

Silenta 3A

Sound-Insulated Piping Systems



+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
- Industrial Buildings
- Utility Projects
- Irrigation Projects

+ Our Presence in the World

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

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

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

+ 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

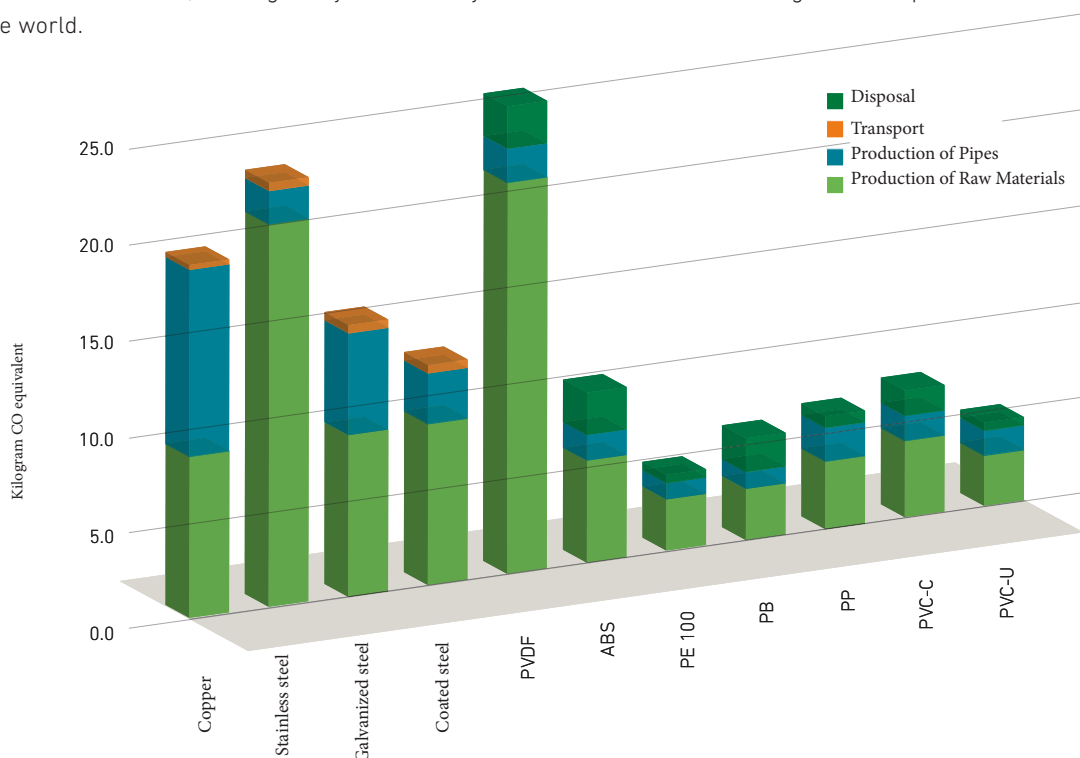
+ Service Life Analysis of Plastics

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.

