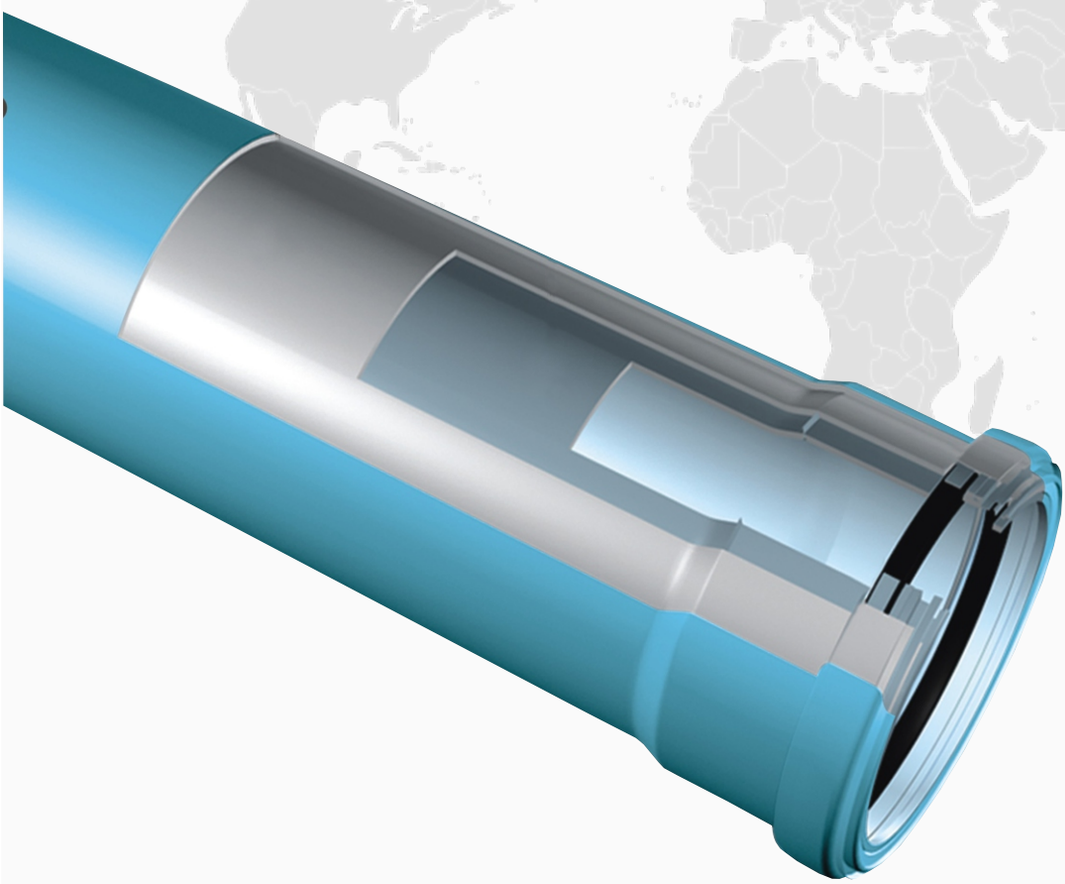
hakan
PLASTiK



SILENTA3A

LOW NOISE PIPE SYSTEMS

www.hakan.com.tr

+GF+

GF HAKAN PLASTIK is one of the world's largest plastic piping systems manufacturers. The company develops, produces and markets a comprehensive range of piping systems and components in a variety of materials used worldwide to transport water and gas at the highest quality, service and the right price. GF HAKAN PLASTiK operates in three core segments of piping systems; Building Technology, Utility and Agriculture. Its certified products are used in more than 70 countries in 5 continents worldwide.

With more than 10.000 products, GF HAKAN PLASTİK manages a land and maritime transport operation seamlessly and is able to meet the needs of its clients fully wherever they may be in the world.

HISTORY

HAKAN PLASTiK was founded in 1965 by the Karadeniz family. Since its foundation, Hakan Plastik has continuously expanded its presence in the manufacturing and sales of plastic piping systems with a focus on innovation.

In 2002, the company invested in a state of art modern facility in Çerkezköy Industrial Zone (ÇOSB), one of the three largest industrial zones in Turkey. To increase its production capacity, HAKAN PLASTİK opened up its second facility in 2012 in Şanlıurfa. Both facilities totally cover an area of 170.000 m^2.

