DRAINAGE

FRIAPHON®

Acoustic Comfort

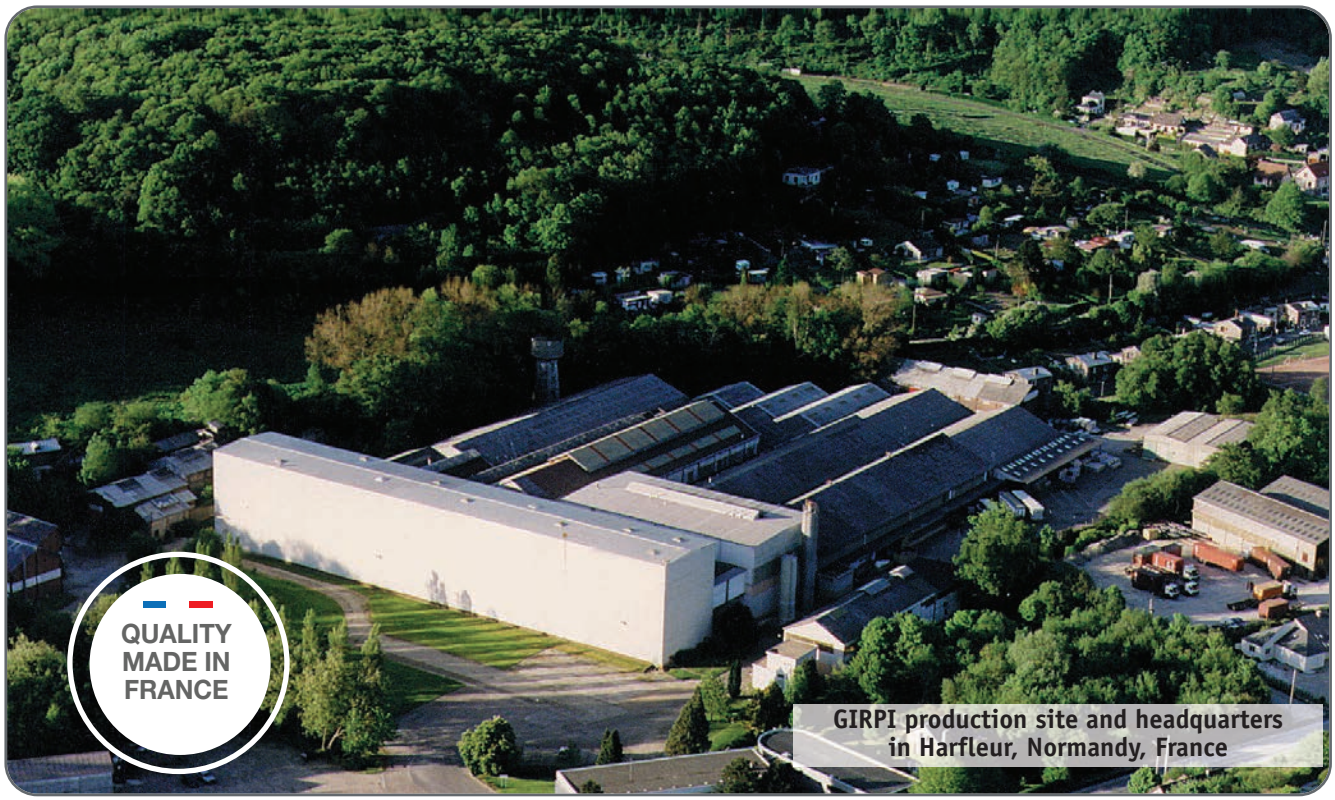
TECHNICAL DOCUMENTATION

March 2018

GIRPI

safety for your pipeworks

an Aliaxis company



GIRPI production site and headquarters in Harfleur, Normandy, France

GIRPI is certified to

afaq ISO 9001 Qualité AFNOR CERTIFICATION

afaq ISO 14001 Environnement AFNOR CERTIFICATION

afaq OHSAS 18001 Santé Sécurité au Travail AFNOR CERTIFICATION

OTHER MAIN CERTIFICATIONS:

CSTBat France

ATEC France

Bs1d0

Fraunhofer

NF Me France

For more information, please consult our current General Catalogue
or contact us at: contact@girpi.fr

CONTENTS

IMPORTANT REMARK:

The date on each page of this documentation is not a printing date but an updating date.

CHOICE OF THE GIRPI SYSTEM BEST ADAPTED TO YOUR NEEDS

How to select the GIRPI drainage system best adapted to your requirements?

APPLICATIONS	GIRPI SYSTEMS
Domestic Soil & Waste effluent drainage **with high acoustic requirements**	**FRIAPHON®**
Rainwater drainage	**PVC raingutter systems, FRIAPHON®**
Domestic Soil & Waste effluent drainage **as per NF EN ISO metric standards**	**PVC solvent welded fittings**
Domestic Soil & Waste effluent drainage **with d110 single stack system**	**CHUH**
High temperature Soil & Waste effluent drainage in centralised kitchens, in laundries, for sterilisation units, for boiler condensates	**HTA®-E**
Domestic Soil & Waste effluent drainage **for marine / shipbuilding applications**	**HTA®-E**

Certifications

	FRIAPHON®	PVC Evacuation	CHUH	HTA®-E
				
Certifications	ATEC n° 14/14-1948	NF - E	ATEC n° 14/11-1669	ATEC n° 14/13-1885
Fire certifications	NF - Me *	NF - Me	NF - Me	
Fire reaction rating	Bs1d0	Bs3d0	Bs3d0	Bs1d0
Joining methods	Push-fit with rubber gaskets	Solvent welding	Push-fit with rubber gaskets and solvent welding	Solvent welding
Cleaner	CLEANER⊕	CLEANER⊕	CLEANER⊕	CLEANER⊕
Welding polymer	GIRFIX **	GIRFIX	GIRFIX	RERFIX
Lubricant	SLUB		SLUB	

* For diameters d78 to d160

** Solvent welding possible for rainwater application

GENERAL PROPERTIES OF FRIAPHON®
Benefits

THE ASSETS OF **FRIAPHON®**:

■ ACOUSTIC PERFORMANCES

FRIAPHON® is designed to meet the highest acoustic performance requirements for drainage piping systems (e.g. French ESA "Exemples de Solutions Acoustiques" scheme). FRIAPHON® is designed to reduce **both airborne** and **structural noises**.

FRIAPHON® limits the noise emissions of domestic equipment in both vertical and horizontal piping sections.

FRIAPHON® has its dedicated range of PHONOKLIP® supporting brackets in order to reduce the transmission of vibrations **from the piping networks towards the walls, i.e. structural noises.**

FRIAPHON®'s acoustic performances were tested by CSTB (France) and Fraunhofer Institut (Germany) according to EN 14366 standard. **FRIAPHON® meets the highest regulatory requirements, such as the ESA5 acoustic performance rating.**

■ PERFORMANCES ON BUILDING SITES

As a complete system consisting of FRIAPHON® pipes and fittings combined with PHONOKLIP® brackets, it fits in all building site configurations (connections with other piping materials also possible).

Lightweight and easy to handle: FRIAPHON®'s light weight makes it very easy to handle on site.

Simple tools, no fire permit required: the installation of FRIAPHON® does not require the use of complex tools, and does not require the possession of a fire permit, which makes it an ideal system to **install in occupied buildings.**

Safe joining conditions: FRIAPHON® pipes and fittings all respect the same standard size tolerances.

■ DURABILITY AND SUSTAINABILITY

No corrosion, reduced scaling.

FRIAPHON® pipes and fittings are submitted to quality controls carried out by an independent laboratory (CSTB in France) and **are certified under ATEC 14/14-1948**.

FRIAPHON®'s **fire reaction properties are Bs1d0** rated according to Euroclasses. Its material and design also enabled it to obtain the **NF-Me** certification (from d78 to d160). Those performances enable FRIAPHON® to comply with the fire regulations that apply to buildings receiving the public.

GENERAL PROPERTIES OF FRIAPHON®
Benefits

THE ASSETS OF **FRIAPHON®** :

■ ENVIRONMENTAL PERFORMANCES

FRIAPHON® is the first acoustic drainage system that contains no heavy metals. Stabilised with organic calcium, its environmental footprint is distinctively low.

FRIAPHON®'s environmental properties are described in its **"FDES"** Environmental and Sanitary Data Sheet, validated by an independent laboratory (CSTB, France) according to EN 15804 standard.

FRIAPHON®'s basic raw material is PVC, which is entirely recyclable.

FRIAPHON® meets the requirements of environmental schemes such as HQE (France), BREEAM (UK), LEED (USA), "GBC" Green Building Council (worldwide), BASTA (Sweden), SWAN (Denmark). GIRPI is a founding member of the Green Building Council's French branch.

■ SUPPORT TEAM PERFORMANCE

GIRPI's Technical Support team can help you carry out detailed execution drawings: network drawings with fitting article references, bills of quantities, bracket positioning, BIM 3D library compatible with REVIT software.

GIRPI's hotline can help you answer questions on the spot, and carry out your building site interventions in the best possible conditions.

GIRPI's on-site technical assistance can help you train building site operatives to install GIRPI piping systems.

GIRPI's web site enables you to consult and download its commercial or technical literature, certificates, and approvals.

GENERAL PROPERTIES OF FRIAPHON®
Characteristics

The physical characteristics below are measured on standard probes before aging.

PHYSICAL CHARACTERISTICS

Characteristics	Performances
Fire Reaction Rating	Bs1d0 Euroclasses according to NF EN 13501 all across the range NF Me from d78 to d160
Volumetric mass	Pipes: 1600 kg/m3 +/- 100 kg/m^3 Fittings: 1400 kg/m3 +/- 100 kg/m^3
Material	Pipes: - internal layer: PVC-U in beige colour - external layer: PVC-U modified for improved acoustic performances in RAL 7024 grey Fittings: PVC-U in RAL 7024 grey Gaskets: EPDM hardness 50 Shore A according to EN 681-1 standard
Durability	Equivalent to that of compact PVC-U pipes covered by NF-T 54030 and EN 1329-1 standards
Vicat	Pipes: - internal layer: 79°C or above - external layer: 79°C or above Fittings: 79°C or above
Creep at 150°C	5 % maximum
Expansion cœfficient	0.08 mm/m/°C
Pressure resistance	With push-fit fittings: 0.5 bar With cemented fittings: 3 bar

■ CHEMICAL RESISTANCE

Water or any other fluid containing a suspension or solution of chemical agents other than (or in other quantities than) those admitted in standards and regulations concerning potable water are to be considered as chemicals. Therefore, their compatibility with FRIAPHON® must be checked.

Whenever particular conditions justify the use of acoustic or thermal insulation on the piping networks, the compatibility of the insulation material, its adhesive and FRIAPHON® must be checked.

If in doubt, consult both supplier and GIRPI's technical support: be.girpi@aliaxis.com

■ PRODUCT QUALITY

In order to ensure a consistent quality level for its productions and to guarantee its users performances matching those declared, GIRPI implements a set of control rules described in its ATEC approval, delivered by CSTB.

Those controls cover the physical and mechanical characteristics of its pipes and fittings.

Those controls play an essential role, as the acoustic performances of a piping system can be greatly altered if the characteristics of the pipes and fittings are not kept within the standard tolerances.

Controls are carried out upon receipt of each component, of the raw material (Vicat, density), and on finished products (impact resistance, reaction to heat, dimensional controls).

In the framework of its CSTBat quality mark, the characteristics and performances of randomly collected FRIAPHON® samples are regularly controlled by an external certification body.

Industrial and logistic processes are ISO 9001 approved. This enables our customers to be assured of our products' technical performances and of our services' quality (production, deliveries, technical support).

GENERAL PROPERTIES OF FRIAPHON®
Operating conditions

■ FIELDS OF APPLICATION

FRIAPHON® is exclusively designed for the gravity drainage of: domestic soil and waste effluents, rainwater from buildings and their attachments.
FRIAPHON® must be used and installed in compliance with the standards, guidelines and building regulations which respectively apply in each country. In France, those are:

- **DTU 60.32**: *PVC-U piping systems, rainwater drainage*.
- **DTU 60.33**: *PVC-U piping systems, soil and waste effluent drainage.*
- **DTU 60.1 P1**: *drainage piping networks.*

FRIAPHON® is not designed for:

- underground sewerage networks outside buildings,
- drainage systems for laundry and industrial kitchen effluents,
- drainage systems for chemical cleaning effluents,
- vacuum systems in dental surgery practices,
- drainage systems for effluents having a high content of benzene.

■ GUARANTEES

GIRPI guarantees its products for a duration of 10 years from the delivery to the first purchaser, except for normal wear parts. This guarantee applies only when the products are chosen, stored, installed and used in strict compliance with the technical documentation, the applicable certificates and codes of practice, and covers only the replacement of defective parts, excluding any other damage.

No application other than those exactly expressed in the technical documentation can be guaranteed, particularly concerning:

- the nature and the type of installation for which the products are being used,
- supporting methods, and materials,
- insulation methods, and materials,
- installation and working conditions (flushing, etc.),
- the nature of the fluids to be transported, and the working temperature-pressure values to be respected.

It is reminded that GIRPI does not take responsibility for the hydraulic design of piping networks, namely as far as pipe dimensioning is concerned.

■ ACOUSTIC PERFORMANCES

The **acoustic test results** shown in this technical documentation **result from tests** carried out in various specialised laboratories according to the requirements of EN 14366 standard, **or from simulations** carried out using the ACOUBAT software (according to EN 12354 standard).
Those tests and simulations give objective values according to accurately defined conditions (network and building configurations, flow rates, construction design, room dimensions, etc.) and **cannot be compared to the acoustic performances of a building measured on site**. Indeed, many factors which are independent from the product's intrinsic performances can influence measurements made on site (installation, construction environment, configurations, etc...).
Relevant test reports can be made available upon simple request from: be.girpi@aliaxis.com or +33 (0)2 32 79 58 00

GENERAL PROPERTIES OF FRIAPHON®
Acoustic regulations in buildings

In order to limit the exposure of persons to noises and the nuisances or inconveniences which result from them, regulations define the maximum acceptable noise levels in various buildings.

