonbox	8

HT-PP Branch 67.5°

Dia. (mm)	Code	Packing Type	Pc
110-110	**4901211041221**	Cartonbox	25

HT-PP

HT-PP Branch 87.5°

Dia. (mm)	Code	Packing Type	Pc
32-32	**4901203241321**	Cartonbox	500
40-40	**4901204042821**	Cartonbox	200
50-50	**4901205007021**	Cartonbox	150
75-50	**4901207508021**	Cartonbox	100
75-75	**4901207508121**	Cartonbox	80
110-50	**4901211009021**	Cartonbox	50
110-75	**4901211009121**	Cartonbox	30
110-110	**4901211009221**	Cartonbox	30
125-125	**4901212510321**	Cartonbox	20
160-110	**4901216010921**	Cartonbox	14
160-160	**4901216011121**	Cartonbox	10

HT-PP Reducer

Dia. (mm)	Code	Packing Type	Pc
40-32	**4901404017021**	Cartonbox	750
50-32	**4901405016521**	Cartonbox	500
50-40	**4901405017021**	Cartonbox	500
75-50	**4901407517121**	Cartonbox	200
110-50	**4901411017221**	Cartonbox	100
110-75	**4901411017321**	Cartonbox	100
125-110	**4901412517421**	Cartonbox	50
160-110	**4901416017521**	Cartonbox	40
160-125	**4901416041021**	Cartonbox	50
200-160	**4901420000621**	Cartonbox	20

HT-PP S Siphon 45°

Dia. (mm)	Code	Packing Type	Pc
75	**4901507592421**	Cartonbox	50
110	**4901611015021**	Cartonbox	20

HT-PP Corner Double Branch 87,5°

Dia. (mm)	Code	Packing Type	Pc
110-110	**4901211015521**	Cartonbox	20

HT-PP S Siphon 87,5°

Dia. (mm)	Code	Packing Type	Pc
110	**4901611015121**	Cartonbox	15

HT-PP Clean Out (Circular)

Dia. (mm)	Code	Packing Type	Pc
75	**4901307530921**	Cartonbox	64
110	**4901311031321**	Cartonbox	30

HT-PP Villa Type Locking Check Valve

Dia. (mm)	Code	Packing Type	Pc
110	**4901911042322**	Cartonbox	10
125	**4901912542422**	Cartonbox	10

HT-PP Sliding Socket

Dia. (mm)	Code	Packing Type	Pc
32	**4901503241521**	Cartonbox	600
50	**4901505031721**	Cartonbox	400
75	**4901507531821**	Cartonbox	200
110	**4901511040621**	Cartonbox	80
160	**4901516032021**	Cartonbox	30

HT-PP Clean Out (Rectangular)

Dia. (mm)	Code	Packing Type	Pc
160	**4901916041821**	Cartonbox	8

HT-PP

HT-PP Socket with Central Register

Dia. (mm)	Code	Packing Type	Pc
32	**4901503241421**	Cartonbox	600
40	**4901504041521**	Cartonbox	500
50	**4901505031621**	Cartonbox	400
75	**4901507531721**	Cartonbox	200
110	**4901511031821**	Cartonbox	80
160	**4901516031921**	Cartonbox	30
200	**4901520000521**	Cartonbox	12

HT-PP Socket Plug

Dia. (mm)	Code	Packing Type	Pc
32	**4901903241621**	Cartonbox	1250
40	**4901904041721**	Cartonbox	1000
50	**4901905040721**	Cartonbox	1000
75	**4901907540821**	Cartonbox	200
110	**4901911016021**	Cartonbox	200
160	**4901916016121**	Cartonbox	60

HT-PP Repair Pipe (Long Socket)

Dia. (mm)	Code	Packing Type	Pc
110-110	**4901911015021**	Cartonbox	15

Worldwide Quality Compliance for PE-RT and PEX

Some certifications around the world

TÜRKİYE
TSE

UK
WRAS

NETHERLANDS
KIWA

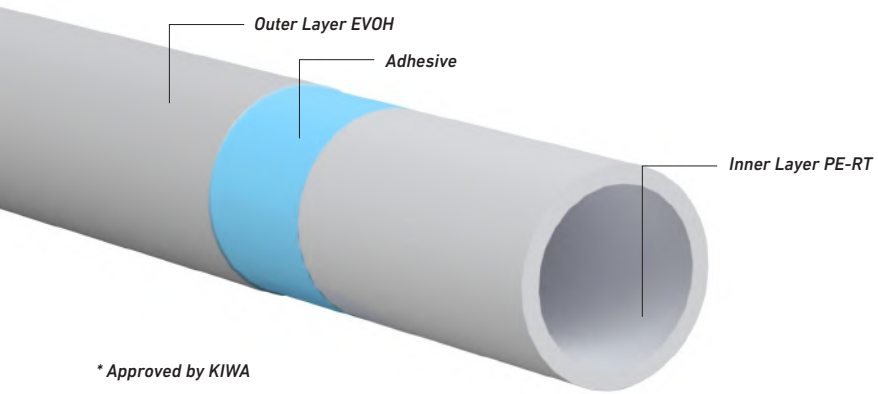
PE-RT
Pipe Systems

PE-RT pipes are heat-resistant Polyethylene pipes. Its extension is PE raised temperature, which means resistant to high temperatures. They are produced in accordance with TS EN ISO 22391 standard. They are available in three different options as standard, standard with spiral cover other and oxygen barrier.

• Ensures fast and easy installation thanks to its lightweight and flexible structure.
• Resistant to high pressure and temperature.
• 100% recyclable environment-friendly
• High chemical resistance.
• No factors such as corrosion and calcification that reduces internal diameter.
• Easy to carry and install due to production in the form of coil.
• Hygienic.
•Thanks to oxygen barrier (EVOH), it ensures full protection against corrosion and oxidation that might occur due to penetration of oxygen into close-loop system.

Fields of Application

- Hot and cold water installations
- Underfloor heating systems
- Drinking water systems
- Heat transfer applications at low/high temperatures
- Transfer of chemicals
- Radiators, air conditioners, coolers



** Approved by KIWA*

Technical Properties

Pipe Structure	One Layered, Oxygen Barrier, 3 Layered with and without jacket pipe
Diameters [mm]	d16
Coil Length [m]	100m, 160m, 200m
Maximum Operating Pressure	Refer to pressure values that indicated in page 112
Jointing method	Mechanical threaded connection
Color	Natural
Chemical Resistance	Resistant to organic and inorganic chemicals for pH values between 2 and 12
Roughness Ratio	0.007 mm
Maximum Service Temperature	70°C
Maximum Temperature Resistance	95°C
Thermal Conductivity	0.42-0.48 W/m°K
Linear Expansion Coefficient	0.2 mm/m°K

PE-XB
Pipe Systems

These are the most preferred pipes systems for heating and cooling pipe systems, made of polyethylene by cross links and stands out with their flexibility.

• At GF Hakan Plastik, cross linking process for PE-XB pipes is conducted according to the silane method.
• Complies with EN ISO 15875-2 and DIN 16892 system standards.
• Sheathed or unsheathed options are available.
• Produced in two different methods for pipes and fittings in the diameters of d16, d18, d20, d25 and d32 mm:
  - Standard Flexa PE-Xb Pipes
  - Oxygen Barrier - Flexa PE-Xb Pipes

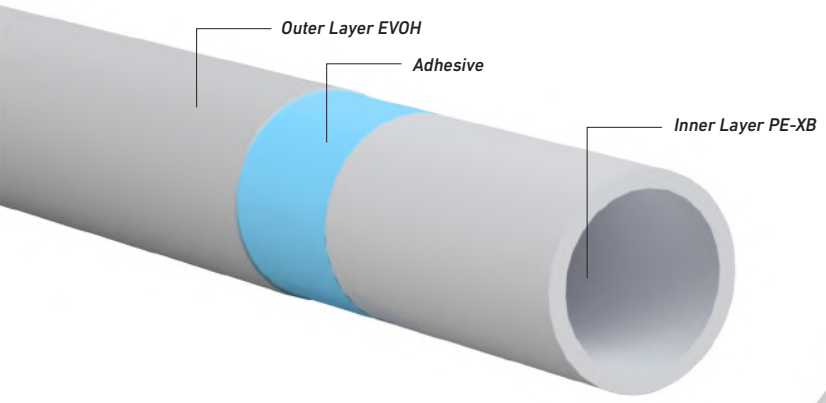
• Oxygen Barrier prevents the penetration and dissolution of oxygen in the pipe transmitted and also:
  - Prevents the living and growth of microorganisms; ensures confidence in terms of hygiene
  - Prevents the diffusion of oxygen in the pipe and blocks the corrosion of installation components; ensures smooth operation of radiators and valvaes.
• Ensures fast and easy installation with O-ring geared connection mechanism.

+ Fields of Application

• Hot and cold water distribution systems, drinking water systems
• Heat transfer applications at low/high temperatures
• Floor heating systems.
• Snow melting systems
• Ice rinks
• Transfer of chemicals.
• Radiators, air conditioners, coolers

+ Technical Properties

Diameter Range [mm]	d16 - d32
Maximum Operating Pressure	Refer to pressure values that indicated in page 112
Thermal Expansion Coefficient	0,2 mm / m°K
Thermal Conductivity Coefficient	0,41 W/m°K;
Operating Temperature Range	-40°C - 95°C
Maximum Temperature Resistance	120°C



PE-XB and PE-RT

PE-XB Crosslink

Dia. (mm)	Leng. (mm)	Code	Packing Type	Pc (m)
16	2,2	**6020001600131**	Coil	160
20	1,9	**6000002000231**	Coil	100
25	2,5	**6000002500331**	Coil	50
32	3	**6000003200431**	Coil	50

PE-RT Oxygen Barrier Red Sheath

Dia. (mm)	Leng. (mm)	Code	Packing Type	Pc (m)
16	2	**6212001600331**	Coil	100

PE-RT Crosslink

Dia. (mm)	Leng. (mm)	Code	Packing Type	Pc (m)
16	2	**6000001610031**	Coil	160
16	2	**6000001610231**	Coil	200

PE-RT Oxygen Barrier Blue Sheath

Dia. (mm)	Leng. (mm)	Code	Packing Type	Pc (m)
16	2	**6204001600231**	Coil	100

PE-RT (Monolayer) with Red Spiral Cover

Dia. (mm)	Leng. (mm)	Code	Packing Type	Pc (m)
16	2	**6012001610031**	Coil	100

HDPE Spiral Red Sheath

Dia. (mm)	Code	Packing Type	Pc (m)
25	**6112002500131**	Coil	100

PE-RT (Monolayer) with Blue Spiral Cover

Dia. (mm)	Leng. (mm)	Code	Packing Type	Pc (m)
16	2	**6004001610031**	Coil	100

HDPE Spiral Blue Sheath

Dia. (mm)	Code	Packing Type	Pc (m)
25	**6104002500131**	Coil	100
32	**6104003200231**	Coil	50