In 2013, the leading plastic pipe manufacturer of Europe and the Middle East, HAKAN PLASTİK and the world's leading manufacturer of piping systems, Swiss-based Company, GEORG FISCHER joined forces under the name of **"GF HAKAN PLASTiK"** to provide a unique platform for further growth worldwide.

GEORG FISCHER, founded in 1802 is headquartered in Switzerland and has 125 companies, 48 of which are production facilities, in 32 countries with a workforce of 13,500 employees. The company generated sales of 3.6 billion Swiss francs in 2012. Georg Fischer operates in three core businesses GF Piping Systems, GF Automotive and GF Machining Solutions.

GF Piping System Division is a global supplier of plastic piping systems for the conveyance of liquids and gases in industry, building technology and utility applications. With over 5,000 employees, GF Piping Systems generated sales of about CHF 1.3 billion in over 100 countries in 2012.

ABOUT GF HAKAN PLASTİK

GF HAKAN PLASTİK operates in 2 production facilities equipped with the latest manufacturing technologies in Çerkezköy and Şanlıurfa with a workforce of 730 employees. Its headquarters is in Çerkezköy. The company has 6 regional directorates, offices and warehouses in Turkey.

The company has taken its place among the top 500 Enterprises in Turkey according to the worldwide known, prestigious Fortune 500 ranking and also one of the Top 500 Largest Companies in Turkey according to "Istanbul Chamber of Industry (ISO)."

GF Hakan Plastik Çerkezköy Factory

The system quality of GF HAKAN PLASTiK has been certified by BVQI, ISO 9001 and ISO 14001. As a result of a meticulous quality control approach and continuous research and development, product quality of GF HAKAN PLASTİK is confirmed by its international quality certificates.

The company gives top priority to using the highest standards of technology to manufacture user-friendly products with the highest quality and service.

SILENTA 3A PIPES & FITTINGS APPROVALS & CERTIFICATES

Fraunhofer
GERMANY
FRAUNHOFER INSTITUT
[P-BA 186 / 09 P-BA187 / 09]

Ukr SEPRO
UKRAINE
UKR SEPRO [10964]

GOST-R
RUSSIA
GOST-R [0303657]
GOST-R HYGIENE
[13.07.05 / 2737974]

Hoch Fladungen
GERMANY
HOCH

TSEK
TURKEY
TURKISH STANDARDS INSTITUTION
[59/14.02.76]

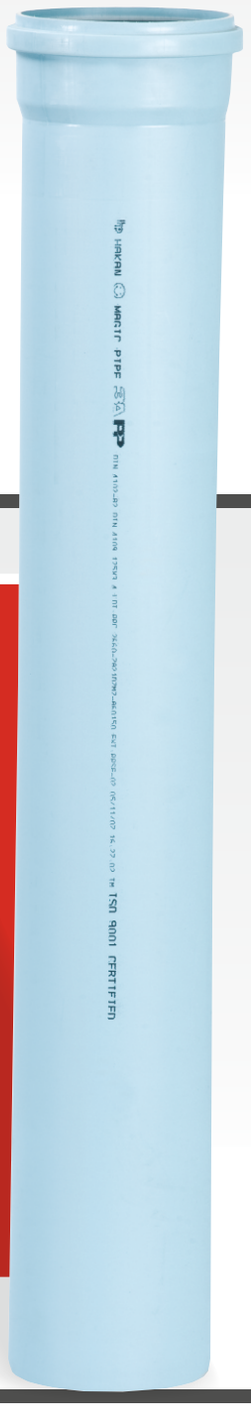
TURKEY
YILDIZ TECHNICAL UNIV.
[23.02.06/210]

SCANDINAVIAN COUNTRIES
SWEDCERT

hakan PLASTiK

SILENTA 3A LOW NOISE PIPE SYSTEMS

GF HAKAN PLASTIK SILENTA 3A is a sound-insulating 3-layered sewer pipe system made of Silenta PP which is specially formulated and reinforced for non-pressurized domestic drainage in accordance with System Standards of **DIN 4109**, **DIN 4102**.



GENERAL INFORMATION

- Silenta 3A reaches a sound-intensity level of **16 dB at 4lt/s** flow rate by the officially recognized Fraunhofer Institute, Germany.
- Silenta 3A is suitable for hot/cold water and acidic liquid transfers.
- Silenta 3A can be used at above and underground drainage systems, even at areas with high traffic load.
- Silenta 3A Products consist of pipes from 40mm to 200mm with and without socket and fittings with complementing accessories.
- Silenta 3A is GF Hakan Plastik' s globally registered trademark.

