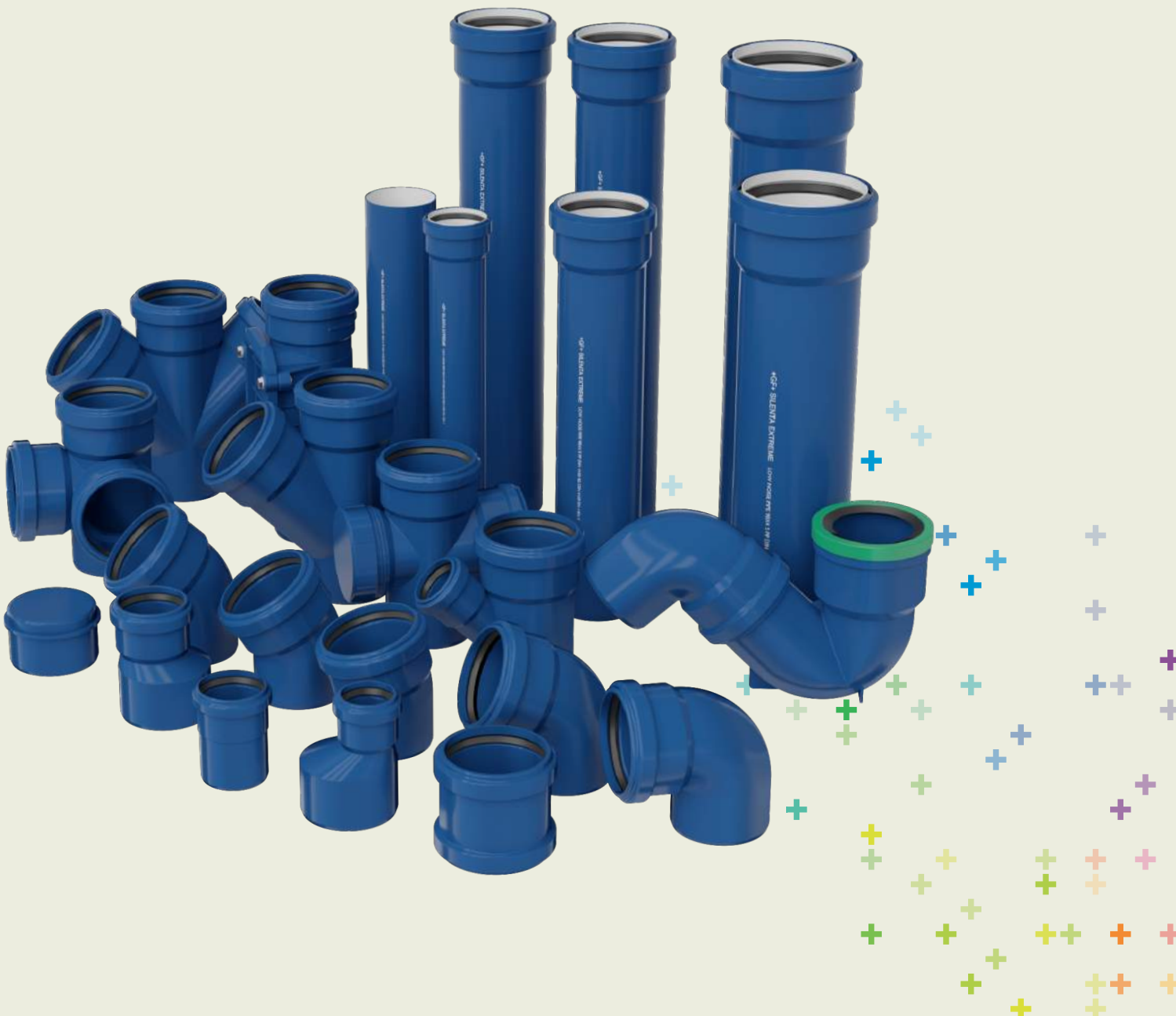


Silenta Extreme

Fire Resistant and Noise-insulated Halogen Free Piping System



+GF+



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About Us





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

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

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

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

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



+ Our Market Segments

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

- Building Technology Projects
- Utility Projects
- Industrial Buildings

+ Our Presence in the World

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

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

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

+ Benefits of Plastics

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

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

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

+ Complete Solution Concept

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

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

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

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

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

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

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

+ Advantages of Plastics

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

Metal Systems

High density

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

Thermal conductivity

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

Corrosion Behaviors

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

Chemical resistance

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

Plastic Systems

Low density

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

Low thermal conductivity

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

High Corrosion Resistance

- * No risk of galvanic corrosion risk
- * No corrosion and reduction of internal diameter
No pressure losses due to lack of reduction of internal diameter