PE-RT Oxygen Barrier Pipe

Dia. (mm)	Leng. (mm)	Code	Packing Type	Pc (m)
16	2	**6200001600331**	Coil	160

PE-XB Red Sheathed Pipe

Dia. (mm)	Leng. (mm)	Code	Packing Type	Pc (m)
16	2,2	**6022001601631**	Coil	100

PE-XB and PE-RT

Corner Trimmer

Dia. (mm)	Leng. (mm)	Code	Packing Type	Pc
16	2	**4300900030021**	Coil	60

PE-XB Blue Sheathed Pipe

Dia. (mm)	Leng. (mm)	Code	Packing Type	Pc (m)
16	2,2	**6024001601631**	Coil	100

Flexa Pipe Holder

Dia. (mm)	Code	Packing Type	Pc
-	**6401900000222**	Cartonbox	8000

Flexa Single Mounting Wall Plug

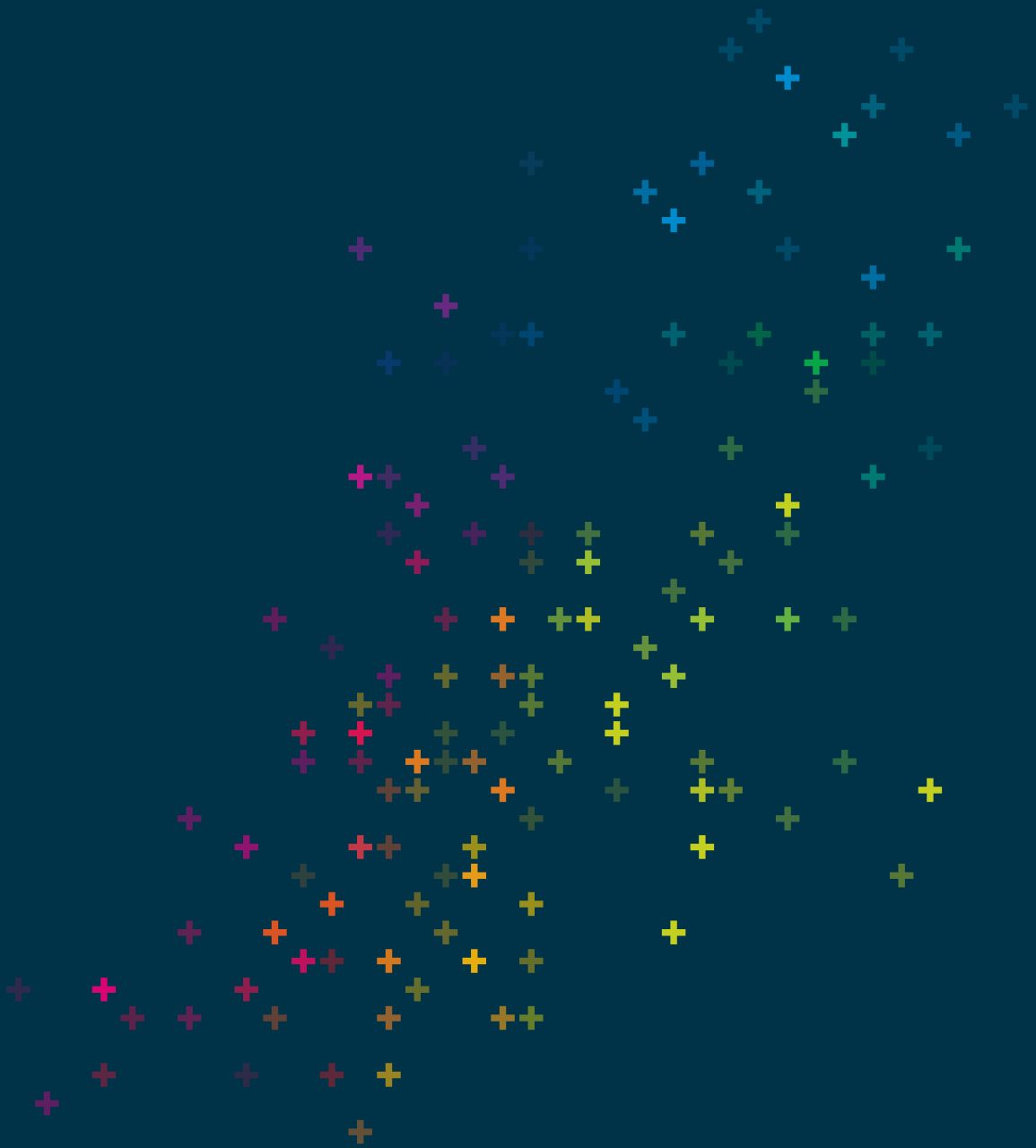
Dia. (mm)	Code	Packing Type	Pc
25	**6401900008522**	Cartonbox	8000

Flexa Double Mounting Wall Plug

Dia. (mm)	Code	Packing Type	Pc
25	**6401900008422**	Cartonbox	5000

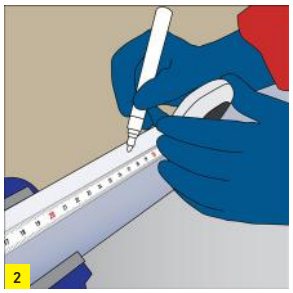
Building Technology (BT) Solid and Waste Water Pipe Range Installation Instructions

- Silenta Premium Sound-Insulated Pipe Systems
- Silenta 3A Sound-Insulated Pipe Systems
- Silenta FR Fire Resistant and Sound-Insulated Pipe Systems
- HT-PP Waste Water Pipe Systems
- PVC Waste Water Pipe Systems

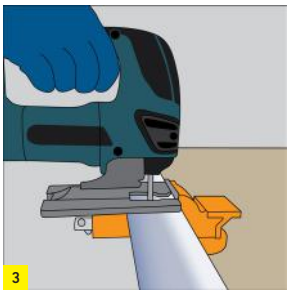


Installation

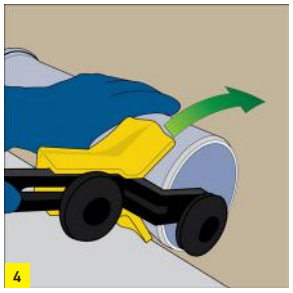
Make sure that your products are clean. If necessary, wipe the jointing points with a dry cloth.



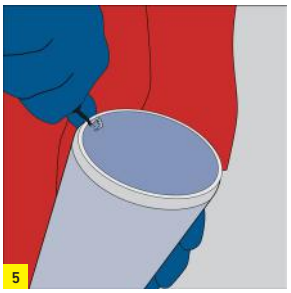
When interval measurements are required, mark the pipe with the desired measurements.



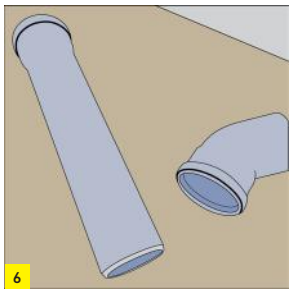
Cut in 90° angle by using a coping saw or a proper cutter.



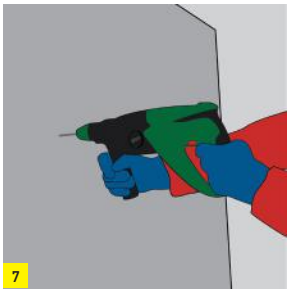
Chamfer the spigot of pipe by using a chamfering device or thick riffler.



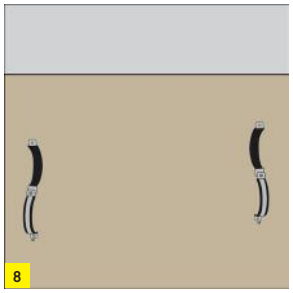
Remove the burrs on the external edges with a knife or scraper.



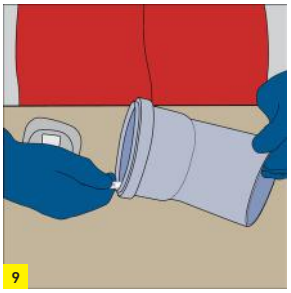
Now, your pipe is ready for installation.



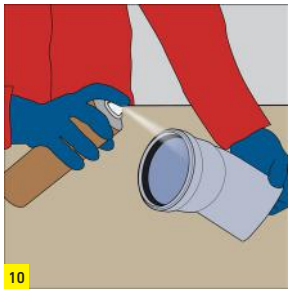
Drill the marked points with a driller and place dowels into the holes.



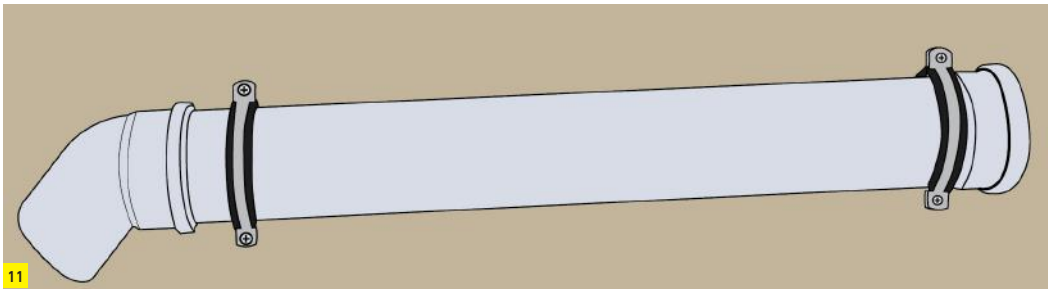
Mark the pipe clamp distances properly with 1% inclination on the wall or ceiling where they will be installed. (as flat wall)



Mark the part of the pipe that will be attached to the fitting as much as the jointing distance.



Apply a lubricating liquid (silicone etc.) to the socket part of the pipe.



After the pipe and fittings are jointed, place them and tighten the clamps.

Rubber Ring (Push Fit) Jointing

1- Mouth of the pipe should be absolutely chamfered. If the mouth of the pipe was cut, it should be chamfered.
2- Check if the sealing gasket is accurately placed on the pipe or fitting socket groove.
3- All installation parts should be dry and clean. There should be no deformation, notches or similar scratches on the pipes or fittings.
4- Apply a proper silicone-based lubricating liquid on the spigot end of the pipe or fitting. Do not use liquid soap, grease or similar petroleum derivatives.
5- Parts to be jointed should be levelled.
6- Push the spigot end of the pipe or fitting into the socket completely. If the application is longer than 2 m, pull the spigot end 10 mm back after placing it into the socket completely, to prevent the effects of thermal expansion.
7- Finally, check again if the gap left for thermal expansion still exists or not.

Pipe Hanging and Clamping

Always use GF Hakan silent pipe clamp to minimize the sound caused by vibration. Maximum clamping distances of the pipes should always comply with the values provided in the following table.

1- While fixing the pipe with clamps, pay special attention to not cause any tension and stress on pipes.
2- Pipe cannot move after tightening the screws of the fixed clamps. For sliding clamps, pipe will continue to move inside the clamp even after tightening the screws.
3- For each line longer than 2 m, use 1 fixed clamp immediately after the muff part.
4- In vertical lines, always place the fixed clamp on the top point of the pipe and below the socket part.
5- While fitting the fixed clamp, pay attention to keep 10 mm distance left on the flat end for expansion.
6- Use a fixed clamp after each fitting or fitting group.
7- All clamps to be added to the system apart from the fixed clamps in the horizontal or vertical line should be sliding clamp that allows for thermal expansion caused by temperature changes.
8- Pipes and fittings should be fixed in short distances so that they do not slide and release.

Maximum distances between the clamps

Nominal External Diameter DN [mm]	Clamp Distance	
	For Horizontal Pipe Directions* Dmax m (max. 15 x da)	For Vertical Pipe Directions* Dmax. m
50	0,75	1,50
75	1,10	2,00
90	1,35	2,00
110	1,65	2,00
125	1,85	2,00
160	2,40	2,00
200	3,00	2,00
250	3,00	2,00

Silent Pipe Clamp

Silent waste water piping systems are tested by the German Fraunhofer Building Physics Institute in accordance with EN 14366 standard, and the reports about sound level are issued by this institute.
In the test equipment used in this institute, sound levels are measured at different flows and different parts of the building.

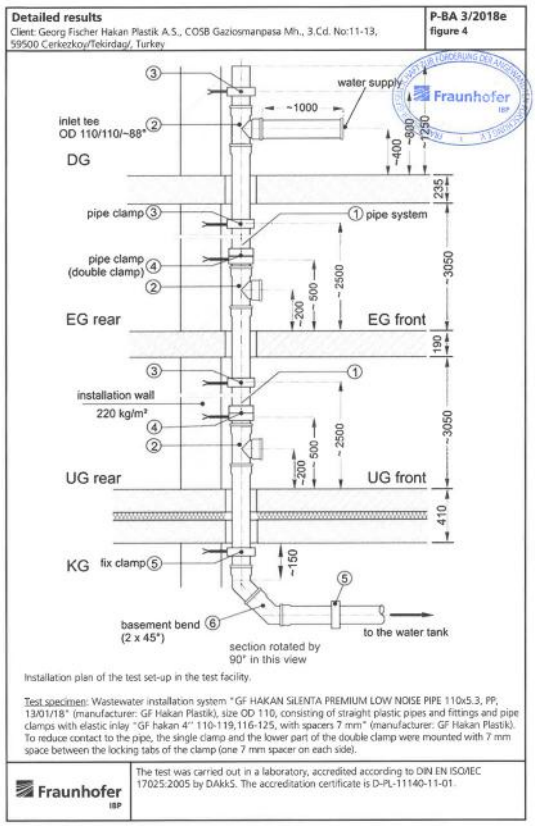
The test equipment in the institute laboratory is standard and the tests related to all waste water systems are conducted here. As seen in the test equipment below, pipe, fittings, installation wall thickness, water discharge amount as well as silent pipe clamp systems are also significant factors in the test report.

In the vertical lines, one group double and one single clamp should be used on each floor. In the horizontal lines, it is more suitable to use single clamp.

Clamp Details

The clamp on top, which is one of the double clamps used in the vertical lines, is fully tightened and grasps the pipe. The lower clamp is tightened up to the plastic wedges on the clamp. It is ensured that the rubber surfaces of the clamp are not jointed. In this system, the purpose is to absorb the vibration transmitted from waste water to pipe inside the first clamp and to minimize the vibration on the wall through the second clamp.

The single clamp in the vertical lines is tightened up to the plastic wedges on the clamp and it is ensured that the pipe is fixed to the wall. The single clamp in the horizontal lines is tightened up to the plastic wedges on the clamp and it is ensured that the pipe is fixed to the ceiling or wall.



To achieve maximum acoustic performance, the silent pipe clamps used in the test should be used in the installations as well.

