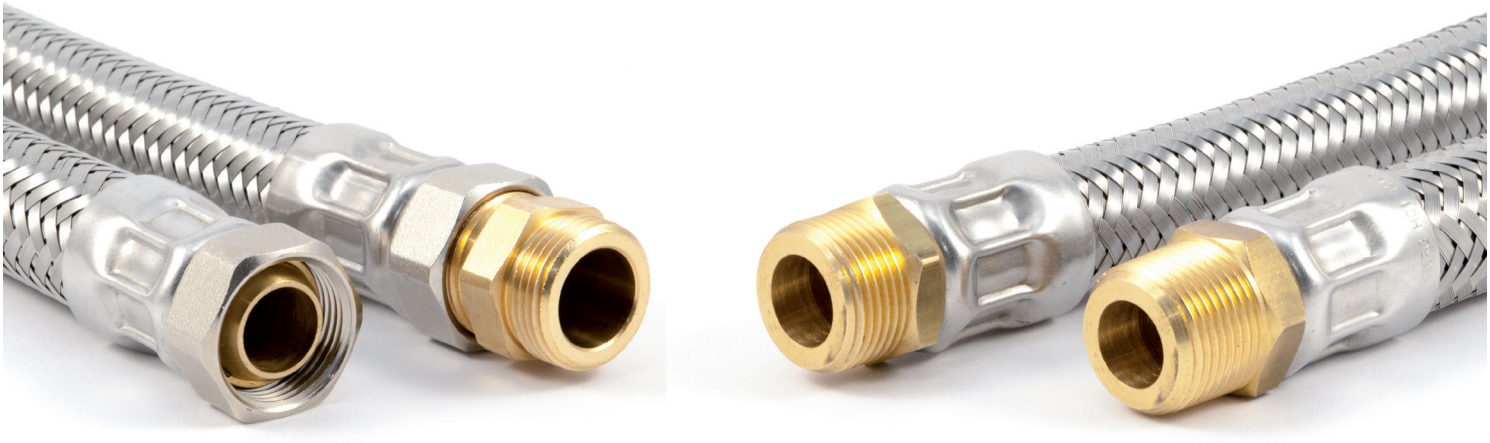
# EvoFLEX NPT

## Flexible hoses NPT

## Technical manual



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FRATELLI PETTINAROLI S.p.A.
CLIMATE SYSTEMS TECHNOLOGY

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# Introduction

The EvoFLEX NPT flexible hoses are connecting hoses made by synthetic rubber and covered with a stainless steel braid to connect two pipe sections. High flexibility and resistance make EvoFLEX hoses able to clear obstacles and make narrow turns operating in very demanding conditions. This product is often exploited as anti vibration device to stop vibration propagation generated by pressurized pipes or machines (pumps, chillers, fans). The high quality of materials allows to get excelent performances and one of longest product life on the market. Very various range of fitting guaranties the customer to always find the most suitable solution for his installation needs.
Fratelli Pettinaroli offers this product with length between 8" and 78" (200 mm - 2000 mm) until DN25, between 8" and 39" (200 mm - 1000 mm) from DN32 to DN50. Refers to the table on next page to check available length according to Nominal Diameter.
Two kind of connections are available:

- Male NPT x Union Male NPT. The union connection is made by:
  - 1/2" to 1" - gasket-less 60° cone connection;
  - 1 1/4" to 2" - flat end connection with fiber gasket.
- Male NPT x Union gasket-less 60° cone: available only for 3/4". Nut has a BSP thread which makes this fitting usable only with specific Fratelli Pettinaroli products (for instance 6-way valve **63/2S DZR**).

There are 4 different nominal diameters in the range according to fitting size. The nominal diameter corresponds to the internal diameter of the hose whereas the minimum area depends on the fitting type.
Finally, each EvoFLEX flexible hose can be covered by a thermal insulation made by cellular elastomer; the insulation is available in four different thicknesses.

| FITTING | DIAMETER | DN13 | DN19 | DN25 | DN32 | DN40 | DN50 |
|---|---|---|---|---|---|---|---|
| Male x Union Male | 1/2” | √ | | | | | |
| | 3/4” | | √ | | | | |
| | 1” | | | √ | | | |
| | 1 1/4” | | | | √ | | |
| | 1 1/2” | | | | | √ | |
| | 2” | | | | | | √ |
| Male x Union F cone 60° | 3/4” | | √ | | | | |

# Selection

In order to make the hose selection easier, please refer to the table below for product article explanation. All available connections are included in it.