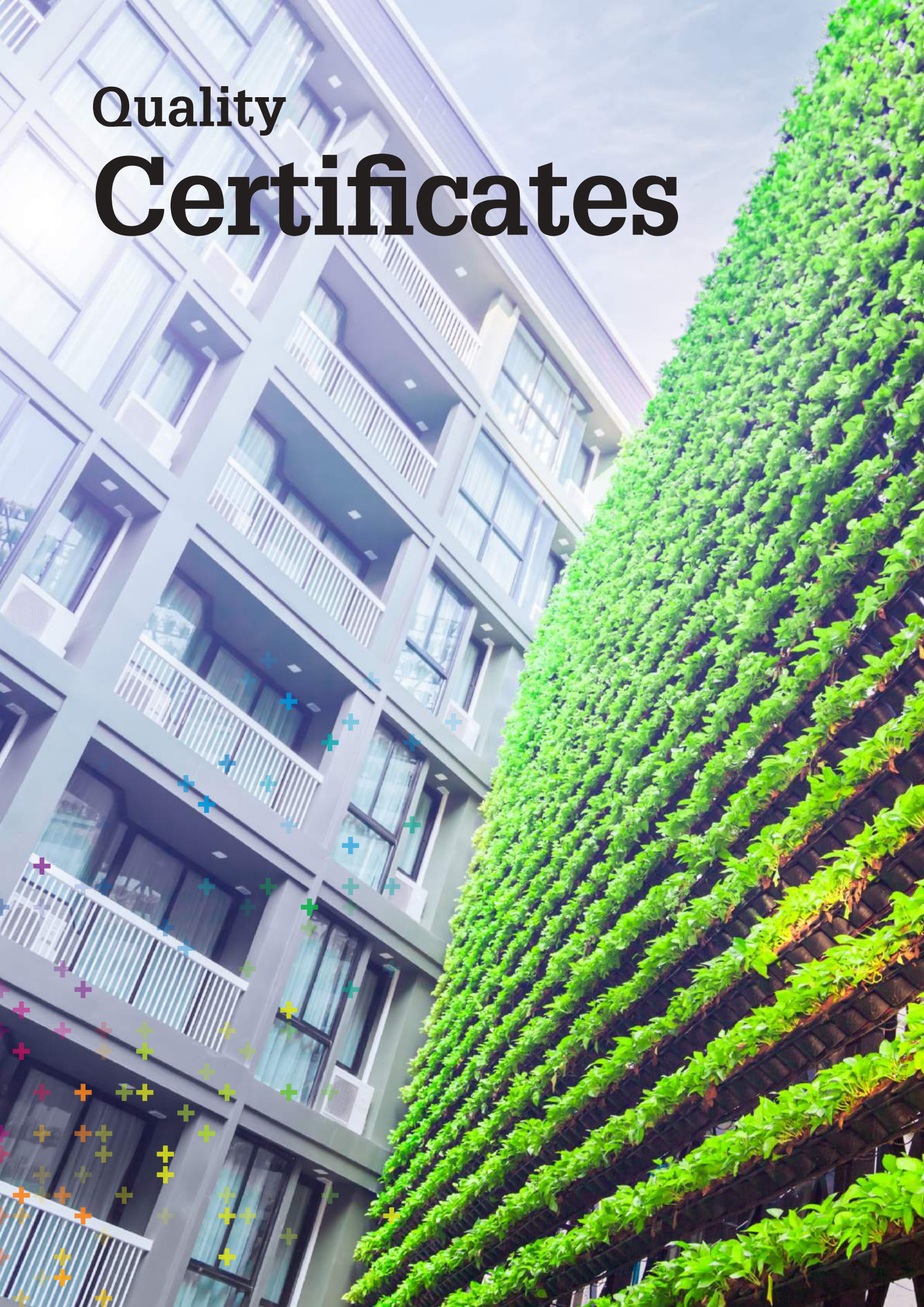
The following graphics indicate the assessment of the lifetime of thermoplastic piping systems in terms of the quality of their environmental performance and application of them in building technology, industry and water and gas distribution. In the analysis, the impacts of one meter long pipe was compared 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 TS EN ISO 9001:2015 certificate and the company maintains its efforts on certification. Our Company that places top priority on process and system quality also has TS EN ISO 14001:2015 and TS EN ISO 45001:2018 certificates. Our both two production plants in Çerkezköy and Şanlıurfa have TS EN ISO/IEC 17025:2017 laboratory accreditation certificates awarded by TÜRKAK organization.

Certificates

 TURKEY- TSE	 SCANDINAVIAN COUNTRIES SWEDCERT	 TURKEY TÜRKAK	 RUSSIA-BELARUS UKRAINE GOST-r
 SPAIN AFITI LICOF	 GERMANY DIN CERTCO	 SWITZERLAND SGS	 RUSSIA-BELARUS KAZAKHSTAN-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 3A

Sound-Insulated Piping 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.

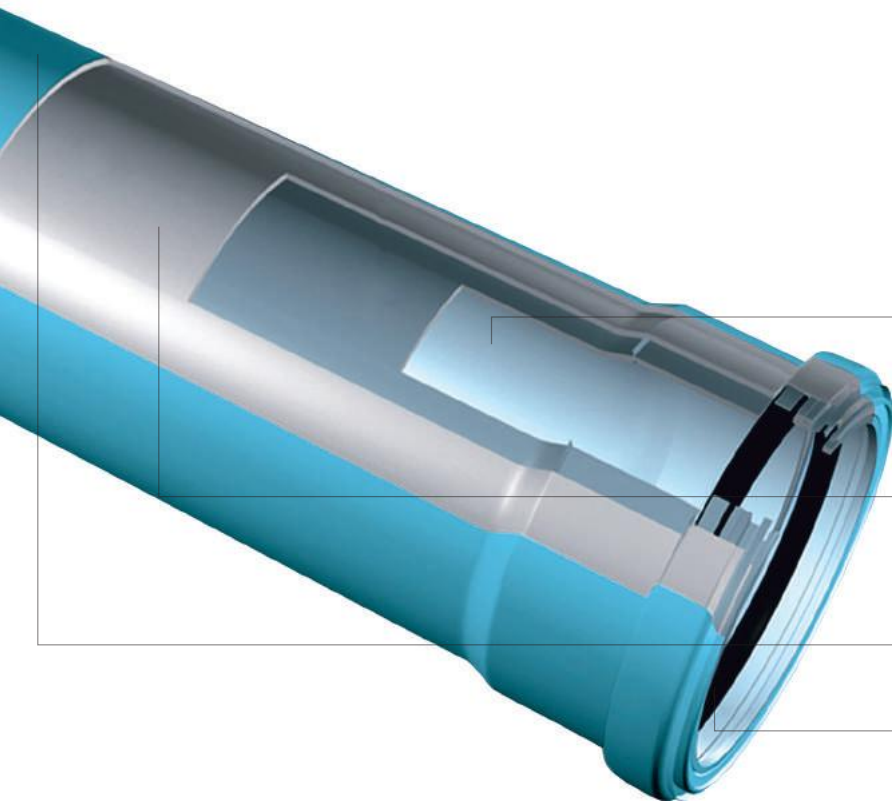
- Silenta 3A Sound-Insulated Piping System reached 16 dB(A) sound intensity level at the flow rate of 4 l/s in the tests conducted by the German Fraunhofer Institute according to EN 14366
- Suitable for hot/cold water and acidic liquid transfers
- It can be used in the underground and aboveground drainage 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	16 dB(A) at 4 l/s (TS EN 14366)
Fire class	B2 (DIN 4102)
Joining method	Joining 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 Stiffness	ISO/DIN 9969, The ring stiffness is at least 4.0 kN / m ² over the entire range of – dimensions: 40 mm – 200 mm
Impact strength	Complies with EN 1451
Approvals and Certificates	Germany: Fraunhofer, Hoch, Spain: AENOR, Sweden: Kiwa/SwedCert, Ukraine: Sepro, Russia: Gost, UK: LR Lloyd Register, Malaysia: Ikram, Turkey: TSE