Although there are different types of silent pipe clamps, they are available in two kinds as fixed and movable.

The noise created in the waste water systems is transmitted by two methods as air born and structure born.

1- Sound waves transmitted through air cause pressure in the ambient and result in vibration on the objects and surfaces that they hit. Thanks to the special formulas used in GF Hakan Plastik Silenta products, these vibrations are absorbed and prevented from being transferred out of pipe.

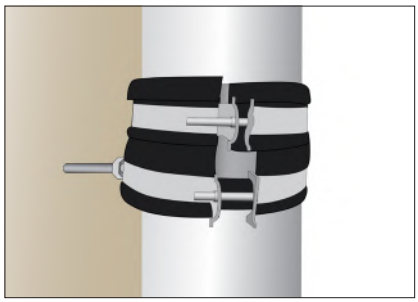
2- Sound waves transmitted through contact occur as a result of the waste water and waste hitting the pipe wall. These vibrations are transferred on the wall of the installation through contact. The sound created by contact is significantly absorbed by the special molecular structure of Silenta and specially-designed GF Hakan silent clamps.

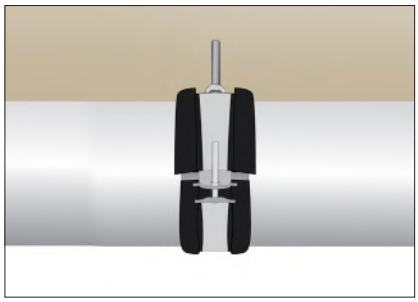
Installation

GF Hakan silent waste water pipe clamps ensure EN 14366 silence norms. In the waste water systems within buildings, cused clamps, their positions and distances are as important as silent pipes and fittings.

The clamp on top, which is one of the double clamps used in the vertical lines, is fully tightened and grasps the pipe. The lower clamp is tightened up to the plastic wedges on the clamp. It is ensured that the rubber surfaces of the clamp are not jointed. In this system, the purpose is to absorb the vibration transmitted from waste water to pipe inside the first clamp and to minimize the vibration on the wall through the second clamp.

The single clamp in the horizontal lines is tightened up to the plastic wedges on the clamp and it is ensured that the pipe is fixed to the ceiling or wall.

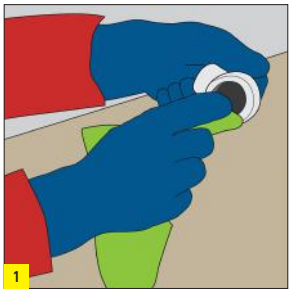


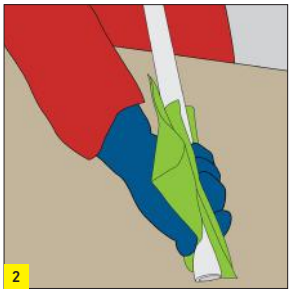


Building Technology (BT) Product Range Installation Instructions

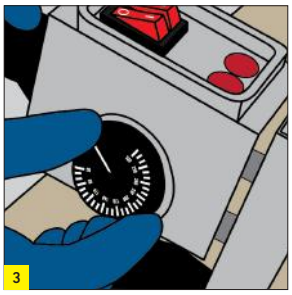
- Aquasystem PP-R and PP-RCT Piping Systems
- PE-RT, PE-XB Piping Systems

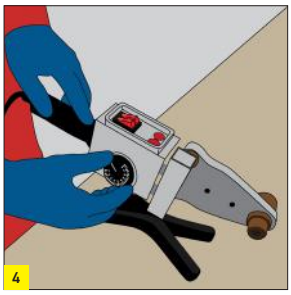
Aquasystem PP-R and PP-RCT Piping Systems



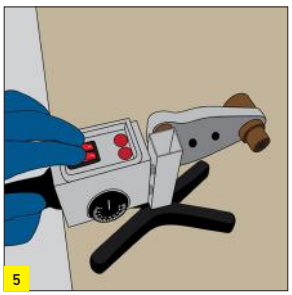


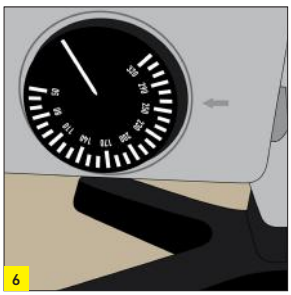
Make sure that pipes, fittings and welding machine are clean.



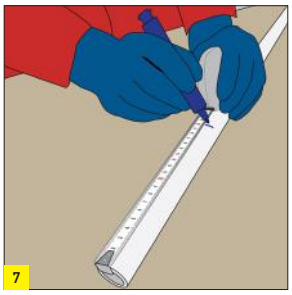


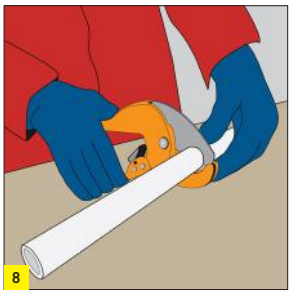
Before operating the socket fusion machine, make sure that the working area is safe. To avoid the rotation and movement of parts, welding plates should be appropriately placed into the welding machine.

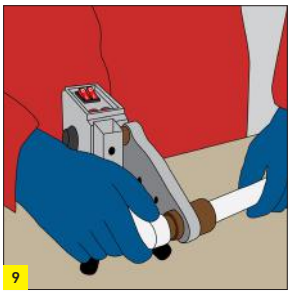




Connect the welding machine to 220 Volts standard socket. Adjust the temperature as 260°C (500 °F). Push the power button. Heating will take 1 to 3 minutes. When the temperature reaches 260°C (500°F), thermostat light will switch off automatically.







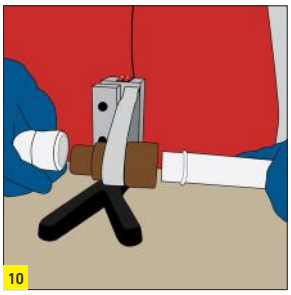
Place the pipes cut in the desired measurements and fittings into the welding plates. If foiled (stabile) pipes are used, first of all, shave the outer layer completely by using a stripper. Make trials to ensure that the blade is accurately adjusted.

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

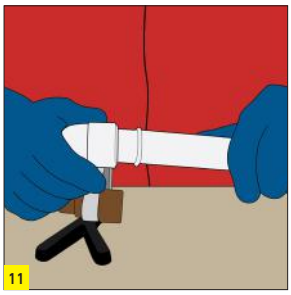
Pipes and fittings should be heated at the same time. Heating times vary depending upon the diameters of pipes. If you do not follow the times indicated in the table, this will cause reduction in the welding quality. If you heat them for too much time, it will cause the pipe to tighten so much and the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

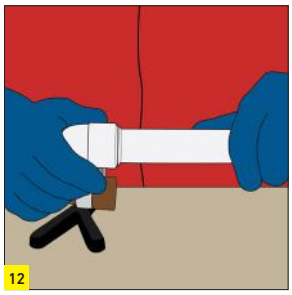
Installation



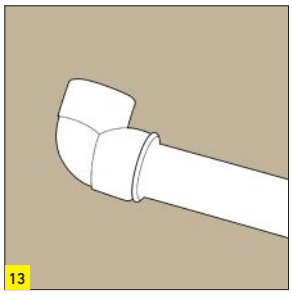
After heating, take out the pipes and fittings from the welding mould carefully.



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**.

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

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.

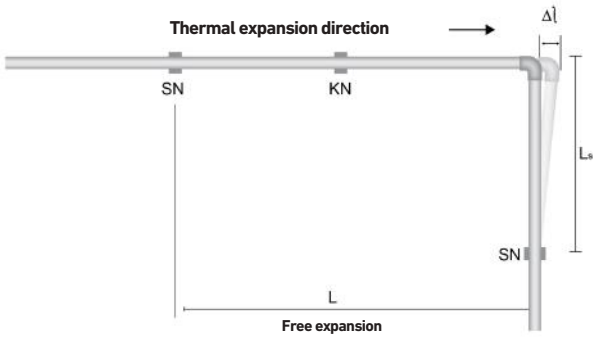
Free Expansion

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:

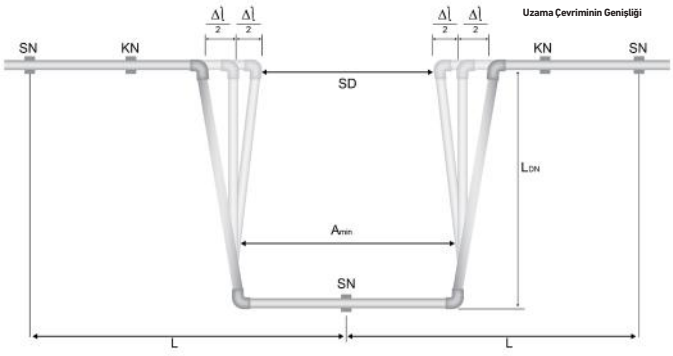
$A_{min} = 2 \times \Delta L + SD$

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)

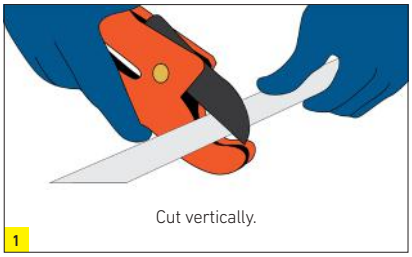
Distances Between Clamps in PP-R Installation:

	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

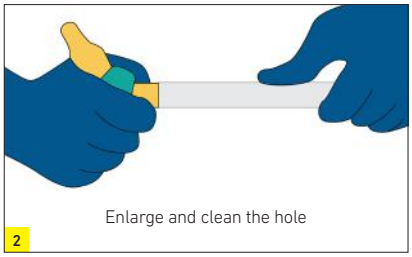
Installation

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

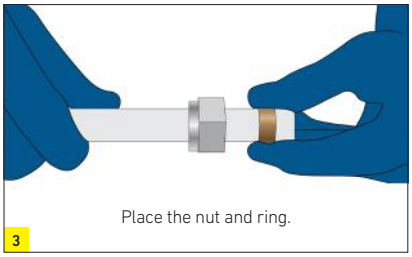
PE-XB, PE-RT Piping Systems



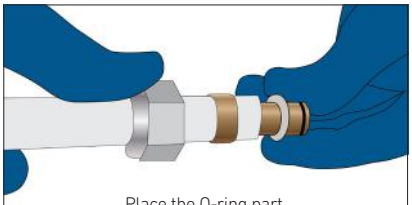
1 Cut vertically.



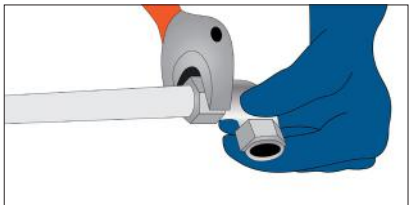
2 Enlarge and clean the hole



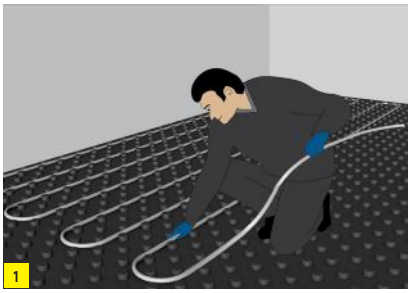
3 Place the nut and ring.



4 Place the O-ring part.
Use undamaged O-rings.

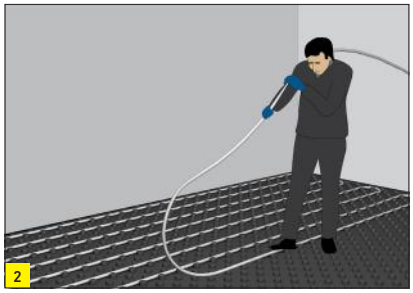


5 Tighten the nut with a wrench.



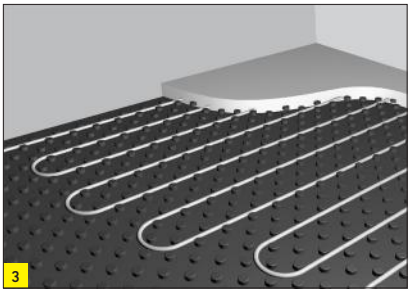
1

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.



