# GIRAIR®

## Pipes system for compressed air

Technical Documentation

# Contents



# General recommendations
## GIRAIR® System

### General recommendations
GIRPI technical documentations are available for free to download and view, via our web site **aliaxis.com**
We advise you to check the updates available. In case of doubt or for any questions on the content of this technical documentation, more specifically:

- chemical compatibility between GIRAIR® and specific additives or fluids,
- calculations and measures related to compensation for expansion affecting GIRAIR®
- special parts and/or assemblies,
- GIRAIR® installation training, please contact Aliaxis **Technical Support +33 0241637325** or by **e-mail tech-com.nicoll@aliaxis.com**

This technical documentation refers to texts and regulations applicable on the day of publishing.

It is reminded that the network must be installed by professionals with good knowledge of applicable standards, and of this documentation.

### Technical recommendations
Before any injection or use of additives or specific fluids in the GIRAIR® network, check their chemical compatibility.

- Refer to page 54 of this brochure, or call Aliaxis Technical Support **+33 0241637325** or e-mail **tech-com.nicoll@aliaxis.com**

### Translation
This English translation of our GIRAIR® technical documentation has been made in good faith, but the original French version shall prevail under all circumstances.

# General properties
## Benefits

**A COMPLETE PIPING SYSTEM FOR:**
- Compressed air distribution networks.
- Non-combustable neutral gas networks
- Centralised vacuum networks (*).

**CORROSION RESISTANT**
GIRAIR® is generally neither attacked by atmospheric agents (humidity, aggressive environment), nor by condensates. This enables networks to remain sound and airtight throughout their long working lives. Furthermore, the cleanliness of the air or gas conveyed is maintained.

**AIRTIGHTNESS**
Thanks to its joining method based on solvent cementing, GIRAIR® networks remain perfectly airtight during their whole working life.

**ENERGY SAVINGS**
For a given piping internal cross section, the air flow is improved. The smoothness of the pipe's inner surface and the design of the fittings, allowing for a full-bore, resulting in reduced load losses and therefore reduced energy requirements.

**AIR QUALITY**
Girair's corrosion and chemical resistance to most of the usual compressor oils (see page 52), GIRAIR® helps maintain the air quality throughout the distribution network, up to the point of use.

**IMPACT RESISTANCE**
GIRAIR® presents excellent ductile behaviour, in case of mechanical impacts, even at very low temperatures (-10oC). Should the pipe break under very high impacts, its ductile structure will prevent it from breaking into pieces and from projecting any dangerous splinters.

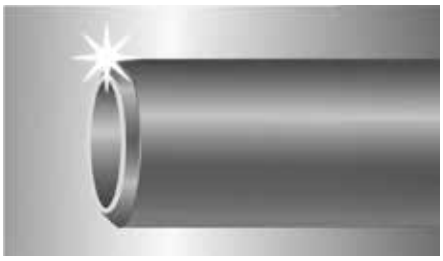
**FIRE REACTION RATING**
Girair meets B-s1,d0 rating according to Euroclasses, which is the best possible fire classification for synthetic materials. GIRAIR® contributes to improving fire safety. Indeed, even when directly submitted to flames, it remains non-flammable, does not produce any flaming drops that could start new fires, and thanks to its high thermal insulation properties, it does not propagate heat along the network.

**EASY NETWORK IDENTIFICATION**
It's specific blue colour (RAL 5012 ), GIRAIR® compressed air networks can be identified easily and quickly.

**INSTALLATION TIMES UNDER CONTROL**
Lightweight system, professional, quick and reliable installation methods, simple tools, no fire permit required for installation, installation times are kept under control with the GIRAIR® system.

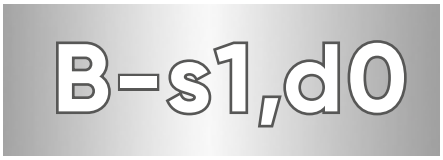
**RECYCLING FRIENDLY**
GIRAIR® is over 98% recyclable.

**LIMITS OF USE**
The GIRAIR® system is not compatible with medical air networks, flammable gases or silicon-free applications.

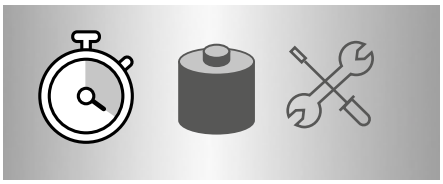


**No corrosion clean air**

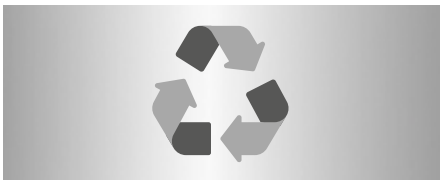
**Jointing with solvent cement**




**Fire classification Euroclasses**



**Installation time under control**



**Recyclability***

# Characteristics

The physical and mechanical properties below are measured on standard test samples before aging. As for all synthetic materials, these characteristics are likely to drop as the materials age, depending also on the conditions of use of the system.

## 1. PHYSICAL CHARACTERISTICS OF GIRAIR®

| Characteristics | Standards | Units | Values |
|---|---|---|---|
| Density (volume mass) | EN ISO 1183-1 | kg/m3 | ≈ 1300 |
| Linear expansion coefficient α | ISO 11359-2 | mm/m°C | 0,095 |
| VICAT softening temperature (5 daN load) | EN ISO 2507-2 | °C | ≥ 73 |
| Fire classification | EN 13501-1 | - | B-s1, d0 |
| Thermal conductivity λ | ISO 22007-1 | W/m.°K | 0,17 |

## 2. MECHANICAL CHARACTERISTICS OF GIRAIR®

| Characteristics | Standards | Units | Values |
|---|---|---|---|
| **Resistance to static pressure** | | | |
| Pipes Fittings time ≥ 1 h | EN ISO 1167-1 | bar | ≥ 52 |
| Assemblies time ≥ 1 000 h | EN ISO 1167-1 | bar | ≥ 40 |
| **Resistance to alternating pressure** | | | |
| (On fittings)<br>Pressure: mini 20 bar/max 50 bar<br>Diameters 16 to 90 = 1 Hz frequency<br>Diameters 110 = 0.42 Hz frequency | <br><br>NF T 54-094<br>NF T 54-094 | <br><br>cycle<br>s<br>cycle<br>s | <br><br>≥ 5000<br>≥ 2500 |

1 MPa = 10 bar

## 3. PHYSICAL CHARACTERISTICS OF BRASS

The grades used are brass CW614N (CuZn39Pb3) for machined parts and CW617N (CuZn40Pb2) for forged/stamped parts.

| Items containing brass | Grades |
|---|---|
| Items with inserts (GAEAL, GAEBL, GAMML, G4GL) | CW617 |
| Nut (GA3G/L, GA3F/L, GAUR) | CW617N or CW614N |

**The user must check whether the nature of the brass composition of our fittings complies with applicable regulations in the country of use, and is compatible with the operating temperature, the specifications of the fluid carried, and any additives.**

## 4. DIMENSIONAL CHARACTERISTICS

GIRAIR® pipes and fittings are manufactured and tested according to the dimensional requirements indicated in the following French Standards:

| | Standards |
|---|---|
| Pipes | EN 1452 |
| Fittings | NF T54-038 |

# Operating conditions

## NOMINAL PRESSURE

The notion of nominal pressure (PN) corresponds to the maximum operating pressure at 20°C of which the product was designed for continuous service. GIRAIR® is **PN 12.5** rated.

## LONG-TERM VALIDATION PRESSURE TESTING

In order to ensure that it can durably meet the performances indicated in the next paragraph, Aliaxis designed and dimensioned the products of the GIRAIR® range so that they could resist the following testing pressures:

- PN x 4.2 = 52.5 bar for 1 hour at 20°C.
- PN x 3.2 = 40 bar for 1 hour at 20°C.

⚠ Tests at the above pressure conditions, very demanding and destructive, are exclusively carried out in factories and laboratories. They are part of a continuous product quality monitoring scheme. Those tests must not be carried out on:

- products that will be installed on networks afterwards
- existing installations

## WORKING CONDITIONS

The **Maximum Working Pressure (MWP)** is the maximum pressure in continuous service for which the GIRAIR® system was designed.
It depends on the temperature of the fluid transported and/or on the ambient temperature that can be found in the direct surroundings of a GIRAIR® installation.
Temperature elevations reduce the modulus of the materials used to manufacture GIRAIR®, which in turn reduces its resistance to hydrostatic pressure. The table below indicates the applicable Maximum Working Pressure according to temperatures

| Ambient or fluid temperature | Maximum working pressure |
|---|---|
| -10°C - 25°C | 12.5 |
| 25°C - 40°C" | 10 |

## WARRANTY

GIRPI warrants its products for a duration of 10 years from the delivery to the first purchaser, except for normal wear parts.
This warranty 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.

Aliaxis does not assume responsibility for the hydraulic design of networks, particularly with regard to sizing.

# GIRAIR® range

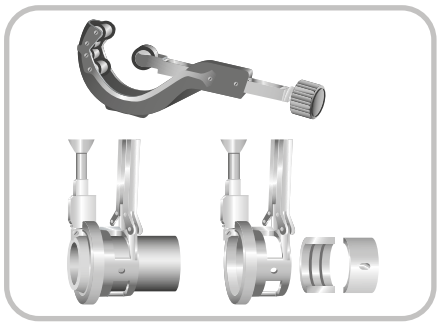
| Designation | Reference | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 75 | 90 | 110 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PIPE | TUBGA | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| ELBOWS 90° | GA4M | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| ELBOWS 45° | GA8M | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| SERRATED STUB FLANGES | GACS | | | | | | ■ | ■ | ■ | ■ | ■ |
| BENDS 90° | GA4C | | | | | | ■ | ■ | ■ | ■ | ■ |
| COUPLINGS | GAMA | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| CAPS | GABO | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| REDUCING BUSHES LONG PATTERN | GARD | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| EQUAL TEES 90° | GATE | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| REDUCING TEES 90° | GATR | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| REDUCING BUSHES SHORT PATTERN | GARS | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| THREADED ADAPTORS | GAMML | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| ADAPTOR NIPPLES | GAEAL | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| THREADED ELBOWS 90° | GA4GL | | ■ | | | | | | | | |
| ADAPTOR NIPPLES | GAEBL | ■ | | ■ | | | | | | | |
| THREADED ADAPTORS | GAMM | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| EQUAL THREADED TEES 90° | GATG | ■ | ■ | ■ | | | | | | | |
| THREADED ELBOWS 90° | GA4G | ■ | ■ | ■ | | | | | | | |
| ADAPTOR NIPPLES | GAEA | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | |
| REDUCING ADAPTOR NIPPLES | GAEB | ■ | ■ | ■ | ■ | ■ | ■ | | | | |
| 3 PIECE UNIONS | GA3P | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| 3 PIECE UNIONS GIRAIR® / BRASS | GA3GL | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| 3 PIECE UNIONS | GA3FP | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| 3 PIECE UNIONS GIRAIR® / BRASS | GA3FL | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| CONNECTORS | GAUR | ■ | ■ | ■ | ■ | ■ | | | | | |
| WALL PLATE ELBOW | GAAP | ■ | ■ | ■ | | | | | | | |
| ACCESSORIES | GHRR | ■ | ■ | | | | | | | | |
| QUICK ADAPTOR | GHES | ■ | | | | | | | | | |
| DOUBLE UNION BALL VALVES | GA2MBE | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| FLANGED SOCKET BALL VALVES | GA2MFE | | | | | | | | ■ | ■ | ■ |
| DROP BENDS 180° | Q2C | | ■ | ■ | ■ | | | | | | |
| DROP BENDS 180° | GA2C | ■ | ■ | ■ | ■ | | | | | | |
| DROP BENDS | Q2S | | ■ | ■ | ■ | | | | | | |
| WALL PLATES with 2 or 3 outlets | GAAP | | ■ | ■ | | | | | | | |
| WALL PLATES with 4 outlets | GAAPG4 | | ■ | ■ | | | | | | | |
| WALL PLATES with 4 outlets and drain | GAAPG4P | | ■ | ■ | | | | | | | |
| WALL PLATES ELBOW with 1 fem threaded outlet and 1 socket inlet | Q4GP | | ■ | ■ | | | | | | | |
| THREADED SADDLES 1/2" | QSB | | | | | ■ | ■ | ■ | | | |
| THREADED SADDLES 3/4" | QSB | | | ■ | ■ | ■ | ■ | ■ | | | |
| MONOKLIP® BRACKETS | HCK | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| WELDING POLYMER | 3FIX | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| CLEANER + | CLEANER+ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |

# Installation Guidance Rules
## 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 and especially with indenting, cutting or heavy objects, particularly in cold weather. Transport and store the pipes with their protection cover. Remove the cover and protection caps or plugs immediately before installation.

**For any operation, please use the correct PPE workwear, which is recommended for the relevant building site for the installation**



### CUTTING

- **The wheel-cutterr**

Allows for neat, clean cuts to be carried out.

- **The chamfering pipe-cutter**

This type of tool cuts and chamfers pipes in one single operation. According to the model and size used, it can cut and chamfer pipes of all dias, with the help of reducing half-shells.

- **It is strongly advised to avoid using disk saws or shears to cut the pipe.**

### TRIMMING - CHAMFERING

⚠ **Omitting to chamfer the pipe externally may cause leaks, both short term and longer term.**

After cutting, the pipe must be de-burred and a chamfer must be made on the outside of the pipe

**The chamfer shall deflect from the pipe following a 15° angle.**
**The dimensions of the chamfer must comply with the following table:**

| Ø pipe | chamfer length A |
|---|---|
| Ø 16 | 1 - 2 mm |
| Ø 20 - Ø 50 | 2 - 3 mm |
| Ø 63 - Ø 160 | 3 - 6 mm |


These operations can be performed by means of the following tools:

- **Trimming and chamfering tool**

This tool can be used to trim the inside of the pipe, and when reversed, it chamfers the outside of the pipe.
Ref. GIRPI **CONE50U** for pipes up to 50 mm

- **Chamfering tool** this tool chamfers the pipe.
Ref. GIRPI **FT 55 05 10** Ø32 to 110 mm

- **Chamfering pipe-cutter** *(see "cutting" section).*

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

### HOLDING TOOLS

- **Chain vice**

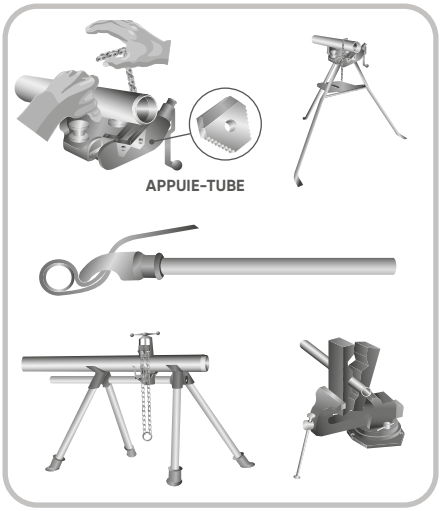
Polyurethane pipe-rests hold the pipe without any scratching.

- **Strap wrench**

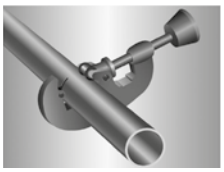
Maximum gripping power, with no risk of deforming the pipes or fittings (braided nylon strap).

- **Bench vice**

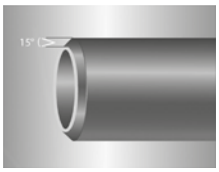
When using such traditional vices, it is mandatory to clamp the pipes by means of wooden notched pipe-rests.



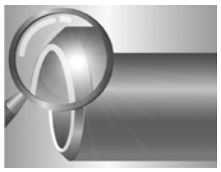
# Welding procedure



Cutting

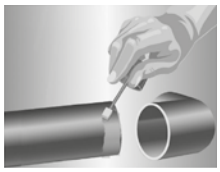


Chamfering



Checks

Priming



Solvent cement application

Push straight

## CHECKS PRIOR TO WELDING

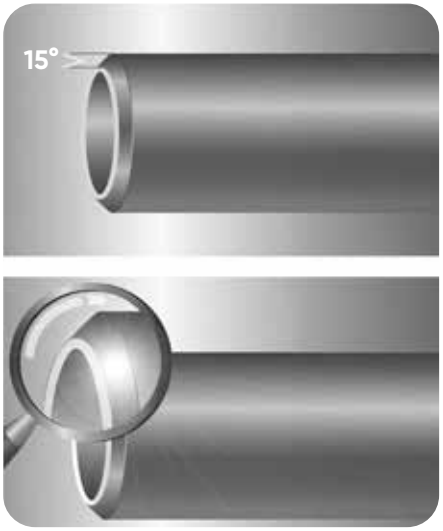
Abrading and priming operations are mandatory.
Pipes and fittings must be cleaned with a clean, lint-free cloth, and primed with CLEANER + , in order to ensure optimal performances for each assembly. In all cases, pipes and fittings MUST be clean and free from any trace of humidity.

Before welding it is important to make certain checks:

- on the pipes: check that they are chamfered.

Extract chips produced during cutting or trimming operations, so as to avoid the obstruction of balancing valves and other similar equipment on the network.