LEVEL OF ACOUSTIC PRESSURE	HOUSING (NEW)	TEACHING FACILITIES	HEALTH CARE FACILITIES	HOTELS
	NRA: New Acoustic Regulations (1999)	Legislation of 25 April 2003 relating to noise limits	Legislation of 25 April 2003 relating to noise limits	Legislation of 25 April 2003 relating to noise limits
30 dB(A)	Main rooms (living room and bedrooms)		Bedrooms	Bedrooms
33 dB(A)		Libraries, infirmaries, rest rooms, music rooms		
35 dB(A)	Other (kitchens, bathrooms)		Examination rooms, offices, waiting rooms	
38 dB(A)		Class rooms, administration, meeting rooms		
40 dB(A)			Health care rooms, operating theatres, workshops	

■ RESIDENTIAL BUILDINGS

In France, the Act dated 30th June 1999 covers acoustic characteristics of residential buildings.
That Act is also known as **"NRA" New Acoustic Regulation**, and concerns professionals investing in, selling or developing buildings.
It applies to all residential buildings without exception.
It sets maximum acceptable noise levels according to the final use of the buildings (see table above).

In France, the Act dated 27th November 2012 covers the proof of compliance with acoustic regulations.
It applies to all actors in the building industry.
It applies to **all residential buildings** whose application for construction has been placed as **from 1st January 2013.**
It makes the production of a document proving that acoustic requirements are complied with compulsory for the investor or his representative, together with the declaration of the building works' completion.
Those documents must show the means and solutions implemented in terms of acoustic treatment, from the initial study stage until project completion.
For projects of more than 10 dwellings, control measurements must be carried out after completion of the building work, and those results must be attached to the declaration documents.

■ OTHER BUILDINGS

In France, the Acts dated 25th April 2003 cover noise limitation.
Those Acts apply to all building investors or their representatives.
They apply to **all buildings used for education, health care and hospitality.**
They define maximum acceptable noise levels according to the final use of the buildings (see table above).

GENERAL PROPERTIES OF FRIAPHON®
Acoustic regulations in buildings

Those regulations are completed by various guidelines and recommendations. Their aim is to accompany professionals working on the design and execution building projects at each stage. Some examples are given below.

■ TECHNICAL GUIDE ON THE IMPLEMENTATION OF ACOUSTICS IN NEW BUILT RESIDENTIAL PROJECTS

(December 2015) by CSTB, France (Scientific and Technical Building Centre).

This guide is intended for consulting engineers and control engineers, and studies various cases of systems and designs which can impact the acoustic performances of a building.
For each case, it gives a critical review of the reference standards and documents covering their implementation, as well as a chronology to identify watch points at each stage of its execution, followed by examples of good practice.

■ CIRCULAR INFORMATION LETTER DATED 25TH APRIL 2003, ABOUT THE APPLICATION OF ACOUSTIC REGULATIONS IN NON RESIDENTIAL BUILDINGS

French Department of Equipment, Transports, Accommodation, Tourism and Sea.
French Department of Environment and Sustainable Development.
French Department of Health, Family and Handicap.

This circular letter is intended for public and private investors and developers. It brings extra clarification to interpret the Acts dated 25th April 2003, especially on the following subjects:

- definition and calculation of the evaluation indexes used in the Acts;
- how to carry out measurements and assess the results obtained when the acoustic quality of a building is being reviewed;
- common requirements to all buildings;
- specific requirements per type of building.

It also reminds the obligation for public and private investors and developers to clearly mention the Act that they are bound to respect in their project's specifications.

■ RECOMMENDATION GUIDE ABOUT UNDERSTANDING AND MANAGING ACOUSTIC PERFORMANCE DECLARATIONS

(January 2014) by the French Department of Territorial Equality, Environment, Sustainable Development and Energy.

This guide, essentially intended for public and private investors and developers:

- aims at facilitating the implementation of applicable regulations,
- does not have any regulatory status in itself,
- brings extra clarification on the contents of the acoustic performance declaration,
- reminds the requirements to be met when monitoring acoustic quality,
- proposes monitoring report sheet models for each stage.

GENERAL PROPERTIES OF FRIAPHON®
Acoustic regulations in buildings

■ "ESA" EXAMPLES OF ACOUSTIC SOLUTIONS - THE 2000 ACOUSTIC REGULATIONS

(January 2014) by the French Department of Environment, Sustainable Development and Energy.

This document aims at providing guidance at design stage, and has no regulatory value.

It consists of two sections.

The **first** section introduces **various solution examples** classified to mirror the contents of the regulation, such as "Noises generated by Equipment: downpipes and technical shafts for drainage purposes".

The **second** section introduces **products or systems** that can be used in order to meet the regulation's requirements.

The acoustic performances of various products are evaluated and **classified on a scale ranging** from **ESA1** to **ESA6** (from lowest to highest performance levels). The scale was designed so that the **ESA4** rating can be considered as sufficient to ensure compliance with those minimum regulatory requirements.

The ESA acoustic performance scale

Together with the technical shafts in which they are installed, soil, waste and rain water drainage piping networks belong to the group of collective building equipment whose **acoustic performance will affect the building's overall performance.**

As such, they require **specific attention** from the teams working on a building project at all stages: design, materials selection and implementation, execution of the project.

The **"ESA"** document, published by the French government's Department in charge of accommodation and sustainable development, introduces piping solutions and technical shaft materials which are classified according to their isolated and combined **acoustic performances** with a view to meeting or exceeding the minimum regulatory requirements.

It is one of the recognised **reference documents** available to date, and its use is recommended to help the teams working on a building project at design stage, in order to select the most appropriate materials.

That document can be downloaded from the web site of the French Department of Environment, Sustainable Development and Energy.

The solutions shown in that guide were evaluated by using the "ACOUBAT" (short for building acoustics) calculation software, which was designed according to the requirements of EN 12534 standard. Worst case conditions were entered for each calculation and each solution's performance was classified and given an **"ESA"** rating.

GENERAL PROPERTIES OF FRIAPHON®
Acoustic regulations in buildings

NOISES GENERATED BY EQUIPMENT: DOWNPIPES AND TECHNICAL SHAFTS FOR DRAINAGE PURPOSES

Concerning effluent drainage piping networks for soil, waste and rain water, the applicable “ESA” performance scales are **ESA3, ESA4** and **ESA5.**

RECOMMENDATIONS

RECOMMENDATIONS	STRUCTURAL NOISE ACCORDING TO EN14366	AIRBORNE NOISE ACCORDING TO EN14366	EXAMPLES OF ESA ACOUSTIC SOLUTIONS
ESA 3	25/33 dB(A)**	53<Lna<57	Pipes and fittings in NF certified PVC-U
ESA 4	25/33 dB(A)**	49<Lna<53	Pipes and fittings with certified acoustic characteristics
ESA 5	25/33 dB(A)**	Lna<49	NF certified cast iron and FRIAPHON® piping systems

Source: “ESA” guide

***: 33 dB with standard brackets, 25 dB with acoustic brackets*

RESULTS

RESULTS	STRUCTURAL NOISE ACCORDING TO EN14366	AIRBORNE NOISE ACCORDING TO EN14366	SOFFIT ACCORDING TO EN14366	CHANGE OF DIRECTION
PVC	25 dB(A) or 33 dB(A)	57 dB(A)	61 dB(A)	63 dB(A)
FRIAPHON®	11 dB(A)	48,5 dB(A)	50 dB(A)	58 (54*) dB(A)

**: By adding heavy gauge phonic insulation (4 to 8 kg/m²)*

TEST RESULTS

In order to obtain objective acoustic performance results and help designers in their choice of solutions, several measurement tests were carried out in the laboratories of CSTB, France, and Fraunhofer Institut, Germany.

The tests covering straight downpipes and soffit configurations were carried out according to EN 14366 standard: laboratory measurements of noises generated by effluent drainage piping networks.

The tests measuring noises generated by downpipes incorporating changes in direction were carried out according to a document called “FIC no. 2014/AI02” established by CERQUAL, France (Quality Certification institute). That document is an Interpretation Sheet Completing the “Qualitel” (Quality Evaluation) and “Habitat & Environnement” (Environmentally Sustainable Residences) schemes.

The test results shown in the tables above result from measurements made as illustrated:

Point A : airborne noise
Point B : structure borne noise behind a partition wall
Point C : noise in the soffit area

ESA 5

FRIAPHON® obtains the best ESA 5 rating.

In the **ESA** framework, FRIAPHON® allows for the use of low acoustic performance materials for technical shafts. The use of high acoustic performance shafts with FRIAPHON® makes it possible to obtain **acoustic comfort**.

GENERAL PROPERTIES OF FRIAPHON®
Acoustic performances

TECHNICAL SHAFTS FOR WATER EFFLUENT DRAINAGE PIPINGS

The acoustic performances of technical shafts called ΔL_{an} is expressed in dB(A). It is obtained by measuring the drop in airborne noise resulting from the insertion of a given material to serve as a technical shaft. The measurements are carried out according to EN 14366.

Concerning technical shafts for soil, waste and rain water piping systems, the applicable "ESA" performance scales are **ESA2, ESA3, ESA4** and **ESA5**.

MATERIAL CHARACTERISTICS:

RATING	CERTIFICATION	TYPE APPROVAL TESTS LESS THAN 10 YEARS OLD	DESCRIPTION
ESA 2	-	$19 \leq \Delta L_{an} < 24$	50 mm thick cellular partition 50 mm thick cellular partition + 1 standard quality BA13 plasterboard plate
ESA 3	-	$24 \leq \Delta L_{an} < 29$	72/48 partition wall + 1 standard quality BA13 plasterboard plate on each side of the metallic structure Masonry partition wall, 50 mm brick or plasterboard plates Sandwich panels of 70 mm thickness Counterplate on metal structure with 2 standard quality BA18 plasterboard plates (both fixed to the same side of the structure) without any mineral wool
ESA 4	-	$29 \leq \Delta L_{an} < 34$	Masonry partition wall, 50mm brick or plasterboard plates, 50mm mineral wool inside the shaft Masonry partition wall, 100mm brick or plasterboard plates Sandwich panels of 73mm minimum thickness 72/48 partition wall + 1 acoustic quality BA13 plasterboard plate on each side of the metallic structure Counterplate on metal structure with 45mm thick mineral wool + 2 standard quality BA13 plasterboard plates (both fixed to the same side of the structure)
ESA 5	-	$34 \leq \Delta L_{an}$	Sandwich panels of 70mm thickness + 2 standard quality BA13 plasterboard plates 72/48 partition wall + 1 standard quality BA13 plasterboard plate on each side of the metallic structure + 40 mm mineral wool inside the shaft Sandwich panels of 73 mm minimum thickness + 80 mm mineral wool inside the shaft 50mm thick cellular partition + 30 mm mineral wool inside the shaft + 50 mm thick cellular partition

Source: "ESA" Examples of Acoustic Solutions guide.

NOTES:

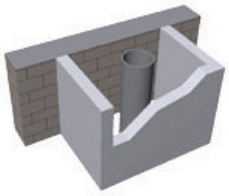
The notion of "type approval" implies that the acoustic tests have been carried out by an accredited laboratory, (e.g. recognised by COFRAC in France), according to the standards which applied at the time.

Inspection traps usually are at least as acoustically efficient as shaft components. That generally implies the use of gaskets on all 4 sides of the trap, and their compression when the trap is in closed position.

GENERAL PROPERTIES OF FRIAPHON®
Acoustic performances

■ NOISE GENERATED BY EQUIPMENT:
TECHNICAL SHAFTS AND DRAINAGE DOWNPIPES

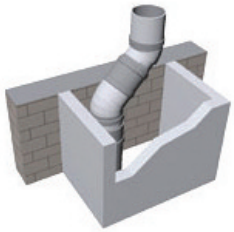
Straight Downpipe



Surface Mass of Supporting Wall	Noise Exposed Room	Piping	Brackets	Technical shaft	Heavy mass
m ≥ 200 kg/m²	Living room ①	ESA 3	Adapted(1)	ESA 4	-
		ESA 4		ESA 3	
		ESA 5		ESA 2	
	Kitchen	ESA 3	Adapted(1)	ESA 3	-
		ESA 4		ESA 2	
		ESA 5		ESA 2	

(1) L_{SC} ≤ 25 dB (A)

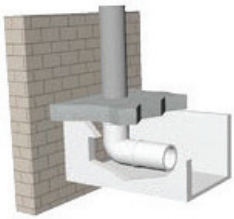
Downpipe with 2 x 45° deflections



Surface Mass of Supporting Wall	Noise Exposed Room	Piping	Brackets	Technical shaft	Heavy mass
m ≥ 200 kg/m²	Living room	ESA 3	Adapted(1)	ESA 5	-
		ESA 4		ESA 4	
		ESA 5		ESA 4	
	Kitchen	ESA 3	Adapted(1)	ESA 4	-
		ESA 4		ESA 3	
		ESA 5		ESA 3	
m ≥ 400 kg/m²	Living room	ESA 3	Rigid	ESA 5	-
		ESA 4		ESA 4	
		ESA 5		ESA 4	
	Kitchen ②	ESA 3	Rigid	ESA 4	-
		ESA 4		ESA 3	
		ESA 5		ESA 3	
m ≥ 400 kg/m²	Living room	ESA 3	Rigid	ESA 4	m ≥5 kg/m²
		ESA 4		ESA 3	
		ESA 5		ESA 3	
	Kitchen	ESA 3	Rigid	ESA 3	m ≥5 kg/m²
		ESA 4		ESA 2	
		ESA 5		ESA 2	

(1) L_{SC} ≤ 25 dB (A)

Downpipe with 1 x 90° deflection with soffit



Surface Mass of Supporting Wall	Noise Exposed Room	Piping	Brackets	Technical shaft	Heavy mass
m ≥ 400 kg/m²	Living room ③	ESA 3	Rigid	ESA 5	-
		ESA 4		ESA 4	
		ESA 5		ESA 3	
	Living room	ESA 3	Rigid	ESA 4	m ≥5 kg/m²
		ESA 4		ESA 3	
		ESA 5		ESA 2	
	Kitchen	ESA 3	Rigid	ESA 4	-
		ESA 4		ESA 4	
		ESA 5		ESA 3	

Source: "ESA" Examples of Acoustic Solutions guide, Technical Sheet 2.7 (p.11)

Configurations ① ② ③ are shown on Technical Sheet 2.12 (p.16)

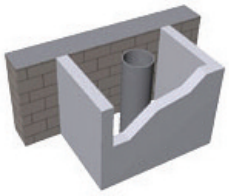
Depending on the configurations, the use of FRIAPHON®, thanks to its **ESA 5** rating, allows for the use of technical shafts with a lower acoustic attenuation level than if standard NF Me PVC drainage or other **ESA 4** rated piping systems are being used.