Silenta 3A is a high quality sound insulating multilayer pipe system.

BENEFITS

- 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.
- Flame-retardant, according to **DIN 4102** standard.
- High impact resistance.
- Does not require additional sound insulation systems.
- The coefficient of thermal expansion is only 0.06 mm/m°K.
- Operation and installation temperature climb down to -20° C.
- Resistant to organic and inorganic acids.
- Suitable for ph value between 2 & 12.
- Alternative to cast iron.

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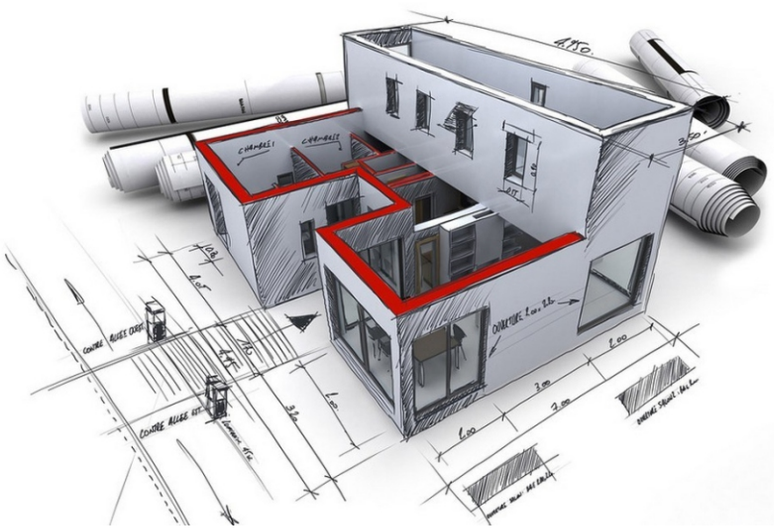
FIELDS OF APPLICATION

Silenta noise-insulating products are used wherever **sound protection** and **high_impact resistance** is required. Silence plays a big role in areas such as;



DRAINAGE SYSTEMS

- Working Areas
Office buildings, conference rooms, etc.
- Studying Areas
Schools, colleges, libraries, community centers, tutoring centers, etc.
- Sleeping Areas
Hospitals, houses, residences, apartments, hotels, etc.
- Commercial Kitchens
Restaurants,industrial kitchens.
- Under Ground Drainage Systems
All underground drain systems between the building and the main pipe line.

CENTRALISED VACUUM CLEANING SYSTEMS

Sustainable / green buildings

EXHAUST GAS SYSTEMS

Waste gas transport at industrial areas

CHEMICAL TRANSFER SYSTEMS

Industrial areas (short and long term usage)

Silenta pipes and fittings are not suitable for:
Transfer of waste water containing petrol or benzene and installations at temperatures below -20 °C.