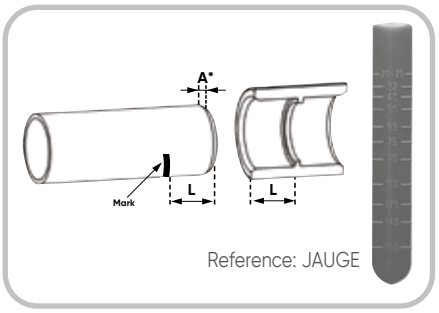
- on the fittings: see that they contain no sign of impact, deep scratches, etc...
- on the solvent cement: it must be fluid, homogeneous, check the maximum use by date on each pot




## MARKING OF THE SOCKET LENGTH

- Before applying the solvent cement, mark the socket depth.

This mark enables the application of the solvent cement over the necessary length, and helps the installer to check whether the penetration length of the male end in the socket is correct




Reference: JAUGE

## SURFACE PREPARATION

Abrading and priming operations are mandatory.Preparing the surfaces of the male and female parts to be joined is mandatory.

That priming operation shall be carried out using CLEANER + cleaner and a clean, soft, lint-free cloth. Leave the cleaned surfaces to dry, or dry them up using another clean, soft, lint-free cloth.

## WELDING POLYMER APPLICATION

- Once the checks and marking have been done, apply **3FIX** 3FIX solvent cement, available in 250 ml or 1 litre pots.
- Check the use by date on each pot.
- To apply the solvent cement, use the brush provided with the pot.

Brushes provided with:

- (Ref. 3FIXP) 250 ml pots are fit for use with sizes 16 to 50 mm.
- Ref. 3FIXB) 1 liter pots are fit for use with sizes 40 to 110 mm.

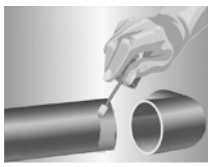
As a range addition, the applicators reference PAB1L are recommended for the application of solvent cements for dias > 90 mm.

# System Implementation
## Specific Recommendations

### SOLVENT WELD APPLICATION

**The use of any other means or method is prohibited, such as fingers, wood sticks, or any other utensil. Dipping the pipes or fittings directly into the solvent cement pots is prohibited as well (such practices lead to the creation of thick solvent cement deposits, which can cause obstruction of small bore pipework).**

The use of unsuitable applicators may result in excess solvent cement inside or outside the pipe. This excess may cause local deterioration of the pipe. Any change in composition by dilution or any other process is prohibited. Apply the solvent cement moderately (in a thin coat) over the whole socket length (female) and over the whole length of the male end (marked on pipe). The solvent cement should be applied in rotation movements so as to obtain a uniform, homogeneous coat, well spread over the whole interlocked surface solvent cement solvent cement.



| Ø pipe | Rotations |
|---|---|
| Ø 16 à 40 | 4 |
| Ø 50 - Ø 90 | 6 |
| Ø 110 - Ø 160 | 8 |

⚠ **Modifying the solvent cements composition by dilution or by any other means is prohibited**

### JOINTING

⚠ **Immediately after applying the solvent cements, joint the two elements right home (as far as the marks previously traced) by pushing longitudinally and without twisting**

- Hold together for 5 to 10 seconds without any movement. In order to secure optimal welding performances, do not submit fresh joints to any mechanical effort during the first minutes that follow joining.
- A bead of solvent cement is formed after pushing the elements together. That bead helps check that the weld is done. Excess solvent cement can be wiped off with a clean, soft and lint-free piece of cloth.

**Note:** In certain cases it is necessary to mark the position of one element in relation to the other. On large sizes, greater than diameter d90, 2 fitters must operate simultaneously, i.e. one fitter will coat the male end, while the other fitter will be coating the female end with solvent cement. This method enables a quick jointing, needed for a strong weld

### PARTICULAR CLIMATIC CONDITIONS

⚠ Temperature range required for cold welding: +5°C to +35°C. If the solvent cements 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 solvent cement).

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 jointed. So as to avoid evaporation of the solvent cement, 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

**DRYING TIMES** the drying times of the 3FIX solvent cements are as follows:

| Drying times before pressure tests: | | 6 bar | 10 bar | | |
|---|---|---|---|---|---|
| | | Ø 16 - 63 | Ø 75-Ø 110 | Ø 16-Ø63 | Ø 75-Ø 110 |
| Ambient temperature | 5 - 10°C | 5 h | 6 h | 6 h | 12 h |
| | 11 - 35°C | 2 h | 2 h | 3 h | 4 h |

# General rules of installation

## Recommendations

### CONNECTIONS BETWEEN GIRAIR® AND THREADED METAL COMPONENTS

**Connections between threaded metal components and GIRAIR® fittings with metal threaded inserts:** excluding connection to wall plates (namely our reference GAAP), obtained by means of tap connectors (GAUR reference), connections between GIRAIR® and metal pipes, fittings and equipment featuring male or female threads (cylindrical/parallel) must be made by means of the GIRAIR® /metal couplings provided for this purpose. It is advised not to connect tapered (conical) male threads onto GIRPI's GIRAIR® fittings with female metal threaded inserts. Fittings that are equipped with threaded metal components: GAEAL, GAEBL, GAMML, GA4GL, can be used when high torque is required for connections to metal threaded components. The table below indicates maximum torque values.

| Dia mm | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
|---|---|---|---|---|---|---|---|
| Maximum torque (N.m) | 45 | 50 | 60 | 75 | 90 | 110 | 135 |

**Connections between threaded metal components and GIRAIR® fittings with plastic threads:** for male or female plastic threaded fittings (GAEA, GAEB, GAMM, GATG, GA4G, GA3F/P), connections with cylindrical/ parallel threaded metal components is possible. When straight couplings, elbows, tees or other GIRAIR® fittings with plastic threads are used, they must be screwed by hand, the last ¼ turn only being tightened with a tool when required, preferably with a strap wrench. Under no circumstances should GIRAIR® pipes and fittings be threaded or tapped by machining.
The compatibility, strength and pressure-tightness of sealing pastes must be confirmed by the paste manufacturers.

### SEALING

**General recommendations related to sealing compounds:** the use of anaerobic resins is forbidden. Applying excess anaerobic resin quantities on brass components may result in a contact between the anaerobic paste and the plastic components, and cause the plastic components to crack. Please contact the sealing paste manufacturers to get their confirmation as to the drying times, chemical/compatibility resistance and sealing capacity under pressure of their products.
**Connections between threaded metal components and GIRAIR® fittings with metal threaded inserts:** in our current state of our knowledge at the date of publication of this data sheet, the following compounds have proven to be satisfactory for connecting GIRAIR®/GIRAIR® parts and mixed GIRAIR®/metal parts: • Tangit (Loctite) plastic seal.
• Do not use anaerobic resins. In no case should GIRAIR® pipes and fittings be machine threaded inside or outside. **Connections between threaded metal components and GIRAIR® fittings with plastic threads:** the use of tallow, hemp or similar materials is forbidden, as excessive tightening can cause the fittings to break up. The following sealants will be preferred:
• Soft silicon paste. • PTFE (e.g. "Teflon") tape, preferably high density.

### INDICATIVE QTY OF WELDING POLYMER FOR 100 WELDS ACCORDING TO THE PIPE Ø:

| Ø pipe (mm) | 16 | 20-25-32 | 40-50-63 | 75 | 90-110 |
|---|---|---|---|---|---|
| Solvent cement quantity | 125 ml | 200 ml | 1 litre | 2 litres | 3,5 litres |

The above figures were estimated based upon laboratory tests.
They cannot truthfully reflect the possible variations encountered from one installation site to another, and must be considered as indicative.

**THERMOFORMING** of GIRAIR® pipes is strictly prohibited on the work site and involves cancellation of GIRPI's guarantee. For all direction changes, make use of standard GIRPI fittings only. Contact GIRPI's Technical Assistance for particular problems to be solved.

# General rules of installation
## Commissioning and tests

### GENERAL
The GIRAIR® system pipes and fittings are inspected throughout their manufacture and are guaranteed for a use complying with their design within the limits indicated. During the installation and before putting the GIRAIR® network into service, it is advisable to make a certain number of checks as with all other materials

### INSPECTION
**a) Visual inspection.** During installation, the pipes and fittings should be inspected so as to eliminate doubtful elements containing abnormalities such as impacts and deep scores caused by unsuitable handling. Before the tests, the whole network will be visually inspected to eliminate any pipework section containing deep cuts or notches, large deformations due to sudden impacts, traces of blow torch burns, etc... Any damaged part should be replaced before putting into service. The aim of the visual inspection is also to ensure that the installation complies with the drawings and hence the correct installation of all the components (connection, supports, monitoring and safety mechanisms, etc...).
GIRPI recommends carrying out a visual inspection to look for any low points not covered by the plans. If necessary, a purge device should be installed before commissioning.

**b) Leak tests.** After installation of the network, a hydrostatic pressure test will be made in order to detect possible leaks, at 1 bar (all parts of the network should be visible and accessible during the test). Valves must all be opened and closed several times.

### SPECIFIC ONSITE TESTING
WIt is suggested that the following test procedure be followed, after joints have been allowed to dry for the appropriate minimum time.
The system should be divided conveniently into test sections.
Fill the section with cold water making sure that no air pockets remain. Do not pressurise at this stage. Check the system for leaks.
If no leaks are apparent check for and remove any remaining air.
Increase pressure up to 50lbf/in2 or 3 bar. Do not pressurise further at this stage. Leave the section pressurised for 10 minutes. If the pressure decays, inspect for leaks and rectify as necessary.
If the pressure remains constant, slowly increase the hydrostatic pressure to 11/2 times the nominal operating pressure. Leave the section pressurised for a period not exceeding 1 hour. During this time the pressure should not change.

### OPERATING CONDITIONS
Whatever the use, the safety mechanisms necessary for the traditional protection of networks (regulation, pressure reduction and limitation, temperature regulation and limitation, shut off mechanisms, etc...), should be planned, installed and kept in perfect working order throughout operation.

**a) Vibrations.** Vibrations can be a source of disorders on both pipework and supports ; it is highly advisable to install a suitable system preventing vibrations from spreading.

**b) Sources of heat and UV.** Being made from thermoplastic material, GIRAIR® 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. For advice on pipe protection please contact technical support **tech-com.nicoll@aliaxis.com** or **+33 02416373259**

**c) Prevention of impacts.** As with all networks conveying pressurised fluids, GIRAIR® pipework systems must be protected from impacts which might occur in passageways used by handling machinery or suspended loads in movement (use of safety barriers, railings, etc...).

**d) Malfunction.** Compliance with the operating Pressure/Temperature conditions must be checked and ensured using regulation and safety devices, such as pressure reducers, safety valves, expansion tanks, anti-hammering or similar devices, in compliance with applicable codes of practice. Any malfunction must be noted in the maintenance logbook of the networks.

**e) Insulation materials.** To ensure the recommended design life of a system, consideration should be given to the ancillary agents applied to amorphous thermoplastics. These include but are not limited too - adhesive labels, intumescent mastics, rubber clips, paints, thread sealants, foil barrier tapes, thermal insulation and compressor oils.
When selecting ancillary agents, it is the responsibility of the installer to check for chemical compatibility by referring to the product literature and/or checking with Aliaxis US technical: **tech-com.nicoll@aliaxis.com**

# Expansion and Contraction Calculations

**TECHNICAL ASSISTANCE:**
GIRPI's installation guide and expansion slide rules will enable you to figure out expansion loop dimensions and bracket positioning in changes of direction.
For help in calculating expansion, producing the application drawings or training staff on site, contact Aliaxis technical support **tech-com.nicoll@aliaxis.com** or **+33 0241637325**

## THE PHENOMENON

All materials subjected to thermal variations:

- contract when temperatures fall,
- expand when temperatures rise.

## CALCULATION PARAS FOR GIRAIR®

The implementation of the system must take account of the elongation or contraction of the pipe which is calculated using the following formula:

$$\Delta L = \alpha \times L \times \Delta T$$

The linear expansion coefficient of GIRAIR® is:

$\alpha$ = 0,095 millimetre per metre per °C (mm/m.°C)

in which:

**α** = expansion - contraction coefficient (linear)
**L** = length of the piping when installed, in s
**ΔT** = temperature deviation in degrees Celsius °C (difference between the maximum or minimum temperature in service and installation temperature)
**ΔL** = length deviation, in mm (difference in length between L on installation and L in operation, i.e. elongation or shrinkage length).

## COMPRESSED AIR TEMPERATURE DURING OPERATION

Most of the time the air's temperature depends on the temperature of the air fed into by the compressor, and on the presence of dryers.

Without dryer, the air produced by the compressor, can vary from 20° in winter to 40° in summer.

If a refrigerating dryer is used, the usual temperature obtained at the start of the network is 10°C.

Ex 1: Working network (without dryer)

Ø 63 mm

- Temperature of installation = 20°C
- Temperature of the air at compressor outlet = 40°C
- Length (during the installation) = 15 m

**ΔT** = 40 - 20 = 20°C

**ΔL1** = 0,095 x 15 x 20 = 29 mm de dilatation.

Ex 2: Working network with a dryer

Ø 63 mm

- Temperature of installation = 25°C
- Temperature of the air at the start = 10°C
- Length (during the installation) = 25 m.

**ΔT** = 25 - 10 = 15°C

**ΔL1** = 0,095 x 25 x 15 = 36 mm **contraction**.

# Solutions

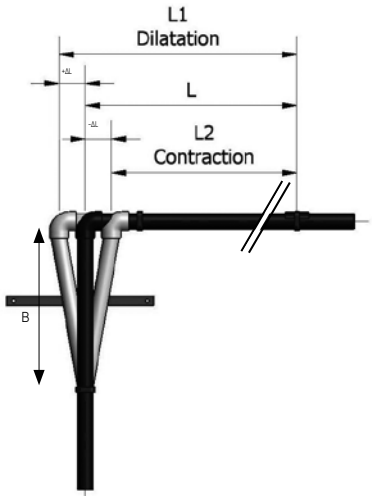
## THE REMEDIES

In order to avoid the disorders subsequent to the movements of the pipes, it is necessary to let them expand and contract freely.
It is therefore necessary to:

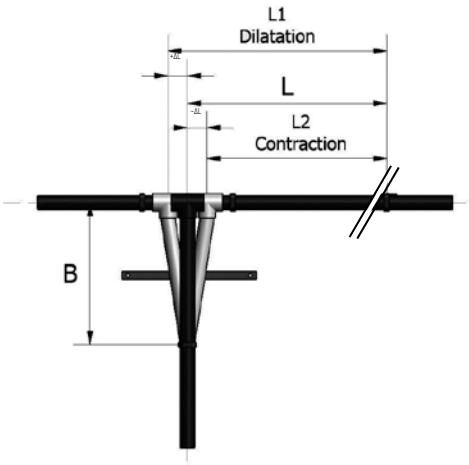
- Use pipe brackets allowing the longitudinal movements of the pipe to be guided.
- See to it that there never is a straight length of pipe between 2 anchors without any expansion compensation, either by using a change in direction, or by making a loop (see illustrations below).

## 1 - LOOP ARMS

**CHANGEMENT DE DIRECTION**




**DÉRIVATION**




| | |
|---|---|
| **L** | Length of pipe section during installation |
| **L1** | Length at maximum temperature |
| **L2** | Length at minimum temperature (fluid or room) |
| **ΔL** | Length difference between L1 (or L2) and L |
| **B** | Length of loop's arm |
| **C.C.** | Guide (bracket) |
| **P.F.** | Anchor point |

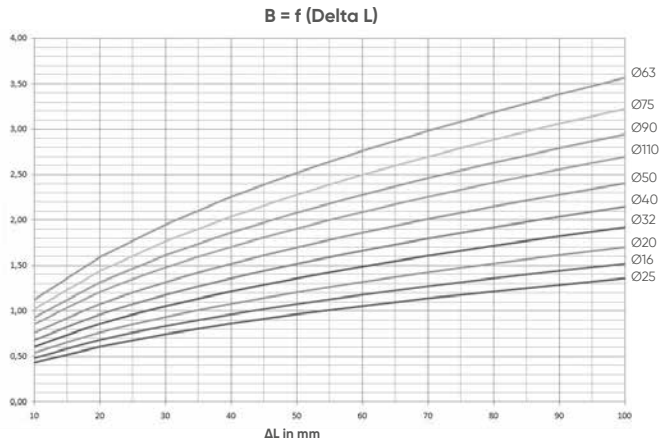
**Change in direction**
(which is generally efficient in most cases).