The selected shaft materials can be 1 to 2 rating levels lower in most cases.

In order to help the teams in charge of designing buildings, GIRPI has carried out various calculations of simulated cases by using the ACOUBAT software, and has asked CSTB to carry out various measurements of the configurations studied in the **"ESA"** guide.

GENERAL PROPERTIES OF FRIAPHON®
Acoustic performances

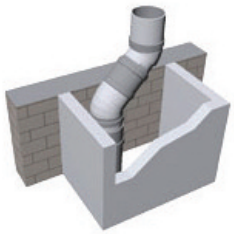
■ COMBINATION EXAMPLES OF TECHNICAL SHAFTS AND DRAINAGE DOWNPIPES



Straight Downpipe ①

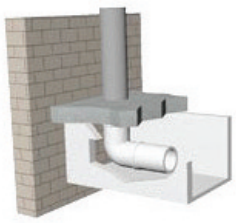
Surface Mass of Supporting Wall	Noise Exposed Room	Piping	Brackets	Technical shaft
m ≥ 200 kg/m²	Living room	PVC NF Me	Adapted(1)	100mm masonry partition wall
		ATEC certified piping system		50mm masonry partition wall
		FRIAPHON®		50mm cellular partition + 1 BA13 plasterboard

(1) $L_{SC} \leq 25$ dB (A)



Downpipe with 2 x 45° deflections ②

Surface Mass of Supporting Wall	Noise Exposed Room	Piping	Brackets	Technical shaft
m ≥ 200 kg/m²	Kitchen	PVC NF Me	Rigid	50mm masonry partition wall + 50mm mineral wool
		ATEC certified piping system		Sandwich panels of 70mm minimum thickness
		FRIAPHON®		Sandwich panels of 70mm minimum thickness



Downpipe with 1 x 90° deflection with soffit ③

Surface Mass of Supporting Wall	Noise Exposed Room	Piping	Brackets	Technical shaft
m ≥ 400 kg/m²	Kitchen	PVC NF Me	Rigid	50mm cellular partition + 30 mm mineral wool + 50 mm cellular partition
		ATEC certified piping system		72/48 partition wall + 1 acoustic quality BA13 plasterboard plate on each side of the metallic structure
		FRIAPHON®		72/48 technical shaft + BA13 plasterboard plates + glass wool by 45

Source: "ESA" Examples of Acoustic Solutions guide, Technical Sheet 2.7 (p.11)

Configurations ① ② ③ are shown on Technical Sheet 2.12 (p.16)

Whatever the configuration (straight, 2 x 45° deflections, 1 x 90° with soffit), selecting FRIAPHON® allows for the use of standard quality shaft materials in order to meet regulatory acoustic requirements.

When a building project requires acoustic comfort for its occupants, GIRPI recommends the use of FRIAPHON® for its drainage networks, together with ESA4 rated technical shafts.

GENERAL PROPERTIES OF FRIAPHON®
Acoustic performances

FRIAPHON® THE ONLY ESA 5 RATED PLASTIC SOLUTION

Values expressed in dB(A)

FRIAPHON®

PVC

1 and 2 -Tests completed at CSTB and Fraunhofer Intitute
3 - Test completed at Aliaxis RD

The result of 54 dB was obtained with an isolation kit composed of ST thermal elastomer insulation and heavy gauge phonic insulation 4 to 8 kg/m

Meeting acoustic regulations does not guarantee acoustic comfort

Expert advice:

Mr. Thierry Mignot, legal expert and member of the CNB, France (National Noise Council), explains:

- "Legal complaints resulting from noise problems most often reveal that the allegations made by the plaintiffs suffering from acoustic **disorders concern buildings which comply with the current acoustic regulations, thus revealing a gap between the level of expectations and reality when it comes to acoustic comfort**. Due to a general lack of information, people are convinced that a building which complies with acoustic regulations guarantees acoustic comfort to its occupants. In fact, the regulation only aims at avoiding worst case situations such as the sheer impossibility to live in a really noisy building. As a result, the plaintiffs can get very frustrated when they are faced with reality".

- **"The current regulations only set infraction noise thresholds"**.

- "Furthermore, one could think that the succession of regulations should have resulted in an improved protection from noises. Unfortunately, that is not the case. For instance, the maximum accepted noise levels generated by domestic equipment had been set at 30 dB(A) in the 1960s, considering that ambient noise in collective dwellings (neighbours, street) was at a similar level, resulting in no perceived acoustic aggravation for the occupants. However, it has been observed that the general improvement of a building's thermal insulation resulted in the installation of better sound insulating windows, which in turn resulted in ambient noises in collective dwellings dropping to approximately 20 dB(A). The above implies that a piece of domestic equipment which meets the regulatory noise levels of 30 dB(A) has now become much more noticeable than it was 50 years ago**".**

Source: "l'état de l'environnement sonore" (evaluation of the sound environment), by CIDB, France – 2014"

GENERAL PROPERTIES OF FRIAPHON®
Acoustic performances

In order to help persons in charge of designing buildings, GIRPI calculated the performances of various combinations of materials by simulation.

Those calculations were based upon test results coming from CSTB, France, for each of the configurations proposed in the "ESA" guide of acoustic solution examples, using the "ACOUBAT" calculation software according to the requirements of EN 12534, in worst case scenario configurations (25 m³ room of the following dimensions: L = 2.5m x W = 4m x H = 2.5m).

Drainage piping systems only constitute part of the materials and systems used in a building which will contribute to its global acoustic performance. As such, a piping system alone is not able to ensure the global acoustic performance of a building. The quality of implementation / installation of all systems plays a decisive role in that field (for more details, please refer to sheets 2.6 and 2.7, p.10&11 of this document).

ACOUBAT ACOUSTIC SIMULATIONS ACCORDING TO VARIOUS TECHNICAL SHAFT MATERIALS

Combination Details	Shaft type	Rail type	Plasterboard plates	Mineral wool	ESA rating	AIRBORNE NOISE dB(A) Straight downpipe **Point A**			AIRBORNE NOISE dB(A) 1x90° soffit deflection **Point C**		AIRBORNE NOISE dB(A 2x45° deflections) **Point A**		
						PVC NF-E NF-Me	Friaphon® + acoustic cushioning elbows	Friaphon® 2x45°	PVC NF-E NF-Me	Friaphon®	PVC NF-E NF-Me	Friaphon®	Friaphon® + acoustic insulation
CSTB test results - airborne noise L_{nAT} standardised level						54.4	48.5	49	60.6	50	63	57.3	52.9
ACOUBAT L_{nAT} simulation 25 m³ - no shaft						57.0	50.0	50.0	62.0	51.0	64.0	58.0	53.0
Technical shaft with 1 single standard BA13 plasterboard plate on M48 metal structure		48 rail	BA13	none	2	37	32	31	42	34	45	40	36
Technical shaft made from 50 mm cellular partition panels	cellular			none	2	37	31	31	42	33	45	39	36
Technical shaft made from 50 mm cellular partition panels + 1 single standard BA13 plasterboard plate	cellular		BA13	none	2	35	28	29	40	30	43	37	34
2 BA18 plasterboard plates on M48 metal structure		48 rail	2 BA18	none	3	31	25	25	36	28	40	34	30
Technical shaft made from 50 mm plaster panels	plaster panels			none	3	31	26	25	36	29	40	33	30
Technical shaft made from masoned partitions of 5 cm plaster bricks with 10 mm plaster surface finish	plaster bricks			none	3	30	25	24	35	27	39	32	29
Technical shaft 72/48 structure with 2 standard BA13 plasterboard plates and 45 mm mineral wool			2 BA13	LM45	3	28	26	23	33	27	37	32	28
Sandwich panel: BA10 / 50 mm mineral wool / BA10		sandwich panel	2 BA10	LM50	3	27	27	23	33	27	37	31	28
Technical shaft made from 3 standard BA18 plasterboard plates on M48 metal structure		48 rail	3 BA18		3	28	23	23	33	26	37	31	28
Technical shaft made from masoned partitions of 10cm plaster bricks with 10 mm plaster surface finish	plaster bricks				4	25	24	21	30	26	37	29	28
Technical shaft made from 2 standard BA18 plasterboard plates on M48 metal structure with 45 mm mineral wool		72/48 rail	2 BA18	LM45	4	25	24	21	30	26	35	29	26
Technical shaft made from 50 mm cellular partition panels on 72/48 metal structure with 45mm mineral wool	cellular	72/48 rail		LM45	4	25	22	20	30	24	34	29	25
Technical shaft made from 2 standard BA13 plasterboard plates and 45 mm mineral wool		rail profiles	2 BA13	LM45	4	24	23	20	29	24	34	28	25
Technical shaft made from two 50 mm plaster panel partitions separated by 30 mm mineral wool	plaster panels			LR30	4	23	23	19	27	24	33	27	24
Technical shaft structure 72/48 with 2 acoustic BA13+ plasterboard plates and 45 mm mineral wool inside the structure		72/48 rail	2 BA13 acoustic	LM45	4	23	20	20	28	22	33	26	23
Technical shaft structure 72/48 with 2 standard BA13 plasterboard plates and two 40 mm mineral wool inside the structure and in the cavity		72/48 rail	2 BA13	2LM40	5	20	19	17	24	22	30	25	22

> 35	Does not meet regulatory acoustic requirements.
31< x < 35	Stands within tolerated values to meet regulatory acoustic requirements.
30< x <24	Meets regulatory acoustic requirements.
x< 24	Meets regulatory acoustic requirements and brings acoustic comfort.

STRUCTURAL NOISES	PVC	FRIAPHON®
Armoured concrete slab, thickness 19cm, surface mass 445kg/m². Wall with surface mass 220kg/m². Measurement made at point B.	**25** or **33 dB(A)***	**11 dB(A)**

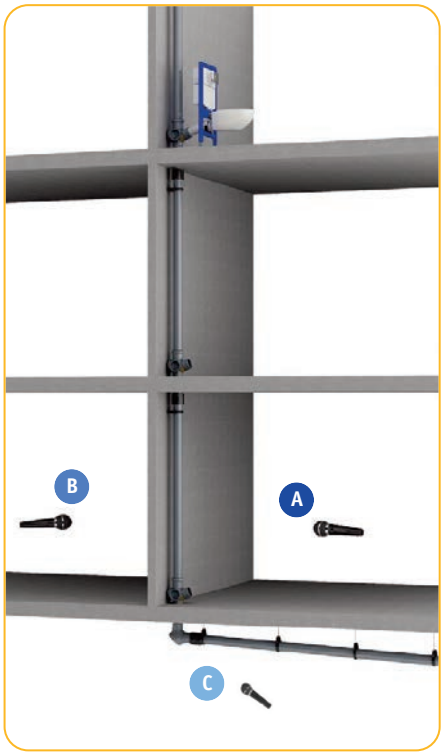
* Depending on type of brackets used.

For more information, please contact GIRPI's Technical Support team at **+33 (0)2 32 79 58 00** or at **be.girpi@aliaxis.com**

OPPORTUNITIES WITH FRIAPHON®
Acoustic performances

■ TEST RESULTS

Point A : airborne noise on downpipe
Point B : structural noise behind partition wall
Point C : airborne noise 1 x 90° deflection in soffit



■ ACOUSTIC PERFORMANCES OF FRIAPHON®

✓ Concerning structural noises (point B), FRIAPHON® combined with PHONOKLIP® brackets makes it possible to limit noise emissions on the other side of a partition wall (facing the wall, 2 floors below the source of noise) to levels which cannot be perceived by the human ear.

Thanks to its complete system, it also makes it possible to reach low acoustic emissions in less frequent, but sensitive cases such as 1 x 90° deflections in soffit, and 2 x 45° deflections in the downpipe.*

✓ In a 25m³ room which is crossed by a non-insulated downpipe, FRIAPHON® makes it possible to reduce noise emissions by 7 dB(A) to 12 dB(A) as compared to NF-Me standard PVC. *

✓ To meet the regulatory requirement of 30 dB(A), FRIAPHON® only requires the use of **ESA2** rated shafts for straight downpipes or 1x90° deflections in soffit, and **ESA3** rated shafts for 2 x 45° deflections in the downpipe.*

* see technical sheets 2.12 (p.16) and 2.13 (p.17)

QUALITY CERTIFICATIONS
Quality labels for buildings

The certification of a building project is based on voluntary decisions from the developers.
The acoustic performance levels are set by the authorities managing the certification or label in their specifications.

■ CERTIFICATION OF BUILDING PROJECTS INTEGRATRING ACOUSTIC PERFORMANCES:

These are examples of current certifications and labels in France:

Non-residential buildings ⇨ **NF HQE** certification or **HQE compliant** design

Residential buildings ⇨ **QUALITEL** label - **CERQUAL** “Environmental Dwelling” label - **NF HQE** certification

NF HQE certification / HQE scheme / Acoustic Comfort

The HQE scheme, supported by the HQE society (chartered society acting for general public interest), aims at improving the environmental quality of buildings under construction, under renovation, or in use.

The design of a building project meeting the requirements of that scheme is based on voluntary decisions from the developers. The operation can also result in a NF HQE certification by independent organisations (CEQUAMI, CERQUAL, CERTIVEA).

The HQE environmental quality management method applies at all stages of a building project, from initial design to final execution, and aims at delivering a building that is durable, healthy and comfortable to live in.

It revolves around 4 environmental commitments (construction, management, health and comfort), split into 14 targets. Target no.9 relates to **acoustic comfort**.