Making an order, customer has to give the following details in order to unmistakably define the product:

- article code as defined below
- fitting size
- length
- thickness of thermal insulation (if present)

**Please always specify the thread standard NPT.**

| Flexible hoses codification | |
|---|---|
| **FX** | Flexible hoses |
| **M** | Left connection |
| **Y** | Right connection |
| **Z** | Thermal insulation |

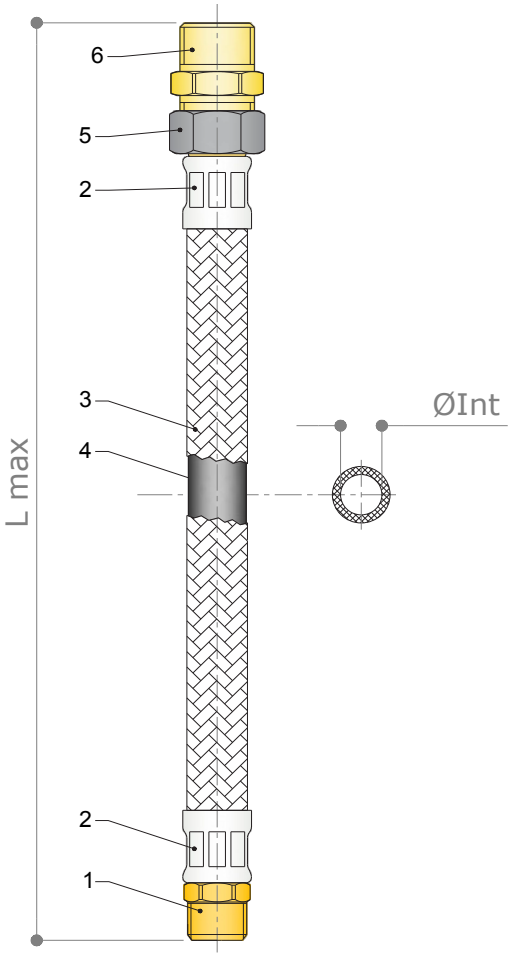
| FX - M - Y - Z | | | |
|---|---|---|---|
| **FX** | **M** | **Y** | **Z** |
| | | | **I** = Thermal insulation |
| | | | **UX** = Union female cone 60° |
| | | | **UM** = Union male |
| | | | **M** = Male |
| | | | **FX** = Flexible Hoses |

# Materials and components

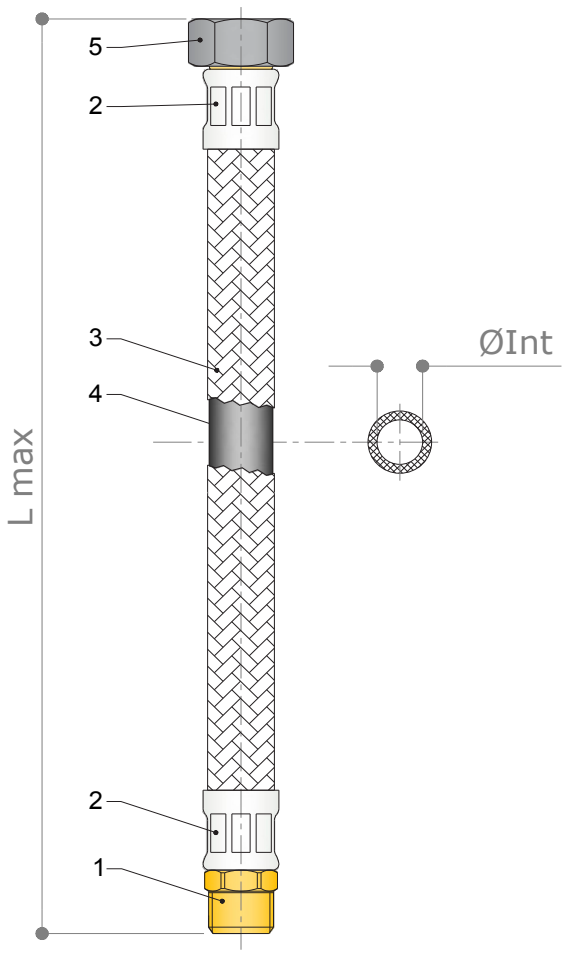
| n. | Description | Material | Quantity |
|---|---|---|---|
| 1 | Fitting | CW617N (EN12164) CuZn40Pb2 | 2 |
| 2 | Crimping Ferrule | Stainless steel AISI 304 | 2 |
| 3 | Cover braid - steel wire Ø 0,22 mm | Stainless steel AISI 304 | 1 |
| 4 | Hose | EPDM | 1 |
| 5 | Union Nut | CW617N (EN12164) CuZn40Pb2 Nickel Plated | 1 |
| 6 | Tail piece | CW617N (EN12164) CuZn40Pb2 | 1 |