Using the following chart, it is possible to determine the loop arm length "B" required to absorb the calculated expansion.

$$B = 34 \sqrt{Ø \times \Delta L}$$

34 : constant
Ø : External diameter (mm)
Δ : Length deviation (in mm)
B : loop arm length (mm)

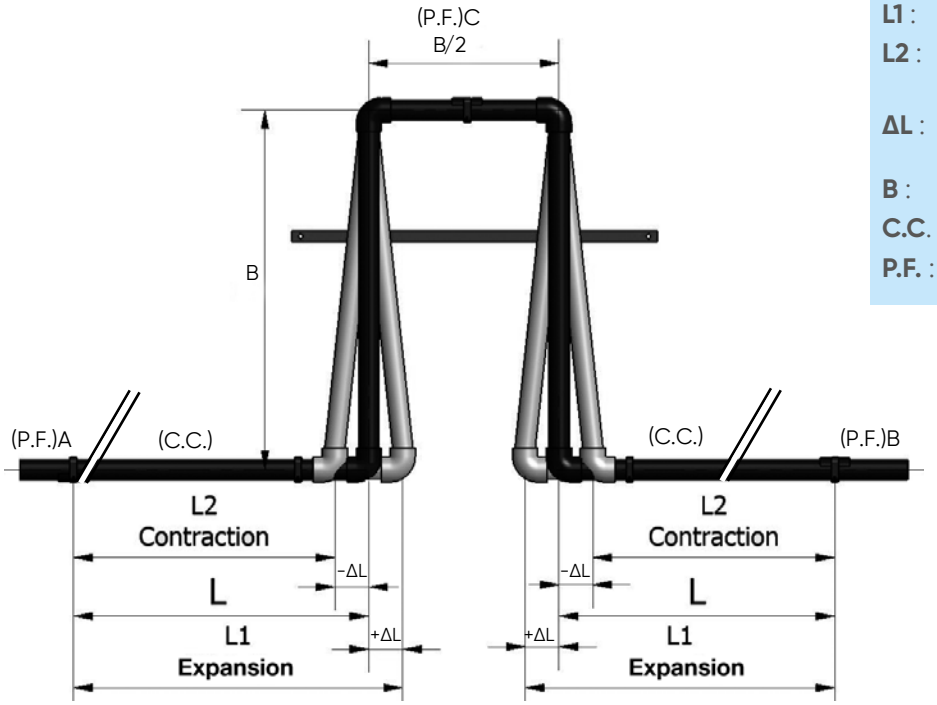
Ex 1:
B = 34 $\sqrt{63 \times 29}$ = 1450 mm = 1.45 m




**Details of ex.1 can be found on technical page 13**

## 2 - EXPANSION LOOPS

**Loops**
Made from GIRAIR® pipes and fittings, they are generally used on long, straight sections of pipework.



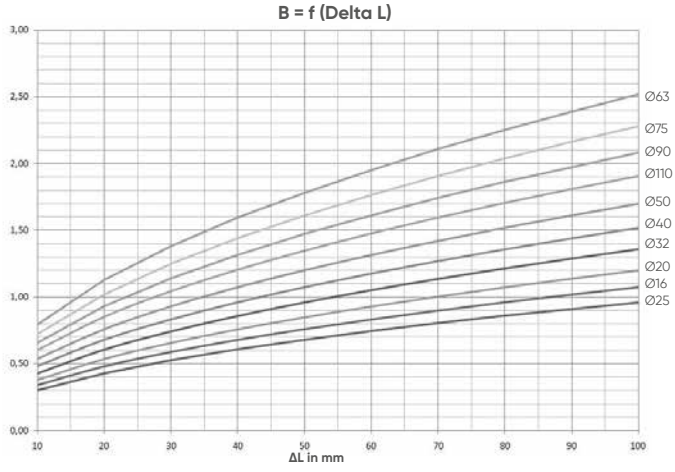

**L** : Length of pipe section during installation
**L1** : Length at maximum temperature
**L2** : Length at minimum temperature (fluid or room)
**ΔL** : Length difference between L1 (or L2) and L
**B** : Length of loop's arm
**C.C.** : Guide (bracket)
**P.F.** : Anchor point

Using the following chart, it is possible to determine the loop arm length "B" required to absorb the calculated expansion.

$$B = 34 \sqrt{Ø \times (\Delta L/2)}$$

34 : constant
Ø : External diameter (mm)
ΔL : Length deviation (in mm)
B : loop arm length (mm)

Ex 1:
B = 34 $\sqrt{63 \times 36}$/2 = 1140 mm = 1.14m




**Details of Ex.2 can be found on page 13**

# Installation

## Accessories and ancillaries MONOKLIP® brackets

### GENERAL DESCRIPTION

MONOKLIP® brackets have been especially designed to support GIRAIR® pipeworks. The pipe is allowed to move freely inside the bracket as it expands and contracts. Depending on their size, they are offered with M6, M8 and 7x150 female threaded brass inserts, or with a plain 5.5 mm diameter drilled base. GIRAIR® is a complete system, specially developped to bring global reliability. Therefore, all of the system's elements must imperatively be used. The use of components of external origin will make GIRPI's guarantee null and void, especially the use of other brackets than MONOKLIP®.

Other brackets than MONOKLIP® shall be used under the installer's entire responsibility. In all cases, the supports:

- shall continue to support their load even under temperature variation effects,
- shall allow the pipeworks to expand freely,
- shall keep the pipeworks which they support at enough clearance from any wall or obstacle so as to allow for the expansion movements and also for the assembly and disassembly of the mechanical couplings and accessories (unions, flanges, valves, pressure limiters, etc... ),
- shall in no event either injure or damage the pipeworks.
- shall be free from any chemical substance which could potentially damage the pipeworks (e.g.plasticisers).

### SUPPORTS

In order to allow the pipes to expand and contract freely, MONOKLIP® brackets must be used (with M6, M8, or 7x150 female threaded inserts). Thanks to its range of wedges, the total height of MONOKLIP® brackets can be controlled so as to ensure a constant axis of the piping sections, even when reducers are used. Also, wedges will be added to MONOKLIP® brackets on piping sections where accessories or components of larger dimensions than the fittings (e.g. valves) are installed

| | | |
|---|---|---|
| Ref. : | CALE1220 | for diameter 20 mm. |
| | CALE2563 | for diameters 25 - 32 - 40 - 50 - 63 mm |
| | CALE2563/4 | for diameters 25 - 32 - 40 - 50 - 63 mm |
| | CALE75110 | for diameters 75 - 90 - 110 mm |

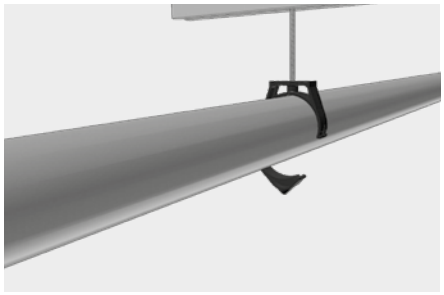
### MONOKLIP® BRACKET CENTRES

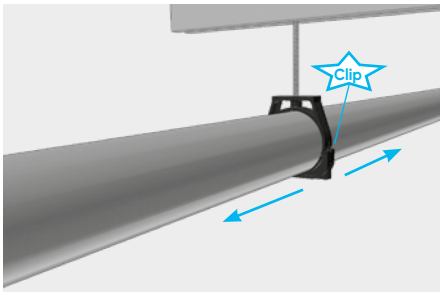
| SPACING BETWEEN MONOKLIPS® | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pipe diameter | | 20 | 25 | 32 | 40 | 50 | 63 | 75 | 90 | 110 |
| Distance between brackets (in meters) | Horizontal sections (m) | 1.1 | 1.3 | 1.4 | 1.6 | 1.8 | 2.1 | 2.1 | 2.1 | 2.1 |
| | Vertical sections (m) | 2 | 2.2 | 2.2 | 2.9 | 3 | 3.1 | 3.1 | 3.1 | 3.1 |

When the fluid's temperature is likely to reach temperatures above 20°C during the projected lifetime of an installation, the following corrective factors shall be applied: 0.9 up to 30°C, and 0.8 up to 40°C.

# MONOKLIP® brackets

## EXAMPLES OF SUPPORTS: MONOKLIP® BRACKETS

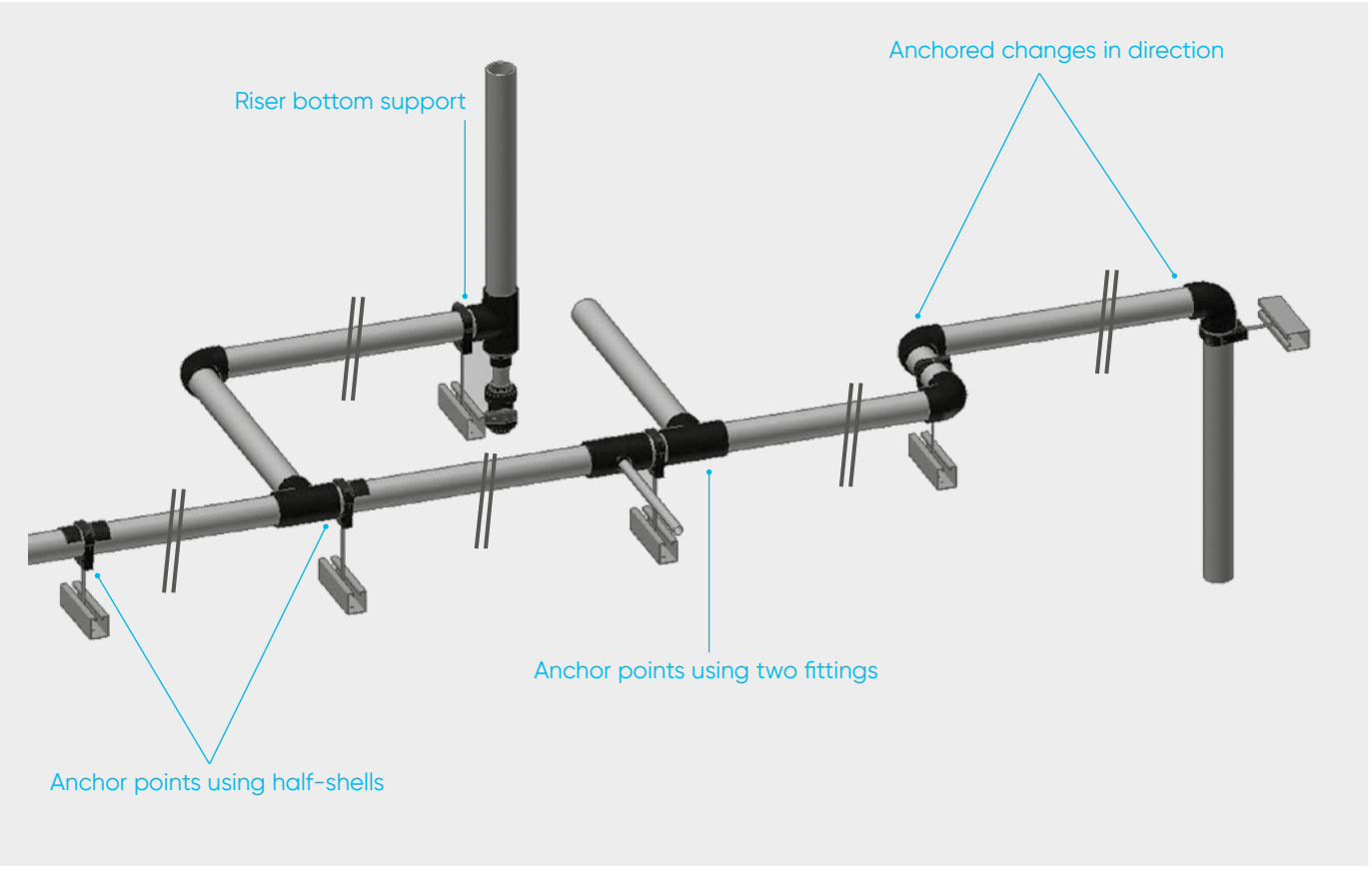





Bracket which works as a guide to ensure free movement of the pipes

## EXAMPLES OF ANCHORS

Half-shell anchors are composed of sections cut from "GAMA" GIRAIR® straight couplings.
Cut the couplings in two transversally and longitudinally, with their internal stops removed.
The resulting half-shells are then cleaned with CLEANER + , coated with 3FIX welding polymer, and welded onto pipes of the same size, also coated with 3FIX welding polymer before contact.



# Special cases

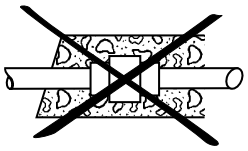
## PASSING THROUGH PARTITIONS AND FLOORS

When a GIRAIR® pipe goes through a wall or a floor, it must be protected by a rigid sleeve made of synthetic material, and preferably GIRAIR®.
The sleeve internal diameter is chosen with enough tolerance to allow the pipes to expand and contract freely The sleeve must be long enough to protrude on both sides of the finished masonry element.

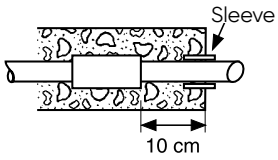
## BUILT-IN OR EMBEDDED INSTALLATIONS

GIRAIR® can be cast into or embedded in masonry, with no mechanical fittings. The following precautions must be respected.

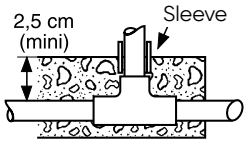
- The pipe must be made integral with the masonry either by means of the couplings making up the system or using half-shells onto the wall of the pipe.
- Each time the pipe enters the masonry it must be protected against shearing by a sleeve which protrudes from the finished surface of the masonry.
- The chase will be filled with a homogeneous material without sharp gravel which could damage the pipe.
- The commissioning tests must be carried out before filling the chase or pouring the concrete.
- Condensate drainage must be part of the design.



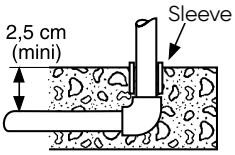
Mechanical coupling



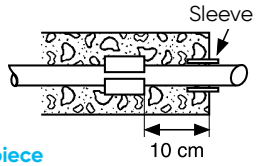

Socket




Tee




Elbow

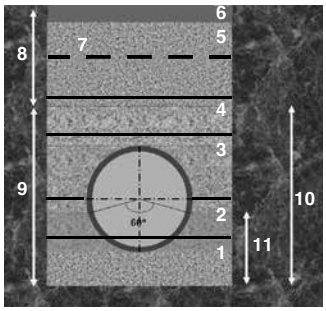



Saddle piece

## BURIED INSTALLATIONS

GIRAIR® pipeworks can be buried if the following precautions are respected:

- The bottom of the excavation must be levelled and free of large grained materials and have no surface hard spots.
  A carefully compacted bed of 10 cm minimum will be made of clean sand 0/10 containing less than 10 % of fines.
- The backfill directly in contact with the pipe (comprised of sand containing less than 12 % of fines and free of gravel with diameter greater than 30 mm) will cover the pipe to a depth of 15 cm minimum and will be compacted.
- The covering backfill will be compacted in successive layers comprised of materials removed from the trench and which contain less than 30 % of elements greater than 20 mm.
- The minimum total height of the backfill above the pipe will be:
  - general case: 60 cm
  - under road/rail traffic: 80 cm
  - under concrete slab: 40 cm




**1 - Belding**
- 10 cm on normal ground
- 15 cm on hard or rocky ground
- Clean, lightly fillerised sand (< 5%)

**2 - Base**
- Clean sand with low fine element content (< 5%)
- Installation by mechanical clamping of the grains

**3 - Lateral embankment**

**4 - Initial embankment**
- ≥ 10 cm above the collar
- ≥ 15 cm above the top

**5 - Roadway embankment or base**
- Untreated gravel
- Granularity 0/20 and 0/40
- Minimum code: "Cb"
  (granulate standard XP P 18-545 march 2008)
- Warning mesh:
  (NF EN 12 613): 30 cm above pipes

**6 - Finishing layer**
- Topsoil, asphalt overlay, etc...

**7 - Warning mesh**

**8 - Embankment**

**9 - Protective embankment**

**10 - Wrapping area**

**11 - Seating**

# Network calculation

## Network design aspects

### GENERAL

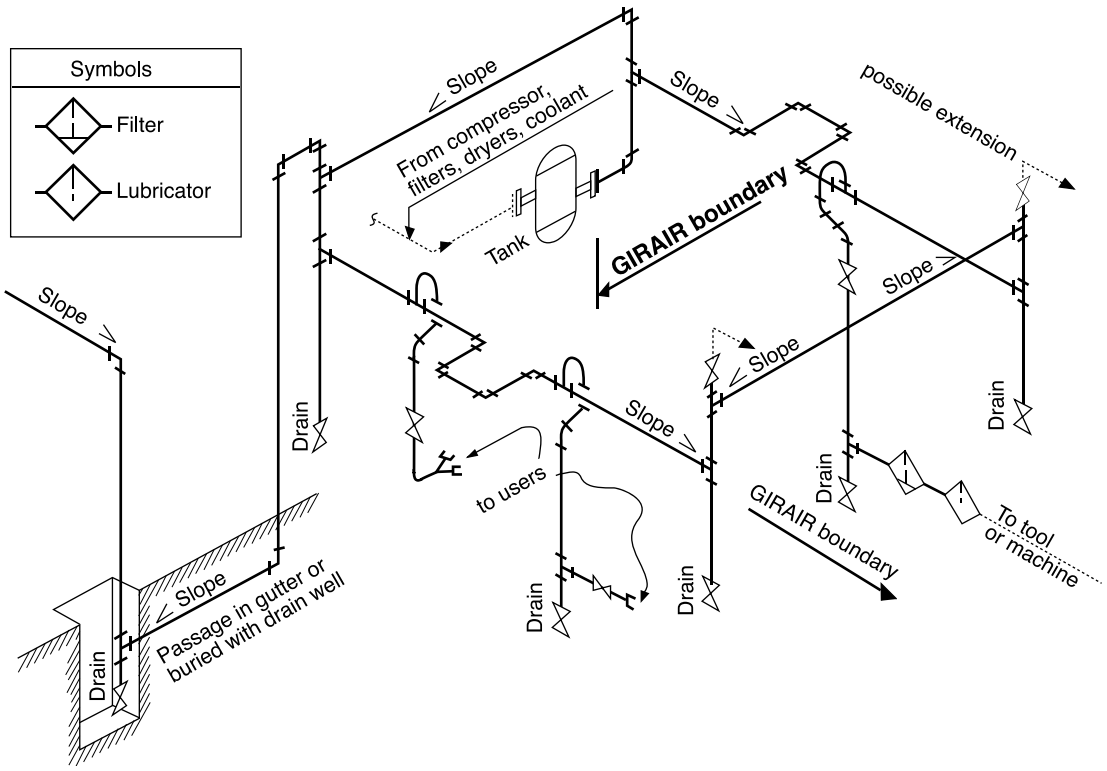
The evolution in compressed air production techniques and tools requires the design of innovative networks. In order to allow for extensions or new branches, the mains of such networks must be amply dimensioned.