In order to obtain a “high performance” rating for that target, 90% of the building must be designed so as to obtain acoustic performances at least 3 dB(A) lower than regulatory requirements.

QUALITEL / Environmentally Sustainable Residences

Those certifications apply to individual and collective residential buildings. Approximately 30% of new built dwellings currently obtain those certifications.

Those certifications aim at guaranteeing that the building projects have been carried out in order to meet regulatory requirements, and designed with a view to exceeding those requirements.

In order to obtain a certification of acoustic performances, a building project must meet or exceed the acoustic regulatory requirements applicable to each room, according to its intended use.

The specification is completed by documents called “FIC ” Interpretation Sheets Completing the “Qualitel” (Quality Evaluation) and “Habitat & Environnement” (Environmentally Sustainable Residences) schemes. Those sheets explain some possible configurations and solutions that can help meet the specifications of those schemes.

Description Equivalent cast iron sizes (for replacement)	Ref.	D 52 (DN 50)	D 78 (DN 70)	D 90 (DN 80)	D 110 (DN 100)	D 135 (DN 125)	D 160 (DN 150)	D 200 (DN 200)	Technical Sheet
ACOUSTIC PIPES chamferred at both ends	*GPIPE*	■	■	■	■	■	■	■ *	7.1
CUSTOM LENGTH 2.60 m					■				7.1
ACOUSTIC CUSHIONING ELBOW	*S4PC110*				■				7.1
ACOUSTIC PATCH	*SBRML110*				■				7.1
ELBOWS SOC. x SPIG.									
Angle 15°	*S24M*	■	■	■	■	■	■		7.1
Angle 30°	*S12M*	■	■	■	■	■	■		7.2
Angle 45°	*S8M*	■	■	■	■	■	■	■	7.2
Angle 67°30	*S6M*	■		■	■				7.2
Angle 87°30	*S4M*	■	■	■	■	■	■	■	7.2
CAPS SPIG.	*SBO*	■	■	■	■	■	■	■	7.3
	SBOV	■	■		■			■	7.3
CONNECTOR FOR URINAL SPIG. x SOC. with rubber seal Ø 52 spig. / Ø 50 with rubber seal	*SUJC*	■							7.3
CONNECTOR FOR COPPER OR PVC / PP-HT SOC. x SOC. WITH RUBBER SEAL Ø 52 SPIG. Dia connection Ø 32 Dia connection Ø 40	*SFC*	■							7.3
LONG COUPLING SOC. x SPIG.	*SMMF*	■	■		■		■	■	7.3
DOUBLE SEAL ACOUSTIC COUPLING SOC. x SOC.	*SMA*	■	■	■	■	■	■		7.4
SLIP COUPLING FOR REPAIRS SOC. x SOC.	*SCIS*	■	■	■	■	■	■		7.4
MIXED COUPLINGS for solvent welding/rubber seal **SOC.**	*SMC*	■	■	■	■	■	■	■	7.4
REPAIR COUPLING FOR SOLVENT WELDING SOC. x SOC.	*SMR*	■	■	■	■	■	■	■	7.4
MULTIPLE CONNECTORS	*SCME*				40, 50, 100, 40x40, 50x40, 50x50, 40x40x40, 50x40x40, 50x50x40				7.5
CUSHIONING SECTIONS SPIG. X SPIG. < 10 m pipe drop	*SCC*				■				7.5
CUSHIONING SECTIONS SOC. X SPIG. > 10 m pipe drop	*SCL*				■				7.5

* Ø 200 Socketed pipe

Description Equivalent cast iron sizes (for replacement)	Ref.	D 52 (DN 50)	D 78 (DN 70)	D 90 (DN 80)	D 110 (DN 100)	D 135 (DN 125)	D 160 (DN 150)	D 200 (DN 200)	Technical Sheet
REDUCERS SPIG. x SOC. 	*SR*		52	52 78	52/78 90	110	110 135	160	7.5
TEES WITH ACCESS PLUG SOC. x SPIG. Angle  45° 87°30	*STA* 87°30 45°	■	■	■	■ ■	■	■	■	7.6
BRANCH SADDLE SOC. 	*SSB*				52				7.6
BRANCHES SOC. x SOC. x SPIG. Angle 45° 	*SCS*	52	52 78	52 90	52 78 110	110 135	110 135 160	200	7.6
Angle 67°30 	*STS*			110					7.6
Angle 87°30 	*STE*	52	52 78	52 90	52 78 110	110 135	110 160	200	7.7
MULTIPLE BRANCHES LEFT 	*STEG*				52 78				7.7
MULTIPLE BRANCHES RIGHT 	*STED*				52				7.7
BRANCHES FOR WC AND SHOWER 	*SLL* *SLD* *SLG*			52 52 52	52 52 52				7.7
PARALLEL DOUBLE BRANCHES SOC. x SOC. x SOC. x SPIG. Angle 45° 	*SCD*				■				7.8
Angle 67°30 	*SDC*				■				7.8
Angle 87°30 	*STD*				■				7.8
RIGHT ANGLE DOUBLE BRANCHES SOC. x SOC. x SOC. x SPIG. Angle 67°30 	*SCDE*				■				7.8
Angle 87°30 	*STDE*				■				7.8
BRANCHES SOC. x SOC. x SPIG.  SCP SCT	*SCP* *SCT (15°)*				■ ■				7.9
WASH BASIN OUTLET PIPES Single 	*SIPHA*	■							7.9
Double 	*SIPHDA*	■							7.9
ADAPTOR PVC/PP-HT FRIAPHON® SOC. x SPIG. 	*SAP*		■			■			7.9
EXTENDED BRANCHES Angle 87°30 	*STEL*				52 78 110				7.9

Description Equivalent cast iron sizes (for replacement)	Ref.	D 52 (DN 50)	D 78 (DN 70)	D 90 (DN 80)	D 110 (DN 100)	D 135 (DN 125)	D 160 (DN 150)	D 200 (DN 200)	Technical Sheet
REDUCING PLUGS FRIAPHON / PVC SPIG. x SOC.	*TR*				■				7.10
ADAPTOR FRIAPHON / PVC /PP-HT SPIG. x SOC.	*SAF*	■	■			■			7.10
TRANSITION ADAPTOR PVC / PP-HT / FRIAPHON SOC. x SPIG.	*SJT*	■	■			■			7.10
TRANSITION ADAPTOR CAST IRON FRIAPHON®	*SJFF*				■	■	■		7.10
EPDM GASKETS	*JALS*	■	■		■	■			7.10
ACOUSTIC SLIDING BRACKETS with M8 – M10 threaded insert	*SCA*	■	■		■	■	■	■	7.11
ANTI-VIBRATILE SUPPORTING BRACKETS	*SCB*		■		■	■	■	■	7.11
PHONOKLIP® BRACKETS	*PHO*	■	■	■	■	■	■		7.11
FRIAPHON® LUBRICANT 1 liter bucket	*GLUB10*	■	■	■	■	■	■	■	7.11
125 ml tube	*SLUB125*	■	■	■	■	■	■	■	7.11
GEL CEMENT 100 ml pot	*GFIXP100*	■	■	■	■	■	■	■	7.11
250 ml pot	*GFIXP250*	■	■	■	■	■	■	■	7.11
500 ml pot	*GFIXP500*	■	■	■	■	■	■	■	7.11
1 liter pot	*GFIXB*	■	■	■	■	■	■	■	7.11
CLEANER ⊕ 1 liter pot	*CLEANER+*	■	■	■	■	■	■	■	7.11

FRIAPHON® INNOVATIONS
Acoustic cushioning elbow

■ ACOUSTIC CUSHIONING ELBOW

When drainage piping networks change direction (e.g. from vertical to horizontal), **they create a sensitive acoustic area**. The flow **of the effluents gets disturbed, which generates impacts, wash and turbulence areas.**

This requires particular attention, as horizontal collection piping sections are often installed in ceiling soffits, and run in areas of the building where living rooms, shops, offices and meeting rooms can be located. The most common way to address this potential source of nuisance consists in using large radius bends or combinations of 45° elbows**.**

GIRPI innovation

GIRPI introduces an acoustic cushioning elbow to absorb impacts and vibrations where the vertical downpipe ends, and reduce noise emissions.

Cross-sectional view

Detail of access plug

Its design enables it to obtain exceptional acoustic performances:

- 87°30 elbow with a curvature radius equivalent to that of two 45° elbows.
- Elastomer membrane to absorb impacts and vibrations.
- Gasket push-fit socket connection to reduce the transmission of vibrations between pipes and fittings.

■ SOFFIT AND STRAIGHT DOWNPIPE TEST RESULTS ACCORDING TO EN 14366 STANDARD

54 PVC NF-E NF-Me

61 PVC NF-E NF-Me

Values expressed in dB(A)

FRIAPHON® INNOVATIONS
Acoustic damper patch

■ ACOUSTIC DAMPER PATCH

GIRPI has carried out studies on the acoustics of domestic effluent drainage.

Those studies show that branches and the bottoms of downpipes generate vibrations which expand towards the nearest piping sections, resulting in increased noise emissions.

A local increase of the piping section's surface mass results in a significant reduction of those phenomena.

GIRPI innovation

GIRPI introduces an acoustic damper patch made from heavy surface mass materials, whose function is to locally increase the downpipe's surface mass, resulting in a reduction of noise emissions by 15%.

The patch consists of high surface mass insulation material encapsulated in an articulated plastic body, easily fixed around pipes by means of two captive sets of screws and retention springs.

For optimal results, we recommend the installation of the acoustic patch:

- below each branch along downpipe stacks,
- immediately after the change of direction located at the bottom of each stack.

FRIAPHON®

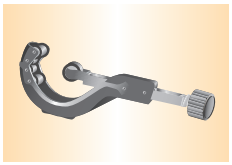
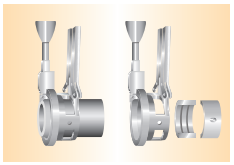
The most efficient acoustic drainage piping system for soil, waste and rain water effluents.

FRIAPHON® INSTALLATION
Tools

■ HANDLING AND STORAGE

The pipes and fittings will be stored separately on an even area, away from dust and sun. In all cases, take special care to avoid rough handling, impacts with indenting, cutting or heavy objects, particularly in cold weather.

■ CUTTING

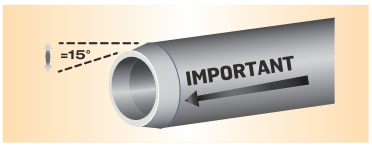
• **The roller plastic pipe-cutter**
Allows for neat, clean cuts to be carried out.

GIRPI Ref. **CT50125R** for diameters 52 to 110 mm

GIRPI Ref. **CT110160R** for diameters 110 to 160 mm

The use of disk saws is tolerated if the blades used are adapted to PVC material and if the pipe is guaranteed to be cut square.

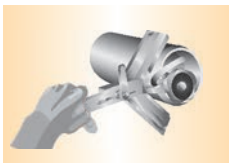
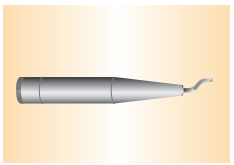
■ TRIMMING - CHAMFERING



After cutting, the pipe must be trimmed inside and a chamfer must be made on the outside**.**
These operatons can be performed by means of the following tools:

• **Chamfering tool**
This tool chamfers the pipe outside from Ø 52 to Ø 160.

GIRPI Ref. **CHANF160R**

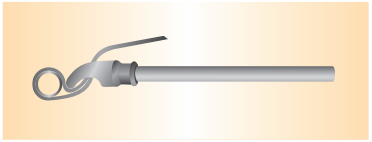
• **The use of tools including cutting or abrading disks to chamfer pipes is strictly prohibited.**

• **Trimmer**
This reams the inside of pipes of all diameters.

GIRPI Ref. **EBAV1R** Ø 20 to 160 mm


■ HOLDING TOOLS

• **Chain vice**
Polyurethane pipe-rests hold the pipe without any scratching.



• **Strap wrench**
Maximum gripping power, with no risk of deforming the pipes or fittings (braided nylon strap).


• **Bench vice**
When using such traditional vices, it is mandatory to clamp the pipes by means of wooden notched pipe-rests.

FRIAPHON® INSTALLATION
Joining method

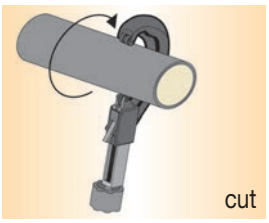
■ CHECKS PRIOR TO JOINING

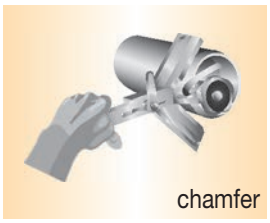
Regardless of the joining method (solvent welding or push fit with gaskets):

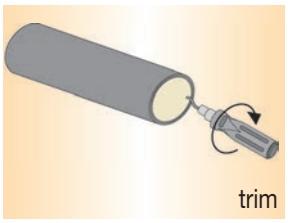
- Make sure that pipes and fittings are clean and dry before joining.
- Make sure that pipe ends are chamfered.
- Make sure that pipes and fittings are free from any traces of impact, deep scratches, etc....

As a general rule, GIRPI recommends the push fit joining method, using FRIAPHON® fittings with gaskets. Solvent welded joints should be reserved for special cases such as: non accessible piping sections, pressure build ups above 0.5bar, etc....

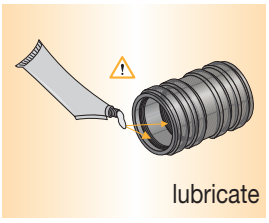
■ PREPARATION OF THE PIPES

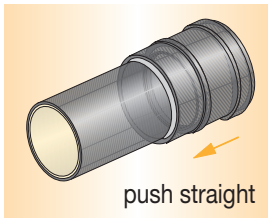


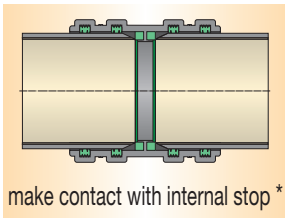




■ PUSH FIT JOINING







* marking socket depths on pipes helps ensuring that the fitting has been pushed home.