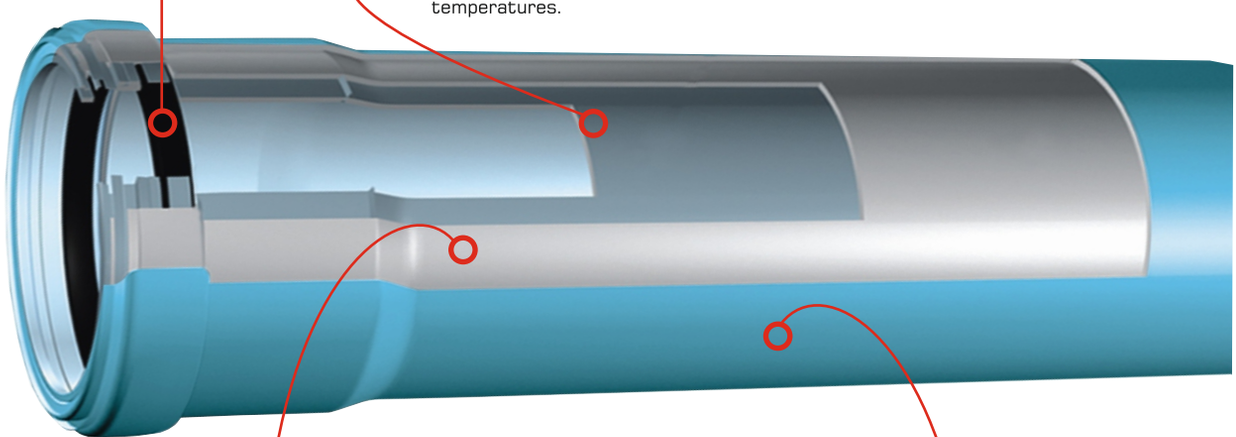
CHARACTERISTICS OF EXCELLENCE

3 LAYERED PIPE TECHNOLOGY

Silenta 3A features a three-layer wall construction. The multi-layer structure increases pipe rigidity. Technically desirable characteristics are optimized in a targeted way.

Special Seal 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.



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

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

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

ANTI-SHRINK SYSTEM

"Anti-Shrink System" is a manufacturing process of SILENTA 3A that prevents any kind of deformation in case of ambient temperature or heat variations. If this system is not applied during the manufacturing process, the socket may be subject to shape deformations. SILENTA Anti-Shrink System avoids problems such as changes in shape, fluid flow obstacles, complicated assembly and leakages.

SILENTA 3A TECHNICAL PROPERTIES

RAW MATERIAL
INNER LAYER : PP
MIDDLE LAYER: MINERAL REINFORCED PP
OUTER LAYER : PP

TENSILE STRENGHT	13 N/mm
COLOR	Light Blue
ELASTICITY MODULE	2400-3800 Mpa
COEFFICIENT OF THERMAL EXPANSION	0,06 mm / mK
DIAMETERS	40 Ø-50 Ø-75 Ø-90 Ø 110 Ø-125 Ø-160 Ø-200 Ø
CONNECTION TYPE	Push-Fit System
TEMPERATURE OF OPERATING MEDIA	Min: 0°C Max: 97°C

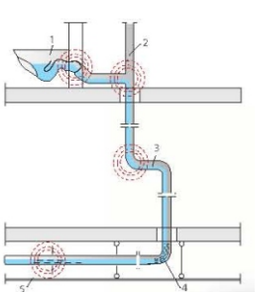
SOUND INSULATION PERFORMANCE

WHY SOUND PROTECTION?

Sound protective measures in a building pursue the purpose of minimizing noise pollution in rooms. Occupants need to be protected from disturbing air-borne and structure-borne sound. Architectural sound protection measures can be applied to the buildings and the elements of them where people spend longer period of time (offices,flats). Disturbing noise caused by sources within the building directly (structure-borne noise) or indirectly (e.g. noise deriving from building engineering systems) can easily be solved by SILENTA.

SOUND REDUCTION WITH SILENTA

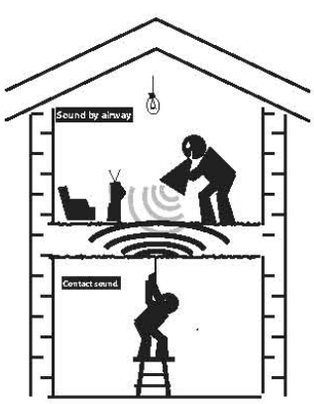
Both structure-borne and air-borne noise occur in sewer pipe systems.The pipe wall of the sewer pipe vibrates due to currents and flow noises.The type and intensity of these pipe vibrations depend on a variety of factors, such as the mass of the pipe, the pipe material and its inner damping. The pipe vibrations are emitted directly from the pipe as air-borne noise and are transferred as structure-borne noise via the pipe attachments to the wall fastening panel.When developing a sound-insulating domestic waste water system, both types of sound distribution must be taken into account.



The sources of sounds in buildings can be listed as;

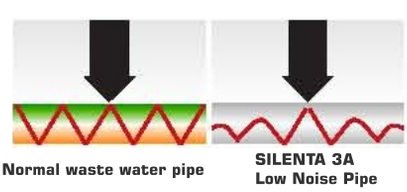
-Water shrinks
-The change of direction of the water
-High water velocities
-Crossing points
-Narrowing the formation of cavitation
-Flushing the toilets
-Unloading
-Incorrect planning

The voice waves diffusing by airway form a pressure inside the environment and surfaces it beats. The high molecular special formula used in the middle layer of three-layer SILENTA 3A pipe absorbs this noise and avoids it from going out.



Air-borne noise
Air-borne noise is present if the noises of a sound source are transferred directly through the air to people.