Sectioning the network into closed loop circuits according to each workshop type and depending on various working pressures guarantees higher efficiency and optimal working pressures at all points in the network.

A shallow slope on the manifolds combined with the installation of a condensate trap made with fittings and pipes at each low point, together with the installation of all branches starting upward, will ensure the good quality of compressed air at each point of final distribution.

### BASIC PATTERN

The isometric drawing below is an example and summarizes the basic principles to respect during the installation of compressed air network using the GIRAIR® system.
In case of any specific problem, please consult Aliaxis US.




The GIRAIR® system can only be used after the tank, the coolers, etc..., and must not be directly connected to elements subject to strong vibrations

# Flow rate-pressure losses

## NETWORK DESIGN ADVICE

- Have as many straight sections as possible.
- Compressed air speed should be around 7 m/s: indeed, by exceeding this speed, pressure losses increase quickly, and so do energy costs. Nonetheless, a speed inferior to 5 m/s means that the diameter of the pipe is not fully used, which also enables to regulate air consumption peaks thanks to the amounts of air stored in the network.
- The network needs to be drained easily from its condensates at low points.
- Make branches start from the upper side of the pipe .
- Choose accessories and fittings that will cause less pressure losses.
- Design a network as simple as possible to have a better balance flow.
- Try to have an internal diameter of pipe as constant as possible. Avoid pipe section reductions to limit pressure losses.
- Use enough valves to allow for network isolation by sections.

## DRAINING

Condensation has no effect on the GIRAIR® system, but it can damage production tools. It is important to be able to evacuate condensation and even more if the system does not have a dryer upstream.

- Drains can be automatic or manual.
- The network requires a slope about 0.7 % to 1 %, directed toward the drain.
- Drains will be located at the lowest points of the circuit or at the end of straight lines.

## BRANCHES

In order to avoid the presence of water in downpipes, branches are done with drop bends starting from the upper side of the network.
This technique enables condensation and impurities to be evacuated toward the drains without affecting the equipment or the manufacturing process (e.g. low pressure paint pistols...).

## THE FLOW: PRESSURE OF NETWORK

To determine the compressed air network dimensions some data needs to be known precisely:

- The equipments using compressed air:
- quantity,
- the pressure recommended by the manufacturers,
- the volume of air consumed when machines are on,
- number of machines working simultaneously.
- Kind of joints used to link the equipment to the compressed air network.
- Identify the accessories added to the compressed air network (filters...).
- Incorporate network extension plans in the initial design.
- User's energetic policy, consequences on the pressure losses....

The pressure of the network at the starting point shall be equal to the pressure of the machine needing the highest pressure added to the GIRAIR® system load losses, and to particular accessories pressure losses: filters, quick fittings (some of them may have a pressure loss of 1 bar or more, contact the manufacturer for exact information).

| | | | | | |
|---|---|---|---|---|---|
| Examples : | - Pneumatic screwdriver | = | flow 25 Nm3/h | pressure | 5 bar |
| | - Paint pistol | = | flow 14 Nm3/h | pressure | 4 bar |
| | - Sandblaster | = | flow 35 Nm3/h | pressure | 6 bar |

In order to determine pipework sizes, start with the mains (starting from compressor outlet) and proceed by sections.

## PRESSURE LOSSES AND PIPEWORK SIZE

The calculation of pipework dimensions is a direct function of the pressure loss (Δp) admitted between start point and end points. Oversized networks will lead to high pressure losses and may cause compressors to conserve too much energy.
This pressure loss takes into account the total length of pipe, and each fitting's specific influence figured out in equivalent runs of pipe, according to each fitting's shape.
The following table shows the equivalent pipe lengths corresponding to each type of fitting, per size.

**EQUIVALENT LENGTH OF PIPE OF THE SAME DIAMETER (in metres)**

| Pipe external Ø | Coupling Unions | Elbow 90° | Elbow 45° | Tee | Tee to branch | Reducing bush short pattern | Reducing double long pattern | Bends 90° | 180° drop bends |
|---|---|---|---|---|---|---|---|---|---|
| 16 | 0.10 | 0.30 | 0.15 | 0.10 | 0.70 | 0.45 | 0.20 | 0.10 | 0.25 |
| 20 | 0.15 | 0.40 | 0.20 | 0.15 | 0.85 | 0.55 | 0.25 | 0.15 | 0.35 |
| 25 | 0.20 | 0.50 | 0.25 | 0.15 | 1.05 | 0.70 | 0.30 | 0.15 | 0.45 |
| 32 | 0.25 | 0.60 | 0.30 | 0.20 | 1.35 | 0.90 | 0.40 | 0.20 | 0.55 |
| 40 | 0.30 | 0.80 | 0.40 | 0.25 | 1.70 | 1.10 | 0.45 | 0.25 | - |
| 50 | 0.40 | 0.95 | 0.50 | 0.35 | 2.15 | 1.35 | 0.60 | 0.35 | - |
| 63 | 0.50 | 1.25 | 0.60 | 0.45 | 2.70 | 1.70 | 0.75 | 0.45 | - |
| 75 | - | 1.50 | 0.75 | 0.55 | 3.70 | 2.40 | 1.10 | 0.55 | - |
| 90 | - | 1.85 | 0.95 | 0.70 | 4.55 | 3.10 | 1.35 | 0.75 | - |
| 110 | - | 2.50 | 1.35 | 0.95 | 6.05 | 3.50 | 1.55 | 1.00 | - |

**It is common usage to consider that fittings account for an additional 15% of the total length of pipe.**

Use the above formula to determine the diameter with an optimised fluid speed of **7m/s:**

$$Ø\ int. = 1.84 \sqrt[5.16]{\frac{Ø^2\ L1}{\Delta p1\ P}}$$

**Aubery equation**

Ø int. = inside diameter (mm)
Q = flow ($m^3/h$)
L1 = length (m)
Δp1 = pressure loss of the pipework section (bar)
P = pressure of the network (bar)

L1 = Length of pipe + sum of length of the equivalent fittings
Note: for a 300 m length circuit if we impose a 0.3 bar Δp
for a 70 m length section: $\Delta p = \frac{0.3 \times 70}{300} = 0.07$ bar

**Reminder: GIRAIR® (mm) pipe dimensions**

| Ø ext. | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 75 | 90 | 110 |
|---|---|---|---|---|---|---|---|---|---|---|
| Ø int. maxi | 12.4 | 15.4 | 19.4 | 26.2 | 32.6 | 40.8 | 51.4 | 61.4 | 73.6 | 90 |

**THOSE TABLES GIVE AN EVALUATION OF THE PIPE OUTSIDE DIAMETER REQUIRED ACCORDING TO THE PRESSURE LOSSES AND THE FLOW RATE, WITH A FLUID SPEED ABOUT 7M/S**

# Pressure = 7 bar

**Δp ≤ 0.1**

| Q Flow $m^3/h$ | L1 = Length (m) pipes length + equal length due to the fittings | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 10 | 25 | 50 | 75 | 100 | 125 | 150 | 200 |
| 25 | 16 | 20 | 20 | 25 | 25 | 25 | 25 | 25 |
| 50 | 20 | 25 | 25 | 32 | 32 | 32 | 32 | 32 |
| 75 | 25 | 32 | 32 | 32 | 32 | 40 | 40 | 40 |
| 100 | 25 | 32 | 32 | 40 | 40 | 40 | 40 | 40 |
| 200 | 32 | 40 | 40 | 50 | 50 | 50 | 50 | 50 |
| 300 | 40 | 50 | 50 | 50 | 63 | 63 | 63 | 63 |
| 400 | 40 | 50 | 63 | 63 | 63 | 63 | 75 | 75 |
| 500 | 50 | 50 | 63 | 63 | 75 | 75 | 75 | 75 |
| 600 | 50 | 63 | 63 | 75 | 75 | 75 | 90 | 90 |
| 700 | 50 | 63 | 75 | 75 | 75 | 90 | 90 | 90 |
| 800 | 50 | 63 | 75 | 75 | 90 | 90 | 90 | 90 |
| 900 | 63 | 63 | 75 | 90 | 90 | 90 | 90 | 110 |
| 1000 | 63 | 75 | 75 | 90 | 90 | 90 | 110 | 110 |
| 1500 | 75 | 90 | 90 | 110 | 110 | 110 | 110 | 110 |
| 2000 | 75 | 90 | 110 | 110 | - | - | - | - |

**Δp ≤ 0.3**

| Q Flow $m^3/h$ | L1 = Length (m) pipes length + equal length due to the fittings | | | | | |
|---|---|---|---|---|---|---|
| | 300 | 400 | 500 | 600 | 800 | 1000 |
| 25 | 25 | 25 | 25 | 25 | 32 | 32 |
| 50 | 32 | 32 | 32 | 32 | 32 | 40 |
| 75 | 40 | 40 | 40 | 40 | 40 | 40 |
| 100 | 40 | 40 | 40 | 40 | 50 | 50 |
| 200 | 50 | 50 | 50 | 63 | 63 | 63 |
| 300 | 63 | 63 | 63 | 63 | 75 | 75 |
| 400 | 75 | 75 | 75 | 75 | 75 | 90 |
| 500 | 75 | 75 | 75 | 75 | 90 | 90 |
| 600 | 75 | 75 | 90 | 90 | 90 | 90 |
| 700 | 90 | 90 | 90 | 90 | 90 | 110 |
| 800 | 90 | 90 | 90 | 90 | 110 | 110 |
| 900 | 90 | 90 | 90 | 110 | 110 | 110 |
| 1000 | 90 | 90 | 110 | 110 | 110 | 110 |
| 1500 | 110 | 110 | 110 | - | - | - |
| 2000 | - | - | - | - | - | - |

# Pressure = 12,5 bar

**Δp ≤ 0.1**

| Q Flow $m^3/h$ | L1 = Length (m) pipes length + equal length due to the fittings | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 10 | 25 | 50 | 75 | 100 | 125 | 150 | 200 |
| 25 | 16 | 16 | 20 | 20 | 20 | 25 | 25 | 25 |
| 50 | 20 | 20 | 25 | 25 | 32 | 32 | 32 | 32 |
| 75 | 25 | 25 | 32 | 32 | 32 | 32 | 32 | 32 |
| 100 | 25 | 32 | 32 | 32 | 32 | 32 | 40 | 40 |
| 200 | 32 | 32 | 40 | 40 | 50 | 50 | 50 | 50 |
| 300 | 32 | 40 | 50 | 50 | 50 | 50 | 63 | 63 |
| 400 | 40 | 50 | 50 | 50 | 63 | 63 | 63 | 63 |
| 500 | 40 | 50 | 63 | 63 | 63 | 63 | 75 | 75 |
| 600 | 40 | 50 | 63 | 63 | 63 | 75 | 75 | 75 |
| 700 | 50 | 63 | 63 | 63 | 75 | 75 | 75 | 75 |
| 800 | 50 | 63 | 63 | 75 | 75 | 75 | 90 | 90 |
| 900 | 50 | 63 | 75 | 75 | 75 | 90 | 90 | 90 |
| 1000 | 50 | 63 | 75 | 75 | 90 | 90 | 90 | 90 |
| 1500 | 63 | 75 | 90 | 90 | 90 | 110 | 110 | 110 |
| 2000 | 75 | 90 | 90 | 110 | 110 | 110 | 110 | - |

**Δp ≤ 0.3**

| Q Flow $m^3/h$ | L1 = Length (m) pipes length + equal length due to the fittings | | | | | |
|---|---|---|---|---|---|---|
| | 300 | 400 | 500 | 600 | 800 | 1000 |
| 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| 50 | 32 | 32 | 32 | 32 | 32 | 32 |
| 75 | 32 | 32 | 32 | 32 | 40 | 40 |
| 100 | 40 | 40 | 40 | 40 | 40 | 40 |
| 200 | 50 | 50 | 50 | 50 | 50 | 63 |
| 300 | 50 | 50 | 63 | 63 | 63 | 63 |
| 400 | 63 | 63 | 63 | 63 | 75 | 75 |
| 500 | 63 | 63 | 75 | 75 | 75 | 75 |
| 600 | 75 | 75 | 75 | 75 | 90 | 90 |
| 700 | 75 | 75 | 75 | 90 | 90 | 90 |
| 800 | 75 | 75 | 90 | 90 | 90 | 90 |
| 900 | 75 | 90 | 90 | 90 | 90 | 110 |
| 1000 | 90 | 90 | 90 | 90 | 110 | 110 |
| 1500 | 110 | 110 | 110 | 110 | 110 | - |
| 2000 | 110 | 110 | 110 | - | - | - |

# PIPES AND FITTING

## FOR COMPRESSED AIR

aliaxis

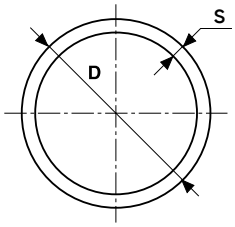
## CAUTION:

- All the sizes indicated in the dimension sheets are in millimetres, when not specified.
- All the threaded fittings are BSP:
  - On GIRAIR®, male threads are conical (taper) and female threads are cylindrical (parallel).
  - On brass, all threads are cylindrical (parallel).

## IMPORTANT NOTE:

With the constant concern to improve the range and quality of its products within the context of the standards used at present, GIRPI reserves the right to modify the dimensional characteristics of its pipes and fittings together with the scope of its ranges, without prior notice.

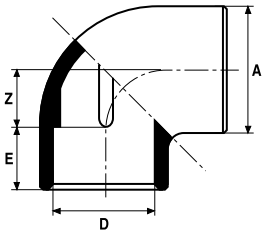
# DIMENSION




## GIRAIR® PIPES

Chamfered at both ends, in 4 lengths. Wrapped in plastic sleeves

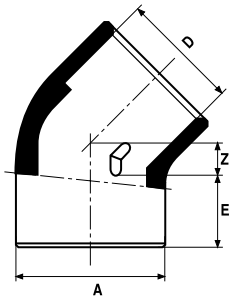
| D | DN | PMS at 25°C | e mini | Weight kg/m | Internal Ø | Capacity l/m | Reference |
|---|---|---|---|---|---|---|---|
| 16 | 10 | 12.5 | 1.8 | 0.106 | 12.4 | 0.120 | TUBGA16 |
| 20 | 15 | 12.5 | 2.3 | 0.168 | 15.4 | 0.186 | TUBGA20 |
| 25 | 20 | 12.5 | 2.8 | 0.257 | 19.4 | 0.295 | TUBGA25 |
| 32 | 25 | 12.5 | 2.9 | 0.340 | 26.2 | 0.538 | TUBGA32 |
| 40 | 32 | 12.5 | 3.7 | 0.542 | 32.6 | 0.834 | TUBGA40 |
| 50 | 40 | 12.5 | 4.6 | 0.842 | 40.8 | 1307 | TUBGA50 |
| 63 | 50 | 12.5 | 5.8 | 1334 | 51.4 | 2074 | TUBGA63 |
| 75 | 65 | 12.5 | 6.8 | 2090 | 61.4 | 2960 | TUBGA75 |
| 90 | 80 | 12.5 | 8.2 | 3030 | 73.6 | 4250 | TUBGA90 |
| 110 | 100 | 12.5 | 10 | 4480 | 90.0 | 6360 | TUBGA110 |




## ELBOWS 90°

Soc. x Soc.

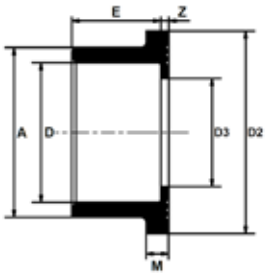
| D | DN | Z | E | A | Reference |
|---|---|---|---|---|---|
| 16 | 10 | 10 | 9 | 21 | GA4M16 |
| 20 | 15 | 11 | 17 | 28,5 | GA4M20 |
| 25 | 20 | 14 | 19,9 | 35,8 | GA4M25 |
| 32 | 25 | 17 | 23 | 44 | GA4M32 |
| 40 | 32 | 23 | 27 | 49 | GA4M40 |
| 50 | 40 | 27 | 31,5 | 58 | GA4M50 |
| 63 | 50 | 33 | 38 | 73 | GA4M63 |
| 75 | 65 | 39 | 44 | 92,5 | GA4M75 |
| 90 | 80 | 49 | 52,5 | 112 | GA4M90 |
| 110 | 100 | 58 | 62 | 131,5 | GA4M110 |




## ELBOWS 45°

Soc. x Soc.