High chemical resistance

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

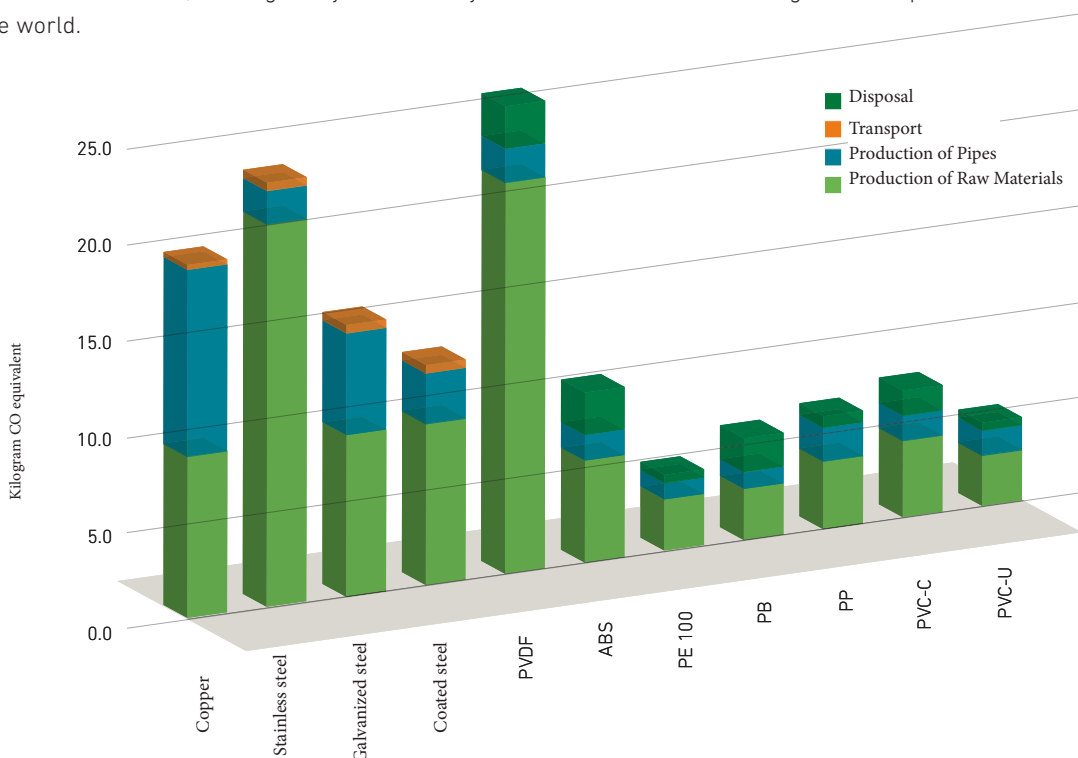
+ Service Life Analysis of Plastics

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

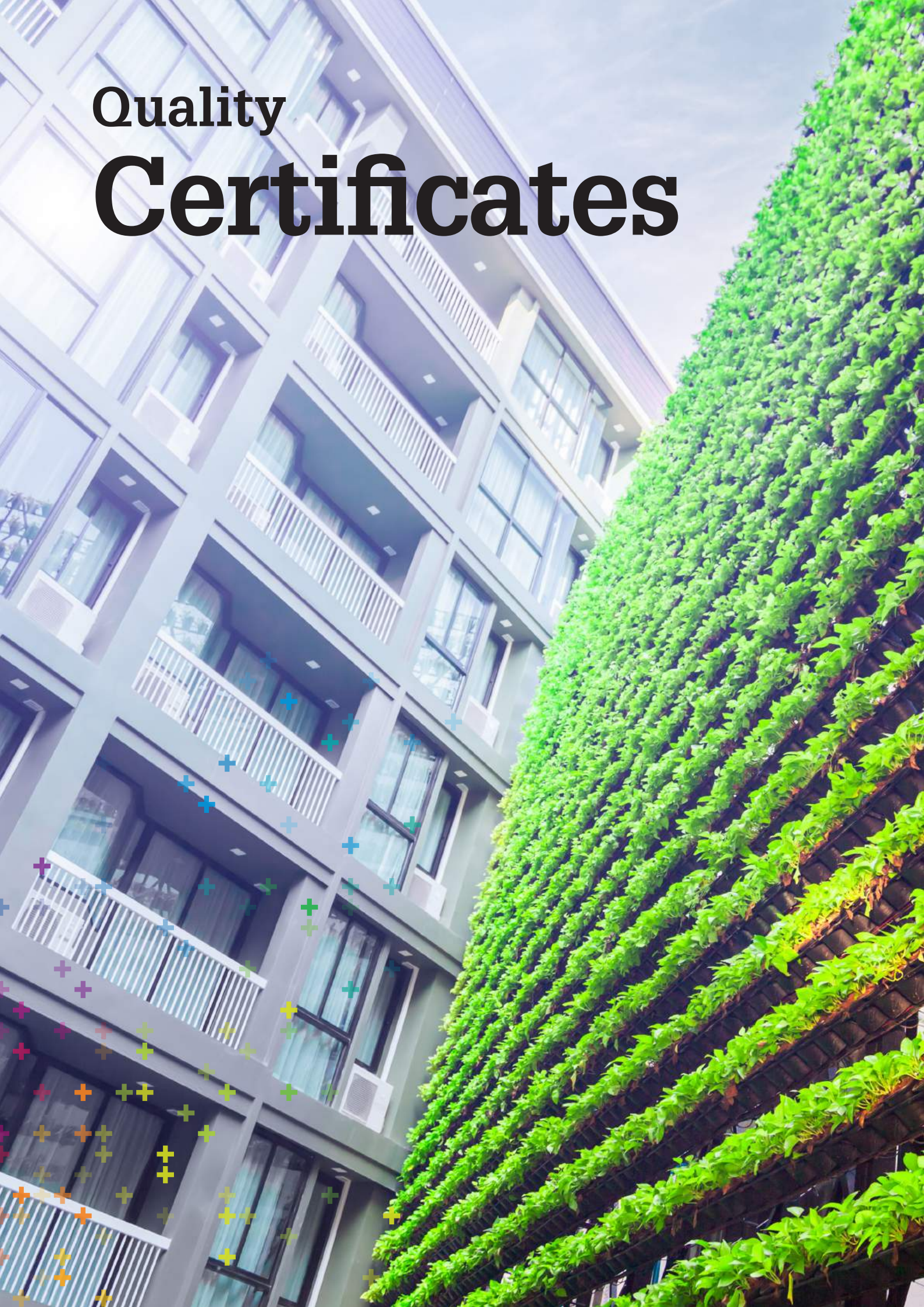
The following graphics indicate the assessment of the lifetime of thermoplastic piping systems in terms of the quality of their environmental performance and application of them in building technology, industry and water and gas distribution. In the analysis, the impacts of one meter long pipe was compared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

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

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



Quality Certificates



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

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

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

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

In addition to product quality, the process and system quality of GF Hakan Plastik is certified by BVQI through ISO 9001:2015 certificate and the company maintains its efforts on certification. Our Company that places top priority on process and system quality also has ISO 14001:2015 and OHSAS 18001:2007 certificates. Our both production plants in Çerkezköy and Şanlıurfa have TS EN ISO/IEC 17025:2012 laboratory accreditation certificates awarded by TÜRKAK organization.

Certificates

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

Silenta Extreme

Fire Resistant and Noise-insulated Halogen Free Piping System

Silenta Extreme, is a new PP-based halogen-free, resistant to fire [B-s1, d0] and noise-insulated [18 dB(A)] soil, waste water and drainage piping system, especially developed and being produced by the highest technology for you to increase your building safety and comfort with its improved features and structure.

Due to its halogen-free feature, it does not emit any poisonous and lethal gases in case of fire.

It is manufactured with the last generation of multilayer polypropylene technology according to the requirements of EN 1451, EN 13501 and DIN EN 14366 standards.

+ Special Differentiating Features

- Halogen-free structure
- Zero toxicity, no emission of poisonous and lethal gases in case of fire
- Fire resistant with B-s1; d0 fire classification
- Soundproof multilayer structure with 18dB(A) noise level at 4 l/s flow rate
- High impact resistance
- Excellent corrosion resistance and long service life
- Superior chemical resistance
- Smooth inner surface, no incrustations
- High temperature resistant up to 97 °C
- UV protected external layer
- 100% recyclable, and environmental-friendly
- Easy installation and application
- Adds value to the property

+ Fields of Application

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

Halogen
Free **PP**

Fire Classification:
(acc. to EN 13501-1)

B-s1, d0

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



18 dB(A)



+ Structure

Internal Layer (PP)

[Flame Retardant Reinforced Composite]

It provides a perfect flow performance with its smooth inner surface and anti-fouling structure. The superior chemical resistance prevents corrosion and abrasion. It is resistant to high water temperatures (up to 97 °C). Fire Resistant.