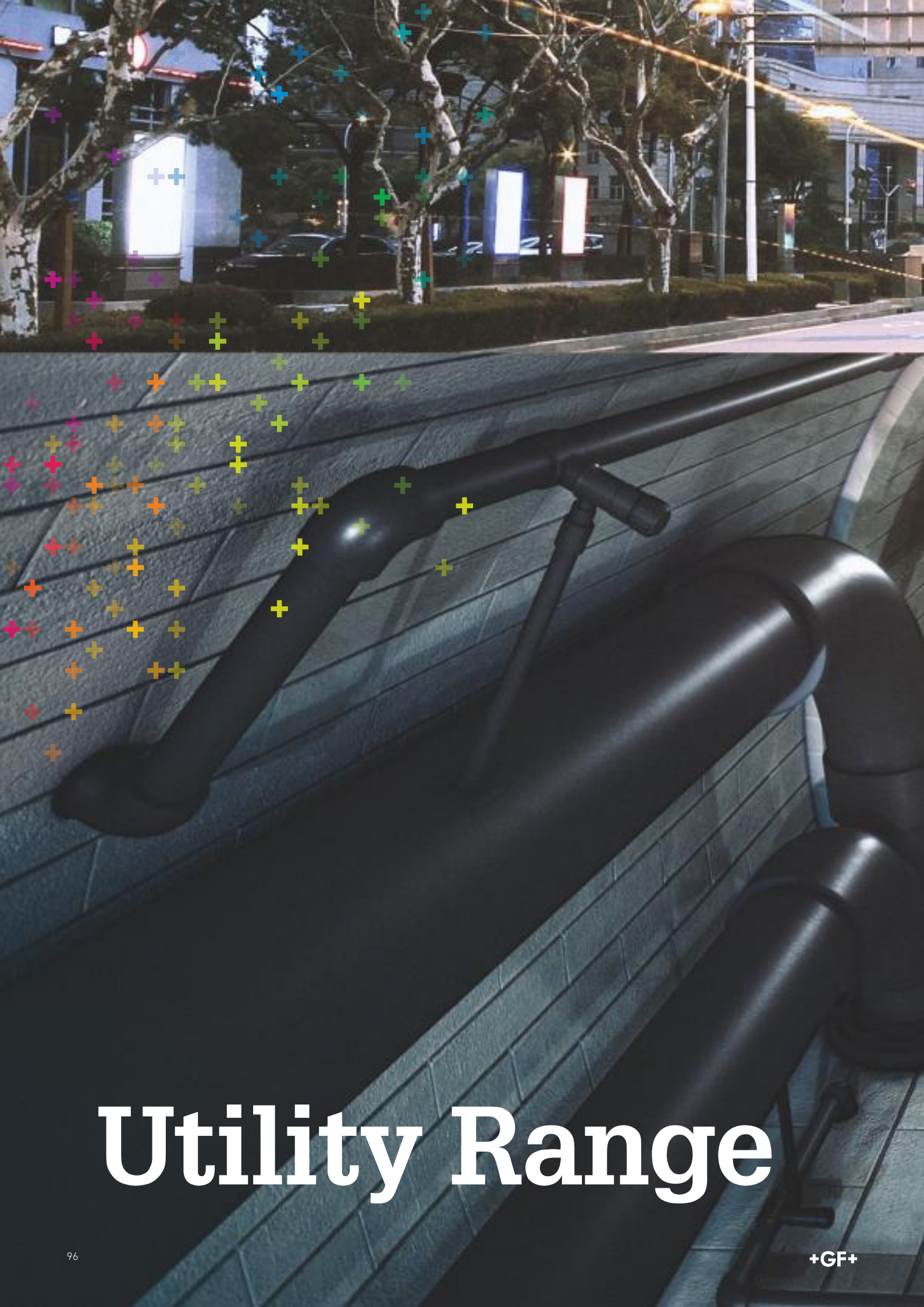
2

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



3

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



Utility Range


+GF+

Worldwide Quality Compliance for Polyethylene

Some certifications around the world

TÜRKİYE
TSE

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AUSTRIA
OFI HYGIENE

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GERMANY
DVGV

UK
WRAS

BULGARIA
NJN

NORWAY
DNV MARINE

UK
LLOYDS REGISTER

ITALY
RINA

Polyethylene
Pipe Systems

Developed by GF Hakan Plastik to meet the increasing needs for PE pipes around the world, these piping systems are mostly used in underground liquid lines and stand out with their lightweight, easy and secure installation characteristics.

PE Piping Systems used for water transfer are classfied as follows by the type of raw material used for production:

- PE 100 - High Density Piping Systems
- PE 100 RC - High Density Piping Systems Resistant to Cracks

PE Piping Systems used for gas transfer are classfied as follows by the type of raw material used for production:

- PE 100 - High Density Piping Systems

• Welding methods such as electrofusion, butt and socket can be jointed quickly and practically.
• Produced in accordance with TS EN 12201-2, TS EN 1555-2 standards.

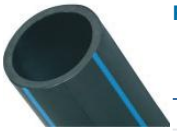
Technical Properties

Diameter Ranges [mm]	d20 - d630 mm for PE 100 and PE 100 RC
Pressure Classes	PN4 - PN5 - PN6 - PN8 - PN10 - PN12,5 - PN16 - PN20 - PN25 for PE 100 and PE 100 RC
Operating Temperature Range	-40°C - 40°C
Connection Type	Electrofusion Welding, Butt Welding, Socket Fusion Welding, Flanged Connection, Mechanical Connection
Thermal Expansion Coefficient	0,18 mm/m°K

Fields of Application

• Pressurized drinking water network
• Waste water discharge and waste water pumping lines
• Irrigation systems, undersea passage lines and deep sea discharges
• Underground fire extinguishing systems (Hydrant lines)
• Cooling water systems
• Telecommunication systems and mining
• Natural Gas Transport, LPG Systems

Polyethylene



Polyethylene Pipe

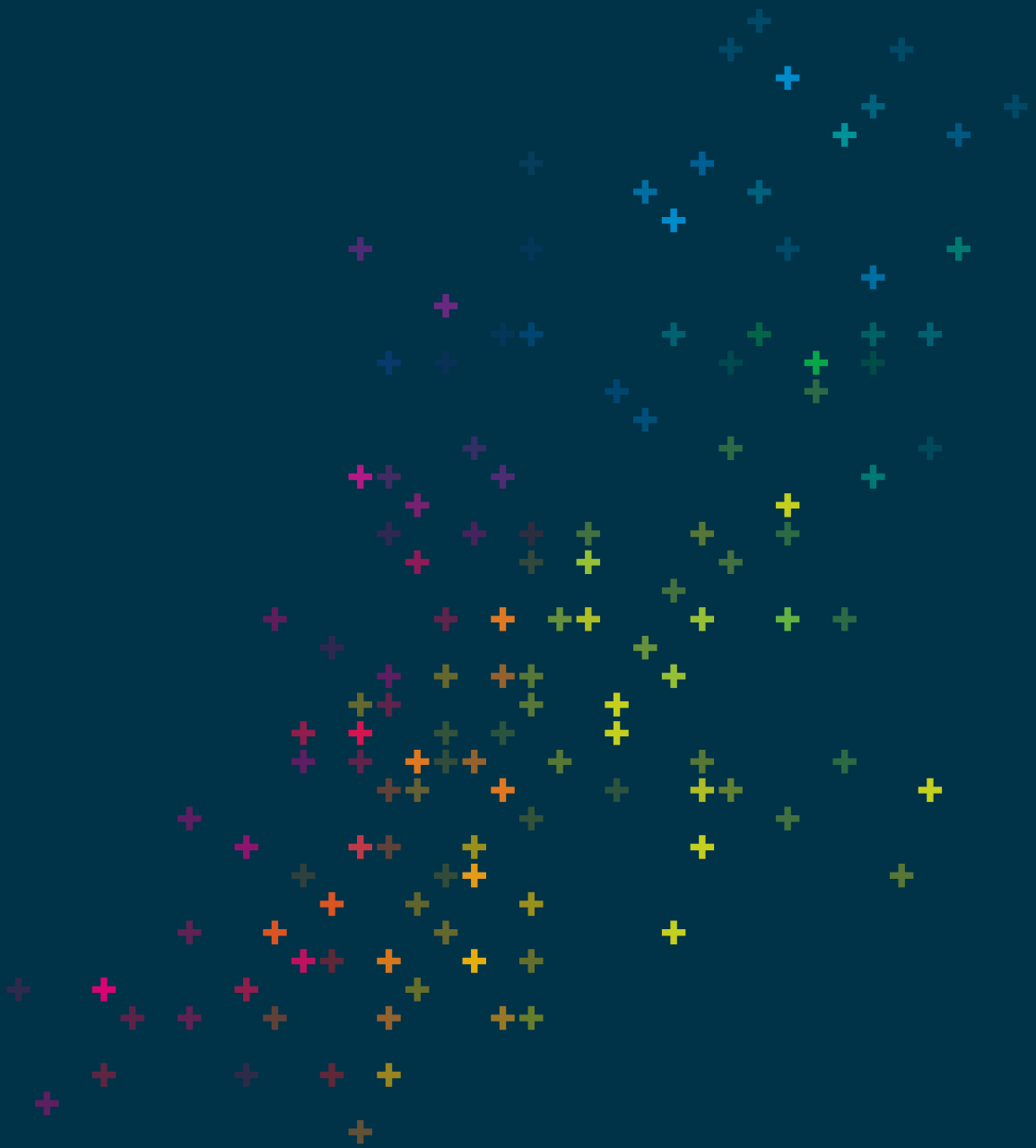
Dia. (mm)	PN4 (SDR41)	PN5 (SDR33)	PN6 (SDR26)	PN8 (SDR21)	PN10 (SDR17)	PN12.5 (SDR13,6)	PN16 (SDR11)	PN20 (SDR9)	PN25 (SDR7,4)
20	-	-	-	-	-	-	2,0	2,3	3,0
25	-	-	-	-	-	2,0	2,3	3,0	3,5
32	-	-	-	-	2,0	2,4	3,0	3,6	4,4
40	-	-	-	2,0	2,4	3,0	3,7	4,5	5,5
50	-	-	2,0	2,4	3,0	3,7	4,6	5,6	6,9
63	-	-	2,5	3,0	3,8	4,7	5,8	7,1	8,6
75	-	-	2,9	3,6	4,5	5,6	6,8	8,4	10,3
90	-	-	3,5	4,3	5,4	6,7	8,2	10,1	12,3
110	-	-	4,2	5,3	6,6	8,1	10,0	12,3	15,1
125	-	-	4,8	6,0	7,4	9,2	11,4	14,0	17,1
140	-	-	5,4	6,7	8,3	10,3	12,7	15,7	19,2
160	-	-	6,2	7,7	9,5	11,8	14,6	17,9	21,9
180	-	-	6,9	8,6	10,7	13,3	16,4	20,1	24,6
200	-	-	7,7	9,6	11,9	14,7	18,2	22,4	27,4
225	-	-	8,6	10,8	13,4	16,6	20,5	25,2	30,8
250	-	-	9,6	11,9	14,8	18,4	22,7	27,9	34,2
280	-	-	10,6	13,4	16,6	20,6	25,4	31,3	38,3
315	7,7	9,7	12,1	15,0	18,7	23,2	28,6	35,2	43,1
355	8,7	10,9	13,6	16,9	21,1	26,1	32,2	39,7	48,5
400	9,8	12,3	15,3	19,1	23,7	29,4	36,3	44,7	54,7
450	11,0	13,8	17,2	21,5	26,7	33,1	40,9	50,3	61,5
500	12,3	15,3	19,1	23,9	29,7	36,8	45,6	55,8	-
560	13,7	17,2	21,4	26,7	33,2	41,2	50,8	62,5	-
630	15,4	19,3	24,1	30,0	37,4	46,3	57,2	70,3	-

Utility

Product Range

Installation Instructions

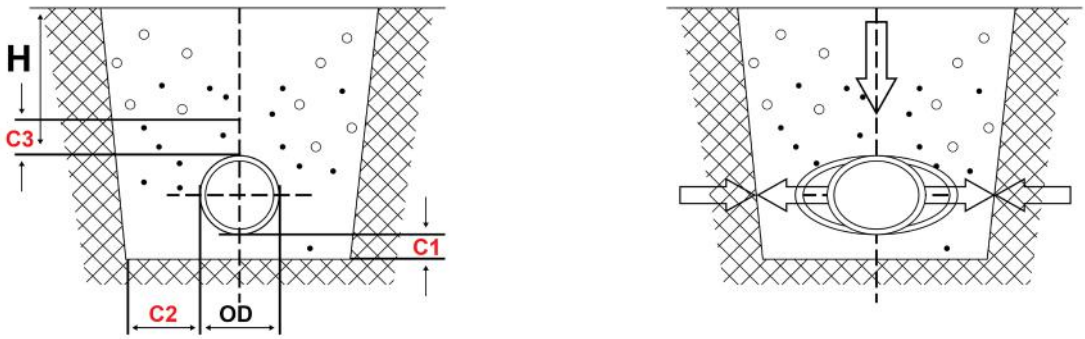
- Polyethylene Pipes and Fittings



Polyethylene Pipes and Fittings

• The installation rules of the PE pipes should be in compliance with ATV-A 127 and EN 805 standards.
• Pipes should be protected against deformation during the application and the pipes damaged during transport - storage should never be used.
• There should be no accumulation of underground water or rainwater inside the duct. Otherwise, such water should be discharged by using a pump.
• It is suitable to use incohesive sands, gravels, mixed grained sands and gravels as filler.
• Depth of duct may vary depending upon the weather conditions. It should be minimum 70-80 cm.
• If the soil generated during excavation is suitable, there is no need for bedding and the duct is filled. If the soil is not suitable (stony or wet), the height of the duct should be increased and bedding should be carried out on the base by using dry filler.
• Bedding thickness should be minimum C1 = 100 mm + 1/10 DN. 95% compacting should be ensured by using a compactor on the bedding material.
• Side fillers of pipes should be poured with C2 = 30 cm thickness and 95% compacting should be ensured by a compactor. This process should be carried out every 30 cm until it covers 30 cm above the pipe.
• After it covers C3=30 cm on the pipe, filling process should be completed by compacting it with the aid of a mid-power compactor.