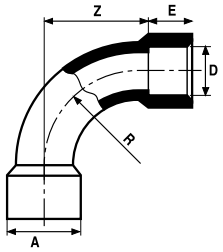
| D | DN | Z | E | A | Reference |
|---|---|---|---|---|---|
| 16 | 10 | 4.5 | 14.5 | 21 | GA8M16 |
| 20 | 15 | 4.5 | 17 | 25.5 | GA8M20 |
| 25 | 20 | 5.5 | 19.5 | 31.5 | GA8M25 |
| 32 | 25 | 8 | 23 | 39.5 | GA8M32 |
| 40 | 32 | 9.5 | 27 | 49 | GA8M40 |
| 50 | 40 | 11 | 31.5 | 63.2 | GA8M50 |
| 63 | 50 | 14 | 38 | 72.5 | GA8M63 |
| 75 | 65 | 18 | 44 | 92 | GA8M75 |
| 90 | 80 | 22 | 52 | 109 | GA8M90 |
| 110 | 100 | 24 | 62 | 131.5 | GA8M110 |




## SERRATED STUB FLANGES

Soc

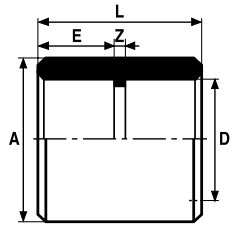
| D | DN | Z | E | A | D2 | M | L | Reference |
|---|---|---|---|---|---|---|---|---|
| 50 | 40 | 3 | 32 | 61 | 73 | 8 | 35 | GACS50 |
| 63 | 50 | 3 | 38.5 | 76 | 90 | 9 | 41.5 | GACS63 |
| 75 | 63 | 3 | 44 | 90 | 106 | 10 | 47 | GACS75 |
| 90 | 80 | 5 | 52 | 108 | 125 | 11 | 57 | GACS90 |
| 110 | 100 | 5 | 62 | 131 | 150 | 12 | 67 | GACS110 |




## BENDS 90°

Soc. x Soc.

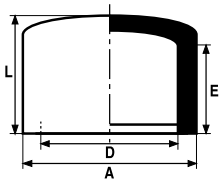
| D | DN | Z | E | A | L | Reference |
|---|---|---|---|---|---|---|
| 50 | 40 | 99 | 31 | 64 | 131 | GA4C50 |
| 110 | 100 | 225 | 60 | 136 | 285 | GA4C110 |




## COUPLINGS

Soc. x Soc.

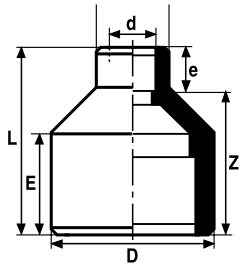
| D | DN | Z | E | A | L | Reference |
|---|---|---|---|---|---|---|
| 16 | 10 | 3 | 15 | 33 | 22 | GAMA16 |
| 20 | 15 | 3 | 17 | 26 | 37 | GAMA20 |
| 25 | 20 | 2.5 | 20 | 31.5 | 42.5 | GAMA25 |
| 32 | 25 | 3.5 | 23 | 38 | 49.5 | GAMA32 |
| 40 | 32 | 4 | 26.5 | 48 | 57 | GAMA40 |
| 50 | 40 | 3 | 32 | 59.5 | 67 | GAMA50 |
| 63 | 50 | 4 | 38 | 75.5 | 80.0 | GAMA63 |
| 75 | 65 | 4 | 45 | 91 | 94 | GAMA75 |
| 90 | 80 | 5 | 52 | 106.5 | 109 | GAMA90 |
| 110 | 100 | 6 | 62 | 126.5 | 130 | GAMA110 |




## CAPS

Soc.

| D | DN | E | A | L | Reference |
|---|---|---|---|---|---|
| 16 | 10 | 14 | 24 | 20 | GABO16 |
| 20 | 15 | 17.5 | 26 | 22 | GABO20 |
| 25 | 20 | 19.5 | 31.5 | 25.5 | GABO25 |
| 32 | 25 | 24 | 39.5 | 30 | GABO32 |
| 40 | 32 | 28 | 48 | 36.5 | GABO40 |
| 50 | 40 | 33 | 59.5 | 43 | GABO50 |
| 63 | 50 | 40.5 | 75 | 52.5 | GABO63 |
| 75 | 65 | 52 | 91 | 77 | GABO75 |
| 110 | 100 | 66 | 129 | 109.5 | GABO110 |

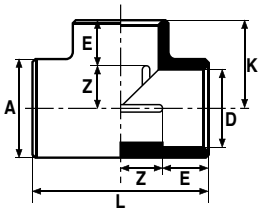



## REDUCING BUSHES LONG PATTERN

Spig. (Ø) x Soc. (øR)

| D-d | DN | D1 | Z | E | E1 | E2 | L | Reference |
|---|---|---|---|---|---|---|---|---|
| 25-16 | 20-10 | (*) 16.5 | 25.5 | 19 | 14.5 | 14 | 40 | GARD2516 |
| 32-20 | 25-15 | 25 | 31 | 22.5 | 17 | 19.5 | 48 | GARD3220 |
| 40-25 | 32-20 | 32 | 36.5 | 27 | 19.5 | 21.5 | 56 | GARD4025 |
| 50-32 | 40-25 | 40 | 45 | 32 | 23 | 27.5 | 68 | GARD5032 |
| 63-32 | 50-25 | 50 | 55.5 | 38.5 | 23 | 32 | 78.5 | GARD6332 |
| 63-40 | 50-32 | 50 | 55.5 | 38.5 | 27 | 32 | 82.5 | GARD6340 |
| 75-32 | 65-25 | (*) 61 | 62 | 45 | 22.5 | 38 | 85 | GARD7532 |
| 90-50 | 80-40 | 75 | 74.5 | 53 | 32 | 44 | 106.5 | GARD9050 |
| 90-63 | 80-50 | 75 | 75 | 53 | 38.5 | 44.5 | 113.5 | GARD9063 |
| 110-50 | 100-40 | 90 | 90.5 | 62 | 32 | 52.5 | 122.5 | GARD1150 |
| 110-63 | 100-50 | 90 | 92 | 63.5 | 38 | 54 | 130 | GARD1163 |

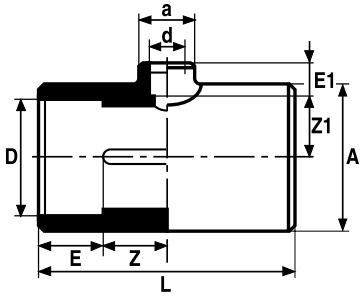
*(*) - NB: GARD 32 to 110 are Male on the reference Ø (D) or Female with a difference Ø and Female on the reduced Ø (d), except GARD 7532*




## EQUAL TEES 90°

Soc. x Soc.

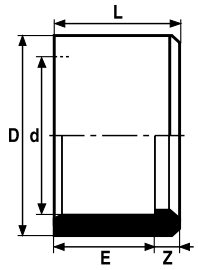
| D | DN | Z | E | A | L | K | Reference |
|---|---|---|---|---|---|---|---|
| 16 | 10 | 9 | 14 | 21 | 48 | 24 | GATE16 |
| 20 | 15 | 11 | 17 | 26 | 56 | 28 | GATE20 |
| 25 | 20 | 14 | 19 | 31.5 | 66.5 | 34 | GATE25 |
| 32 | 25 | 17 | 22,9 | 45 | 81 | 40,1 | GATE32 |
| 40 | 32 | 22 | 27 | 49.5 | 97.5 | 50 | GATE40 |
| 50 | 40 | 26.5 | 31 | 61 | 115 | 58 | GATE50 |
| 63 | 50 | 32.5 | 38.5 | 78 | 142 | 72 | GATE63 |
| 75 | 65 | 39 | 44.5 | 91.5 | 166.5 | 83 | GATE75 |
| 90 | 80 | 45 | 53 | 112 | 196.5 | 98 | GATE90 |
| 110 | 100 | 55.5 | 62.5 | 132 | 236 | 119 | GATE110 |




## REDUCING TEES 90°(mm)

Soc. x Soc.

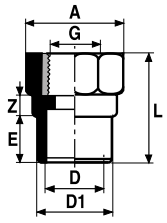
| D-d | DN | Z | Z1 | E | E1 | A | a | L | Reference |
|---|---|---|---|---|---|---|---|---|---|
| 20-16 | 15-10 | 11 | 11 | 17 | 15 | 26 | 21 | 56 | GATR2016 |
| 25-16 | 20-10 | 14 | 14 | 18.5 | 14 | 31 | 21 | 66 | GATR2516 |
| 25-20 | 20-15 | 13.5 | 13 | 19.5 | 16 | 31 | 26 | 66 | GATR2520 |
| 32-16 | 25-15 | 17 | 18 | 23 | 14 | 44.5 | 24 | 82.5 | GATR3216 |
| 32-20 | 25-15 | 17.5 | 18.5 | 23.5 | 16.5 | 39 | 26.5 | 82 | GATR3220 |
| 32-25 | 25-20 | 18 | 20 | 23 | 19 | 39 | 31.5 | 82 | GATR3225 |
| 40-20 | 32-15 | 22 | 23 | 27 | 17 | 49.5 | 26.5 | 97.5 | GATR4020 |
| 40-25 | 32-20 | 22 | 23 | 27 | 19.5 | 49.5 | 31.5 | 97.5 | GATR4025 |
| 40-32 | 32-25 | 22 | 22 | 27 | 23 | 49.5 | 39.5 | 97.5 | GATR4032 |
| 50-25 | 40-20 | 26.5 | 28 | 31 | 20 | 60.5 | 33 | 114.5 | GATR5025 |
| 50-32 | 40-25 | 26.5 | 28 | 31 | 23 | 61 | 41 | 115 | GATR5032 |
| 63-20 | 50-15 | 34 | 32.5 | 38 | 17.5 | 80 | 38 | 143 | GATR6320 |
| 63-25 | 50-20 | 33.5 | 35 | 38.5 | 20 | 80 | 37 | 144 | GATR6325 |
| 63-32 | 50-25 | 33.5 | 35 | 38.5 | 23.5 | 80 | 45 | 144 | GATR6332 |
| 63-40 | 50-32 | 33.5 | 36 | 38.5 | 27.5 | 80 | 54.5 | 144 | GATR6340 |
| 75-25 | 65-20 | 39 | 40 | 44.5 | 19.5 | 92.5 | 37 | 167 | GATR7525 |
| 75-32 | 65-25 | 38.5 | 38.5 | 44.5 | 23 | 92.5 | 45 | 166.5 | GATR7532 |
| 90-25 | 80-20 | 46 | 46.5 | 52.5 | 19.5 | 114.5 | 37.5 | 197 | GATR9025 |
| 110-32 | 100-25 | 57 | 67.5 | 62 | 23.5 | 135 | 65 | 238 | GATR1132 |




## REDUCING BUSHES SHORT PATTERN

Spig. (Ø) x Soc. (øR)

| D-d | DN | Z | E | A | Reference |
|---|---|---|---|---|---|
| 20-16 | 15 | 2.5 | 15.0 | 17.5 | GARS20 |
| 25-20 | 20 | 3.5 | 17.0 | 20.5 | GARS25 |
| 32-25 | 25 | 5 | 19.5 | 24.5 | GARS32 |
| 40-32 | 32 | 6 | 23 | 29 | GARS40 |
| 50-40 | 40 | 5 | 27 | 32 | GARS50 |
| 63-50 | 50 | 7 | 31.5 | 38.5 | GARS63 |
| 75-63 | 65 | 7.5 | 37 | 44.5 | GARS75 |
| 90-75 | 80 | 8 | 44 | 52 | GARS90 |
| 110-90 | 100 | 10.5 | 52 | 62.5 | GARS110 |

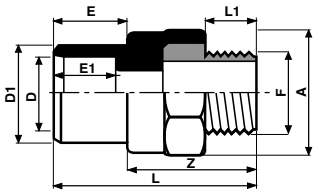



## THREADED ADAPTORS

Soc. / Spig. x female brass thread

| D-G | DN | Z | E | L | D1 | A1 | Reference |
|---|---|---|---|---|---|---|---|
| 16-3/8" | 10 | 5.5 | 14 | 32 | 20 | 23 | GAMML16 |
| 20-1/2" | 15 | 5.5 | 16 | 38.5 | 25 | 27.5 | GAMML20 |
| 25-3/4" | 20 | 5.5 | 19 | 43 | 32 | 34 | GAMML25 |
| 32-1" | 25 | 5 | 22 | 48 | 40 | 41 | GAMML32 |
| 40-1"1/4 | 32 | 7 | 27.5 | 58.5 | 50 | 55 | GAMML40 |
| 50-1"1/2 | 40 | 8.5 | 31 | 63.5 | 63 | 65 | GAMML50 |
| 63-2" | 50 | 10.5 | 40 | 78.5 | 75 | 76 | GAMML63 |

Assembling: see page 11



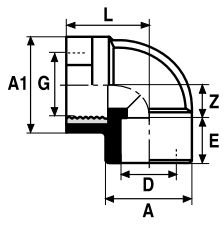

## ADAPTOR NIPPLES

Soc. / Spig. x male brass thread

| D-d | D | Z | E | E1 | A | L | L1 | Reference |
|---|---|---|---|---|---|---|---|---|
| 16-3/8" | 20 | 32.5 | 17 | 15 | 32.2 | 49.5 | 11 | GAEAL16 |
| 20-1/2" | 25 | 41 | 19 | 17 | 36 | 60 | 15 | GAEAL20 |
| 25-3/4" | 32 | 43 | 22.5 | 19.5 | 41 | 65 | 16 | GAEAL25 |
| 32-1" | 40 | 49 | 27 | 23 | 49.5 | 76 | 19.5 | GAEAL32 |
| 40-1"1/4 | 50 | 55 | 31 | 26 | 60 | 87 | 22 | GAEAL40 |
| 50-1"1/4 | 63 | 55 | 37.5 | 31 | 66 | 92 | 22 | GAEAL50 |
| 63-2" | 75 | 63 | 43.5 | 37.5 | 82 | 106 | 26 | GAEAL63 |

| D-d | D | Z | E | E1 | A | L | L1 | Reference |
|---|---|---|---|---|---|---|---|---|
| 16-1/2" | 20 | 36.5 | 16.5 | 14.5 | 32.2 | 53.5 | 13.5 | GAEABL16 |
| 25-1" | 32 | 45.5 | 23 | 19 | 49.5 | 68.5 | 19.5 | GAEABL25 |

Assembling: see page 11



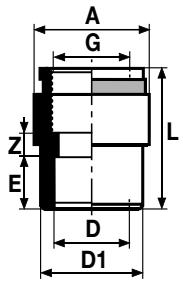

## THREADED ELBOWS 90°

Soc. x Female brass thread

| D-G | DN | Z | E | A | A1 | L | Reference |
|---|---|---|---|---|---|---|---|
| 20-1/2" | 15 | 16 | 16.5 | 29 | 36 | 32 | GA4GL20 |

Especially adapted for connection with metal threaded fittings and high torque.