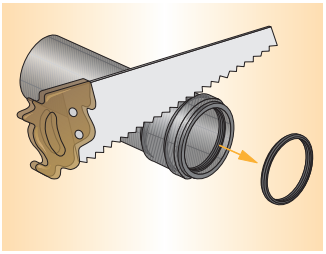
⚠ The use of inappropriate lubricants can severely damage or disintegrate the gaskets.

- Spread the FRIAPHON® dedicated SLUB lubricant, preferably using a brush, on all gaskets and on the chamfered end of the pipe.
- Push pipe straight into the fitting until making contact with the fitting's internal stop.

■ CONVERSION OF FITTINGS

Push-fit fittings with gaskets can be converted for solvent cementing as follows:

- Remove gaskets.
- Saw the fitting's grooved end off.
- Check remaining socket depth for the solvent welding operation.



⚠ Never use fittings with their gaskets to carry out solvent welding operations.

FRIAPHON® INSTALLATION
Joining method

■ SOLVENT WELDING

- Pipes and fittings MUST be clean and free from any trace of humidity.
- Make sure that the cement is fluid and homogeneous.
- The cement's colour may vary depending on ambient temperature and humidity, but that will not affect its performances.
- Check the cement's use-by date on the pot.

⚠ The acoustic performances of solvent welded connections are less good than those of push fit connections made with fittings equipped with rubber gaskets.


priming


apply cement


push straight

1 - The cement shall be applied using the cement pot's own brush.
2 - The use of any other method is prohibited, namely : fingers, woodsticks or any other ustensil.
3 - Apply the cement over the whole female (socket) depth first, and afterwards over the whole, corresponding length of the male end (pipe or spigot).
4 - Push straight until reaching the socket's internal stop.
5 - Keep held together for a few seconds.
6 - Remove excess cement.
7 - On large sizes, starting from diameter 110mm, **2 fitters must operate simultaneously** (i.e. one fitter will apply cement to the male end while the other fitter will be applying cement to the female end, and both fitters will then join both ends together).
8 - Respect the drying times indicated on the pot before using the piping installation.

⚠ Expansion movements must be taken into account and compensated by appropriate means.

■ PARTICULAR RECOMMENDATIONS

⚠ PARTICULAR CLIMATIC CONDITIONS

- Temperature range required for cold welding: +5°C to +35°C.
  If the welding polymer is stored at 20°C, welding is possible at 0°C.

The atmospheric conditions (temperature, humidity) considerably affect the curing/drying time, (evaporation of solvents of the welding polymer). Therefore:

- At low temperature, the parts when assembled should be held together for 20 to 30 seconds.
- In hot weather, the adhesive should be applied rapidly and the parts immediately joined. So as to avoid evaporation of the welding polymer, the pot must be closed after each welding operation, and it must be used as quickly as possible once opened, especially under warm climatic conditions.

■ THERMOFORMING

Thermoforming of FRIAPHON® pipes is strictly prohibited and involves the cancellation of GIRPI's manufacturer's guarantee. For all direction changes, exclusively use FRIAPHON® fittings.

When faced with particular problems, ask GIRPI for an offer for special fabricated fittings by contacting GIRPI's Technical Support team at: be.girpi@aliaxis.com or +33 (0)2 32 79 58 00

■ SOURCES OF HEAT AND UV

FRIAPHON® should in no case be installed close to a source of heat causing a rise in temperature greater than its limits of use, and must be protected from exposure to ultraviolet rays.

■ EXPANSION

The expansion coefficient of FRIAPHON® pipes is 0.08 mm.m/°C. Therefore, their expansion movements need to be taken into account all along the networks installed.

For instance, in France, DTU 60.33 code of practice makes the use of an expansion compensation device compulsory at each floor level on vertical piping sections, and between each anchor point on horizontal piping sections.

Thanks to the specific design of its SMA double sockets which enables them to fulfil both functions of expansion compensation and acoustic disconnection, and thanks to adapted supporting brackets (e.g. PHONOKLIP®), the FRIAPHON® system meets the requirements of DTU 60.33 code of practice without the addition of any extra specific device.

FRIAPHON® INSTALLATION
Supporting PHONOKLIP® brackets

■ PHONOKLIP® SUPPORTING BRACKETS

A drainage piping system must include:

- anchors,
- guides.

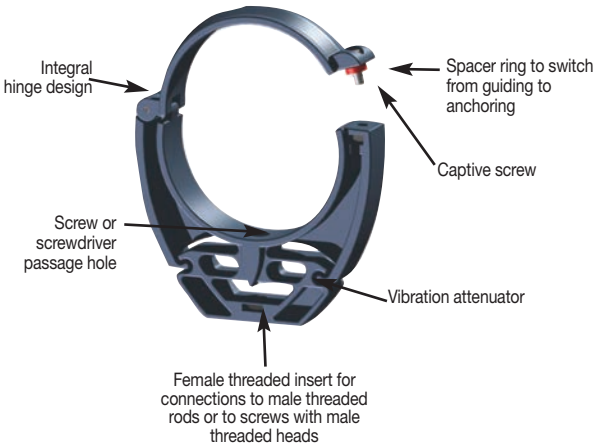
Anchors and guides allow for the expansion movements of a piping network to take place without damaging the pipes. PHONOKLIP® brackets were specially designed for drainage piping networks and can be used for both anchoring and guiding functions.

For anchoring purposes, remove the red spacer ring before closing the bracket.

For guiding purposes, keep the red spacer ring in position so that the pipe is allowed to move freely.

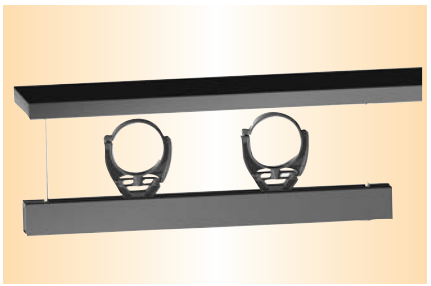
The essential function of a bracket is to keep the piping networks in position, even when submitted to heavy loads. PHONOKLIP® brackets were designed to obtain:

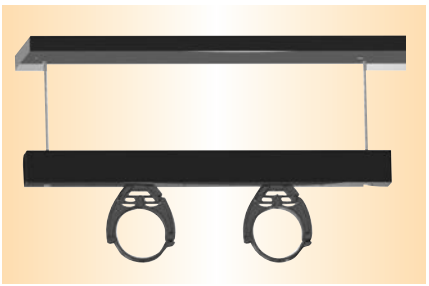
- The best possible acoustic performances: 11 dB(A) structural noise measured by Fraunhofer Institut, Germany (flow rate 2 l/s according to EN 14366 standard).
- The mechanical performances required to ensure its supporting function during its entire lifetime.



■ INSTALLATION CONFIGURATIONS

Thanks to its design, PHONOKLIP® brackets can indifferently be installed with horizontal or vertical piping networks.

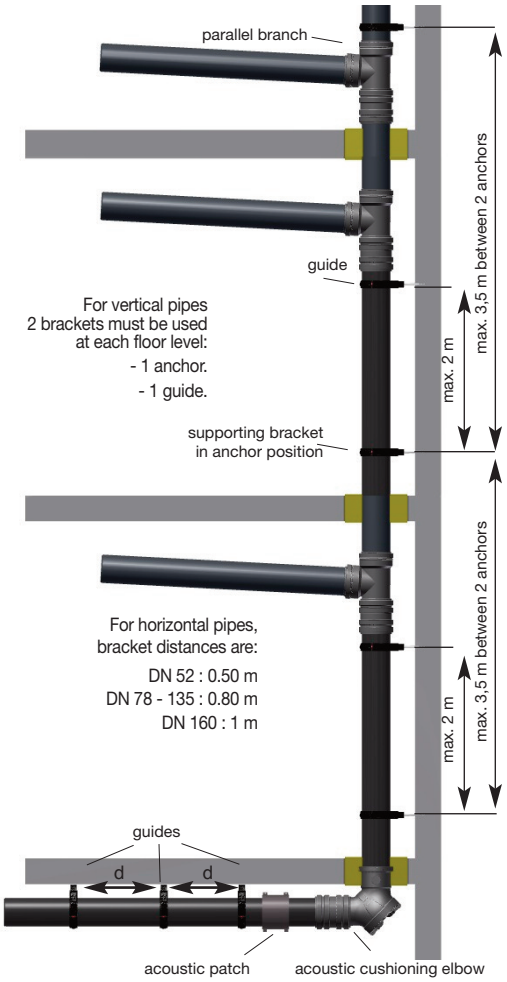




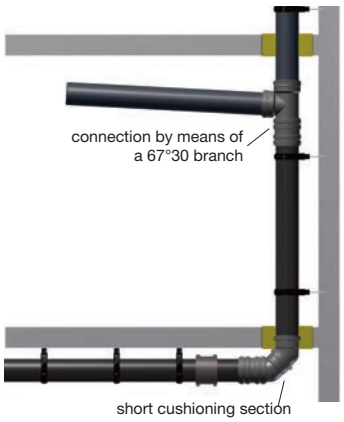
FRIAPHON® INSTALLATION
Installation of horizontal and vertical piping sections

■ DISTANCES BETWEEN PHONOKLIP® BRACKETS

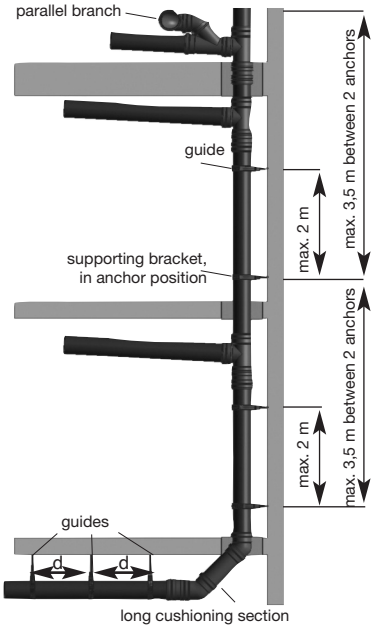
GIRPI recommended configuration



Alternative configuration for pipe drops up to 10 m

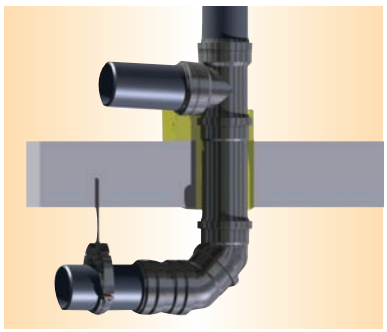


Alternative configuration for pipe drops above 10m

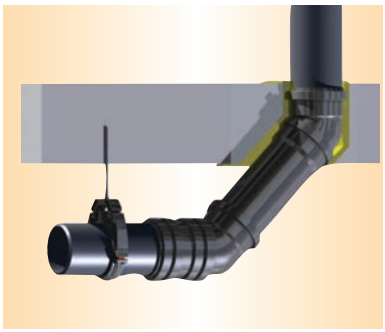


Note: when using rubber lined metal brackets (such as SCA and SCB), refer to technical sheet 7.11 (p.42).

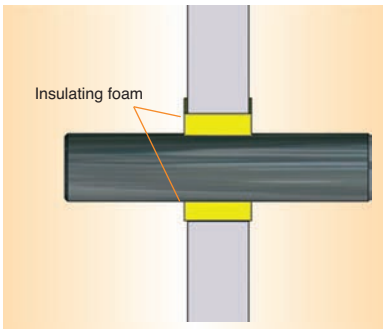
■ ACOUSTIC INSULATION OF PIPES PASSING THROUGH FLOORS, PARTITIONS AND WALLS



Passage through floor
with short cushioning section
(up to 10m pipe drop)



Passage through floor
with long cushioning section
(above 10m pipe drop)



Passage through wall or partition

In order to limit the transmission of structural noises, pipes must be disconnected from floors, partitions and walls each time they pass through, by use of foam or insulating material (minimum thickness 4mm).

FRIAPHON® INSTALLATION
Special recommendations

■ CONNECTIONS BETWEEN FRIAPHON® AND OTHER EXISTING PIPING SECTIONS

GIRPI recommended configurations, using GIRPI's FRIAPHON® and PVC metric solvent welded drainage or pressure articles for optimal modularity and compatibility.

FRIAPHON®	ARTICLE	PVC
Ø 52	SJT52	Ø 50
Ø 78	SJT75	Ø 75
Ø 135	SJT135	Ø 125

CAST IRON	ARTICLE	FRIAPHON®
Ø 110	SJFF110	Ø 110
Ø 135	SJFF135	Ø 135
Ø 160	SJFF160	Ø 160

PVC	ARTICLE	FRIAPHON®
Ø 110	MG110	Ø 110
Ø 160	MG160	Ø 160

PVC	ARTICLE 1	ARTICLE 2	FRIAPHON®
Ø 50	MG50	SAF52	Ø 52
Ø 75	MG75	SAF78	Ø 78
Ø 125	MG125	SAF135	Ø 135

FRIAPHON®	ARTICLE 1	ARTICLE 2	PVC
Ø 78	SMA78	SAP78	Ø 75
Ø 135	SMA135	SAF135	Ø 125

PVC	ARTICLE	FRIAPHON®
Ø 110	HESG110	Ø 110
Ø 160	HESG160	Ø 160

FRIAPHON®	ARTICLE 1	ARTICLE 2	PVC
Ø 110	SMA110	TR5/4	Ø 100

FRIAPHON®	ARTICLE	PVC OU PE
Ø 110	SMA110	Ø 110
Ø 160	SMA160	Ø 160

Flanged connections

FRIAPHON®	ARTICLE 1	ARTICLE 2	ARTICLE 3
Ø 110	HCS110	BPA100	JPNCS110
Ø 160	HCS160	BVR150	JPNCS160

FRIAPHON®	ARTICLE 1	ARTICLE 2	PVC
Ø 110	STE11011	SME5/44	2 x Ø 40

FRIAPHON®	ARTICLE 1	ARTICLE 2	ARTICLE 3	WC
Ø 110	STS11011	CZ110	M110L	Ø 100

FRIAPHON®	ARTICLE 1	ARTICLE 2	ARTICLE 3	WC
Ø 110	STS11011	TR5/4	PWC100L	Ø 100

FRIAPHON® INSTALLATION
Special recommendations

SPECIAL INSTALLATIONS

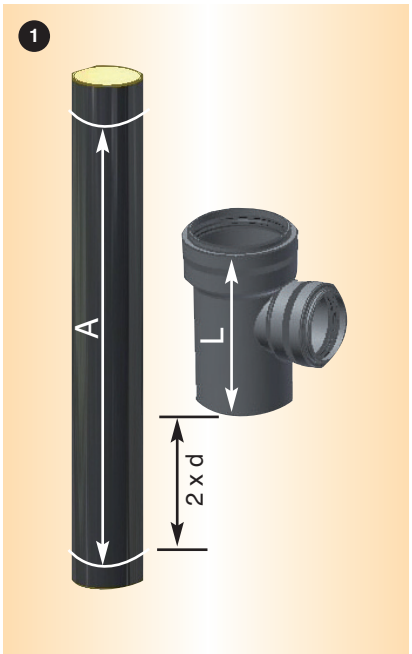
Only solvent welded joints are accepted for installations built in, embedded in or hidden behind inaccessible walls or floors.
FRIAPHON® pipes passing through floors, partitions or walls must be protected from shearing by a sleeve allowing them to move freely (e.g. by using a larger diameter PVC pipe).