1

Middle Layer (PP)

[Flame Retardant and Mineral Reinforced Composite]

Thanks to its high molecular structure and special composite formula which contains flame retardants (FR) and mineral reinforcement; it has perfect fire resistant and noise insulated performance. Sound-proof.

2

External Layer (PP)

[Flame Retardant and UV Reinforced Composite]

Perfect Shield: for Fire and impacts. Protection layer for UV. Fire Resistant.

3

Special Gasket System

It guarantees water tightness with its special gasket structure which also provides easy assembly. The geometrical features of the gasket groove and structure ensure fast and easy installation.

4

+ Technical Properties

Pipe Structure	3-Layers, Polypropylene based, halogen free composite structure
Diameters [mm]	d50, d75, d110, d125, d160, d200
Pipe Length [mm]	150, 250, 500, 1000, 2000, 3000
Acoustic Performance	18 dB(A) at 4 l/s flow rate (DIN EN 14366)
Fire Class	B-s1,d0 (EN 13501)
Joining Type/Method	Rubber Gasket and Socket (Push-Fit)
Clamping	With GF Hakan Silent pipe clamps
Color	Dark Blue (RAL 5017)
Installation	With GF Hakan Silent pipe clamps
Thermal Expansion Coefficient	0.06 mm/m°K
Tensile Strength	13 N/mm ²
Chemical Resistance	Resistant to the organic and inorganic acids suitable for pH values between 2-12
Installation Temperature	Minimum: -10 °C Maximum: +97 °C
Operating Temperature	Minimum: -10 °C Maximum: +97 °C
Application Class	B/D (building / drainage)
Ring Stiffness	ISO/DIN 9969, Ring Stiffness is minimum 4,0 kN/m ² in all dimension ranges between d50 and d200 mm
Impact Resistance	Complies with EN 1451
Halogen Acid Gas Formation (During fire or combustion)	0,24 mg/g To be classified as "halogen-free", a product or a substance must consist of less than: <ul style="list-style-type: none"> • 900 parts per million (ppm) or 0,9 mg/g of chlorine or, • 900 parts per million (ppm) or 0,9 mg/g of bromine and, • 1500 ppm or 1,5mg/g of total halogens, according to the International Electrochemical Commission (IEC), Restriction Use of Halogen (IEC 61249-2-21) Directive.

Approvals And Certificates

Approvals and Certificates: Afiti-Licof (Spain): Fire Classification Report, Fraunhofer (Germany): Acoustic Performance Report, TSE (Turkey): Halogen free test report

Superior Sound Proof Performance

Fire Resistant and Noise-insulated Halogen Free Piping System guarantees quality, peace of mind and living comfort.

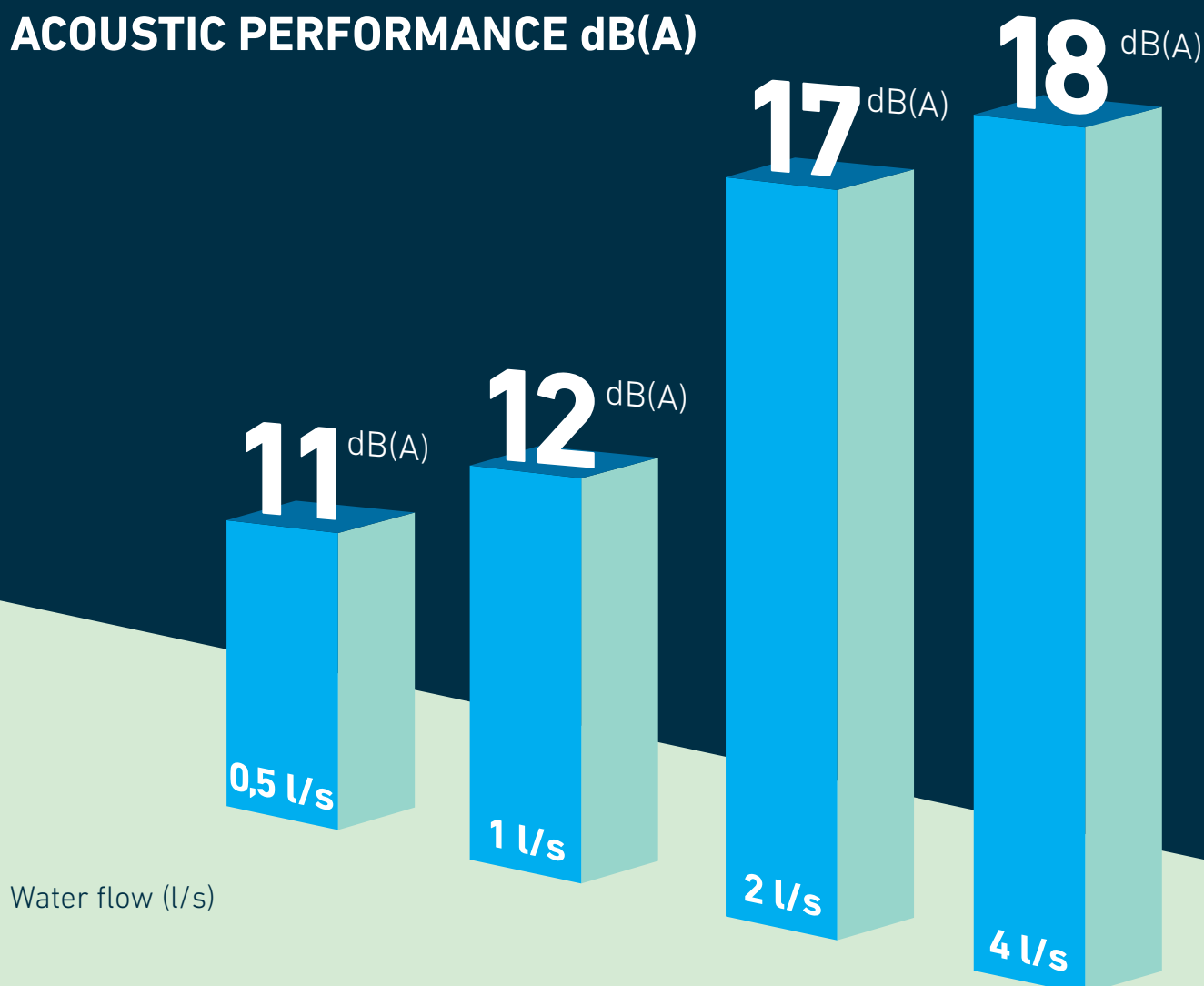
Acoustic performance of Silenta Extreme was accredited by the famous German Fraunhofer Institute, in compliance with DIN 4109 and EN 14366.