Assembling: see page 11

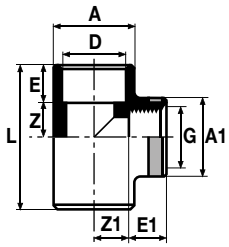



## F-G THREADED SLEEVES TO SCREW (with brass insert)

With metal reinforcement ring - cylindrical thread

| D-G | DN | Z | E | L | D1 | A1 | Reference |
|---|---|---|---|---|---|---|---|
| 16-3/8" | 10 | 5,5 | 14 | 32 | 20 | 23 | GAMM16 |
| 20-1/2" | 15 | 5,5 | 16 | 38,5 | 25 | 27,5 | GAMM20 |
| 25-3/4" | 20 | 5,5 | 19 | 43 | 32 | 34 | GAMM25 |
| 32-1" | 25 | 5 | 22 | 48 | 40 | 41 | GAMM32 |
| 40-1"1/4 | 32 | 7 | 27,5 | 58,5 | 50 | 55 | GAMM40 |
| 50-1"1/2 | 40 | 8,5 | 31 | 63,5 | 63 | 65 | GAMM50 |
| 63-2" | 50 | 10,5 | 40 | 78,5 | 75 | 76 | GAMM63 |

Assembling: see page 11

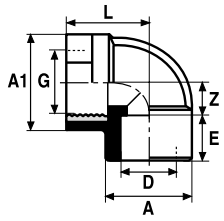



## REDUCING TEES 90° (with metal reinforcing ring)

Soc. x Female thread branch

| D-G | DN | Z | E | L | A | Z1 | E | A1 | Reference |
|---|---|---|---|---|---|---|---|---|---|
| 20-1/2" | 15 | 14 | 17 | 61.5 | 30.5 | 14.5 | 17 | 30 | GATG2012 |
| 25-3/4" | 20 | 13 | 20 | 66.5 | 35 | 15.5 | 20 | 40 | GATG2534 |

Assembling: see page 11

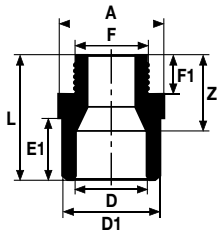



## THREADED ELBOWS 90° (with metal reinforcing ring)

Soc. x Female thread

| D | G | Dn | Z | E | A | A1 | L | Reference |
|---|---|---|---|---|---|---|---|---|
| 20 | 1/2" | 15 | 10 | 17 | 29 | 27 | 27 | GA4G20 |
| 25 | 1/4" | 20 | 14 | 19.5 | 36 | 34 | 33 | GA4G25 |

Assembling: see page 11

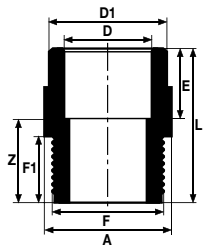



## ADAPTOR NIPPLES

Soc. x Male thread

| D | F | D1 | Z | E | A | L | F1 | E1 | Reference |
|---|---|---|---|---|---|---|---|---|---|
| 16 | 3/8" | 20 | 24.5 | 15 | 25 | 39.5 | 12 | 17 | GAEA16 |
| 20 | 1/2" | 25 | 29 | 17 | 30 | 46 | 15 | 19 | GAEA20 |
| 25 | 3/4" | 32 | 33.5 | 19.5 | 36.5 | 53 | 17 | 23 | GAEA25 |
| 32 | 1" | 40 | 43.5 | 22.5 | 47 | 66 | 20 | 27 | GAEA32 |
| 40 | 1"1/4 | 50 | 45 | 26.5 | 55 | 71.5 | 21.5 | 32 | GAEA40 |
| 50 | 1"1/2 | 63 | 46 | 31.5 | 68 | 77.5 | 23 | 38.5 | GAEA50 |
| 63 | 2" | 75 | 49 | 38.5 | 78.5 | 87.5 | 27.5 | 44 | GAEA63 |
| 75 | 2"1/2 | 90 | 49.5 | 45 | 94 | 94.5 | 30.5 | 51.8 | GAEA75 |

Assembling: see page 11



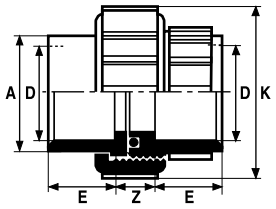

## REDUCING ADAPTOR NIPPLES

Soc. x Male thread

| D | F | D1 | Z | E | A | L | F1 | E1 | Reference |
|---|---|---|---|---|---|---|---|---|---|
| 16 | 1/2" | 20 | 27.5 | 15 | 24.5 | 42.5 | 15 | 16.5 | GAEB16 |
| 20 | 3/4" | 25 | 31.5 | 17 | 30 | 48.5 | 17 | 20 | GAEB20 |
| 25 | 1" | 32 | 35 | 21 | 36.5 | 56 | 19.5 | 23 | GAEB25 |
| 32 | 1"1/4 | 40 | 40 | 23 | 47 | 63 | 21.5 | 27 | GAEB32 |
| 40 | 1"1/2 | 50 | 42.5 | 27 | 48 | 69.5 | 22.5 | 32 | GAEB40 |
| 50 | 2" | 63 | 49.5 | 32.5 | 60 | 82 | 27 | 38 | GAEB50 |

The solvent welded ends of GAEA and GAEB adaptors are female (socket) only.
The male threaded ends of GAEA and GAEB adaptors can be assembled with GIRAIR® or metal threaded fittings (brass, iron, steel, stainless).
- Exclusively use PTFE tape or a sealing paste that is compatible with GIRAIR® (consult us).
- The male threaded ends of GAEA and GAEB adaptors are tapered (conical).

Assembling: see page 11

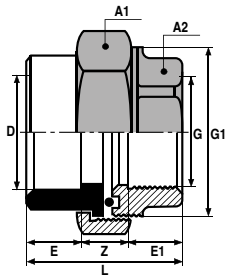



## 3 PIECE UNIONS (with EPDM gasket)

Soc. x Soc.

| D | DN | Z | E | A | K | Reference |
|---|---|---|---|---|---|---|
| 16 | 10 | 14 | 15 | 22 | 34.5 | GA3P16 |
| 20 | 15 | 14 | 17 | 27 | 42 | GA3P20 |
| 25 | 20 | 14 | 19 | 35.5 | 55 | GA3P25 |
| 32 | 25 | 13.5 | 23 | 41.5 | 62.5 | GA3P32 |
| 40 | 32 | 17 | 26,5 | 52.5 | 73.5 | GA3P40 |
| 50 | 40 | 17.5 | 32.5 | 58.5 | 81.5 | GA3P50 |
| 63 | 50 | 22 | 38.5 | 74 | 100.5 | GA3P63 |

Assembling: see page 11

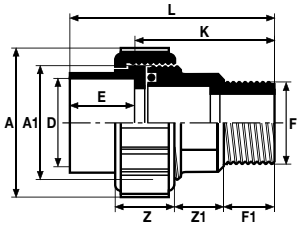



## 3 PIECE UNIONS GIRAIR® /BRASS (with EPDM gasket)

Soc. x Female brass thread

| D | G | Dn | Z | E | E1 | G1 | A1 | A2 | L | Reference |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 3/8" | 10 | 10 | 14 | 13 | 3/4" | 30 | 27 | 37 | GA3G/L16 |
| 20 | 1/2" | 15 | 8 | 17 | 14 | 1" | 36 | 27 | 39 | GA3G/L20 |
| 25 | 3/4" | 20 | 8 | 19.5 | 16 | 1"1/4 | 46 | 32.5 | 43.5 | GA3G/L25 |
| 32 | 1" | 25 | 10.5 | 23 | 16.5 | 1"1/2 | 51.5 | 38.5 | 50 | GA3G/L32 |
| 40 | 1"1/4 | 32 | 10 | 27.5 | 21 | 2" | 67 | 47 | 58.5 | GA3G/L40 |
| 50 | 1"1/2 | 40 | 12 | 32.5 | 18.5 | 2"1/4 | 72 | 53.5 | 63 | GA3G/L50 |
| 63 | 2" | 50 | 11 | 38.5 | 22 | 2"3/4 | 89 | 65.5 | 71.5 | GA3G/L63 |

Assembling: see page 11



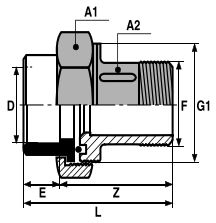

## 3 PIECE UNIONS (with EPDM gasket)

Soc. x Male thread

| D | F | Z | Z1 | F1 | L | A | A1 | K | E | Reference |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 3/8" | 19 | 11.5 | 11.5 | 52 | 36 | 3/4" | 36.5 | 15.5 | GA3F/P16 |
| 20 | 1/2" | 23 | 11 | 16.5 | 61 | 42 | 1" | 40 | 17 | GA3F/P20 |
| 25 | 3/4" | 25 | 17 | 18 | 72 | 55 | 1"1/4 | 49 | 19 | GA3F/P25 |
| 32 | 1" | 26 | 17.5 | 20.5 | 80.5 | 62.5 | 1"1/2 | 53.5 | 23 | GA3F/P32 |
| 40 | 1"1/4 | 30.5 | 17 | 23 | 88 | 73 | 2" | 57.5 | 27 | GA3F/P40 |
| 50 | 1"1/2 | 34 | 21 | 27 | 109 | 81.5 | 2"1/4 | 62 | 32 | GA3F/P50 |
| 63 | 2" | 38 | 22 | 31.5 | 125 | 99 | 2"3/4 | 68 | 38 | GA3F/P63 |

GA3F/P unions can be assembled with GIRAIR® or metal threaded fittings.
Use PTFE tape or a sealing paste that is compatible with GIRAIR® (consult us). Any other sealant is prohibited.
The male thread is tapered (conical).

Assembling: see page 11

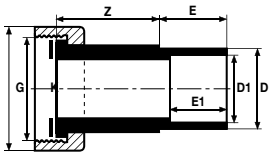



## 3 PIECE UNIONS GIRAIR® /BRASS (with EPDM gasket)

Soc. x Female brass thread

| D | F | Dn | Z | E | A1 | G1 | A2 | L | Reference |
|---|---|---|---|---|---|---|---|---|---|
| 16 | 3/8" | 10 | 35 | 14 | 30 | 3/4" | 17 | 49 | GA3F/L16 |
| 20 | 1/2" | 15 | 34 | 17 | 36 | 1" | 24.5 | 51 | GA3F/L20 |
| 25 | 3/4" | 20 | 50 | 19 | 46 | 1"1/4 | 31.5 | 69 | GA3F/L25 |
| 32 | 1" | 25 | 54 | 23 | 52 | 1"1/2 | 37.5 | 77 | GA3F/L32 |
| 40 | 1"1/4 | 32 | 53 | 27 | 67 | 2" | 47 | 83 | GA3F/L40 |
| 50 | 1"1/2 | 40 | 63.5 | 32.5 | 72 | 2"1/4 | 53 | 96 | GA3F/L50 |
| 63 | 2" | 50 | 70 | 38.5 | 89.5 | 2"3/4 | 66 | 108.5 | GA3F/L63 |

Assembling: see page 11

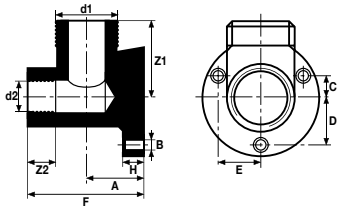



## CONNECTORS
## (with brass nuts for use with EPDM flat gasket)

Spig. x Female brass thread

| D-G | Dn | Z | E | D1 | E1 | K | Reference |
|---|---|---|---|---|---|---|---|
| 16-1/2" | 10 | 20 | 15 | 12 | 14 | 24 | GAUR16 |
| 20-3/4" | 15 | 22 | 17 | 16 | 15 | 29.5 | GAUR20 |
| 25-1" | 20 | 23 | 20 | 20 | 17 | 36 | GAUR25 |
| 32-1"1/4 | 25 | 26 | 23 | 25 | 19.5 | 45 | GAUR32 |
| 40-1"1/2 | 32 | 29 | 27 | 32 | 23 | 52 | GAUR40 |

Assembling: see page 11




## WALL PLATE ELBOW
## (for jointing on pipe with GAUR brass connector)

Inlet male thread f - outlet female thread G

| Pipe | Dn | D1 | D2 | A | B | Z1 | Z2 | C | D | E | F | H | Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 10 | 1/2" | 3/8" | 17 | 5 | 36 | 7.5 | 6 | 18 | 17 | 35.5 | 5.5 | GAAP16 |
| 20 | 15 | 3/4" | 1/2" | 18.5 | 5 | 38 | 10 | 6 | 20 | 19 | 42.5 | 6 | GAAP20 |
| 25 | 20 | 1" | 3/4" | 24.5 | 5 | 39.5 | 12 | 8 | 26 | 24 | 52.5 | 6 | GAAP25 |

Assembling: see page 11

## ACCESSORIES

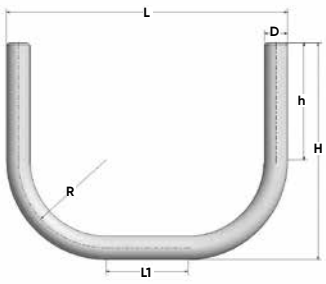
Male threaded instant fitting - profile: ISO C - inside Ø 6 mm

| D-G | Ø int. | Cond. | Reference |
|---|---|---|---|
| 3/8'' | 6 | 1 | GHRR38 |
| 1/2'' | 6 | 1 | GHRR12 |

## QUICK ADAPTOR

ISO C quick nipples for Ø 8 mm flexible pipes - inside Ø 6 mm

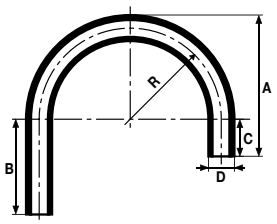
| D-G | Ø int. | Cond. | Reference |
|---|---|---|---|
| 8 | 6 | 1 | GHES8 |




## DROP BENDS 180°

Spig. x Spig. (profile C)

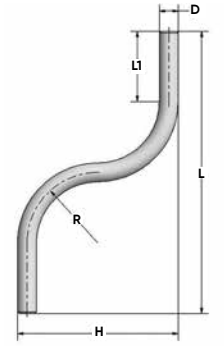
| D | Dn | h | H | R | L | l | Reference |
|---|---|---|---|---|---|---|---|
| 20 | 15 | 100 | 185 | 75 | 200 | 50 | Q2C20 |
| 25 | 20 | 100 | 187 | 75 | 200 | 50 | Q2C25 |
| 32 | 25 | 150 | 166 | 100 | 200 | / | Q2C32 |




## DROP BENDS 180°

Spig. x Spig. (profile P)

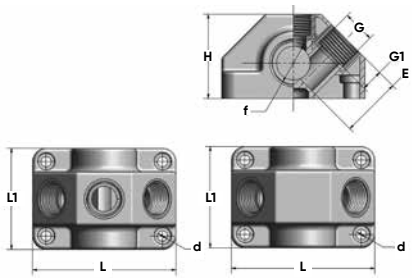
| D | Dn | R | A | B | C | Reference |
|---|---|---|---|---|---|---|
| 16 | 10 | 64 | 89 | 90 | 17 | GA2C16 |
| 20 | 15 | 70 | 100 | 90 | 20 | GA2C20 |
| 25 | 20 | 75 | 110.5 | 90 | 23 | GA2C25 |
| 32 | 25 | 95 | 138 | 140 | 27 | GA2C32 |




## DROP BENDS 180°

Spig. x Spig. (profile S)

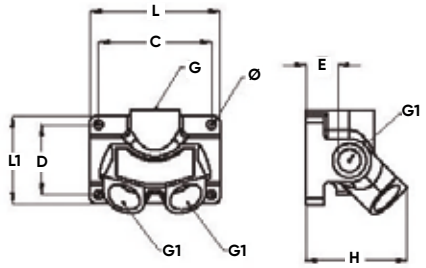
| D | Dn | R | A | B | C | Reference |
|---|---|---|---|---|---|---|
| 20 | 15 | 75 | 170 | 300 | 75 | Q2S20 |
| 25 | 20 | 75 | 175 | 350 | 100 | Q2S25 |
| 32 | 25 | 75 | 182 | 500 | 150 | Q2S32 |




## WALL PLATES

with 2 or 3 outlets

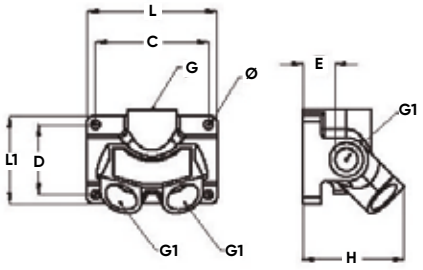
| G-F | DN | d | E | G1 | H | L | L1 | Reference |
|---|---|---|---|---|---|---|---|---|
| 2 x 1/2"-1/2" | 15 | 6 | 36 | 14 | 50 | 85 | 60 | GAAP12G2 |
| 3 x 1/2"-3/4" | 20 | 6 | 36 | 14 | 50 | 85 | 60 | GAAP34G3 |




## WALL PLATES

with 4 outlets and drain

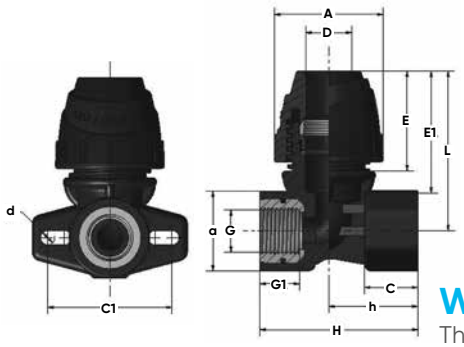
| G | G1 | d | E | L | L1 | H | D | C | Ø | Reference |
|---|---|---|---|---|---|---|---|---|---|---|
| G 1/2" | 4 x 1/2" | 7 | 35 | 105 | 70 | 81.5 | 56 | 91 | 7 | GAAP12G4P |
| G 3/4" | 4 x 1/2" | 7 | 35 | 105 | 70 | 81.5 | 56 | 91 | 7 | GAAP34G4P |




## WALL PLATES

with 4 outlets

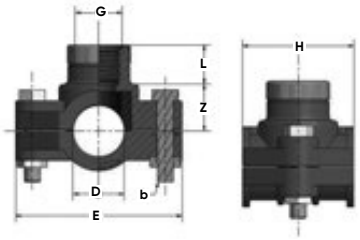
| G | G1 | d | E | L | L1 | H | D | C | Ø | Reference |
|---|---|---|---|---|---|---|---|---|---|---|
| G 1/2" | 4 x 1/2" | 7 | 35 | 105 | 70 | 81.5 | 56 | 91 | 7 | GAAP12G4 |
| G 3/4" | 4 x 1/2" | 7 | 35 | 105 | 70 | 81.5 | 56 | 91 | 7 | GAAP34G4 |




## WALL PLATES ELBOW WITH 1 FEMALE

Threaded outlet and 1 socket inlet

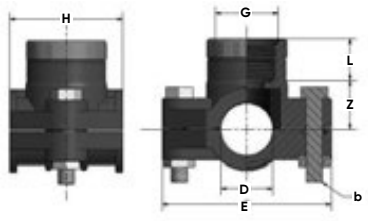
| D-G | DN | A-a | C | C1 | d | E | E1 | G1 | H-h | L | Reference. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20x1/2" | 15 | 48-36.2 | 24 | 56 | 6.5 | 45 | 55 | 17 | 71-40 | 72 | Q4GP20 |
| 25x3/4" | 20 | 58-41.1 | 26 | 56 | 6.5 | 54 | 60 | 18 | 78-42 | 79 | Q4GP25 |