Superior Sound Proof Performance

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

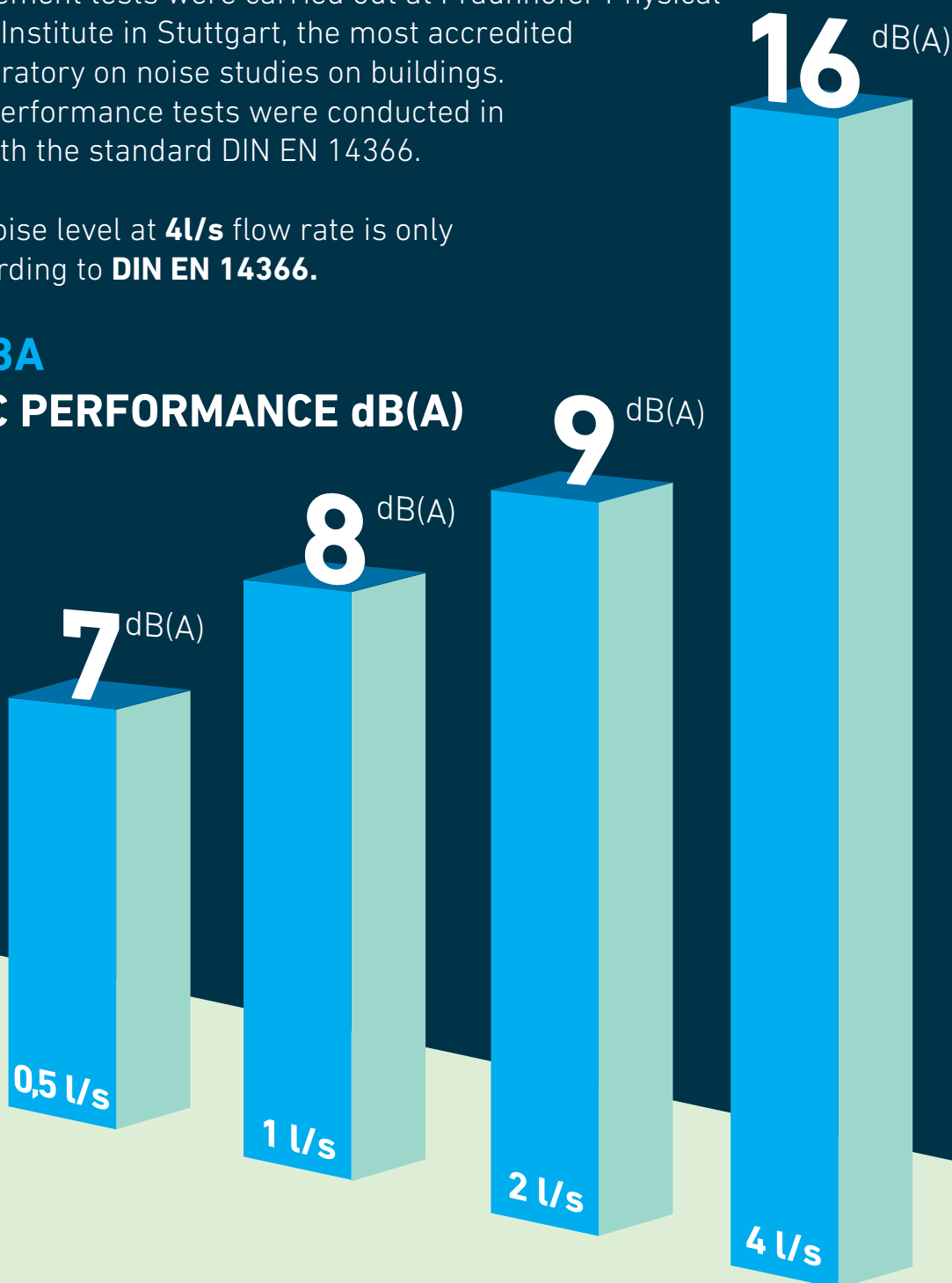
Acoustic performance of Silenta 3A was accredited by the famous German Fraunhofer Institute, in compliance with DIN 4109 and EN 14366.