# Technical features

Main technical features of EvoFLEX flexible hoses are reported in the following




Male x Union Male




Male x Union Cone Female

| Connections details | Page |
|---|---|
| Male - M | 3 |
| Union female cone 60° - UX | 4 |
| Union male - UM | 5 |

The fitting hole is always smaller thant the pipe internal diameter. Length L is always mesured from end points of flexible hose. This dimension is specified in the following sheets. Further details about connections are available on following pages.

| Technical features | |
|---|---|
| Nominal pressure | 16 bar - 230 psi |
| Max medium temperature | 90°C - 194°F |
| Min medium temperature | -10°C - 14°F (no frost) |
| Allowed medium | Water and Water + Glycol |
| Minimum bending radius | 5 x DN |
| ASTM Fire rate | 25/50 |

| Nominal Diameter | Internal diameter | | L max | |
|---|---|---|---|---|
| | mm | Inch | mm | Inch |
| DN13 | 13 mm | 0,51" | 2000 mm | 78" |
| DN19 | 19 mm | 0,75" | 2000 mm | 78" |
| DN25 | 25 mm | 0,98" | 2000 mm | 78" |
| DN32 | 32 mm | 1 1/4" | 1000 mm | 39" |
| DN40 | 40 mm | 1 1/2" | 1000 mm | 39" |
| DN50 | 50 mm | 2" | 1000 mm | 39" |

**Installation Notes - Male x Union Male**

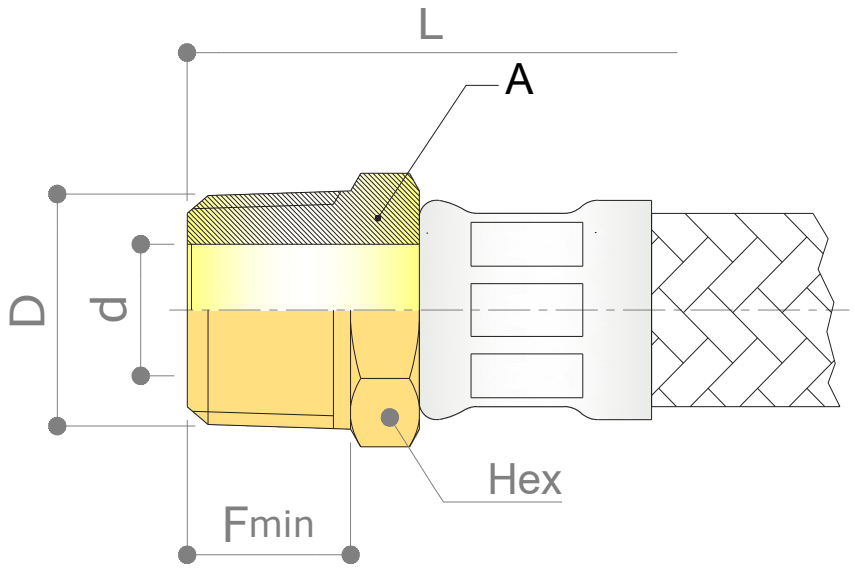
- ON INSTALLATION: avoid absolutely any tension due to stretching, twisting or torsion during the course of tightening the connectors.
  - Install and tighten the fixed male connector (if applicable)
  - Install and tighten the union adaptor (if applicable)
  - Install and tighten the swivel nut
- Use two spanners in order to screw in the union: one to hold the hexagon of the adaptor. The other to tighten the nut at the same time.

**Installation Notes - Male x Union cone female**

- ON INSTALLATION: avoid absolutely any tension due to stretching, twisting or torsion during the course of tightening the connectors.
  - Install and tighten the fixed male connector (if applicable)
  - Install and tighten the swivel nut
- Use two spanners in order to screw in the union: one to hold the hexagon of the fixed connector. The other to tighten the nut at the same time.