Placement of the Pipe in the Duct



Jointing Methods of Polyethylene Pipes

Butt Welding

Butt welders consist of 4 units:

1-Main Hydraulic Body: Ensures the fixed connection for the purpose of welding polyethylene pipes or fittings.
2- Hydraulic Board (Unit): Unit that ensures welding pressures required so that the welding surfaces have the suitable welding parameters and pressures.
3-Trimming Unit: Relevant surfaces should be smooth for welding. Trimming unit removes the residues on the butt surfaces through its blades and makes the surfaces suitable for welding.
4-Heating Coil: Surfaces are heated with appropriate temperatures so that they can adhere homogeneously, and the raw material is melted according to the desired standards.

Preparations for Butt Welding:

Before butt welding, special attention should be paid to the following points and butt welding should not be initiated without fulfilling these conditions.
a-The temperature of heating coil should be checked. It should be ensured that the temperature is distributed homogeneously.
b-The surface of heating coil should be clean prior to welding.
c-Polyethylene pipes should be properly connected to the welder. There should be no axial run-out.
d-Surfaces should be smooth for welding process. Avoid hand contact on the trimmed surfaces.

Application of Butt Welding:

Before starting the welding process, the environment should be protected against unsuitable weather conditions (extreme moisture, dust, temperature below +5°C). It is recommended to use welding tent in the environments below +5°C.

Wind, sunlight and moisture might cause improper heating in the welding area. This would negatively affect the welding quality. Welding operator should be well-trained and experienced. The pipes to be welded being of the same type material, diameter and wall thickness is one of the most appropriate welding methods.

a-Welding temperature: The temperature of the heating coil should be between 190 and 220°C. Welding times of the heating coil should be applied according to the standards.

b-Wall height: It is the wall height that occurs as a result of reclining between the heating plate and butt surfaces of the pipes at P=0,15 N/mm^2 pressure and is calculated as **0,55 mm + (0,1 x e) mm**.

e= Pipe wall thickness [mm]

c- Welding time depending upon the wall thickness: Apply the following table.

d- Jointing time: Within 9 seconds after the completion of the heating time and wall release process, heating coil is taken from the welder, and butt surfaces are jointed to each other at the required pressure according to the standard data.

e-Cooling time: Welding process is completed after waiting for the walls to cool according to the standards.

Welding Times of HDPE Pipes at 20^{0}C Ambient Temperature

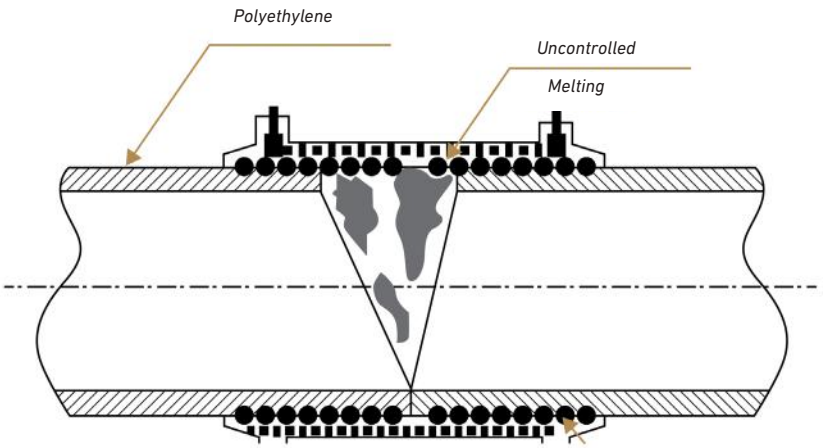
Pipe Wall Thickness [mm]	Welding Pressure 0,15 N / [mm]^2 Wall Height [mm]	Heating Time 0,02 N /mm^2 [s]	Heating Iron Release time [sn]	Pipe Jointing Pressure Operating Time [s]	Cooling Time [m]
..... 4,5	0,5	 45	 5	5	6
4,5 7	1.0	45.....70	5 6	5 6	6.....10
7 12	1,5	70 120	6 8	6 8	10.....16
12 19	2,0	120 190	8 10	8 11	16.....24
19 26	2,5	190 260	10 12	11 14	24.....32
26 37	3,0	260 370	12 16	14 19	32.....45
37 50	3,5	370 500	16 20	19 25	45.....60
50 70	4,0	500 700	20 25	25 35	60.....80

Electrofusion Welding

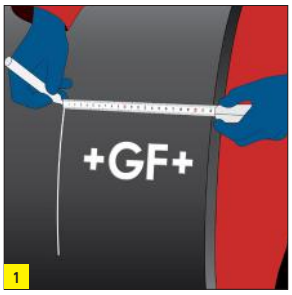
1. Cutting the Pipes:

Pipes should be cut vertically to their own axis. For cutting process, PE pipe cutter or a saw suitable to cut plastics can be used.

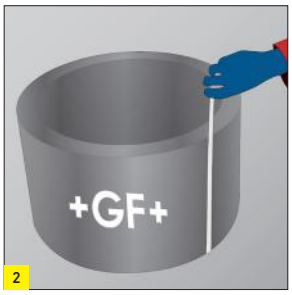
Cutting the pipes improperly results in the metal windings in the sleeve not contacting the pipes in certain areas. This might cause overheating and uncontrolled flow of the melted material.



2. Marking the Welding Area

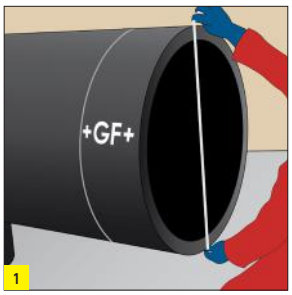


Welding area can be described as the depth in which the pipe will be fitted into the sleeve. Measure the length of sleeve and calculate the half Length of it.

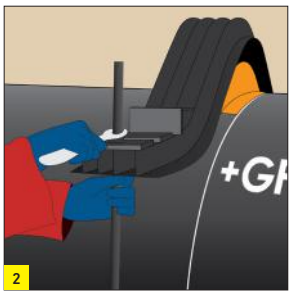


Mark the half length of sleeve by + 10 mm on pipe.

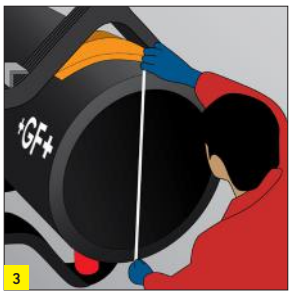
3. Checking the Ovality



Any possible ovality on PE pipes should be absolutely checked. Check it at several points of pipes.



If ovality exists on the pipe, use ovality clamp.



After fitting the ovality clamp, check the ovality of pipe again, and if necessary, re-position the clamp.

4. Scraping the Pipe Surface

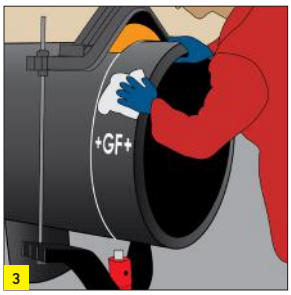
Before welding, shave the pipe with a scrapper to remove the oxidized layer on the surface.

To remove the oxidized layer completely, it should be scraped in a way that the marking on the pipe is removed and chips occur. Pay special attention to ensure that the scraped pipe is protected from dirt and undesired weather conditions. Chips that may occur on the pipe end should be removed by a scraper and edges should be rounded.

5. Cleaning the Welding Area

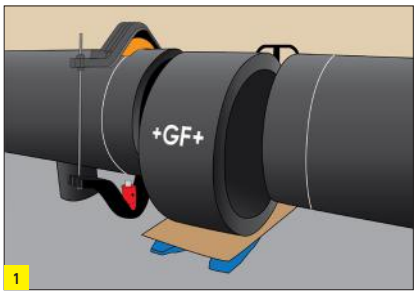
Unpack the sleeve and check it is not damaged. Avoid contacting the welding area of sleeve with dirty or oily hands.

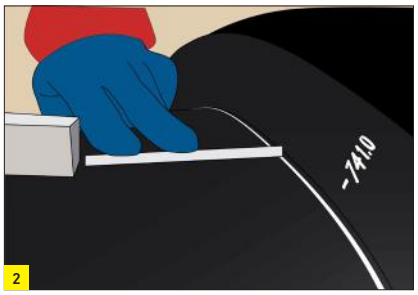
Isopropyl alcohol could be used as cleaning substance. (Alcohol content should not be less than 96% by volume).



Use the cleaning substance by pouring it on a absorbing cloth that does not leave any particles. Cleaned surfaces should be protected from dirt and undesired weather conditions.

6. Placing the Pipe into Sleeve:





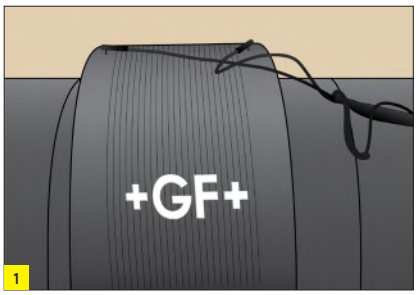
Place the sleeve in a way that it will encircle the marked area of pipe. The marked area should easily fit into the sleeve. If necessary, re-scrap the pipe.

While placing the pipe into the sleeve, ensure that the contact terminals of sleeve stay on top. Pipes should not be exposed to bending tension and should easily bear their own weight inside the sleeve. Free ends of pipes could be supported.

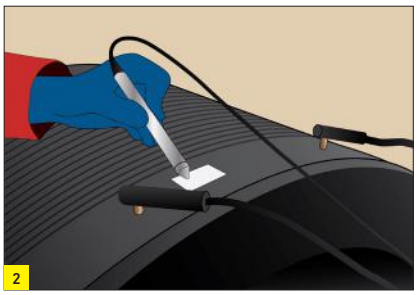
Likewise, prepare the other pipe end. Make sure that the pipe and sleeve are at the same axis. Check the gap between pipe and sleeve along the surrounding of the pipe. If there are local gaps, disperse the ovality with wooden parts (maximum 3 cm long) and ensure that the gaps are equal around the entire pipe. Measure the gaps. If gaps are shorter than 2 mm, proceed with electrofusion welding.

7. Electrofusion Welding:

If you have precisely followed the installation instructions step by step and there are no problems, welding process could be carried out by an universal EF welder. Place the socket ends of the welder into the contact terminals of the sleeve. Welding details are indicated on the barcode label on GF sleeve. Enter the welding details into the welder automatically with the aid of a barcode scanner or manually. Check the details on the welder screen and on the barcode. Start the welding process. Upon completion, always wait as much as cooling period. Do not move the welded area during this period of time.



If any errors occur during welding, melted PE material might splash around. So, for safety reasons, keep away for at least 1 m during welding.



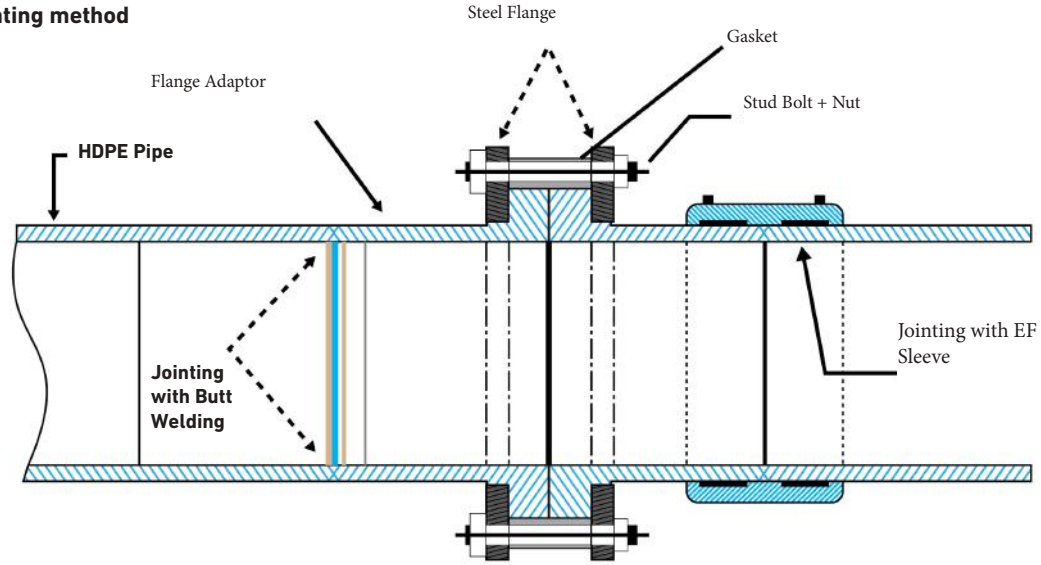
If welding is interrupted for any reasons (power supply etc), cooling times of the welded part are indicated on the barcode labels.