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 **4 l/s** flow rate is only **16 dB(A)** according to **DIN EN 14366**.

SILENTA 3A

ACOUSTIC PERFORMANCE dB(A)



Water flow (l/s)

Silenta 3A

Silenta 3A Pipe with Socket



Dia. [mm]	Leng. [mm]	Thick. [mm]	Code	Packing Type	Pc
40	150	1,8	4604004000121	Cartonbox	30
40	250	1,8	4604004000221	Cartonbox	30
40	500	1,8	4604004000321	Cartonbox	35
40	1000	1,8	4604004000421	Bundle	10
40	2000	1,8	4604004000521	Bundle	10
40	3000	1,8	4604004000621	Bundle	10
50	150	2,0	4604005000121	Cartonbox	200
50	250	2,0	4604005000221	Cartonbox	150
50	500	2,0	4604005000321	Cartonbox	90
50	1000	2,0	4604005000421	Bundle	10
50	2000	2,0	4604005000521	Bundle	10
50	3000	2,0	4604005000621	Bundle	10
75	150	2,6	4604007501021	Cartonbox	40
75	250	2,6	4604007501121	Cartonbox	30
75	500	2,6	4604007501221	Cartonbox	40
75	1000	2,6	4604007501321	Bundle	10
75	2000	2,6	4604007501421	Bundle	10
75	3000	2,6	4604007501521	Bundle	10
110	150	3,4	4604011002021	Cartonbox	20
110	250	3,4	4604011002121	Cartonbox	35
110	500	3,4	4604011002221	Cartonbox	20
110	1000	3,4	4604011002321	Bundle	4
110	2000	3,4	4604011002421	Bundle	4
110	3000	3,4	4604011002521	Bundle	4
125	150	3,4	4604012503021	Cartonbox	15
125	250	3,4	4604012503121	Cartonbox	5
125	500	3,4	4604012503221	Cartonbox	6
125	1000	3,4	4604012503321	Bundle	4
125	2000	3,4	4604012503421	Bundle	4
125	3000	3,4	4604012503521	Bundle	4
160	150	4,0	4604016004021	Cartonbox	24
160	250	4,0	4604016004121	Cartonbox	6
160	500	4,0	4604016004221	Cartonbox	8
160	1000	4,0	4604016004321	Bundle	1
160	2000	4,0	4604016004421	Bundle	1
160	3000	4,0	4604016004521	Bundle	1
200	500	4,5	4604020006321	Bundle	5
200	1000	4,5	4604020006421	Length	1
200	2000	4,5	4604020006521	Length	1
200	3000	4,5	4604020006721	Length	1



Silenta 3A Clamp

Dia. (mm)	Code	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)	Code	Packing Type	Pc
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 Pipe without Socket



Dia. [mm]	Leng. [mm]	Thick. [mm]	Code	Packing Type	Pc
200	500	4,5	4604020005221	Cartonbox	8
200	1000	4,5	4604020005321	Length	1
200	2000	4,5	4604020005421	Length	1
200	3000	4,5	4604020005521	Length	1



Silenta 3A Elbow 45°

Dia. (mm)	Code	Packing Type	Pc
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 Branch 67,5°

Dia. (mm)	Code	Packing	
		Type	Pc
110-110	4704211000721	Cartonbox	25



Silenta 3A Elbow 87,5°

Dia. (mm)	Code	Packing	
		Type	Pc
50	4704105000521	Cartonbox	150
75	4704107501021	Cartonbox	50
110	4704111001521	Cartonbox	40
125	4704112501721	Cartonbox	10
160	4704116001921	Cartonbox	6
200	4704120002121	Cartonbox	6



Silenta 3A Long Elbow 45°

Dia. (mm)	Code	Packing	
		Type	Pc
110	4704111004521	Cartonbox	8



Silenta 3A Branch 87,5°

Dia. (mm)	Code	Packing	
		Type	Pc
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
125-110	4704212503822	Cartonbox	20
125-125	4704212503921	Cartonbox	4
160-125	4704216004022	Cartonbox	10



Silenta 3A Branch 45°

Dia. (mm)	Code	Packing	
		Type	Pc
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 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

Silenta 3A Reducer



Dia. (mm)	Code	Packing	
		Type	Pc
40-32	4704404000521	Cartonbox	750
50-32	4704405000021	Cartonbox	500
50-40	4704405000121	Cartonbox	500
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 Pipe Socket Plug



Dia. (mm)	Code	Packing	
		Type	Pc
50	4704905000421	Cartonbox	125
75	4704907500121	Cartonbox	50
110	4704911000221	Cartonbox	25
160	4704916000321	Cartonbox	12

* Silenta 3A S Siphon 45°



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

Silenta 3A Socket with Central Register



Dia. (mm)	Code	Packing	
		Type	Pc
50	4704505000121	Cartonbox	50
75	4704507500221	Cartonbox	20
110	4704511000321	Cartonbox	10
160	4704516000421	Cartonbox	6
200	4704520000521	Cartonbox	12