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 18 dB(A) according to DIN EN 14366.

SILENTA EXTREME

ACOUSTIC PERFORMANCE dB(A)



Water flow (l/s)



Silenta Extreme Pipe with Socket



Dia [mm]	Leng. [mm]	Thick. [mm]	Code	Packing	
				Type	Pc
50	150	2.0	5504005000121	Cartonbox	200
50	250	2.0	5504005000221	Cartonbox	150
50	500	2.0	5504005000321	Cartonbox	90
50	1000	2.0	5504005000421	Bundle	10
50	2000	2.0	5504005000521	Bundle	10
50	3000	2.0	5504005000621	Bundle	10
75	150	2,6	5504007500121	Cartonbox	100
75	250	2,6	5504007500221	Cartonbox	70
75	500	2,6	5504007500321	Cartonbox	40
75	1000	2,6	5504007500421	Bundle	10
75	2000	2,6	5504007500521	Bundle	10
75	3000	2,6	5504007500621	Bundle	10
110	150	3,4	5504011000121	Cartonbox	45
110	250	3,4	5504011000221	Cartonbox	35
110	500	3,4	5504011000321	Cartonbox	20
110	1000	3,4	5504011000421	Bundle	4
110	2000	3,4	5504011000521	Bundle	4
110	3000	3,4	5504011000621	Bundle	4
125	150	3,4	5504012500121	Cartonbox	40
125	250	3,4	5504012500221	Cartonbox	20
125	500	3,4	5504012500321	Cartonbox	16
125	1000	3,4	5504012500421	Bundle	4
125	2000	3,4	5504012500521	Bundle	4
125	3000	3,4	5504012500621	Bundle	4
160	150	4,0	5504016000121	Cartonbox	24
160	250	4,0	5504016000221	Cartonbox	14
160	500	4,0	5504016000321	Cartonbox	8
160	1000	4,0	5504016000421	Bundle	1
160	2000	4,0	5504016000521	Bundle	1
160	3000	4,0	5504016000621	Bundle	1
200	500	4,5	5504020000321	Bundle	5
200	1000	4,5	5504020000421	Cartonbox	1
200	2000	4,5	5504020000521	Cartonbox	1
200	3000	4,5	5504020000621	Cartonbox	1

Silenta Extreme Pipe without Socket



Dia [mm]	Leng. [mm]	Thick. [mm]	Code	Packing	
				Type	Pc
200	500	4,5	5504020005221	Cartonbox	8
200	1000	4,5	5504020005321	Length	1
200	2000	4,5	5504020005421	Length	1
200	3000	4,5	5504020005521	Length	1

Silenta Extreme Clamp



Dia [mm]	Code	Packing	
		Type	Pc
50	5601905001022	Cartonbox	100
75	5601907501122	Cartonbox	200
110	5601911001222	Cartonbox	100
125	5601912501322	Cartonbox	100
160	5601916001422	Cartonbox	50

Silenta Extreme Elbow 15°



Dia [mm]	Code	Packing	
		Type	Pc
50	5604105000121	Cartonbox	300
75	5604107500121	Cartonbox	150
110	5604111000121	Cartonbox	60
160	5604116000121	Cartonbox	60

Silenta Extreme Elbow 30°



Dia [mm]	Code	Packing	
		Type	Pc
50	5604105000221	Cartonbox	350
75	5604107500221	Cartonbox	150
110	5604111000221	Cartonbox	60
160	5604116000221	Cartonbox	20

Silenta Extreme Elbow 45°



Dia [mm]	Code	Packing	
		Type	Pc
50	5604105000321	Cartonbox	300
75	5604107500321	Cartonbox	150
110	5604111000321	Cartonbox	50
125	5604112500321	Cartonbox	40
160	5604116000321	Cartonbox	20
200	5604120000321	Cartonbox	10

Silenta Extreme Elbow 67,5°



Dia [mm]	Code	Packing	
		Type	Pc
50	5604105000421	Cartonbox	300
75	5604107500421	Cartonbox	150
110	5604111000421	Cartonbox	50

Silenta Extreme Elbow 87,5°



Dia [mm]	Code	Packing	
		Type	Pc
50	5604105000521	Cartonbox	300
75	5604107500521	Cartonbox	100
110	5604111000521	Cartonbox	40
125	5604112500521	Cartonbox	30
160	5604116000521	Cartonbox	15
200	5604120000521	Cartonbox	6

Silenta Extreme Long Elbow 45°



Dia [mm]	Code	Packing	
		Type	Pc
110	5604111004521	Cartonbox	8

Silenta Extreme Long Socket



Dia [mm]	Code	Packing	
		Type	Pc
110	5604911002221	Cartonbox	15



Silenta Extreme Branch 45°



Dia [mm]	Code	Packing	
		Type	Pc
50-50	5604205000121	Cartonbox	150
75-50	5604207500121	Cartonbox	75
75-75	5604207500221	Cartonbox	60
110-50	5604211000121	Cartonbox	40
110-75	5604211000221	Cartonbox	30
110-110	5604211000321	Cartonbox	20
125-50	5604212500121	Cartonbox	30
125-75	5604212500221	Cartonbox	25
125-110	5604212500321	Cartonbox	20
125-125	5604212500421	Cartonbox	16
160-110	5604216000121	Cartonbox	10
160-125	5604216000221	Cartonbox	10
160-160	5604216000321	Cartonbox	8
200-110	5604220000121	Cartonbox	4
200-125	5604220000221	Cartonbox	4
200-160	5604220000321	Cartonbox	4
200-200	5604220000421	Cartonbox	4

Silenta Extreme Branch 67,5°



Dia [mm]	Code	Packing	
		Type	Pc
110-110	5604211001121	Cartonbox	25

Silenta Extreme Branch 87,5°



Dia [mm]	Code	Packing	
		Type	Pc
50-50	5604205000221	Cartonbox	150
75-50	5604207500321	Cartonbox	100
75-75	5604207500421	Cartonbox	80
110-50	5604211000421	Cartonbox	50
110-75	5604211000521	Cartonbox	30
110-110	5604211000621	Cartonbox	30
125-110	5604212503822	Cartonbox	20
125-125	5604212500521	Cartonbox	20
160-110	5604216000521	Cartonbox	20
160-125	5604216004022	Cartonbox	20
160-160	5604216000421	Cartonbox	10