Flanged Jointing Methods of HDPE Pipes

Flanged jointing method generally allows for detachable connection of polyethylene pipes or polyethylene fittings. It also allows for the connection of necessary system materials such as valve-vacuum lifter-hydrant etc. to polyethylene pipes and fittings. After attaching the flange, a steel round connection component with bolt slots drilled on it, to the PE pipeline, PE part that will hold the steel round piece on the end and that is called flange adaptor on the end of the pipeline is welded by the butt welding method.

The two pipelines that will be jointed with flange are taken together and after fitting a leakproof gasket between the two sides, flanges are connected by using bolts and nuts. The significant point is to tighten the bolts by mutual sequence not by circular sequence. While tightening the bolts, it is important not to draw the pipelines in terms of extreme overloads.

Flanged Jointing method

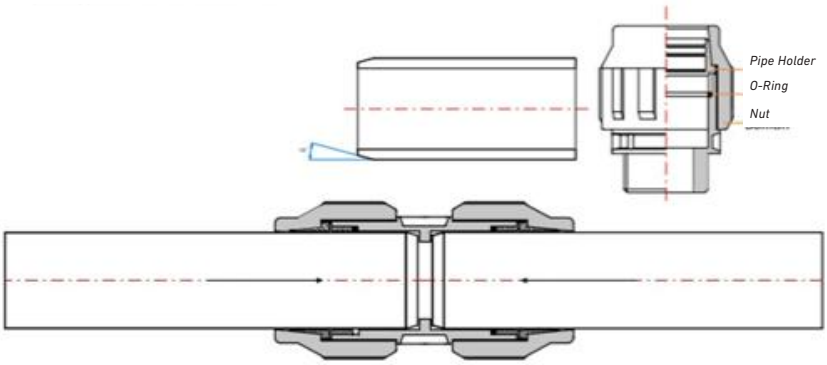


Jointing with Coupling Adaptor

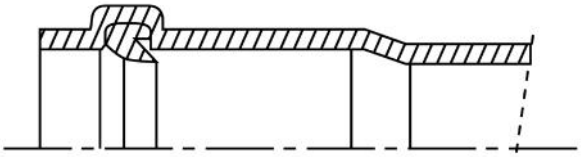
After cutting the pipes that will be jointed vertically to their axis, bevelling is applied to the pipe ends at approximately 15° angle, and the pipe is rotated and pushed up to the protrusion inside the coupling.

- After placing the both pipes properly, nuts are manually tightened and connection is completed.
- If the diameter of pipe is equal to or above 40 mm, it would be more appropriate to tighten the nuts by special wrench not manually.
- Coupling adaptors are resistant to 16 bars pressure. However, it is not recommended for the pipes with diameter above 110 mm.

Method of Jointing with Coupling Adaptor

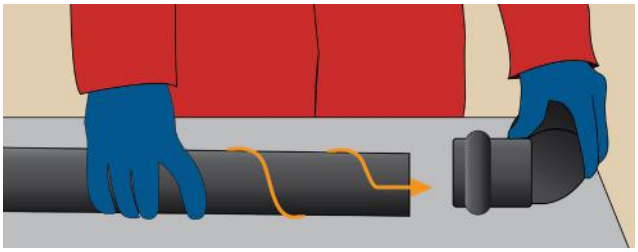


PVC-U Pressurized Potable Water Piping Systems



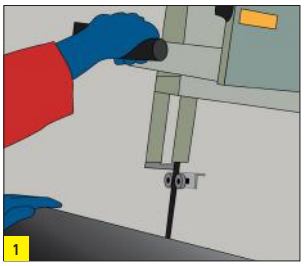
Connection of Push-Fit Pipes with Socket:

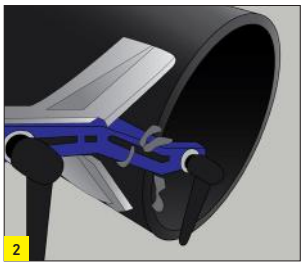
- Gasket is used for the jointing of Push-Fit PVC-U Pressurized potable Water Pipes.
- While placing the gasket, the groove of socket should be properly cleaned and attention should be paid to the direction of gasket.
- Solution is applied to the end of the pipe as a lubricating material. Pipe end is pushed into the socket in a way that will not slide the gasket. You should push up to the end of the push-fit distance inside the two pipes at the jointing point.
- Avoid extreme pressure and deflection during the installation of pipes.

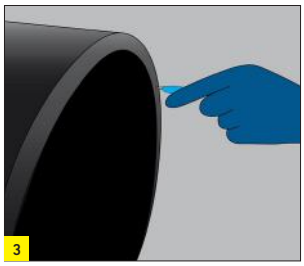


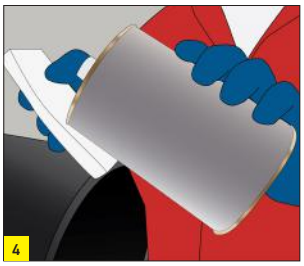
Connection of Solvent Cement Pipes with Socket:

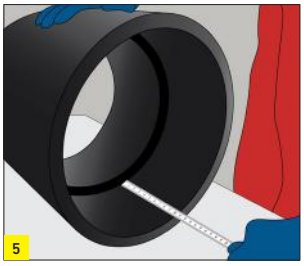
• First of all, remove all dusts, oils, stains and burrs by using cleaning liquid in the points that will be adhered to each other.
• Adhesion area is marked by the length of socket.
• Grind the adhesion areas on the both parts appropriately. After grinding, wipe and dry the adhesion areas again by using cleaning liquid.
• Apply the adhesive longitudinally on the adhesion points of the both parts by using a clean brush.
• After applying the adhesive appropriately, do not wait and immediately push the parts into each other without rotating them.
• Remove the adhesive residues that come out after pushing the parts into each other.

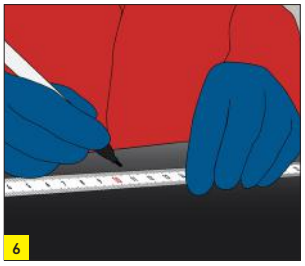


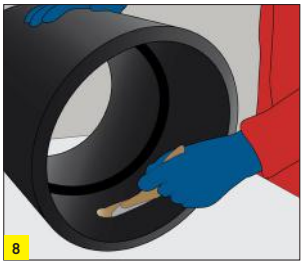


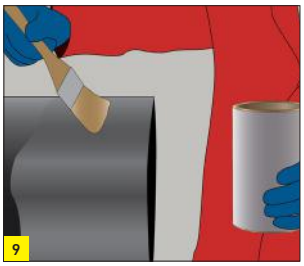


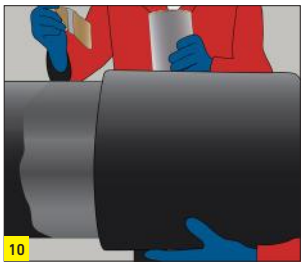


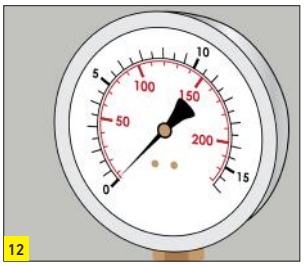








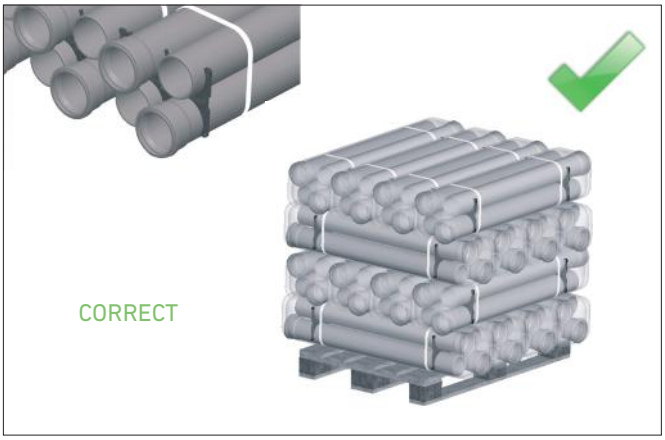




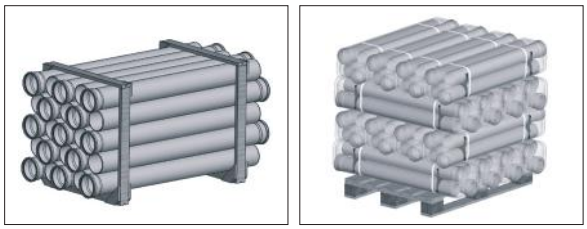
Packaging, Storage and Transportation

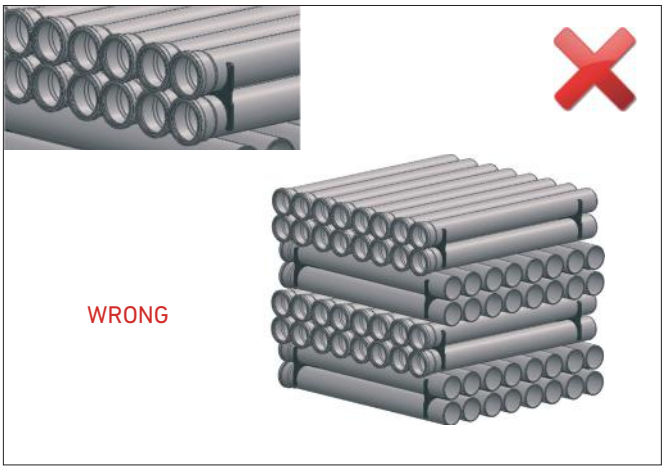
Packaging

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.



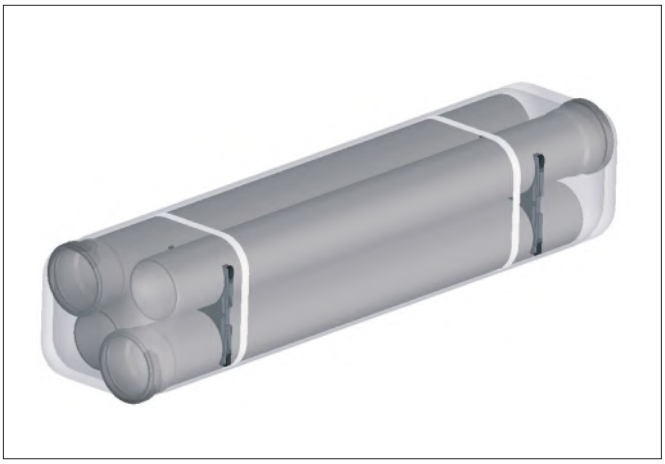
Waste water pipes are shipped on wooden frames or pallets according to the demands of customers.





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

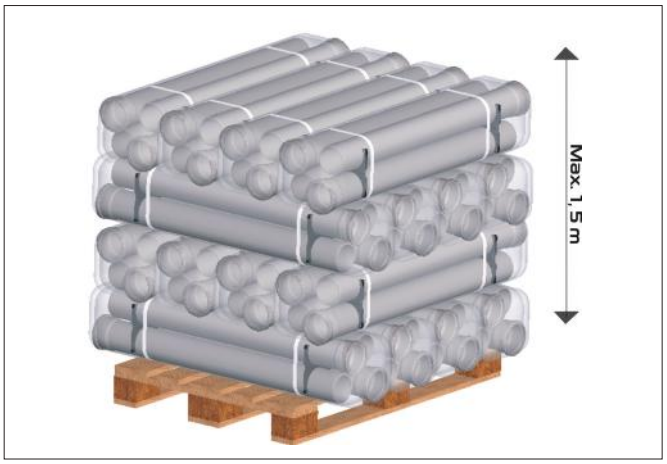
Short parts with the length of 150, 250 and 500 mm are packed in carton boxes like connection parts.



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.