Silenta 3A Corner Double Branch 87,5°



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

Silenta 3A Sliding Socket



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

* Silenta 3A S Siphon 87,5°



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

Silenta 3A



Silenta 3A Repair Pipe (Long Socket)

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



Silenta 3A Clean Out (Circular)

Dia. (mm)	Code	Packing	
		Type	Pc
75	4704311000421	Cartonbox	80



Silenta 3A Floor Trap

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



Silenta 3A Clean Out (Rectangular)

Dia. (mm)	Code	Packing	
		Type	Pc
110	4704311000121	Cartonbox	30
160	4704316000221	Cartonbox	8



Silenta 3A P-Trap

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



Silenta 3A Floor Trap - Long

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

Silence Clamp Metal - Vertical Set



Dia. (mm)	Code	Packing	
		Type	Pc
50	1300905030412	Cartonbox	20
75	1300907530412	Cartonbox	15
110	1300911030412	Cartonbox	10
125	1300912530412	Cartonbox	10
160	1300916030412	Cartonbox	7
200	1300920030412	Cartonbox	5

Silence Clamp Metal - Horizontal



Dia. (mm)	Code	Packing	
		Type	Pc
50	1300905030612	Cartonbox	50
75	1300907530612	Cartonbox	30
110	1300911030612	Cartonbox	25
125	1300912530612	Cartonbox	25
160	1300916030612	Cartonbox	25
200	1300920030612	Cartonbox	20

What is Sound Insulation Performance?

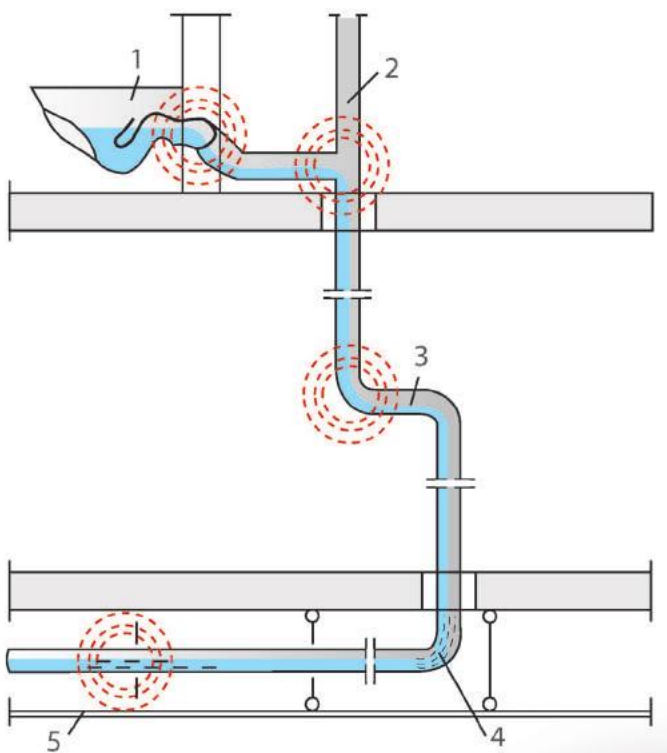
Sound insulation performance is the sound insulation capability of the system against the vibrations that occur between the pipes used in the waste water installation and the fluids transmitted through these pipes. With Silenta Premium, Silenta 3A and Silenta FR Piping Systems, GF Hakan Plastik offers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

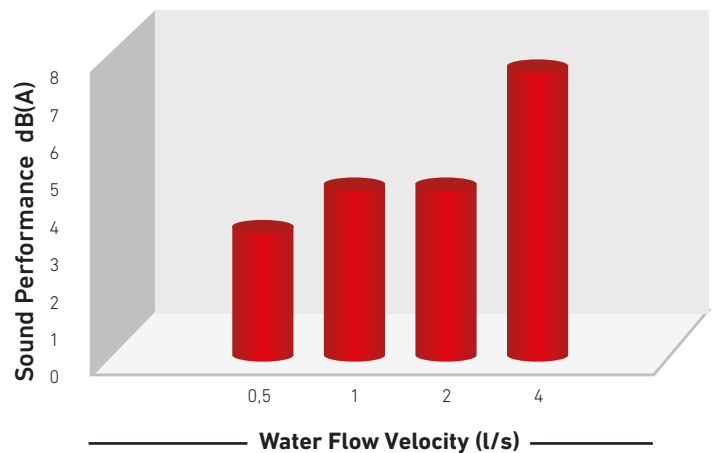
To minimize and eliminate these impacts, Silenta Product Ranges reduce noise in the sound-critical areas with elbows having nominal widths of DN 58-DN 200, and ensures better noise reduction in the affected areas.



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.