Silenta Extreme Double Branch 45°



Dia [mm]	Code	Packing	
		Type	Pc
50-50	5604205000321	Cartonbox	100
75-50	5604207500521	Cartonbox	80
110-50	5604211000921	Cartonbox	35
110-110	5604211001021	Cartonbox	40
160-110	5604216000621	Cartonbox	8

Silenta Extreme Double Branch 87,5°



Dia [mm]	Code	Packing	
		Type	Pc
110-110	5604211000721	Cartonbox	20

Silenta Extreme Corner Double Branch 87,5°



Dia [mm]	Code	Packing	
		Type	Pc
110-110	5604211000821	Cartonbox	20

Silenta Extreme Reducer



Dia [mm]	Code	Packing	
		Type	Pc
75-50	5604407500121	Cartonbox	200
110-50	5604411000121	Cartonbox	100
110-75	5604411000221	Cartonbox	100
125-110	5604412500121	Cartonbox	50
160-110	5604416000121	Cartonbox	40
160-125	5604416000221	Cartonbox	50
200-160	5604420000121	Cartonbox	20

Silenta Extreme Socket with Central Register



Dia [mm]	Code	Packing	
		Type	Pc
50	5604505000121	Cartonbox	400
75	5604507500121	Cartonbox	200
110	5604511000121	Cartonbox	80
160	5604516000121	Cartonbox	30
200	5604520000121	Cartonbox	12

Silenta Extreme Sliding Socket




Dia [mm]	Code	Packing	
		Type	Pc
50	5604505000221	Cartonbox	400
75	5604507500221	Cartonbox	200
110	5604511000221	Cartonbox	80
160	5604516000221	Cartonbox	30
200	5604520000221	Cartonbox	12

Silenta Extreme Pipe Socket Plug




Dia [mm]	Code	Packing	
		Type	Pc
50	5604905000121	Cartonbox	1000
75	5604907500121	Cartonbox	500
110	5604911000121	Cartonbox	200
160	5604916000121	Cartonbox	60

* Silenta Extreme S Siphon 45°




Dia [mm]	Code	Packing	
		Type	Pc
75	5604607500121	Cartonbox	50
110	5604611000121	Cartonbox	20

* Silenta Extreme S Siphon 87,5°



Dia [mm]	Code	Packing	
		Type	Pc
75	5604607500221	Cartonbox	50
110	5604611000221	Cartonbox	15

Silenta Extreme Clean Out (Round Cover)




Dia [mm]	Code	Packing	
		Type	Pc
75	5604307500121	Cartonbox	80

Silenta Extreme Clean Out (Rectangle Cover)




Dia [mm]	Code	Packing	
		Type	Pc
110	5604311000121	Cartonbox	30
160	5604316000121	Cartonbox	8

Silenta Extreme P-Trap




Dia [mm]	Code	Packing	
		Type	Pc
110	5604611000521	Cartonbox	25

Silenta Extreme Floor Trap




Dia [mm]	Code	Packing	
		Type	Pc
110-75-50-50	5604911002022	Cartonbox	12

Silenta Extreme Floor Trap - Long




Dia [mm]	Code	Packing	
		Type	Pc
110-75-50-50	5604911002122	Cartonbox	12

Silenta Clamp Metal - Vertical Set



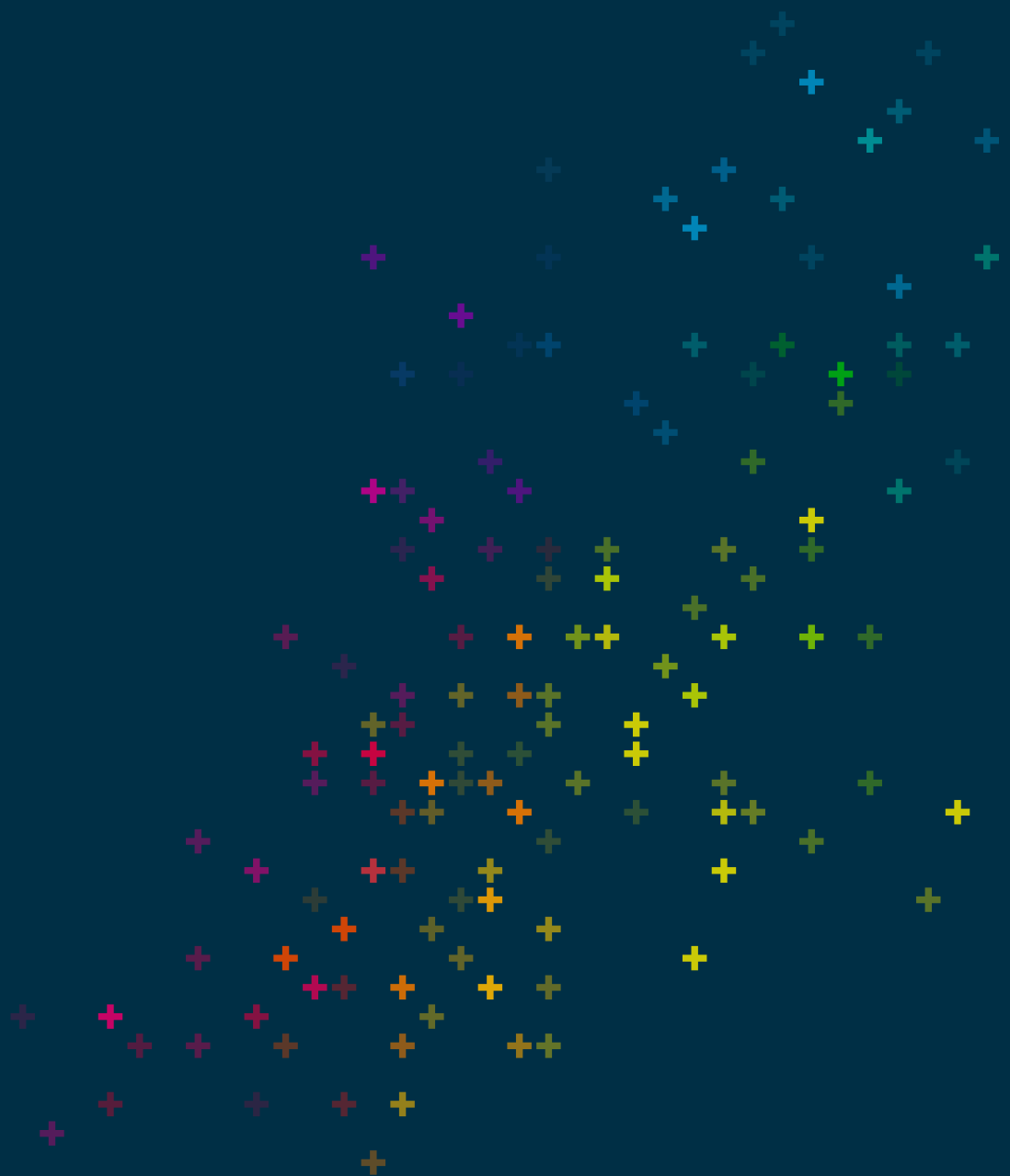
Dia [mm]	Code	Packing	
		Type	Pc
50	1300905030412	Cartonbox	20
75-78	1300907530412	Cartonbox	15
110	1300911030412	Cartonbox	10
125	1300912530412	Cartonbox	10
160	1300916030412	Cartonbox	7
200	1300920030412	Cartonbox	5