Structure-borne noise
With structure-borne noise, the sound transfer first occurs through a solid body. This body vibrates and the vibration passes on to people as air-borne noise.

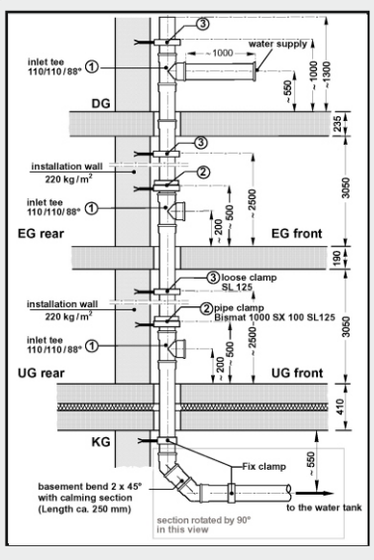


In the waste water installations, vibrations on the pipe systems occur as a result of beating or the impulsion waste water on the pipe surface.These vibrations are transferred on the wall where the installation is assembled by contact.
The voice formed by contact is substantially absorbed by courtesy of the special structure of SILENTA 3A.

SIGNIFICANT ACOUSTIC PERFORMANCE

	Wastewater system "HAKAN SILENTA 3A Noise Insulated DIN4102" with pipe clamps "Bismat 1000 SX100 SL125"			
Flow rate [l/s]	0,5	1,0	2,0	4,0
Installation sound level L_{ap} [dB(A)] measured in the basement test-room UG front [1])	46	48	49	52
Installation sound level L_{ap} [dB(A)] measured in the basement test-room UG rear [1])	9	10	12	19
Airborne sound pressure level $L_{a,A}$ [dB(A)] [2])	46	48	49	52
Structure-born sound characteristic level $L_{ac,A}$ [dB(A)] [3])	7	8	9	16

GF Hakan Plastik measurements of August 19, 2009. Sound pressure levels measured in the installation test facility. Test object was the waste water system "HAKAN SILENTA 3A Noise-Insulated DIN 4102" (manufacturer Hakan).The waste water system consisted of straight plastic pipes and fittings, nominal width OD 110 and pipe clamps "Bismat 1000 Sx100 SL125" (manufacturer BIS Walraven).



■ **Sample Test Layout**

The sound-insulating domestic waste water system SILENTA 3A guarantees quality, peace and living comfort.

In practice-oriented measurements carried out by the officially recognized Fraunhofer Institute for Building Physics in Stuttgart, Germany SILENTA 3A reached a sound-intensity level of **16 dB at 4lt/s** flow rate.

SILENTA 3A SOUND PERFORMANCE (dB)

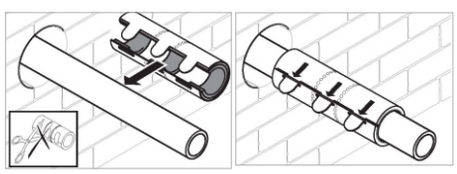
Water Flow Rate (l/s)

FIRE PROTECTION

During the assembly of SILENTA pipes, it is recommended to use one of the below fire retarding products in wall and floor transitions in order to ensure a good fire protection. In case of fire, these items prevent the propagation of flames between the floors and the adjacent doors. Their assembly is fast and easy and does not require the use of any extra equipment.

Fire, Smoke and Noise Barrier

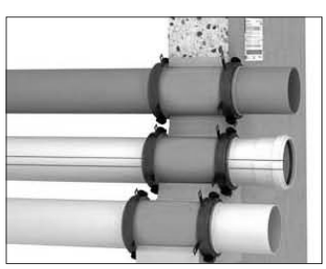
1-Foam Tape
2-Fire-Resistant Layer
3-Stainless Steel Sleeve



Is easily and simply installed.

Is maintenance-free and unaffected by moisture or any other building chemicals in common use.

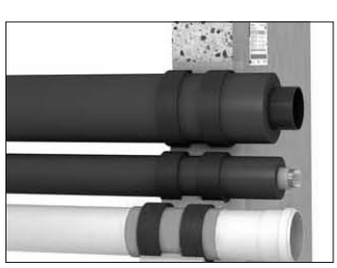
Fire Retarding Cuff



If installed properly, stuck on both sides of the wall, the cuffs will not allow smoke or flames to pass from a room to another.

It can be used with waste water pipes for up to 200mm diameter.