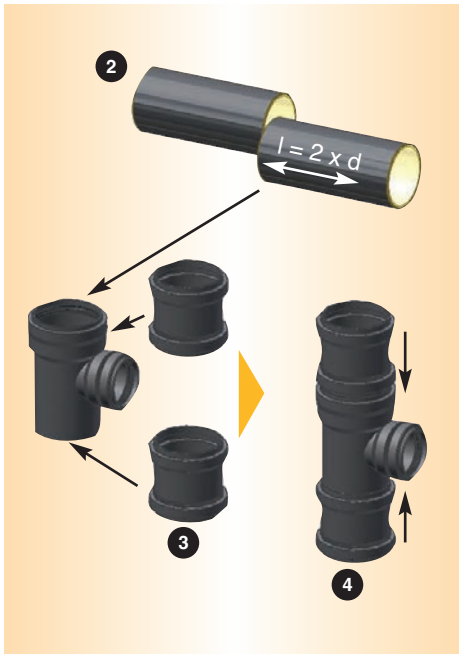
SPECIAL FABRICATED ITEMS

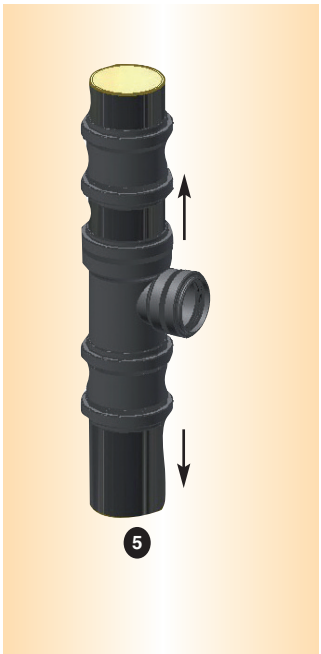
GIRPI can fabricate special items upon request, in order to adapt the installation to particular situations or special configurations. In France, those fabricated articles are not covered by the ATEC certificate and shall be used under the contractor's responsibility.
Price and delivery can be obtained from GIRPI's technical support team: **be.girpi@aliaxis.com** or **+33 (0)2 32 79 58 00**



INSTALLATION OF ADDITIONAL BRANCHES







1. Cut pipe to length using the following formula:
   A = L + 2 x d

2. Cut an adaptor nipple from the cut pipe to length:
   l = 2 x d
   Chamfer nipple at both ends.

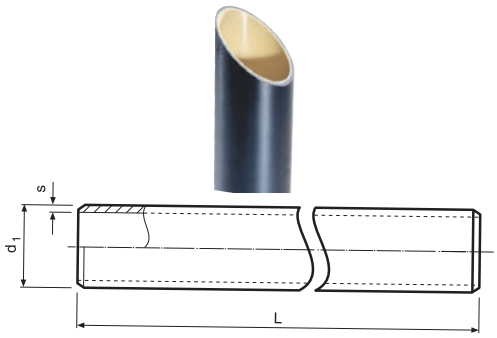
3. Insert the chamfered nipple into the socket end of the branch.

4. Insert repair sleeves at each end of the branch.

5. Connect repair sleeves with existing piping network.

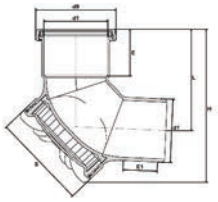
DIMENSION SHEET FRIAPHON®

ACOUSTIC PIPES FRIAPHON® chamferred at both ends



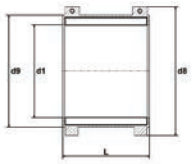
(Ø ext) d_1	Diam*	s mm	L mm	kg/m	Reference
52	50	3.0	2000	0.68	GPIPE52
78	70	4.4	3000	1.84	GPIPE78
90	90	4.6	3000	2.26	GPIPE90
110	100	5.0	3000	2.89	GPIPE110
110	100	5.0	2600	2.89	GPIPE1126
135	125	5.4	3000	3.58	GPIPE135
160	150	5.8	3000	5.07	GPIPE160
200	200	7.0	3000	6.67	GPIPE200

ACOUSTIC CUSHIONING ELBOW



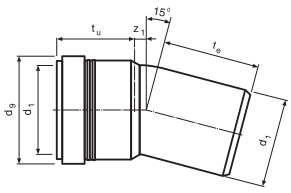
Ø d_1	Diam*	d_9	E	E_1	L	H	S	Reference
110	100	136	79	70	171	250	165	S4PC110

ACOUSTIC PATCH



Ø d_1	Diam*	d_8	d_9	L	Reference
110	151	134	134	103	SBRML110

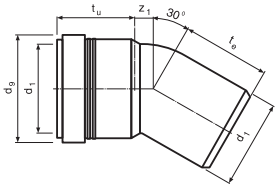
ELBOWS 15° Soc. x Spig.



Ø d_1	Diam*	d_9 mm	z_1 mm	t_u mm	t_e mm	Reference
52	50	63	7	48	57	S24M52
78	70	97	11	54	62	S24M78
90	80	113	14	55	70	S24M90
110	100	132	14	60	72	S24M110
135	125	159	15	65	80	S24M135
160	150	187	19	71	93	S24M160

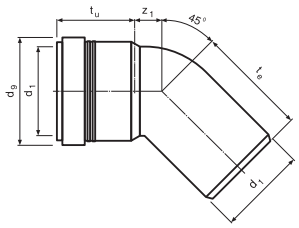
*** Equivalent cast iron sizes**

ELBOWS 30° Soc. x Spig.



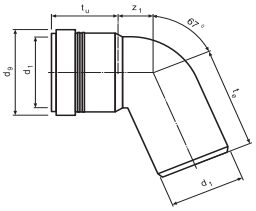
Ø d_1	Diam*	d_9 mm	z_1 mm	t_u mm	t_e mm	Reference
52	50	63	11	48	61	**S12M52**
78	70	97	15	54	67	**S12M78**
90	80	113	18	55	76	**S12M90**
110	100	132	21	60	80	**S12M110**
135	125	159	23	65	89	**S12M135**
160	150	187	30	71	104	**S12M160**

ELBOWS 45° Soc. x Spig.



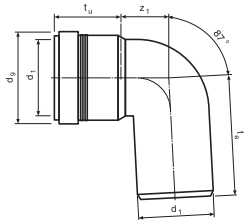
Ø d_1	Diam*	d_9 mm	z_1 mm	t_u mm	t_e mm	Reference
52	50	63	16	48	66	**S8M52**
78	70	97	21	54	73	**S8M78**
90	80	113	33	55	79	**S8M90**
110	100	132	29	60	88	**S8M110**
135	125	159	33	65	97	**S8M135**
160	150	187	42	71	115	**S8M160**
200	200	216	56	94	145	**S8M200**

ELBOWS 67°30 Soc. x Spig.



Ø d_1	Diam*	d_9 mm	z_1 mm	t_u mm	t_e mm	Reference
52	50	63	24	48	74	**S6M52**
78	70	97	36	54	88	**S6M78**
90	80	113	42	55	95	**S6M90**
110	100	132	49	60	107	**S6M110**

ELBOWS 87°30 Soc. x Spig.

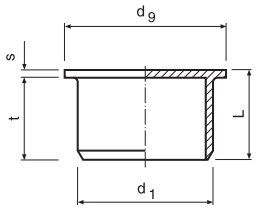


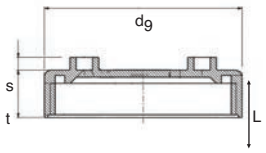
Ø d_1	Diam*	d_9 mm	z_1 mm	t_u mm	t_e mm	Reference
52	50	63	33	48	83	**S4M52**
78	70	97	43	54	95	**S4M78**
90	80	113	57	55	103	**S4M90**
110	100	132	61	60	120	**S4M110**
135	125	159	70	65	135	**S4M135**
160	150	187	89	71	163	**S4M160**
200	200	223	113	95	205	**S4M200**

*** Equivalent cast iron sizes**

DIMENSION SHEET FRIAPHON®

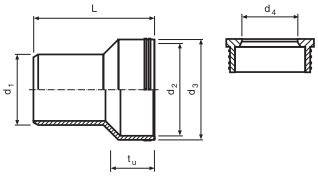
CAPS Spig.





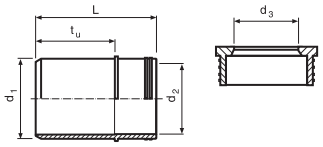
Ø d_1	Diam*	d_9 mm	t mm	s mm	L	Reference
52	50	62	31,5	3	34.5	**SB052**
78	70	88	31,5	5	36.5	**SB078**
90	80	105	38	2	40	**SB090**
110	100	120	32	5	37	**SB0110**
135	125	142	42	3	45	**SB0135**
160	160	180	49	3.6	52.6	**SB0160**
200	200	223	59	4.6	63.6	**SB0200**
52	50	59	18	5	23	**SB0V52**
78	70	84	20	5.5	25.5	**SB0V78**
110	100	116	25	7.5	32.5	**SB0V110**
200	200	216	18	3	21	**SB0V200**

CONNECTOR FOR URINAL Spig. x Soc. with rubber seal Ø 52 M/Ø 50 with rubber seal



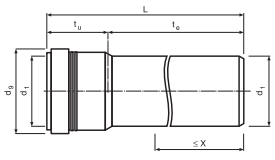
Ø d_1	Diam*	d_2 mm	d_3 mm	d_4 mm	t_u mm	L mm	Reference
52	50	68	74	50	33	88	**SUJC52**

CONNECTOR FOR COPPER OR PVC / PP-HT Soc. x Soc. with rubber seal Ø 52 spig. dia connection Ø 32 and Ø 40



Ø d_1	Diam*	d_2 mm	d_3 mm	t_u mm	L mm	Reference
52	50	46	32	52	80	**SFC5232**
52	50	46	40	52	80	**SFC5240**

LONG COUPLING Soc. x Spig.



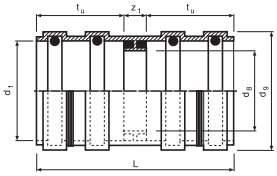
Ø d_1	Diam*	d_9 mm	t_u mm	t_e mm	L mm	X mm	Reference
52	50	61	47	153	200	100	**SMMF52150**
52	50	61	47	253	300	100	**SMMF52250**
78	70	90	50	250	304	178	**SMMF78**
110	100	123	57	250	310	172	**SMMF110**
160	160	179	69	250	321	160	**SMMF160**
200	200	231	112	1000	1112	800	**SMMF200**

*** Equivalent cast iron sizes**

DIMENSION SHEET FRIAPHON®

DOUBLE SEAL ACOUSTIC COUPLINGS

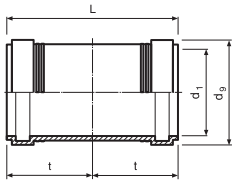
Soc. x Soc.



Ø d_1	Diam*	d_8 mm	d_9 mm	z_1 mm	t_u mm	L mm	Reference
52	50	42.5	63	13	46.0	105	**SMA52**
78	70	64.0	97	13	54.0	121	**SMA78**
110	100	95.0	132	14	61.5	137	**SMA110**
135	125	119.0	159	14	68.0	150	**SMA135**
160	150	142.0	187	14	78.0	170	**SMA160**

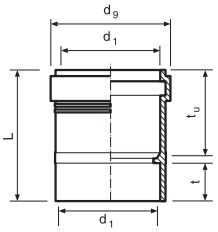
SLIP COUPLING FOR REPAIRS

Soc. x Soc.



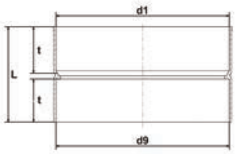
Ø d_1	Diam*	d_9 mm	t mm	L mm	Reference
52	50	63	51.5	103	**SCIS52**
78	70	97	54.5	109	**SCIS78**
110	100	132	62.5	125	**SCIS110**
135	125	159	69.0	138	**SCIS135**
160	150	187	79.0	158	**SCIS160**

MIXED COUPLINGS for solvent welding/rubber seal - Soc. x Soc.



Ø d_1	Diam*	d_9 mm	t_u mm	t mm	L mm	Reference
52	50	63	48	20	71	**SMC52**
78	70	97	54	25	82	**SMC78**
90	90	113	50	26	80	**SMC90**
110	100	132	60	32	95	**SMC110**
135	125	159	65	35	103	**SMC135**
160	150	187	71	42	117	**SMC160**
200	200	223	106	106	217	**SMC200**

REPAIR COUPLING FOR SOLVENT WELDING Soc. x Soc.