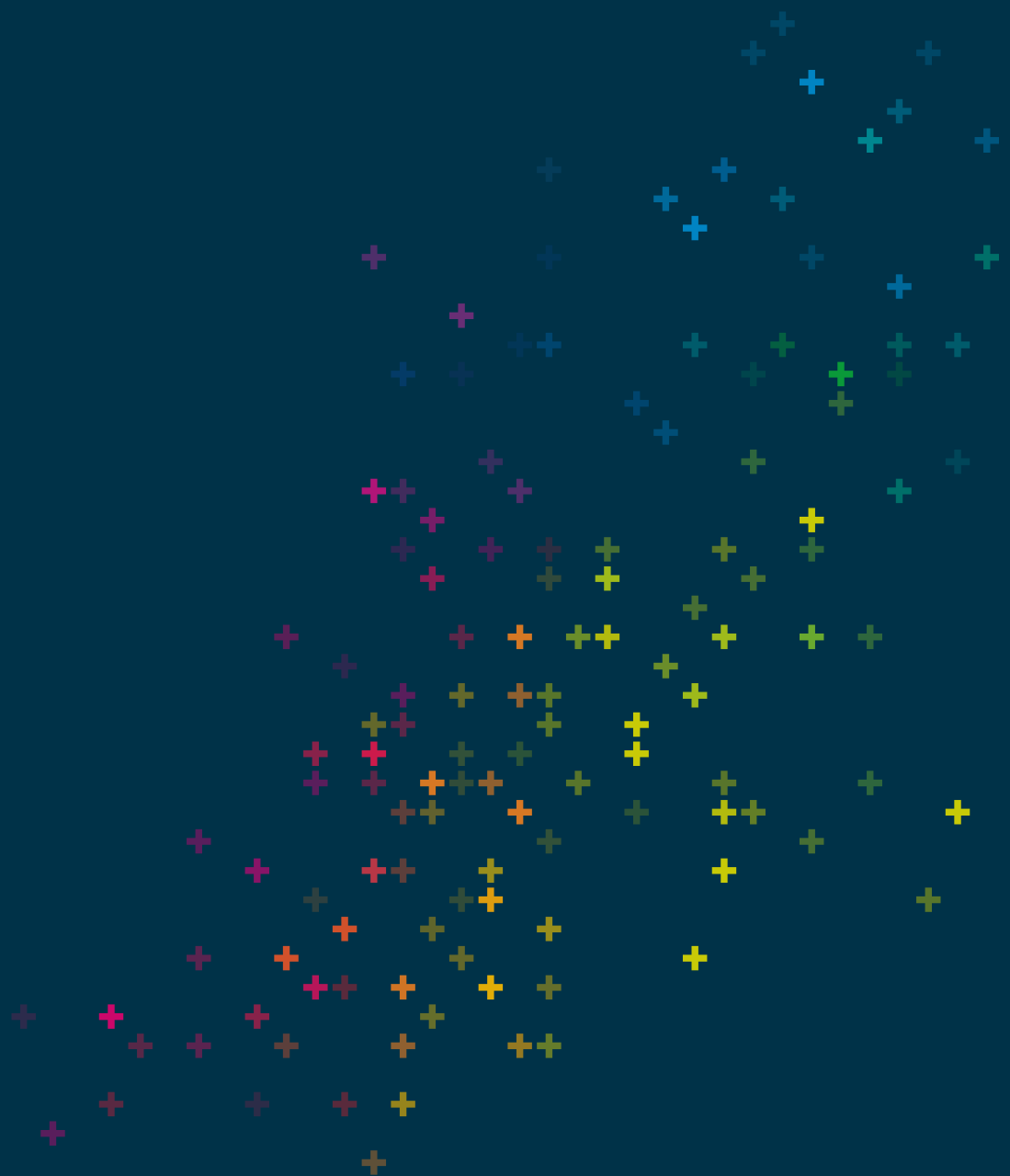
The above graphics indicate the results of the acoustic tests conducted by Fraunhofer Building Physics Institute.

Silenta Premium 13 dB(A) at 4 l/s flow

Silenta 3A 16 dB(A) at 4 l/s flow

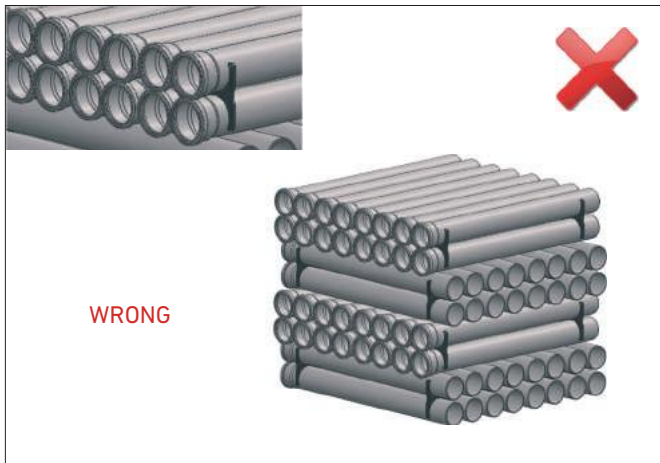
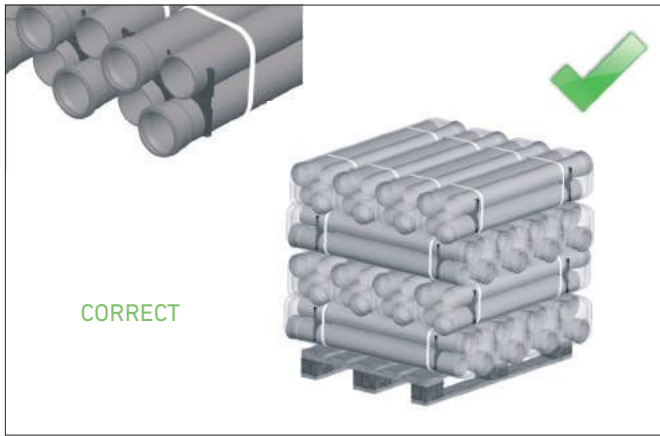
Silenta FR 12 dB(A) at 4 l/s flow