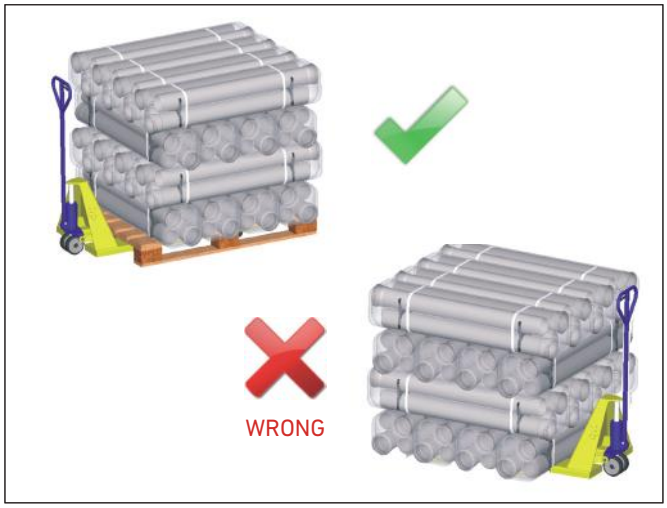
Storage



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.

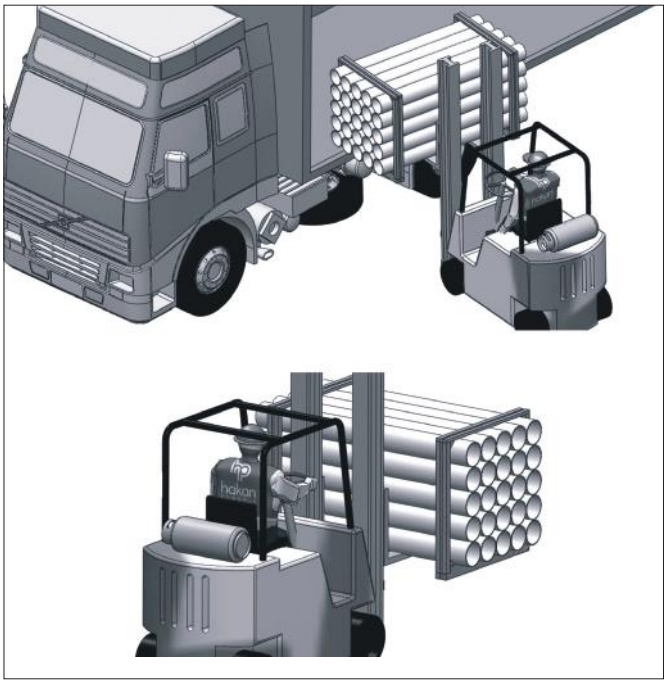
Pipes packed in the factory might be stacked on wooden frames. Appropriate materials such as pallet etc. should be used to prevent any damage on the socket parts of the pipes stored for a long time. This also makes it easier to lift the pipes by from the flor.



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.



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

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:

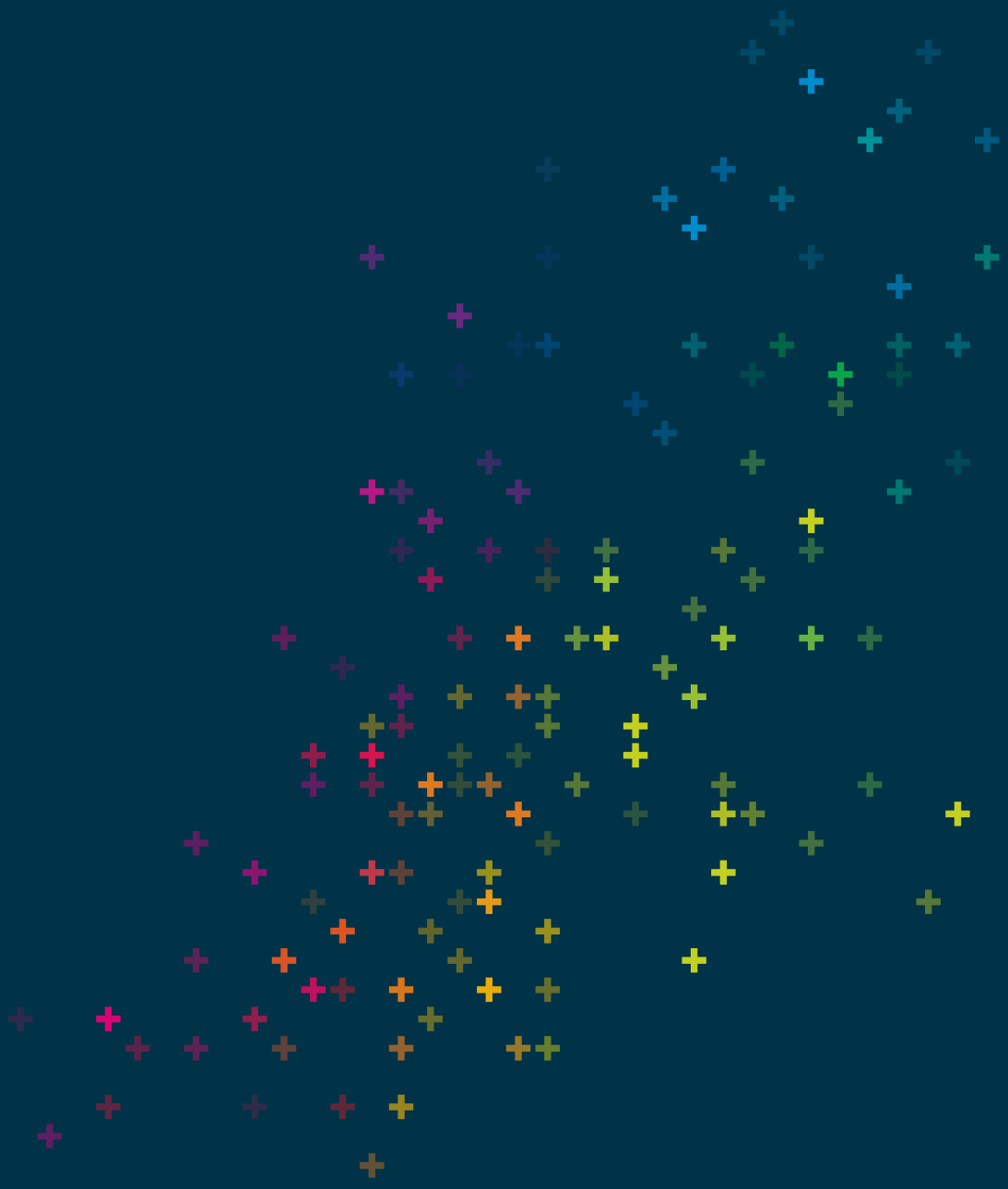
Maximum Operating Pressures according to DIN 8077 with safety factor of 1,5

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
	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.

Technical Tables

- Chemical Resistance Tables



Chemical Resistance Tables

++ Resistant
+ Limited Resistance
0 Contact GF Hakan Plastik
- Not Resistant

2-Chloroethanol	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	+	0	
PP	++	+	0	-
Acetaldehyde	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0	-	
PP	0	-		
Acetaldehyde, 0-40% aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0	-	
PP	++	0	0	-
Acetic acid, > 80 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	0	-	
PE	+	0	-	
PP	0	0	-	
Acetic acid, >10-50 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	+	-
PE	+	+	0	-
PP	+	+	0	0
Acetic acid, >50-60 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	0	0	-
PE	+	+	0	-
PP	+	+	0	0
Acetic acid, >60-80 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	0	0	-
PE	+	+	0	-
PP	+	+	0	0
Acetic acid, 0-10 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	+	-
PE	+	+	0	-
PP	+	+	0	0
Acetic acid anhydride	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0	-	
PP	++	0	-	
Acetone	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	++	0	-
PP	++	++	++	0
Acetone, up to 10 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	++	++	-
PP	++	++	++	0
Acetonitrile	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0	-		
PP	0	-		
Acetophenone	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0	-		
PP	0	-		
Acrylic acid ethylester	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0	-		
PP	-			
Acrylic acid methylester	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0	-		
PP	0	-		
Acrylonitrile	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	++	++	-
PP	++	0	0	-
Adipic acid, aqueous, saturated solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	-	
PE	++	++	++	-
PP	++	++	++	++
Allyl alcohol, 96% solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	-		
PE	++	++	0	-
PP	0	0	-	
Aluminium salts, aqueous, saturated solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Ammonia, gaseous, dry / wet	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	0
Ammonium Acetate, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Ammonium hydroxide, aqueous	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	0
Ammonium salts, various concentrations, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Amyl acetate	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0	-	
PP	0	-		
Amyl alcohol	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	0
Aniline	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0	0	-
PP	++	++	0	-
Antimony trichloride, 0-80 % aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	0

Chemical Resistance

Aqua regia	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	-		
PE	-			
PP	-			
Arsenic acid, 80% aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	++
Barium salts, aqueous, saturated solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Beer	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Benzaldehyde	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0	-	
PP	++	0	-	
Benzene	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	-			
PP	-			
Benzene sulfonic acid	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	0	-
PP	++	++	0	-
Benzoic acid, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	++
Benzyl alcohol	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	-		
PE	++	++	0	-
PP	++	++	0	-
Beryllium salts, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Boric acid, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	++
Brine	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Bromine water, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	0	-	
PE	-			
PP	-			
Bromine, pure, liquid or gaseous, dry and wet	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	-			
PP	-			
Butadiene, gaseous	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0	-	
PE	0	-		
PP	0	-		
Butane, gaseous	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	0	-
PP	++	++	0	-
Butanediol-1,4,	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	-		
PE	++	++	++	-
PP	++	++	++	0
Butanediol-1,4, technically pure	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	
PE	++	++	0	
PP	++	++	0	
Butanol	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	0	-
PP	++	++	0	-
Butyl acetate	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	+	0	-	
PP	0	-		
Butyl phenol, p-tertiary	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	-		
PE	0	-		
PP	0	-		
Cadmium salts, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	0
Caesium salts, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Calcium hydroxide, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Calcium salts, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Carbon dioxide, gaseous, anhydrous	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Carbon tetrachloride	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	-			
PP	-			

Chemical Resistance

Carbonic acid, CO2 in H2O	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	++
Chloric acid, >10-20% aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0	-	
PE	0	-		
PP	0	-		
Chloric acid, 0-10 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0	-	
PE	0	-		
PP	0	-		
Chlorine, gaseous, dry, pure	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	0	-	
PE	-			
PP	-			
Chlorine, gaseous, wet	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	0	-	
PE	-			
PP	-			
Chlorine water, <= 2 ppm Chlorine	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	0	-
PP	++	++	++	0
Chlorine water, saturated solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	-			
PP	-			
Chloroacetic acid, 100 %	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	0	-	
PE	++	++	0	-
PP	++	++	0	-
Chloroacetic acid, 50 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0	0	-
PE	++	++	0	-
PP	++	++	++	0
Chlorobenzene	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0	-		
PP	0	-		
Chlorosulfonic acid	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	-		
PE	-			
PP	-			
Chromic acid, <10 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	-	
PE	-			
PP	-			
Chromic acid, > 30 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	-		
PE	-			
PP	-			

Chromic Acid, >=10-30 %, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	-	
PE	-			
PP	-			
Chromium (II) -salts, aqueous, saturated solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	0	-
PP	++	++	0	-
Citric acid, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Compressed air, containing oil	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0	0	0	-
PP	0	0	0	-
Copper I/II salts, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	0	-
PP	++	++	++	0
Crotonaldehyde	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0	0	-
PP	++	0	-	-
Cyclohexane	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0	-	
PE	++	0	-	
PP	++	0	-	
Cyclohexanol	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	0	-
PP	++	++	0	-
Cyclohexanone	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0	-	
PP	0	0	-	
Dextrine, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	0
Dibrombenzene	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	-			
PP	-			
Dibutyl ether	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0	0	-	
PP	0	0	-	
Dibutyl phthalate	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	0	-
PP	++	0	-	
Dichloroacetic acid	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C

Chemical Resistance

PVC-U	++	0	-	
PE	0	-		
PP	0	-		
Dichloroacetic acid, <= 50 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	0	-
PP	++	++	0	-
Dichloroacetic acid methyl ester	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	++	0	-
PP	++	++	++	0
Dichlorobenzene	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0	-		
PP	0	-		
Dichlorodifluoromethane, gaseous	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0	-		
PP	0	-		
Dichloroethylene	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	-			
PP	-			
Diesel oil	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	0	-	
PE	0	0	-	
PP	0	-		
Diethanolamine, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0	-	
PP	++	0	-	
Diethyl ether	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0	-		
PP	0	-		
Diethylamine	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0	-	
PP	++	0	-	
Diisobutyl ketone	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0	-	
PP	++	0	-	
Diisopropyl ether	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0	-		
PP	0	-		
Dimethyl formamide	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	++	0	-
PP	++	++	++	0
Dimethylamine	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0	-	
PP	++	0	-	