Silenta Clamp Metal - Horizontal



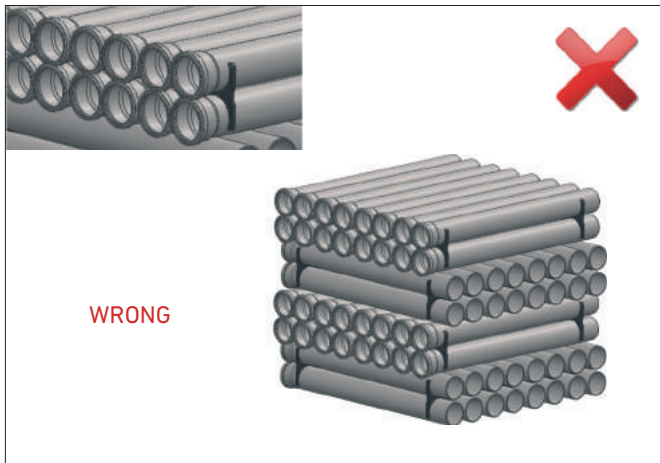
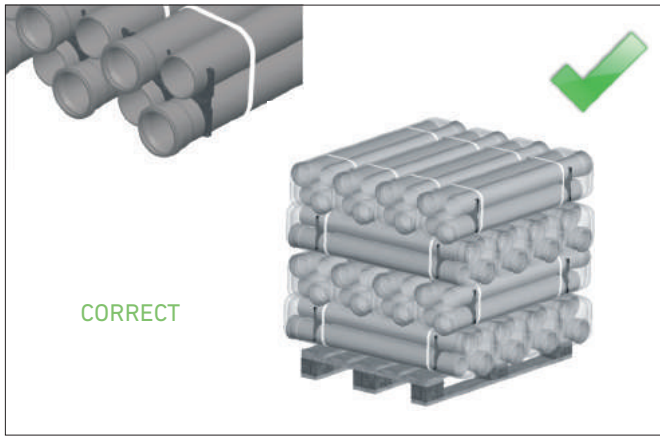
Dia [mm]	Code	Packing	
		Type	Pc
50	1300905030612	Cartonbox	50
75-78	1300907530612	Cartonbox	30
110	1300911030612	Cartonbox	25
125	1300912530612	Cartonbox	25
160	1300916030612	Cartonbox	25
200	1300916030612	Cartonbox	20

Packaging, Storage and Transportation



Packaging

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



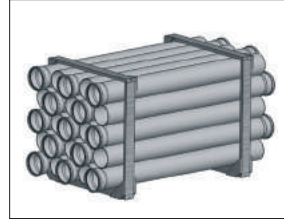
Pipes and fittings with socket are placed in a way that they will not stay on top of each other.



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



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

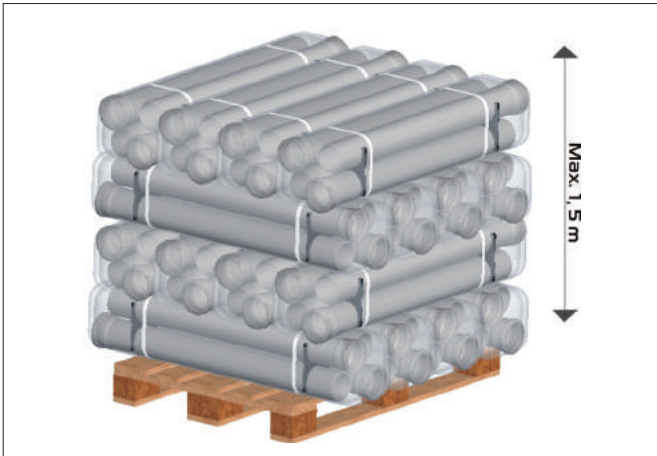


Short parts with the length of 150, 250 and 500 mm are packed in carton boxes like connection parts.



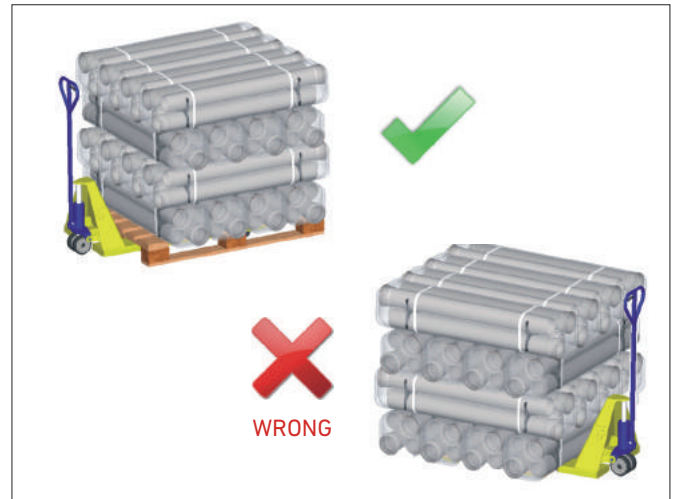
All product ranges are identified in the Warehouse Management System (WMS) by barcode label. Barcode system ensures management of products and prevents complexity and errors during storage and loading.