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.



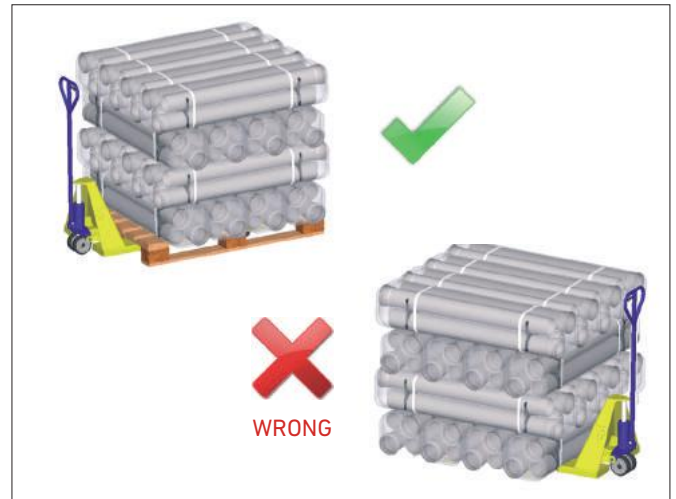
All product ranges are identified in the Warehouse Management System (WMS) by barcode label. Barcode system ensures management of products and prevents complexity and errors during storage and loading.

Storage

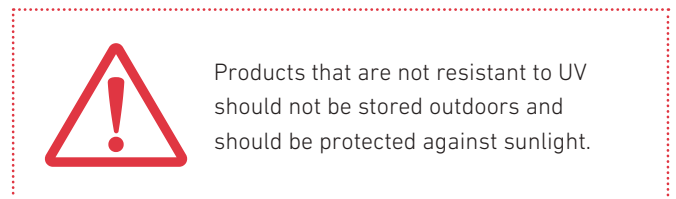


Method of storage should not cause any outflow and should not damage the pipes. As long as they are stored properly, no permanent deformations or damages will occur on the pipes and fittings. Pipes should not be stacked above 1,5 m. Pipes should be safe against sliding.

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

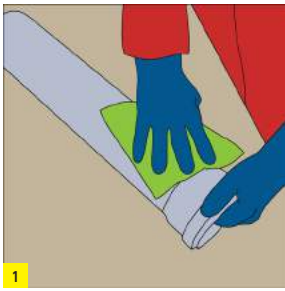
Pipes should be carefully transported to prevent any damages. Avoid sudden and hard pressures on pipes and fittings that might cause freezing in cold weather conditions. Ensure that pipes are not slid and dropped on the floor. Loading and unloading and packing of pipes in a block should be carried out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



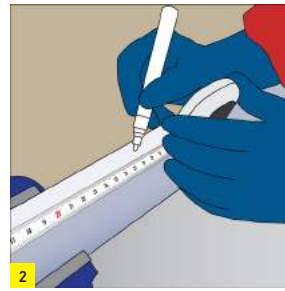
Silenta 3A Installation



Installation



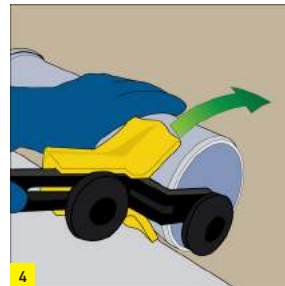
Make sure that your products are clean. If necessary, wipe the jointing points with a dry cloth.



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



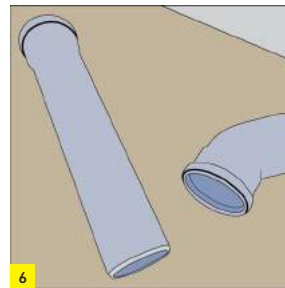
Cut in 90° angle by using a coping saw or a proper cutter.



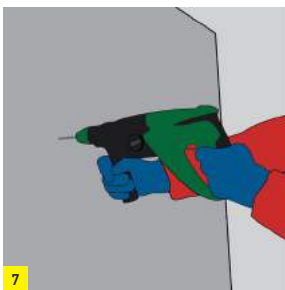
Chamfer the spigot of pipe by using a chamfering device or thick riffler.