## THREADED SADDLES (1/2" thread)

Soc. x female thread branch

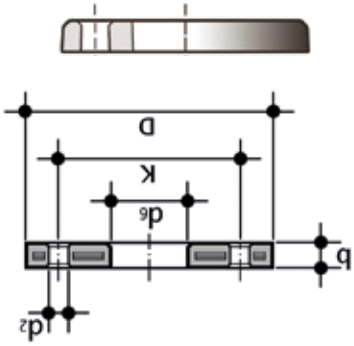
| DxG | Dn | E | H | L | Z | b | Reference |
|---|---|---|---|---|---|---|---|
| 40 x 1/2" | 32 | 84 | 51 | 22 | 27 | 2 M8 x 45 | QSB4012 |
| 50 x 1/2" | 40 | 115 | 80 | 18.8 | 38 | 4 M8 x 45 | QSB5012 |
| 63 x 1/2" | 50 | 127 | 88 | 18.8 | 45 | 4 M8 x 55 | QSB6312 |




## THREADED SADDLES (3/4" thread)

Soc. x female thread branch

| DxG | Dn | E | H | L | Z | b | Reference |
|---|---|---|---|---|---|---|---|
| 25 x 3/4" | 20 | 81.5 | 54.5 | 20.1 | 22.5 | 2 M8 x 45 | QSB2534 |
| 32 x 3/4" | 25 | 92 | 66 | 20.1 | 26.5 | 2 M8 x 45 | QSB3234 |
| 40 x 3/4" | 32 | 84 | 51 | 22 | 27 | 2 M8 x 45 | QSB4034 |
| 50 x 3/4" | 40 | 115 | 80 | 20.1 | 38 | 4 M8 x 45 | QSB5034 |
| 63 x 3/4" | 50 | 127 | 88 | 20.1 | 45 | 5 M8 x 55 | QSB6334 |

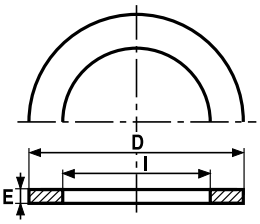



## ODT/ODT-SW

Wedge profile backing ring, with metal core and a PP-GR coating
According to EN/ISO/DIN for stub QRNM. Drilling: PN 10/16

| d | DN | *PMA (bar) | b | $d_2$ | $d_6$ | D | K | M | n | **Nm | g | Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 15 | 16 | 13 | 14,6 | 28 | 100 | 65 | M12 | 4 | 10 | 215 | ODT020 |
| 25 | 20 | 16 | 15 | 14,6 | 34 | 111 | 75 | M12 | 4 | 15 | 308 | ODT025 |
| 32 | 25 | 16 | 17 | 14,6 | 42 | 120,2 | 85 | M12 | 4 | 15 | 449 | ODT032 |
| 40 | 32 | 16 | 18 | 18,6 | 51 | 140 | 100 | M16 | 4 | 20 | 682 | ODT040 |
| 50 | 40 | 16 | 19 | 18,6 | 62 | 150 | 110 | M16 | 4 | 25 | 808 | ODT050 |
| 63 | 50 | 16 | 19 | 18,6 | 78 | 1654 | 125 | M16 | 4 | 35 | 1100 | ODT063 |
| 75 | 65 | 16 | 19 | 18.6 | 92 | 186 | 145 | M16 | 4 | 35 | 1200 | ODT075 |
| 90 | 80 | 16 | 20 | 18,6 | 109 | 200,8 | 160 | M16 | 8 | 35 | 1430 | ODT090 |
| 110 | 100 | 16 | 20 | 18,6 | 128 | 221 | 180 | M16 | 8 | 35 | 1498 | SWODT110DN100 |

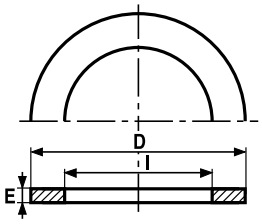
* PMA: maximum allowable pressure
**maximum recommended tightening torque
n = number of bolt




## EPDM FLAT GASKETS

For GAUR

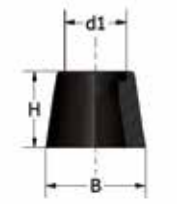
| D | I | E | Reference |
|---|---|---|---|
| 19 | 13 | 2 | JPNUR16 |
| 24 | 17 | 2 | JPNUR20 |
| 30 | 21 | 3 | JPNUR25 |
| 38 | 27 | 3 | JPNUR32 |
| 44 | 32 | 3 | JPNUR40 |
| 55 | 42 | 3 | JPNUR50 |




## EPDM FLAT GASKETS

For GACS

| D | I | E | Reference |
|---|---|---|---|
| 71 | 50 | 3 | JPNCS50 |
| 88 | 63 | 3 | JPNCS63 |
| 104 | 75 | 3 | JPNCS75 |
| 123 | 90 | 3 | JPNCS90 |
| 148 | 110 | 4 | JPNCS110 |




## WEDGES FOR MONOKLIP® BRACKETS

20 mm high - only compatible with MONOKLIP® brackets HCK 16 to 20

| D | H | d1 | H | Reference |
|---|---|---|---|---|
| 16 to 20 | 26 | 16 | 20 | CALE1220 |


## WEDGES FOR MONOKLIP® BRACKETS

20 mm high - only compatible with MONOKLIP® brackets HCKC 25 to 63

| D | H | d1 | H | Reference |
|---|---|---|---|---|
| 25 to 63 | 20 | 25 | 52 | CALE2563 |


## WEDGES FOR MONOKLIP® BRACKETS

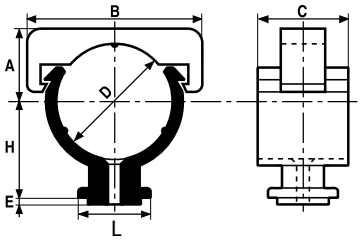
4 mm high - only compatible with MONOKLIP® brackets HCKC 25 to 63

| D | H | d1 | H | Reference |
|---|---|---|---|---|
| 25 to 63 | 20 | 25 | 52 | CALE2563/4 |


## WEDGES FOR MONOKLIP® BRACKETS

20 mm high - only compatible with MONOKLIP® brackets HCKC 75 to 110

| D | H | d1 | H | Reference |
|---|---|---|---|---|
| 75 to 110 | 20 | 30 | 80 | CALE75110 |

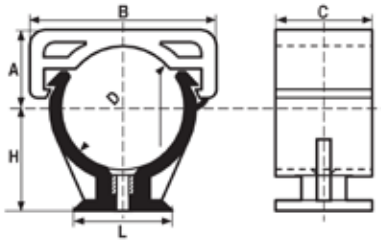



## MONOKLIP® BRACKETS (Ø16 ÷ Ø20)

with M6, 7x150, M8 metal threaded insert, or Ø5.5 drilled base

| D | Dn | H | A | B | C | E | Reference |
|---|---|---|---|---|---|---|---|
| | | | | | | | **with M6 THREAD** |
| 16 | 10 | 18 | 12 | 27 | 20 | 1 | HCK16/6 |
| 20 | 15 | 20 | 14 | 32 | 22 | 1 | HCK20/6 |
| | | | | | | | **with M8 THREAD** |
| 16 | 10 | 18 | 12 | 27 | 20 | 1 | HCK16/8 |
| 20 | 15 | 20 | 14 | 32 | 22 | 1 | HCK20/8 |
| | | | | | | | **with 7 x 150 THREAD** |
| 16 | 10 | 18 | 12 | 27 | 20 | 1 | HCK16/7 |
| 20 | 15 | 20 | 14 | 32 | 22 | 1 | HCK20/7 |
| | | | | | | | **without INSERT drilled base Ø5.5** |
| 16 | 10 | 18 | 12 | 27 | 20 | 1 | HCKP16/5 |
| 20 | 15 | 20 | 14 | 32 | 22 | 1 | HCKP20/5 |

Material: Black Polypropylene
NB: compatible with CALE 1220 wedges, 20 mm thickness.

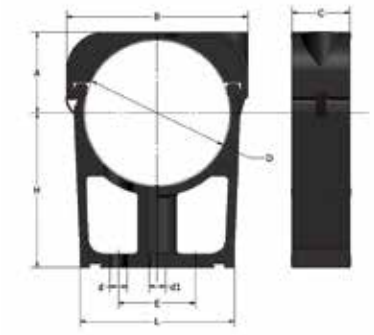



## MONOKLIP® BRACKETS (Ø25 ÷ Ø63)

with M6, 7x150, M8 metal threaded insert, or Ø5.5 drilled base

| D | Dn | H | A | B | C | L | Reference |
|---|---|---|---|---|---|---|---|
| | | | | | | | **without INSERT drilled base Ø5.5** |
| 25 | 20 | 22 | 16 | 38.5 | 25 | 16 | HCKCP25/5 |
| | | | | | | | **with M6 THREAD** |
| 25 | 20 | 22 | 16 | 38.5 | 25 | 16 | HCKC25/6 |
| 32 | 25 | 28 | 20 | 44 | 24.5 | 34 | HCKC32/6 |
| 40 | 32 | 32 | 24 | 55 | 24.5 | 34 | HCKC40/6 |
| 50 | 40 | 35 | 30 | 65.6 | 24.5 | 52 | HCKC50/6 |
| 63 | 50 | 35 | 41 | 79.5 | 24.5 | 52 | HCKC63/6 |
| | | | | | | | **with 7 x 150 THREAD** |
| 25 | 20 | 22 | 16 | 38.5 | 25 | 16 | HCKC25/7 |
| 32 | 25 | 28 | 20 | 44 | 24.5 | 34 | HCKC32/7 |
| 40 | 32 | 32 | 24 | 55 | 24.5 | 34 | HCKC40/7 |
| 50 | 40 | 35 | 30 | 65.6 | 24.5 | 52 | HCKC50/7 |
| 63 | 50 | 35 | 41 | 79.5 | 24.5 | 52 | HCKC63/7 |
| | | | | | | | **with M8 THREAD** |
| 25 | 20 | 22 | 16 | 38.5 | 25 | 16 | HCKC25/8 |
| 32 | 25 | 28 | 20 | 44 | 24.5 | 34 | HCKC32/8 |
| 40 | 32 | 32 | 24 | 55 | 24.5 | 34 | HCKC40/8 |
| 50 | 40 | 35 | 30 | 65.6 | 24.5 | 52 | HCKC50/8 |
| 63 | 50 | 35 | 41 | 79.5 | 24.5 | 52 | HCKC63/8 |

Material: Black Polypropylene
NB: compatible with wedges CALE 2563, 20 mm thickness or CALE 2563/4, 4 mm thickness.



## MONOKLIP® BRACKETS (Ø75 ÷ Ø110)

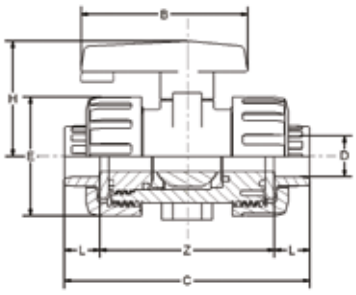
with M6, 7x150, M8 metal threaded insert, or Ø5.5 drilled base

| D | d1 | H | A | B | C | L | d | E | J | Reference |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | **with M8 THREAD** |
| 75-65 | M8 | 80 | 42 | 96 | 30 | 80 | 9 | 40 | 7 | HCKC75/8 |
| 90-80 | M8 | 80 | 49 | 113 | 30 | 80 | 9 | 40 | 7 | HCKC90/8 |
| 110-100 | M8 | 80 | 60 | 130 | 30 | 80 | 9 | 40 | 7 | HCKC110/8 |

Material: Black Polypropylene
NB: compatible with CALE 75110 wedges, 20 mm thickness.

# VALVES

## FOR COMPRESSED AIR




# Ø16 to Ø63

## DOUBLE UNION BALL VALVES (Ø16 ÷ Ø63)

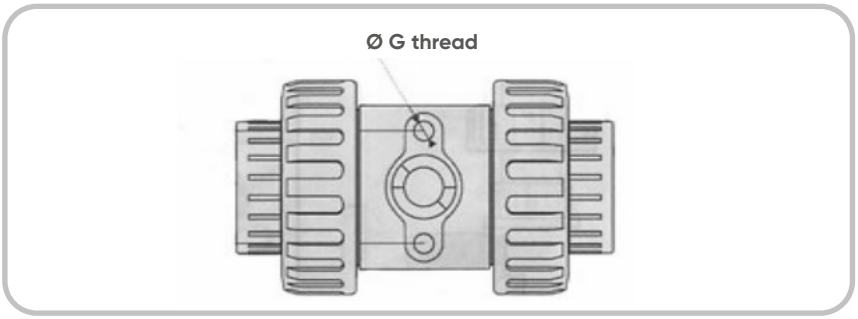
CEMENTED SOCKET ENDS

| d | DN | L | Z | C | E | H | B | g | X | Ø | Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 10 | 14 | 67 | 97 | 47 | 45 | 66 | 160 | 31 | 5.5 | GA2MBE16 |
| 20 | 15 | 16 | 68 | 102 | 47 | 45 | 66 | 160 | 31 | 5.5 | GA2MBE20 |
| 25 | 20 | 19 | 82 | 120 | 57 | 55 | 78 | 260 | 31 | 5.5 | GA2MBE25 |
| 32 | 25 | 22 | 87 | 131 | 68 | 67 | 86 | 380 | 40 | 6.5 | GA2MBE32 |
| 40 | 32 | 26 | 98 | 150 | 86 | 83 | 100 | 655 | 45 | 8 | GA2MBE40 |
| 50 | 40 | 31 | 101 | 163 | 98 | 91 | 110 | 925 | 50 | 8 | GA2MBE50 |
| 63 | 50 | 38 | 121 | 197 | 122 | 111 | 130 | 1695 | 50 | 8 | GA2MBE63 |

## FIELD OF APPLICATION:

- The same as that of GIRAIR® fittings
- Max. working temperature: 40°C
- The nominal pressure (PN) in normal use, i.e. for compressed air at 20°C maximum, is:
  - 12.5 bar for ø 16 to 63 mm.

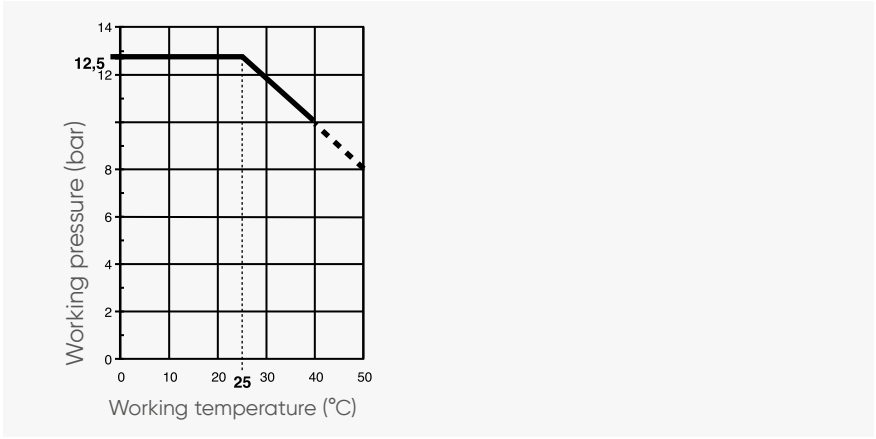
| Ball valve Ø | G Thread |
|---|---|
| 16 | M4 |
| 20 | M4 |
| 25 | M4 |
| 32 | M5 |
| 40 | M6 |
| 50 | M6 |
| 63 | M6 |



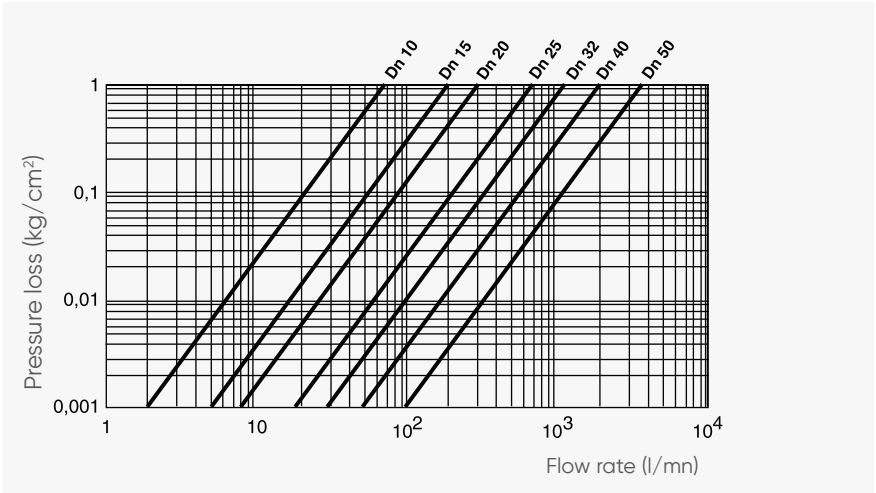

- These ball valves have a built-in anchoring system.
- There are two holes underneath fitted with threaded brass inserts (use screw in accordance with data below).
- These valves are solvent cemented to pipes, and can be dismantled thanks to their double union concept.
- Observe the flow direction.