Dioxane	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0	-	
PP	0	-		
Ethanol, <= 50% aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	++
Ethyl alcohol, 96%	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	++
Ethanolamine	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0	-	
PP	++	0	-	
Ethyl benzene	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0	-		
PP	0	-		
Ethylacetate	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0		
PP	++	0		
Ethylchloride, gaseous	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0	-		
PP	0	-		
Ethylene diamine	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	++	++	-
PP	++	++	++	0
Ethylene glycol	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	+	+	0	-
PP	+	+	0	-
Ethylene glycol, <= 50% aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	+	+	0	-
PP	+	+	+	0
Ethylenediamine tetraacetic acid, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	-		
PE	+	+	0	-
PP	+	+	0	-
Ferric chloride	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Fluorosilicic acid, < = 32 % aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	0

Chemical Resistance

Formaldehyde, <= 40 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	0	-
PE	+	+	0	-
PP	+	+	0	-
Formamide	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	++	++	-
PP	++	++	++	0
Formic acid, > 25-50 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	0	-
PE	+	+	0	-
PP	+	+	0	-
Formic acid, > 60 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	-		
PE	+	+	0	-
PP	0	-		
Formic acid, >10-25 % aquesous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	0	-
PE	+	+	0	-
PP	+	+	0	-
Formic acid, >50-60 %, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	0	-
PE	+	+	0	-
PP	+	+	0	-
Formic acid, 0-10% aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	0	-
PE	+	+	0	-
PP	++	+	0	-
Fuel oil, heavy fuel oil	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0	-		
PP	0	-		
Furfural	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	++	0	-
PP	++	0	0	0
Furfuryl alcohol	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	++	0	-
PP	++	++	0	-
Gasoline	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	-		
PE	0	-		
PP	0	-		
Gelatine, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	0
Glucose, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	++

Glycerol, Glycerin	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Glycin, 10% aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	0	-
PP	++	++	0	-
Glycolic acid, 37% aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	+	+	0	-
PP	+	+	0	-
Heptane	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0	-	
PE	++	0	-	
PP	0	-		
Hexane	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0	-	
PE	++	0	-	
PP	0	-		
Hydrazine Hydrate, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0	-	
PE	++	++	0	-
PP	++	0	-	
Hydrochloric acid, <= 10% aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	+	+	+	-
PP	+	+	+	+
Hydrochloric acid, > 10-25 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	+	+	+	-
PP	+	+	+	+
Hydrochloric acid, > 25-30% aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	+	+	+	-
PP	+	+	+	+
Hydrochloric acid, > 30 - 37 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	+	+	0	-
PP	0	0	0	0
Hydrochloric acid, > 37 %, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	-		
PE	0	-		
PP	0	-		
Hydrocyanic acid	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	0
Hydrofluoric acid, <= 10 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	0	-
PE	+	+	0	-
PP	+	+	0	0

Chemical Resistance

Hydrofluoric acid, > 40% - 75% aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	+	+	0	-
PP	0	0		
Hydrofluoric acid, > 75 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	-			
PP	-			
Hydrofluoric acid, 10% - 40 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	0	-	
PE	+	+	0	-
PP	+	+	0	0
Hydrogen chloride, gaseous	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	0	-
PP	++	++	0	-
Hydrogen peroxide, < 5 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	-	
PE	+	0	-	
PP	0	-		
Hydrogen peroxide, >= 5 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	-	
PE	0	-		
PP	-			
Hydrogen Sulfide gaseous	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	0	-
PP	++	++	++	0
Hydrogen sulfide, aqueous saturated solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	0
Hydrogen, gas	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	0
Hydroquinone, cold saturated aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0	-	
PE	++	0	-	
PP	++	0	-	
Iron salts, aqueous, saturated solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Isobutylacetate	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0	-	
PP	++	0	-	
Isooctane	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0	-	
PE	++	0	-	
PP	++	0	-	
Isopropyl alcohol	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0	-	
PE	++	++	0	-
PP	++	++	0	-
Lactic acid, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0	0	-
PE	+	+	+	-
PP	+	+	+	0
Lead Acetate	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	0
Linseed oil	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	0	-
PP	++	++	++	0
Lithium salts, aqueous saturated solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Magnesium salts, aqueous, saturated solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Maleic acid, cold saturated, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0		
PE	++	++	0	
PP	++	++	0	
Mercury salts, aqueous, saturated solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	++
Methane, gaseous	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0		
PE	++	0		
PP	++	0		
Methanol	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	0
Methyl acetate	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	++	0	
PP	++	++	0	
Methyl Amine, 32 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0			
PE	++	0		
PP	++	0		
Methyl bromide, gaseous	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C

Chemical Resistance

PVC-U	-			
PE	-			
PP	-			
Methyl ethyl ketone	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0		
PP	++	0		
Methyl isobutyl ketone	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0		
PP	++	0		
Methyl acetate	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	++	0	
PP	++	++	0	
Methyl Amine, 32 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0			
PE	++	0		
PP	++	0		
Methyl bromide, gaseous	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	-			
PP	-			
Methyl ethyl ketone	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0		
PP	++	0		
Methyl isobutyl ketone	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0		
PP	++	0		
Methyl methacrylate	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	++	0	
PP	++	++	0	
Milk	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Mineral oil	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	
PE	++	++	0	
PP	++	++	0	
50% Chromic acid / 15% sulfuric acid / 35% water	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	0	-	
PE	-			
PP	-			
Mixed acids: 15% nitric / 15% hydro-fluoric / 18% sulfuric	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0			
PE	-			
PP	-			
Mixed acids: 30% sulfuric / 60% phosphoric / 10% water	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C

PVC-U	++	++	0	-
PE	++	++	0	-
PP	++	++	++	0
Mixed acids: sulfuric / nitric / water, various concentrations	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0			
PE	0			
PP	0			
N-Methylpyrrolidon	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0		
PP	++	0		
N,N-Dimethylaniline	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0		
PP	0			
Nickel salts, aqueous, saturated solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	++
Nitrating acid	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	0	-	
PE	-			
PP	-			
Nitric acid, > 30 - 55 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	-	
PE	-			
PP	-			
Nitric acid, > 6 - 20 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	0	-		
PP	0	0		
Nitric acid, >20 - 30 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	0	-		
PP	0	0		
Nitric acid, >55 - 65% aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	0	-	
PE	-			
PP	-			
Nitric acid, ≤ 6 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	0	-		
PP	0	0	0	
Nitrobenzene	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0		
PP	++	0		
Nitrogen Gas	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++

Chemical Resistance

Nitrotoluene (o-, m-, p-)	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0		
PP	0			
Nitrous acid	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	0		
PP	++	0		
Nitrous gases (Nitric oxide),	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0		
PE	0			
PP	0			
Oleic acid	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	0		
PP	++	0		
Oleum, <= 10 % SO3	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	-			
PP	-			
Olive oil	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	+	+	0	
PP	+	+	0	
Oxygen, gaseous	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	0	
PP	++	++	0	
Palm oil, palm nut oil	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	0		
Peracetic acid, > 10 %	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	0		
PE	0			
PP	0			
Peracetic acid	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	0		
PE	0			
PP	0			
Perchloric acid, <= 70 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0			
PE	0			
PP	0			
Peroxo monosulfuric acid, 0-10 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0			
PE	-			
PP	-			
Phenol, <= 10 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0			
PE	++	++	0	
PP	++	++	0	
Phosphoric acid, <= 60 % aqueous solution	Fluid Temperatures			

	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	+	+	0	
PP	+	+	+	0
Phosphoric acid, >60-85 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	0	-
PE	+	+	0	
PP	+	+	0	
Phosphoric acid, >85-95 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	0	-
PE	+	+	0	
PP	+	+	0	
Phosphorous chlorides: -trichloride -pentachloride -oxichloride	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0			
PP	0			
Photographic fixer, commercial solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	+	+	0	-
PP	+	+	0	
Phthalic acid, aqueous saturated solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0		
PE	++	++	++	-
PP	++	++	++	0
Potassium aluminium salts(alum), aqueous, saturated solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Potassium cyanide, sodium Cyanide, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Potassium formiate, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	++
Potassium hydroxide <= 50 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	+	+	+	+
Potassium hypochlorite, <=16% active Chlorine	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	-	
PE	0			
PP	0			
Potassium Permanganate, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	0	-
PE	0	0	-	
PP	0	0	-	
Potassium persulphate, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C

Chemical Resistance

PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	0
Propane, gaseous	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0		
PE	++	++	0	
PP	++	0		
Propionic acid	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0		
PE	++	0		
PP	++	0		
Propionic acid, 50% aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	0
Propylene glycol	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	+	+	0	-
PP	+	+	+	0
Propylene glycol <= 50% aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	+	+	0	-
PP	+	+	+	0
Pyridine	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0		
PP	0			
Salicylaldehyde	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	-		
PE	0			
PP	0			
Silicic acids	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Silicone oils	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0		
PE	++	++	++	-
PP	++	++	++	++
Silver salts, aqueous saturated solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Sodium borate, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	
PE	++	++	++	-
PP	++	++	++	++
Sodium Carbonate, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Sodium Chloride, aqueous saturated solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Sodium chlorite, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	+	+	0	
PP	+	+	0	
Sodium Chromate, diluted aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	
PE	0			
PP	0			
Sodium hydrogen sulfite,	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Sodium hydroxide, <=10% aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	+	-
PE	++	++	++	-
PP	+	+	+	0
Sodium hydroxide, > 50 %	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0	0	-	
PE	0	0	0	-
PP	0	0	0	0
Sodium hydroxide, >10-50 % aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	+	+	0	0
Sodium Hypochlorite from elec-trochlorination plants	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0			
PE	0			
PP	0			
Sodium hypochlorite, < 0.5 ppm active chlorine	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	0	-
PP	++	++	0	-
Sodium hypochlorite, <= 6 % active chlorine	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	0	-
PE	-			
PP	-			
Sodium hypochlorite, > 6 % active chlorine	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	-	
PE	-			
PP	-			
Sodium hypochlorite, 0.5 - 2 ppm active chlorine	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	-	
PP	++	++	-	
Sodium persulphate, aqueous, cold saturated solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	0

Chemical Resistance

Sodium salts, aqueous, saturated solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Starch solution, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Styrene	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0			
PP	0			
Succinic acid, aquesous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	0
Sulfuric acid, <= 25% aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	+	+	+	0
Sulfuric acid, > 25-50% solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	+	+	+	+
Sulfuric acid, > 50 - 70% solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	+	-
PE	++	++	++	-
PP	+	+	+	0
Sulfuric acid, > 70 - 78% solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	-	
PE	++	++	++	-
PP	+	+	0	0
Sulfuric Acid, > 78 - 93% solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	-	
PE	-			
PP	-			
Sulfuric acid, > 93 - 96% solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	+	-	
PE	-			
PP	-			
Sulfuric acid, > 96% - 98% solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	+	0	-	
PE	-			
PP	-			
Sulfurous acid, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	0	-
PP	++	++	0	-
Sulfuryl chloride	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	-			
PP	-			
Sulphur dioxide, gaseous, dry and moist	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0			
PE	0			
PP	0			
Tannic acid, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0		
PE	++	0		
PP	++	0		
Tartaric acid, <=10% aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	0
Tetrachloroethane	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	-			
PP	-			
Tetrachloroethylene	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0			
PP	0			
Tetrachloromethane	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	-			
PP	-			
Tetrahydrofurane	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0			
PP	0			
Tetramethyl ammoniumhydroxide	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	0	0	-
PE	++	0	0	-
PP	++	0	0	
Tin (II) Chloride, aqueous saturated solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	0
Toluene	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0			
PP	0			
Trichloroacetic acid, aqueous solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0			
PE	++	++	0	
PP	++	++	0	
Trichloroethane	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0			
PP	0			
Trichloroethylene	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	-			
PP	-			
Trichloromethane	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0			
PP	0			

Chemical Resistance

Triethylamine	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	0			
PP	0			
Trifluoroacetic acid, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	0		
PP	++	0		
Turpentine oil	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	0			
PE	0			
PP	-			
Urea, aqueous solution	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	0
Urine	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	0	-
PE	++	++	++	-
PP	++	++	++	0
Vinyl acetate	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	++	++	0	
PP	++	0		
Vinyl Chloride gas	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	-			
PP	-			

Mineral water	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Potable Water	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Sea water	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Water - distilled - deionised	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Water, drinking, chlorinated, ≤ 0.1 ppm Chlorine	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++
Xylene	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	-			
PE	-			
PP	-			
Zinc salts, aqueous saturated solutions	Fluid Temperatures			
	20 °C	40 °C	60 °C	80 °C
PVC-U	++	++	++	-
PE	++	++	++	-
PP	++	++	++	++

++ Resistant
\+ Limited Resistance
0 Contact GF Hakan Plastik
\- Not Resistant

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