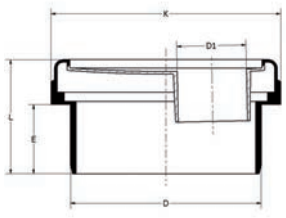


Ø d_1	Diam*	d_9 mm	t mm	L mm	Reference
52	50	58	22	47	**SMR52**
78	70	82	30	61	**SMR78**
90	80	97	25	54	**SMR90**
110	100	115	35	73	**SMR110**
135	125	140	38	79	**SMR135**
160	160	167	42	88	**SMR160**
200	200	210	70	144	**SMR200**

*** Equivalent cast iron sizes**

MULTIPLE CONNECTORS

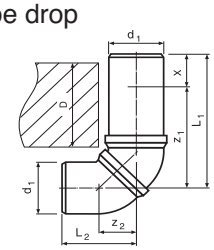
to 1, 2 or 3 reduced inlets “R”



Ø	R 1	R 2	R 3	L	E	K	Reference
110	40			66	40	132	SCME5/40
110	50 to 52			66	40	132	SCME5/50
110	100			66	40	132	SCME5/100
110	40	40		66	40	132	SCME5/44
110	50 to 52	40		66	40	132	SCME5/54
110	50 to 52	50 to 52		66	40	132	SCME5/55
110	40	40	40	66	40	132	SCME5/444
110	50 to 52	40	40	66	40	132	SCME5/544
110	50 to 52	50 to 52	40	66	40	132	SCME5/554

CUSHIONING SECTIONS

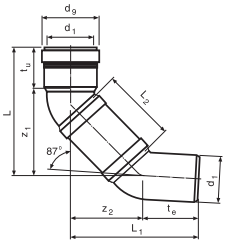
Spig. x Spig. < 10 m pipe drop



Ø d_1	Diam*	z_1 mm	z_2 mm	x mm	L_1 mm	L_2 mm	D mm	Reference
110	100	170.0	56	120	285	144	145 - 270	SCC110

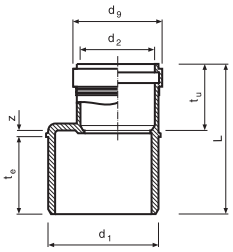
CUSHIONING SECTIONS

Soc. x Spig. > 10 m pipe drop



Ø d_1	Diam*	d_g mm	z_1 mm	z_2 mm	t_u mm	te mm	L mm	L_1 mm	L_2 mm	Reference
110	100	132	266	213	60	88	320	301	250	SCL110

REDUCERS Spig. x Soc.

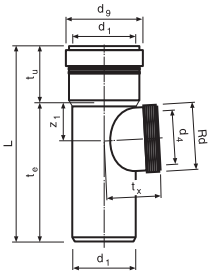


Ø d_1	Diam*	d_2 mm	d_g mm	t_u mm	t_e mm	Z mm	L mm	Reference
78	70/50	52	63	48	55	4.5	107.5	SR7852
90	80/50	52	63	48	59	24	130.0	SR9052
90	80/70	78	43	53	59	5	116.0	SR9078
110	100/50	52	63	48	63	4.0	115.0	SR11052
110	100/70	78	97	54	63	4.0	121.0	SR11078
110	100/80	90	111	55	63	5	122.5	SR11090
110	125/100	110	132	60	70	4.5	134.5	SR135110
160	150/100	110	132	60	80	4.0	144.0	SR160110
160	150/125	135	159	65	80	4.0	149.0	SR160135
200	200/150	160	180	82	100	3.1	213.0	SR200160

*** Equivalent cast iron sizes**

TEES WITH ACCESS PLUG 87°30 Soc. x Spig.

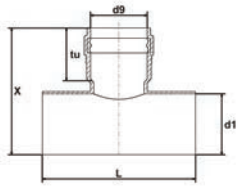
STA110
Angle 87°30



STA11045
Angle 45°

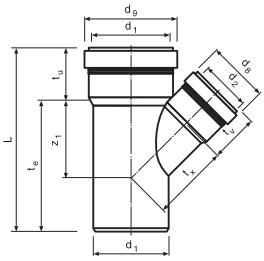
Ø d_1	Diam*	Angle	d_4 mm	d_9 mm	Rd mm	z_1 mm	t_u mm	t_e mm	t_x mm	L mm	Reference
52	50	87°30	43	63	55 x 1/8	29	48	112	45.5	160	**STA52**
78	70	87°30	71	97	79 x 1/6	43	54	138	64.0	192	**STA78**
90	80	87°30	93	113	110 x 1/6	51	55	159	94.0	214	**STA90**
110	100	87°30	93	132	110 x 1/6	62	60	182	80.0	242	**STA110**
110	100	45°	93	132	110 x 1/6	62	60	182	135	242	**STA11045**
135	125	87°30	93	159	110 x 1/6	75	65	215	97.5	280	**STA135**
160	150	87°30	93	187	110 x 1/6	89	71	252	110,0	323	**STA160**
200	200	87°30	200	223	217	110	96	315	157	411	**STA200**

BRANCH SADDLE Soc.



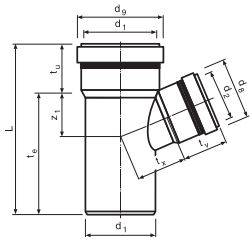
Ø d_1	Diam*	d_9 mm	t_u mm	L mm	X mm	Reference
110	100	52	48	140	115	**SSB5/52**

BRANCHES 45° Soc. x Soc. x Spig.



Ø d_1	Diam*	d_2 mm	d_8 mm	d_9 mm	Z_1 mm	t_u mm	t_e mm	t_v mm	t_x mm	L mm	Reference
52	50/50	52	63	63	64	48	130	48	64	178	**SCS5252**
78	70/50	52	63	97	77	54	138	48	79	192	**SCS7852**
78	70/70	78	97	97	91	54	165	54	91	219	**SCS7878**
90	90/50	52	65	113	83	55	140	47	91	195	**SCS9052**
90	90/90	90	113	113	119	55	197	55	119	252	**SCS9090**
110	100/50	52	63	132	93	60	146	48	101	206	**SCS11052**
110	100/70	78	97	132	109	60	174	54	116	234	**SCS11078**
110	100/100	110	132	132	134	60	223	60	134	283	**SCS11011**
135	125/70	78	97	159	122	65	186	54	132	251	**SCS13578**
135	125/100	110	132	159	144	65	232	60	149	297	**SCS13511**
135	125/125	135	159	159	162	65	261	65	162	326	**SCS13513**
160	150/100	110	132	187	159	71	240	60	168	311	**SCS16011**
160	150/125	135	159	187	174	71	266	65	181	337	**SCS16013**
160	150/150	160	187	187	194	71	310	71	194	381	**SCS16016**
200	200/200	200	224	224	247	90	390	90	247	480	**SCS20020**

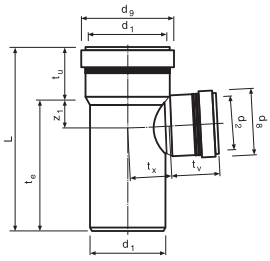
BRANCHES 67°30 Soc. x Soc. x Spig.



Ø d_1	Diam*	d_2 mm	d_8 mm	d_9 mm	Z_1 mm	t_u mm	t_e mm	t_v mm	t_x mm	L mm	Reference
110	100/100	110	132	132	81	60	188	60	81	248	**STS11011**

*** Equivalent cast iron sizes**

BRANCHES 87°30 Soc. x Soc. x Spig.

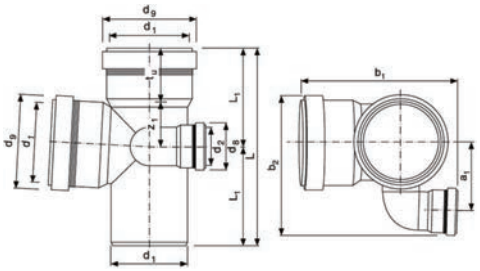


Ø d_1	Diam*	d_2 mm	d_8 mm	d_9 mm	Z_1 mm	t_u mm	t_e mm	t_v mm	t_x mm	L mm	Reference
52	50/50	52	63	63	29	48	113	48	29	161	STE5252
78	70/50	52	63	97	31	54	123	48	40	177	STE7852
78	70/70	78	97	97	43	54	139	54	43	193	STE7878
78	70/70	78	97	97	43	54	139	54	43	193	STE7878
90	90/50	52	65	113	31	55	123	47	46	178	STE9052
90	90/90	90	113	113	51	55	159	55	51	214	STE9090
110	100/50	52	63	132	32	60	133	48	56	193	STE11052
110	100/70	78	90	123	45	57	148	50	60	204	STE11078
110	100/100	110	132	132	62	60	183	60	62	243	STE11011
135	125/70	78	97	159	45	65	156	54	72	221	STE13578
135	125/100	110	132	159	63	65	191	60	74	256	STE13511
135	125/125	135	159	159	75	65	215	65	75	280	STE13513
160	150/100	110	132	187	64	71	202	60	86	273	STE16011
160	150/150	160	187	187	89	71	252	71	89	323	STE16016
200	200/200	200	223	223	110	96	315	96	110	411	STE20020

MULTIPLE BRANCHES LEFT OR RIGHT 87°30

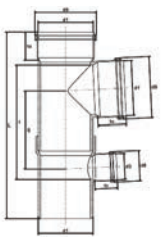
LEFT

RIGHT



Ø d_1	Diam*	d_2 mm	d_8 mm	d_9 mm	Z_1 mm	t_u mm	a_1 mm	b_1 mm	b_2 mm	L mm	L_1 mm	Reference
110	100/50/100	52	61	127	32	57	93	200	187	238	119	STE1111G52
110	100/75/100	78	90	123	45	57	83	348	211	204	119	STE1111G78
110	100/100/50	52	61	127	32	57	93	200	187	238	119	STE1111D52

BRANCHES FOR WC AND SHOWER

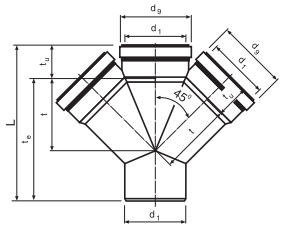


Ø d_1	Diam*	d_2	d_3	d_8	d_9	t	s	L	Reference
90	80/50	90	52	63	112	192	103	305	SLL9052
110	100/50	110	52	63	126	223	129	350	SLL11052
90	80/50	90	52	63	112	192	103	305	SLD9052
110	100/50	110	52	63	126	223	129	350	SLD11052
90	80/50	90	52	63	112	192	103	305	SLG9052
110	100/50	110	52	63	126	223	129	350	SLG11052

*** Equivalent cast iron sizes**

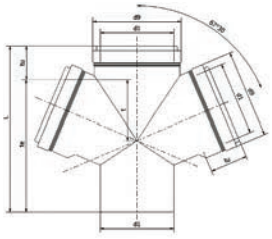
DIMENSION SHEET FRIAPHON®

PARALLEL DOUBLE BRANCHES 45° Soc. x Soc. x Soc. x Spig.



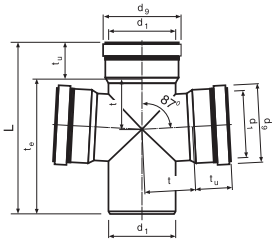
Ø d_1	Diam*	d_9 mm	t mm	t_e mm	t_u mm	L mm	Reference
110	100/100/100	132	130	223	60	283	**SCD11045**

PARALLEL DOUBLE BRANCHES 67°30 Soc. x Soc. x Soc. x Spig.



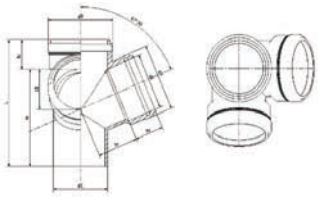
Ø d_1	Diam*	d_9 mm	t mm	t_e mm	t_u mm	L mm	Reference
110	100/100	132	41	188	60	248	**SDC11067**

PARALLEL DOUBLE BRANCHES 87°30 Soc. x Soc. x Soc. x Spig.



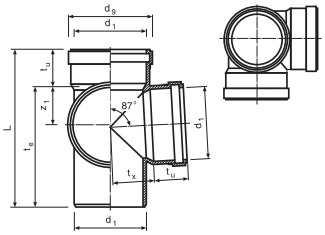
Ø d_1	Diam*	d_9 mm	t mm	t_e mm	t_u mm	L mm	Reference
110	100/100/100	132	62	183	60	243	**STD110**

RIGHT ANGLE DOUBLE BRANCHES 67°30 Soc. x Soc. x Soc. x Spig.



Ø d_1	Diam*	d_9 mm	Z_1 mm	t_e mm	t_u mm	t_x mm	L mm	Reference
110	100/100/100	132	78	190	60	81	250	**SCDE110**

RIGHT ANGLE DOUBLE BRANCHES 87°30



Ø d_1	Diam*	d_9 mm	Z1 mm	t_e mm	t_u mm	t_x mm	L mm	Reference
110	100/100/100	132	59	185	60	77	245	**STDE110**

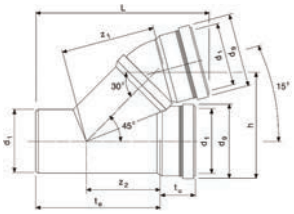
*** Equivalent cast iron sizes**

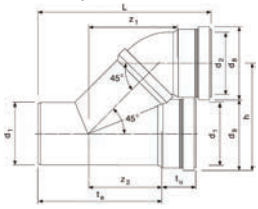
DOUBLE INLET BRANCHES

Soc. x Soc. x Spig.

SCT 15°

SCP parallel

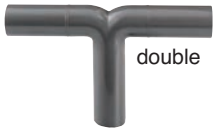




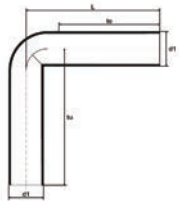
Ø d_1	Diam*	d_9 mm	Z1 mm	Z2 mm	t_e mm	t_u mm	h mm	L mm	Reference
110/110	100/100	132	167	134	223	60	169	302	**SCT11011**
110/110	100/100	132	157	134	223	60	185	302	**SCP11011**

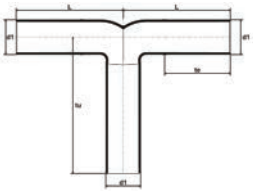
WASH BASIN OUTLET PIPES

single



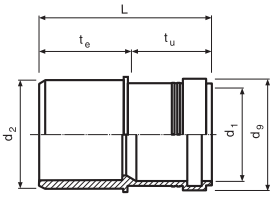
double





Ø d_1	Diam*	t_u mm	te mm	L mm	Reference
52	50	204	151	200	**SIPHA5230**
52	50	204	151	200	**SIPHA5240**
52	50	204	96	160	**SIPHDA5240**

ADAPTOR PVC / PP-HT ⟶ FRIAPHON® Soc. x Spig.