Storage

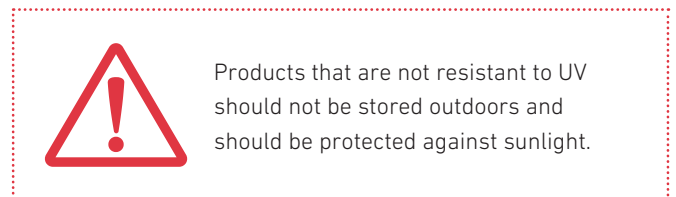


Method of storage should not cause any outflow and should not damage the pipes. As long as they are stored properly, no permanent deformations or damages will occur on the pipes and fittings. Pipes should not be stacked above 1,5 m. Pipes should be safe against sliding.

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

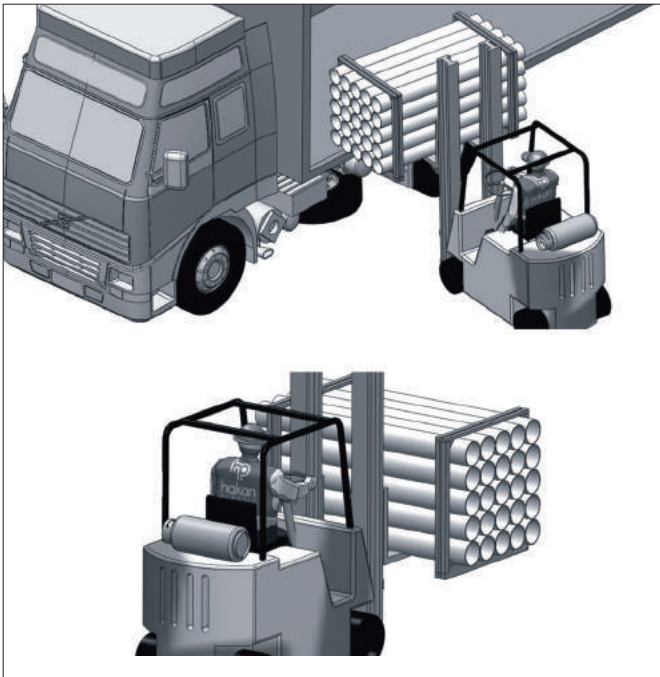


Pipes and fittings packed in carton boxes should be protected against moisture. Carton boxes should be sealed and stored in a dry area.

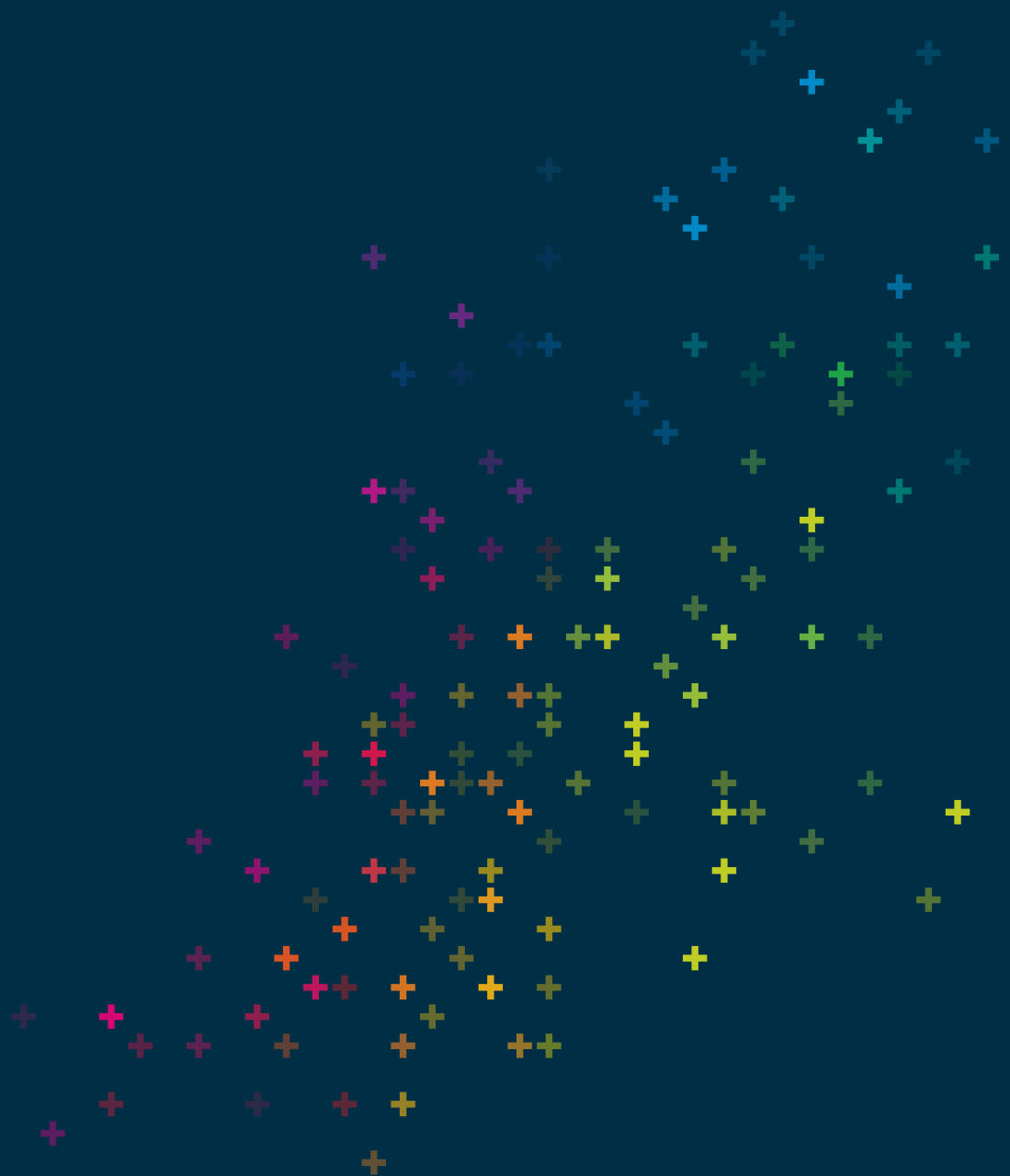


Transportation

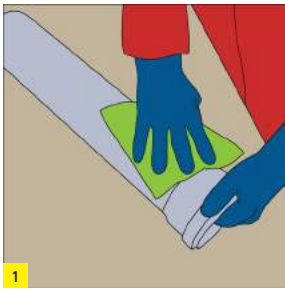
Pipes should be carefully transported to prevent any damages. Avoid sudden and hard pressures on pipes and fittings that might cause freezing in cold weather conditions. Ensure that pipes are not slid and dropped on the floor. Loading and unloading and packing of pipes in a block should be carried out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



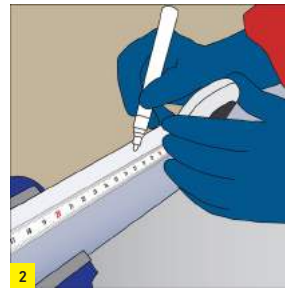
Silenta Extreme Installation



Installation



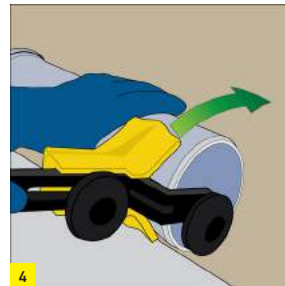
Make sure that your products are clean. If necessary, wipe the jointing points with a dry cloth.