Fire Protection Stripe



The nature of his work is based on the coverage of the surface of the pipes then the protective shield will protect it from heat and flame.

It can be applied to any material without the need of any extra tools or can be installed with glued tape.

AN EXTREMELY WIDE RANGE

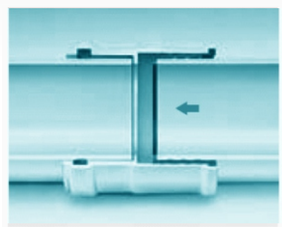
The wide range of GF Hakan Plastik Pipes & Fittings allow construction of the entire waste network.

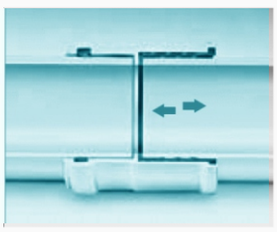
Pipe lenghts between **0,15m** to **6m** and diameters from **40mm** to **200mm** characterised by a wide choice of fittings.

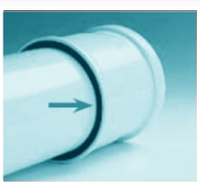
These particular pipe sizes are due to the large wall thickness and the need for a sufficient bore passage; Special connection and transition fittings of **SILENTA 3A LOW NOISE SYSTEM** to make it possible to connect other waste systems made of different materials.

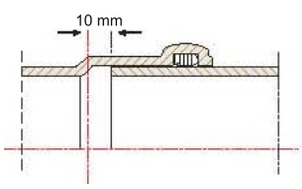
The range is completed with accessories for connections to other waste systems produced by GF Hakan Plastik and pipe clips with anti-vibration rubber to reduce the vibrations that are transferred to the installation walls when the waste system is in operation.

EASY & RAPID INSTALLATION









Length expansion coefficient:

- SILENTA 3A 0,06 mm/m°K

SILENTA 3A having a great jointing system with push-fit socket ensures practical and rapid installations without the use of electrical appliances or special tools,

Thanks to Silenta low coefficient of heat expansion the push-fit joints are capable of absorbing the variations in lenght of the pipe without taking any particular precautionary measures; It is enough to observe the installation instructions in the GF Hakan Plastik technical manuals.

CONNECTING THE PIPES WITH THE FITTINGS

1. Clean the ends of both the pipe and the fitting to be connected.

2. Apply a thin layer of lubricant to the ends of the pipe and the fitting. Do not use grease or soft soap.

3. Insert the pipe completely into the fitting until it stops.

4. Mark inserted pipe end in this position at the sleeve edge with a pencil, felt pen etc.

5. Vertically laid pipework: for each additional storey, retract the push-fit connection in the socket by 10 mm.

6. Horizontally laid pipework: after every 4 m of laid pipe length, retract the push-fit connections between the fittings and they can remain fully inserted.

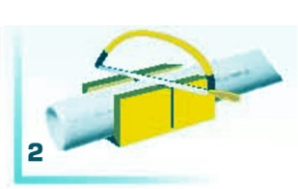
7. It is not necessary to make changes in length to push-fit connections between fittings, they can remain fully inserted.

SHORTENING AND CHAMFERING THE PIPES

1. Cut the pipe at a 90° angle from the axis with a pipe cutter, a fine-toothed saw or any other parting–off tool.

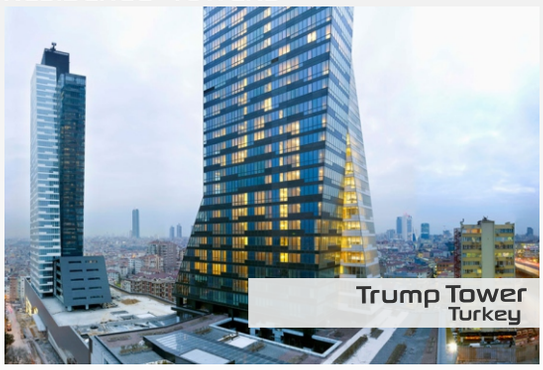
2. For connections to push-fit socket pipe systems, chamfer the pipe ends with a chamfering tool or a coarse file at an angle under approx. 10°.

3. Deburr the outside edges with a knife or a scraper.



SOME REFERENCE PROJECTS

RESIDENCE - TOWERS



HOTELS

HOSPITALS

SHOPPING & BUSINESS CENTERS

SILENTA 3A