Ø d_1	Diam*	d_2 mm	d_9 mm	t_u mm	t_e mm	l mm	Reference
75	70	78	89	54	55	109	**SAP78**
125	125	135	144	65	70	135	**SAP135**

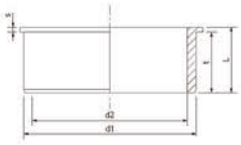
EXTENDED BRANCHES 87°30

Ø d_1	Diam*	d_9 mm	t_u mm	t_e mm	L mm	Z mm	Reference
110	100	52	57	47	543	32	**STE11052L**
110	100	78	57	50	559	45	**STE11078L**
110	100	110	57	57	592	62	**STE11011L**

*** Equivalent cast iron sizes**

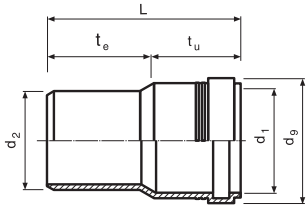
DIMENSION SHEET FRIAPHON®

REDUCING PLUGS FRIAPHON®/PVC Spig. x Soc.



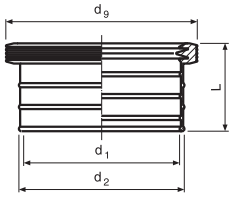
Ø d_1	Diam*	d_2 mm	t	s	l mm	Reference
110	100/90	100	33	3	36	**TR5/4**

ADAPTOR FRIAPHON® ⟶ PVC / PP-HT Soc. x Spig.



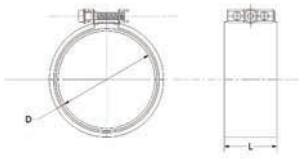
Ø d_1	Diam*	d_2 mm	d_9 mm	t_u mm	t_e mm	l mm	Reference
52	50	50	63	48	58	106	**SAF52**
78	70	75	97	54	57	111	**SAF78**
135	125	125	159	65	73	138	**SAF135**

TRANSITION ADAPTOR PVC / PP-HT ⟶ FRIAPHON® Soc. x Spig.



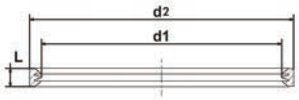
Ø d_1	Diam*	d_2 mm	d_9 mm	l mm	Reference
50	50	52	61.5	28.0	**SJT52**
75	70	78	91.0	33.0	**SJT78**
125	125	135	151.5	43.5	**SJT135**

TRANSITION ADAPTOR FRIAPHON® ⟶ CAST IRON



Ø d_1	Diam*	L	Reference
110	**100**	**57**	**SJFF110**
135	**125**	**69**	**SJFF135**
160	**150**	**69**	**SJFF160**

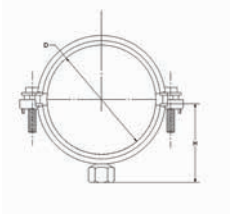
EPDM GASKETS



Ø d_1	Diam*	d2	L	Reference
50,5	50	61,1	6.5	**JALS52G**
76	70	90,8	8.0	**JALS78G**
108	100	124	9.5	**JALS110G**
133	125	151,6	11.0	**JALS135G**

*** Equivalent cast iron sizes**

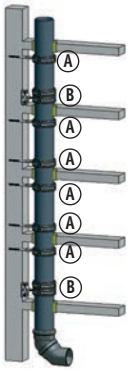
ACOUSTIC SLIDING BRACKETS WITH M8 - M10 THREADED INSERTS (Type A)



Ø d_1	Diam*	Thread insert	H	Reference
52	50	M8	46	**SCA52**
78	70	M10	58	**SCA78**
110	100	M10	75	**SCA110**
135	125	M10	88	**SCA135**
160	150	M8	100	**SCA160**
200	200	M10	145	**SCA200**

ANTI-VIBRATION SUPPORTING BRACKETS (Type B)

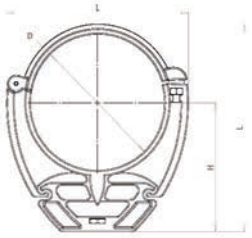
DN	Reference
70	**SCB78**
100	**SCB110**
125	**SCB135**
150	**SCB160**
200	**SCB200**



1 USE OF SCA "TYPE" A AND SCB "BRACKETS"

- Vertical run: use one "type B" bracket at 3 floor intervals, and use "type A" brackets in between.
- Horizontal run: use "type A" brackets only, separated by a maximum distance equal to 10 times the pipe's diameter (e.g. by a maximum distance of 1100 mm for ø110 mm pipe).

PHONOKLIP® BRACKETS WITH 7 x 150, M8, M10 THREADED INSERTS



Ø D	Diam*	Thread insert	L	l	h	H	Reference
52	52	7x150	76	75	23.0	48.0	**PH052/7**
52	52	M8	76	75	23.0	48.0	**PH052/8**
78	78	7x150	112	109	23.0	68.5	**PH078/7**
78	78	M8	112	109	23.0	68.5	**PH078/8**
90	90	M8	144	127	30.0	91.0	**PH090/8**
110	110	M8	171	150	30.0	106.0	**PH0110/8**
135	135	M10	213	187	37.0	136.0	**PH0135/10**
160	160	M10	245	213	43.5	153.0	**PH0160/10**

FRIAPHON® LUBRICANT

ml	Reference
125	**SLUB125**

CLEANER ⊕

ml	Reference
1000	**CLEANER+**

CEMENT

ml	Reference
100	**GFIXP100**

GIRLUB LUBRICANT

ml	Reference
1000	**GLUB10**

GEL CEMENT

ml	Reference
250	**GFIXP250**
500	**GFIXP500**
1000	**GFIXB**

*** Equivalent cast iron sizes**

ANCILLARY EQUIPMENT
Fire collars

■ FIRE SAFETY:

FRIAPHON®'s fire reaction rating is B s1 d0 according to Euroclasses (EN 13501). Its material composition and its design also enabled it to obtain an NF-Me certification for diameters ranging from 78 to 160 mm. That NF-Me certification implies that the fire resistance performances of FRIAPHON® on its own correspond to the E30 fire resistance class (i.e. FRIAPHON® can provide a 30 minute passive fire protection through partitions).

In France, FRIAPHON®'s performances enable it to meet the requirements of fire regulations in buildings receiving the public (E.R.P.) in most configurations (pipes passing through floors, walls and more generally all partitions, coming from or leading to low or average risk areas, whether accessible to the public or not).

When higher fire resistance classes are required (up to 120 minutes - EI 120 U/U), specific fire collars or equivalent devices must be used.

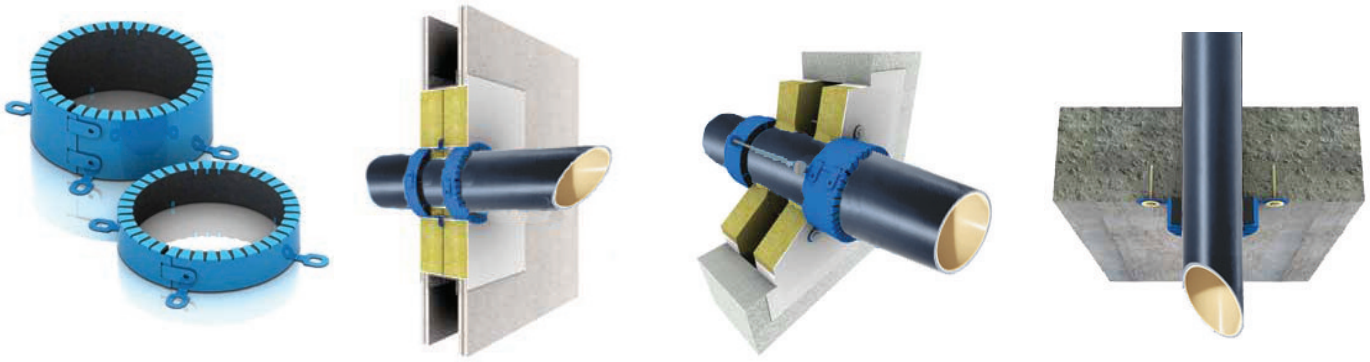
A test report according to EN 1366-3 standard, covering the pipe / fire collar combination, must be provided in order to demonstrate its performances.

GIRPI recommends the use of PROMASTOP® FC6 fire collars, which enable FRIAPHON® to obtain such higher performance requirements when passing through floors, walls or partitions (such as light plasterboard partitions with or without mineral wool, or concrete floors and walls).

The table below indicates which PROMASTOP PC6 reference must be used according to various FRIAPHON® pipe diameters (OD = outside diameter, ID = inside diameter):

Reference	FRIAPHON® pipe OD mm	Pipe OD mm	Collar ID mm	Collar OD mm	Hole centres mm	Anchoring depth mm
FC6/63	52	56	64	81	90	60
FC6/90	78	90	100	120	130	60
FC6/90	90	90	100	120	130	60
FC6/110	110	110	120	142	150	60
FC6/140	135	140	150	180	190	60
FC6/160	160	160	170	200	210	60
FC6/200	200	200	210	240	250	60

GIRPI recommends following the manufacturer's installation guidance for PROMASTOP® FC6 fire collars, which can be downloaded at: **www.promat-see.com/en/downloads**



- **Rigid floor,** thickness 150 mm, minimum density 650 kg/m³, made from concrete.
- **Light partition,** thickness 100 mm, plasterboard 2 x 12.5 mm on each side, fixed on 50 x 50 mm metal rails, with mineral wool insulation between the boards.

Test reports are available upon request from GIRPI's technical support team at
+33 (0)2 32 79 58 00 ou be.girpi@aliaxis.com

ANCILLARY EQUIPMENT
Other connection ancillaries

The FRIAPHON® system can be connected to various articles taken from GIRPI's general catalogue:

■ WC CONNECTORS

Special sleeves Ø 110

Ø WC	Ref. GIRPI
85 to 107	M110L

Connectors Ø 110

Ø WC	Ref. GIRPI
85 to 107	PWC110L

Short connector Ø 110

Ø WC	Ref. GIRPI
85 to 107	CWC110L

■ VENTILATION (for partial replacement of ventilation circuits)

Air admittance valves

AERA100

■ DIAMETER 110MM REDUCING PLUGS (for connections to standard PVC drainage networks)

Reducing plugs Ø 110

Simple					
TR110/32	TR110/40	TR110/50	TR110/63	TR110/75	TR5/4
Double					
TR5/43	TR5/44	TR5/54			
Triple					
TR5/444					

SPECIFICATION
ACOUSTIC DRAINAGE

ESA5 acoustic piping system for the drainage networks of soil, waste and rain water effluents inside buildings, from diameter 52 mm to diameter 200 mm.

IDENTIFICATION - RANGE:

The complete system shall be designed for its global acoustic performance. Pipes, fittings and brackets shall come from one same supplier.

Pipes shall be made of two coextruded layers of PVC with increased density, in order to reduce the transmission of sound waves. Those pipes shall be available in 3m lengths, or 2.6m lengths for standard floor heights. The pipes' internal layer shall be of beige colour. The fittings and the pipe's external layer shall be of dark grey colour.

The system shall include:

• double sockets with three gaskets each, absorbing expansion movements and completely disconnecting pipes from each other, to prevent noise transmission,

• a large range of fittings ensuring homogeneous acoustic performances and adaptation to all configurations on building sites (horizontal and vertical).

• cushioning elbows and acoustic patches attenuating impact noises at the bottom of pipe stacks and under toilets.

• brackets made from one single material with an integrated vibration attenuation system to limit structural noises.

QUALITY - CERTIFICATIONS:

The piping system shall bear the marks corresponding to its quality certificates and all information elements to make its production traceable.

• The system shall come from a company certified according to ISO 9001, ISO 14001, OHSAS 18001.

• The system's pipes and fittings shall be certified under ATEC by CSTB in diameters ranging from 52 mm to 160mm, and shall also have a CSTBat certification.

• The system shall be B s1 d0 rated under Euroclasses according to EN 13501-1 standard, and shall be NF-Me rated.

ACOUSTIC PERFORMANCES:

The manufacturer shall be able to provide acoustic test reports carried out by independent laboratories by approved European organisations, proving that the system significantly reduces noise emissions caused by the flow of effluents, i.e.: an ESA5 rating for straight downpipes, and good acoustic performances at deflection points, in both horizontal and vertical positions.

TECHNICAL SUPPORT:

The manufacturer shall be able to:

- propose its BIM product library,
- produce drawings to help the implementation of its product, based upon the drawings and dimensioning data supplied by the appointed contractor,
- propose professional training sessions on the building site or on its own premises, to help with the implementation of its product.

ENVIRONMENT:

The system shall be covered by an Environmental and Sanitary Data Sheet (FDES) according to NF-EN 15804+A1, and its national appendix XP P01-064CN in France. That document shall have been validated by an independent organisation.

The system shall be recyclable through an existing recovery network.

More SERVICES from GIRPI...

NETWORK DESIGN AND TECHNICAL ASSISTANCE

Our technical assistance and design service can help optimize network drawings

- Drawings featuring all GIRPI articles.
- Complete bill of materials.
- Calculations of bracketing,...

Contact : be.girpi@aliaxis.com

HOTLINE 33 (0)2 32 79 58 00

Our hotline is at your disposal to answer your questions and help you successfully install our products on your building projects.

TRAINING

Our training center (officially recognized for vocational training) gives installers and decision-makers modular training courses about installation techniques.

CUSTOM-MADE ITEMS

Our fabrication workshop can manufacture your special items as per your requirements and can also prefabricate pipework sections.

Please consult us for prices and deliveries.

Visit our website www.girpi.com

Stockist

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