# Ø16 to Ø63

## WORKING PRESSURE/ TEMPERATUR




## PRESSURE LOSSES ACCORDING TO FLOW RATES




## FLOW COEFFICIENT AT FULL OPENING

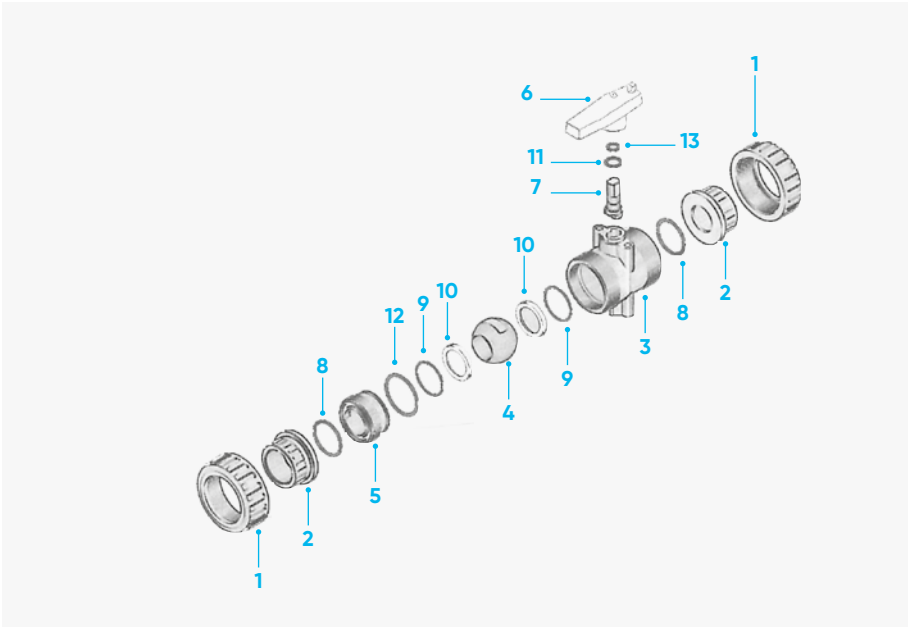
| d-G | 16-3/8" | 20-1/2" | 25-3/4" | 32-1" | 40-1"1/4 | 50-1"1/2 | 63-2" |
|---|---|---|---|---|---|---|---|
| Dn-G | 10-3/8" | 15-1/2" | 20-3/4" | 25-1" | 32-1"1/4 | 40-1"1/2 | 50-2" |
| KV* | 70 | 190 | 350 | 700 | 1000 | 1650 | 3100 |

* KV: coefficient (litre/minute) calculated with ΔP = 1 kg/cm²

| OPERATION TORQUE (PRESSURE 12.5 BAR) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ø | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| Torque Nm | 2,0 | 3,0 | 3,0 | 5,0 | 6,0 | 9,0 | 9,0 |

## COMPONENTS EXPLODED VIEW

| | |
|---|---|
| 1 | Backing nut |
| 2 | Cemented stub socket |
| 3 | Body |
| 4 | Ball |
| 5 | Ball seat support |
| 6 | Handle |
| 7 | Spindle |
| 8 | Socket o-ring |
| 9 | Seat gasket |
| 10 | Ball seat |
| 11 | Spindle o-ring |
| 12 | Ball seat support o-ring |
| 13 | Spindle o-ring |




## ASSEMBLY:

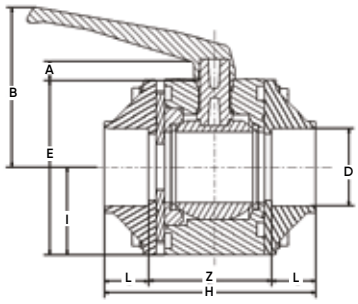
- Remove backing nuts (1) and slide them onto the pipes.
- Glue the sockets (2) on GIRAIR® pipes.
- Place valve body (3) between sockets with “ADJUST” end upstream if the flow direction needs to be respected.
- Use threaded inserts supplied with the valves for supporting.
- Tighten and block the nut (1) on the opposite side to the one marked “ADJUST”, then progressively tighten the nut (1) on the “ADJUST” side until complete airtightness is obtained.

## DISMANTLING:

- Close valve.
- Unscrew nuts completely (1).
- Remove handle (6) by pulling it off.
- Insert the handles’ notches into the ball support (5) and unscrew by rotating handle anticlockwise.
- Remove ball (4).
- Depress stem (7) and extract from the inside of the valve body (3).
- Remove PTFE ball seats from ball supports (5) and body (3).
- Replace o-rings if needed.
- Re-assemble by repeating the above steps in reverse sequence.

## ACTUATION

- Valves can be actuated pneumatically or electrically. Ask for our technical information.




# Ø75 to Ø110

## FLANGED BALL VALVES (Ø75 ÷ Ø110)

CEMENTED SOCKET ENDS

| d | L | Z | H | E | B | C | A | I | Weight (Kg) | Reference |
|---|---|---|---|---|---|---|---|---|---|---|
| 75 | 43 | 148 | 234 | 211 | 177 | 210 | 25 | 105 | 7 | GA2MFE75 |
| 90 | 52 | 148 | 252 | 211 | 177 | 210 | 25 | 105 | 7 | GA2MFE90 |
| 110 | 63 | 174 | 300 | 252 | 220 | 255 | 30 | 121 | 11 | GA2MFE110 |

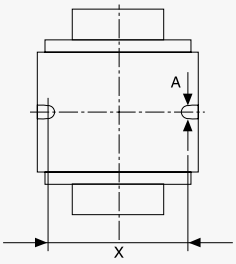
The weight of the ball valve and its correct use require its anchoring on a convenient support.

There are two holes underneath the valve body which allow to hang it with bolts on the correct support. The table above gives the width of the holes and their spacing.

- Valves in Ø 75 to 110 are carefully assembled in our workshops. It is strongly recommended NOT to dismantle the counterplates which ensure good valve operation. The flanged sockets may be dismantled.
- Observe the flow direction

## ANCHORING SYSTEM

| Ball valve Ø | A | X (mm) |
|---|---|---|
| 75 | 11 | 110 |
| 90 | 11 | 110 |
| 110 | 11 | 135 |

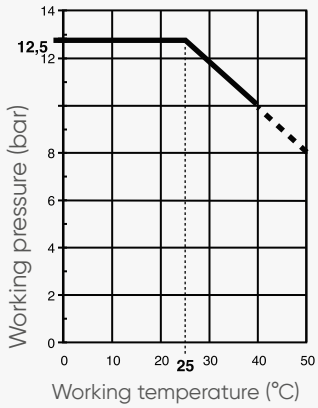



## FIELD OF APPLICATION:

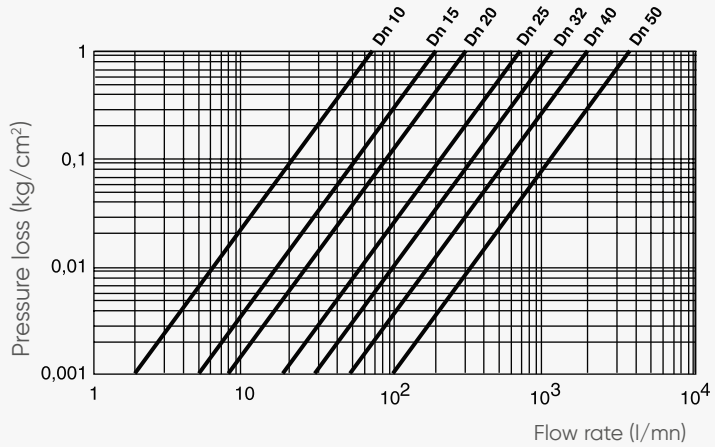
- The same as that of GIRAIR® fittings
- Max. working temperature: 40°C
- The nominal pressure (PN) in normal use, i.e. for compressed air at 20°C maximum, is:
  - 12.5 bar for ø 16 to 63 mm.

# Ø75 to Ø110

## WORKING PRESSURE/ TEMPERATUR




## PRESSURE LOSSES ACCORDING TO FLOW RATES



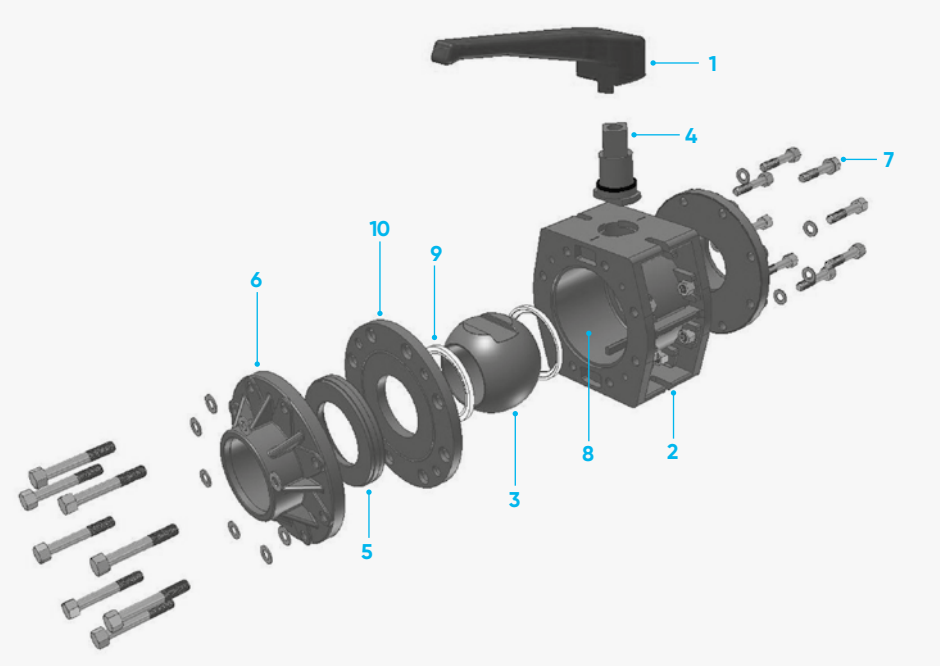

## FLOW COEFFICIENT AT FULL OPENING

| | | | |
|---|---|---|---|
| **d-G** | 75-2"1/2 | 90-3" | 110-4" |
| **Dn-G** | 65 | 80 | 100 |
| **KV** | 5000 | 7000 | 12000 |

| **OPERATION TORQUE (PRESSURE 12.5 BAR)** | | | |
|---|---|---|---|
| **Ø** | 75 | 90 | 110 |
| **Torque Nm** | 65.0 | 65.0 | 110.0 |

## COMPONENTS EXPLODED VIEW

| | |
|---|---|
| 1 | Handle |
| 2 | Body |
| 3 | Ball |
| 4 | Spindle |
| 5 | Support |
| 6 | Flanged socket |
| 7 | Bolt |
| 8 | Ball seat |
| 9 | O ring |
| 10 | Counterplate |




## ASSEMBLY:

**N.B.:** there is an arrow on the valve's body showing the direction of flow (the arrow's head is located close to the fixed ball seat support).

- Insert o-ring (9) and PTFE ball seat (8) into their own seats inside the body.
- Insert spindle (4) through body, equipped with one o-ring in groove, two PTFE bearings and one o-ring at bottom.
- The spindle's pivot being located in alignment of the valve, place the ball (3).
- Fit the moving ball seat support (5) with the O-ring (9) and the PTFE ball seat (8).
- Place the equipped moving ball seat support inside the body (2).
- Place the flange socket's o-ring into the groove located between the body and the moving ball seat support.
- Screw flange socket with 8 stainless steel bolts (each bolt contains a hexagonal head screw + washer + nut). Attention: there is a mark on the body of the valve and an other one on the flange end to know the right position of assembly.
- Assemble the handle (1), taking care to put it correctly with regard to the ball (on spindle's top, a furrow shows the piping's direction).

## DISMANTLING:

**N.B.:** there is an arrow on the valve's body showing the direction of flow (the moving ball seat support is located upstream of the arrow).

- Put the handle (1) in closed position.
- Unscrew the screws (7).
- Remove the flange socket (6).
- Extract moving ball seat support by pulling or by pushing it with the ball, using a tool that cannot damage the ball (beware not to lose the flange socket's o-ring).
- Take the ball out (3).
- Take the spindle out (4) after removing the handle (1), by pushing it towards the inside of the body (2).

## ACTUATION

- Valves can be actuated pneumatically (single or double action) or electrically. Ask for our technical information.

# Chemical resistance

The table below lists some compressor oils whose formulation was tested at the mentioned dates. The compatibility of those oils with GIRAIR® was established based upon those tests.

It must be noted that the nature of chemical elements, the way they are mixed, the presence of impurities can significantly influence the indications below. Reliable results can only be obtained by carrying out concrete tests. It is the installation owner's responsibility to ensure that the chemical agents composing its formulation have not been changed since the testing year below, by consulting his supplier.

Those tests were carried out on the plastic components of the GIRAIR® system.

For any question concerning compatibility with other components of the GIRAIR® system (brass, gaskets, etc.), contact the oil manufacturers.

The indications below shall in no case engage our responsibility. The chemical agents are classified in alphabetical order.

Aliaxis Chemist **advicechemist@aliaxis.com**

Never use oils or any fluids containing esters, ethoxyls or amines, as they may be incompatible with GIRAIR®.

Concerning oils or fluids that are not listed in the table above, Aliaxis technical support team can be consulted a **tech-com.nicoll@aliaxis.com** or **+33 02416373259**

| OILS | | |
|---|---|---|
| **BRAND** | **REFERENCE** | **TESTING YEAR** |
| **ANDEROL** | ANDEROL 3046 | 1996 |
| | ANDEROL 500 | 2000 |
| **ATLAS COPCO** | ROTOINJECTFLUID | 2001 |
| **CASTROL** | AIRCOL PD 68 | 1989 |
| | CRD30 | 1989 |
| | HYSPIN AWS 46 | 1989 |
| | MAGNA 68 | 1989 |
| **ELF** | BARELF SM 46 | 2002 |
| | DACNIS P 100 | 1990 |
| | ELFOLNA DS 46 | 2002 |
| | DACNIS VS 46 | 1990 |
| **ESSO** | COMPRESSOR OIL RS32 | 1994 |
| | COMPRESSOR OIL RS68 | 1994 |
| | TERESSO 46 | 1988 |
| **HAFA** | STATEX | 1992 |
| **INGERSOLL RAND** | FOOD GRADE COOLANT | 1989 |
| **KAESER** | SIGMA-FLUID PLUS | 2003 |
| | SIGMA-FLUID MOL | 2008 |
| **KLUBER-SUMMIT** | HYSYN FG100 | 1998 |
| | HYSYN FG46 | 1998 |
| **MATTEI** | ROTOROIL 2000 | 1993 |
| **MOBIL** | RARUS SHC 924 | 1989 |
| **MOTUL** | SAFCO CPS 100 | 1993 |
| **SHELL** | COMPTELLA 46 | 1989 |
| | TONNA T220 | 1990 |
| **TOTAL** | AZOLLA ZS 32 | 1989 |
| | EQUIVIS ZS 46 | 1989 |
| | PRESLIA 46 | 1989 |
| | RUBIA H10 | 1989 |
| | RUBIA H30 | 1989 |
| | CORTUSA SY150 | 1989 |

# Description for specification

**PVC PIPING SYSTEM MADE FROM A DUCTILE VINYL BASED ALLOY FOR THE CONSTRUCTION OF COMPRESSED AIR DISTRIBUTION NETWORKS.**

**FIELD OF APPLICATION:**
Compressed air distribution networks.

**IDENTIFICATION – RANGE:**
The system shall consist of:
- Pipes and fittings of one same origin, made from a ductile vinyl based alloy, all of blue colour (incorporated in the mass of its resin).
- Pipes that shall be delivered in plastic bags, in order to ensure a good level of cleanliness until installation.
- A large range of fittings with brass threaded inserts, in order to enable safe connections with metallic threads.
- Drop bends and wall plates allowing for drop pipes and top-down connections to ensure good air quality.
- A dedicated solvent cement that can be used as a welding indicator thanks to its colour (dark blue), in order to simplify the execution of installation works and avoid errors on building sites.
- A dedicated range of supporting brackets enabling expansion and contraction factors to be accounted for, whilst respecting the manufacturer's recommendation.

**QUALITY - CERTIFICATIONS:**
The system shall come from an ISO 9001, ISO 14001 certified company.
The system shall have a test report proving its Euroclasses fire reaction B-s1,d0 rating according to EN 13501-1 standard.
The product's quality certifications shall be marked on the pipes, as well as the information enabling its production traceability.
The pipe sizes shall range from diameter 16 to 110 mm with a PN 12.5 nominal pressure rating (with a safety coefficient of 2.5 for 50 years).
Those pipes shall be designed to withstand 1 hour pressure tests amounting to 4.2 times that PN rating.

Beyond those tests, fittings shall be submitted to static pressure tests, and to pressure cycling tests of 20/50 bar, at a rate of:
- 5.000 cycles at a 1 hertz frequency for diameters 16 to 90 v2.500 cycles at a 0.42 hertz frequency for diameter 110 according to NF T 54-094 standard.

**TECHNICAL SUPPORT:**
The manufacturer shall be able to:
- 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 recyclable through an existing recovery network.

**Aliaxis Utilities & Industry SAS**
Z.I. Route de Béziers – 8 avenue du Mas de Garric
34140 Mèze – France
Tel +33 (0)467 51 63 30 – Fax +33 (0)467 43 61 43
RCS Montpellier 787 050 103
**aliaxis.fr**