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



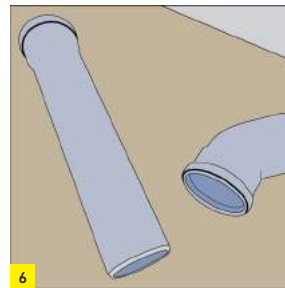
Cut in 90° angle by using a coping saw or a proper cutter.



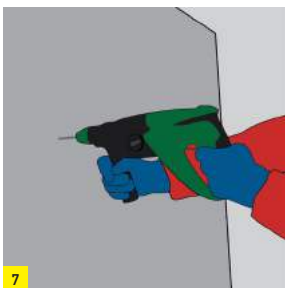
Chamfer the spigot of pipe by using a chamfering device or thick riffler.



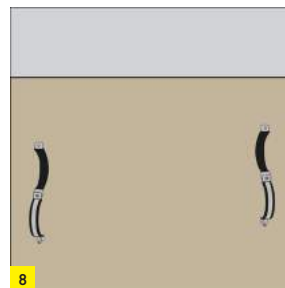
Remove the burrs on the external edges with a knife or scraper.



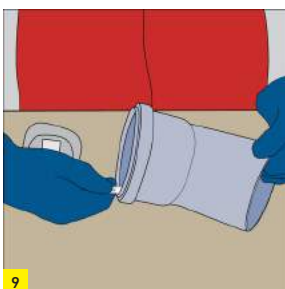
Now, your pipe is ready for installation.



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



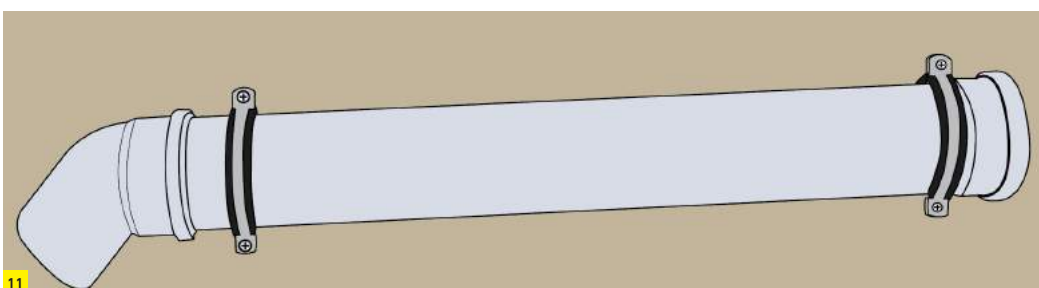
Mark the pipe clamp distances properly with 1% inclination on the wall or ceiling where they will be installed. (as flat wall)



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.

Installation

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

Installation

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.

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.

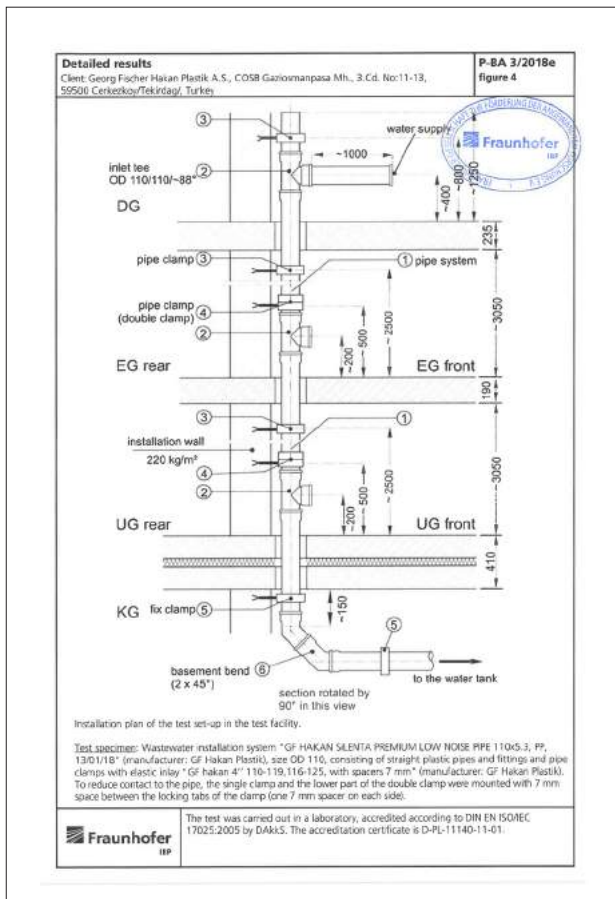
The test equipment in the institute laboratory is standard and the tests related to all waste water systems are conducted here. As seen in the test equipment below, pipe, fittings, installation wall thickness, water discharge amount as well as silent pipe clamp systems are also significant factors in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



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.

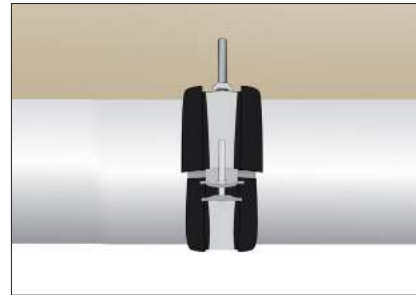
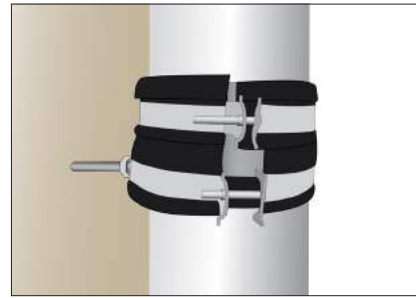
2- Sound waves transmitted through contact occur as a result of the waste water and waste hitting the pipe wall. These vibrations are transferred on the wall of the installation through contact. The sound created by contact is significantly absorbed by the special molecular structure of Silenta and specially-designed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



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