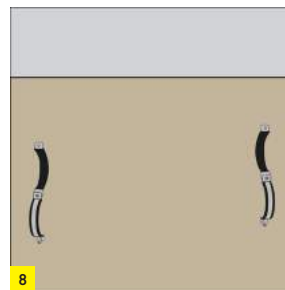
Remove the burrs on the external edges with a knife or scraper.



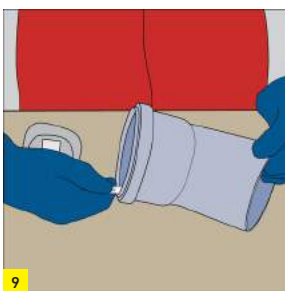
Now, your pipe is ready for installation.



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



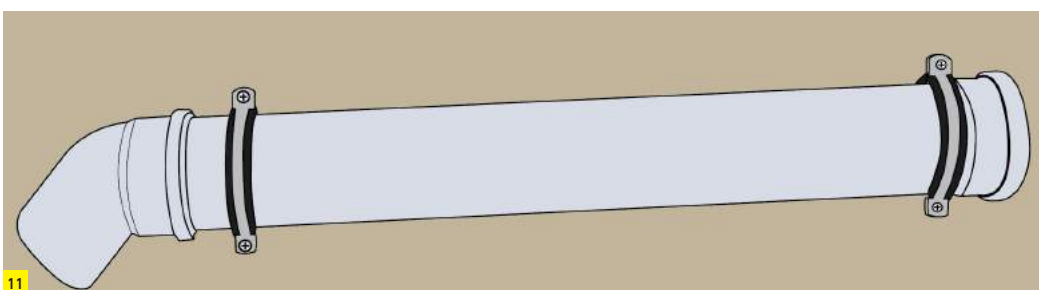
Mark the pipe clamp distances properly with 1% inclination on the wall or ceiling where they will be installed. (as flat wall)



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.

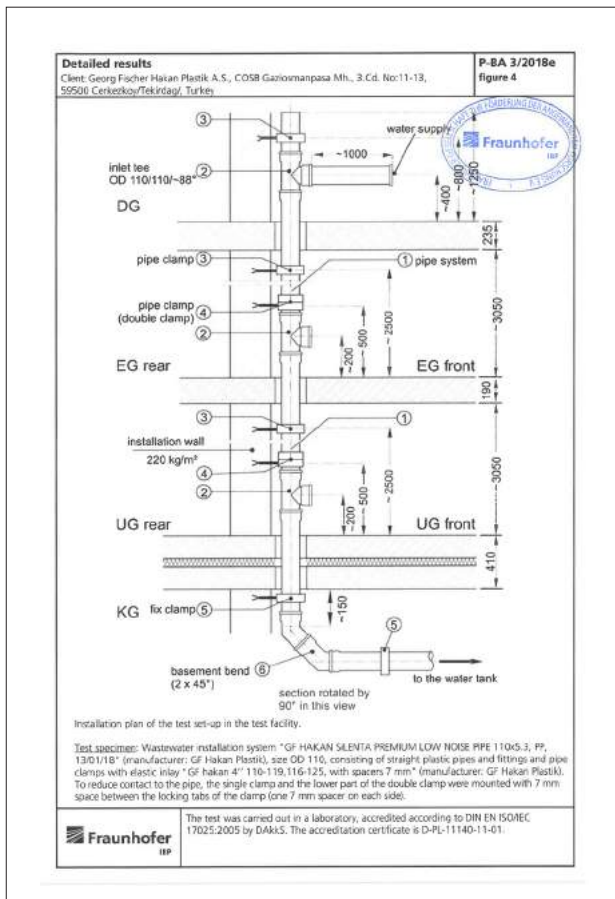
The test equipment in the institute laboratory is standard and the tests related to all waste water systems are conducted here. As seen in the test equipment below, pipe, fittings, installation wall thickness, water discharge amount as well as silent pipe clamp systems are also significant factors in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

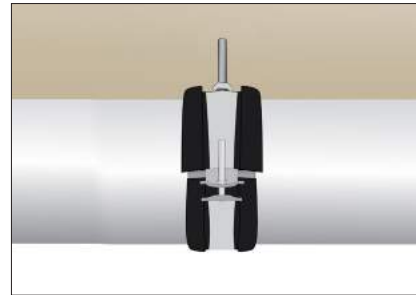
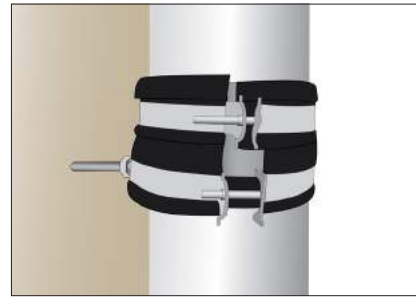
2- Sound waves transmitted through contact occur as a result of the waste water and waste hitting the pipe wall. These vibrations are transferred on the wall of the installation through contact. The sound created by contact is significantly absorbed by the special molecular structure of Silenta and specially-designed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

Installation

GF Hakan silent waste water pipe clamps ensure EN 14366 silence norms. In the waste water systems within buildings, correct 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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