# Male Fitting - M

| Technical features | |
|---|---|
| Connection | Male thread NPT |
| Thread | NPT |
| Nominal pressure | 16 bar - 230 psi |
| Max medium temperature | 90°C - 194°F |
| Min medium temperature | 5°C - 41°F (-10°C - 14°F if water+glycol). No frost |
| Available connections | 1/2" to 2" |
| Torque | 20 Nm max |




In order to guarantee watertight seal, additional sealant.

| CONNECTION | DIAMETER | DN13 | DN19 | DN25 | DN32 | DN40 | DN50 |
|---|---|---|---|---|---|---|---|
| Male | 1/2” | √ | | | | | |
| | 3/4” | | √ | | | | |
| | 1” | | | √ | | | |
| | 1 1/4” | | | | √ | | |
| | 1 1/2" | | | | | √ | |
| | 2" | | | | | | √ |

| DN | d* | |
|---|---|---|
| | mm | Inch |
| DN13 | 9,5 | 0,4" |
| DN19 | 15 | 0,6" |
| DN25 | 20 | 0,8" |
| DN32 | 26 | 1.02" |
| DN40 | 32 | 1.26" |
| DN50 | 41 | 1.61" |

| D | 1/2" | | 3/4" | | 1" | | 1 1/4" | | 1 1/2" | | 2" | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mm | Inch | mm | Inch | mm | Inch | mm | Inch | mm | Inch | mm | Inch |
| Fmin | 18 | 0,71" | 17 | 0,70" | 22 | 0,87" | 22 | 0.87" | 22 | 0.87" | 22 | 0.87" |
| Hex | 22 | 0,87" | 27 | 1,06" | 36 | 1,42" | 42 | 1.65" | 49 | 1.93" | 60 | 2.36" |

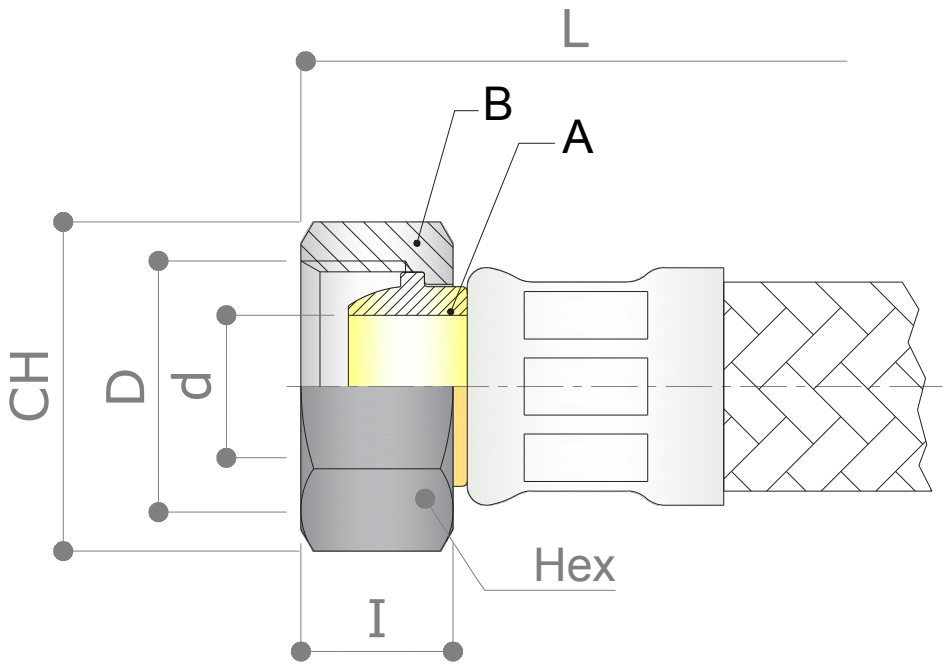
* minimum flow passage

Use only fixed hexagonal keys to tighten the fitting. Every other tool can damage the fitting.

| n. | Description | Material |
|---|---|---|
| A | Fitting | CW617N (EN12164) CuZn40Pb2 |

# Union Female Fitting cone 60° - UX

| Technical features | |
|---|---|
| Connection | Union female cone 60° gasket-less |
| Thread | ISO 228 |
| Nominal pressure | 16 bar - 230 psi |
| Max medium temperature | 90°C - 194°F |
| Min medium temperature | 5°C - 41°F (-10°C - 14°F if water+glycol). No frost |
| Available connections | 3/4" |
| Torque | 30 Nm max |




| CONNECTION | DIAMETER | DN13 | DN15 | DN19 | DN25 |
|---|---|---|---|---|---|
| Union F cone 60° | 3/4” | | √ | | |

| DN | d* | |
|---|---|---|
| | mm | Inch |
| DN19 | 15 | 0,6" |

* minimum flow passage

| D | 3/4" | |
|---|---|---|
| | mm | Inch |
| I | 16 | 0,6" |
| Hex | 30 | 1,18" |

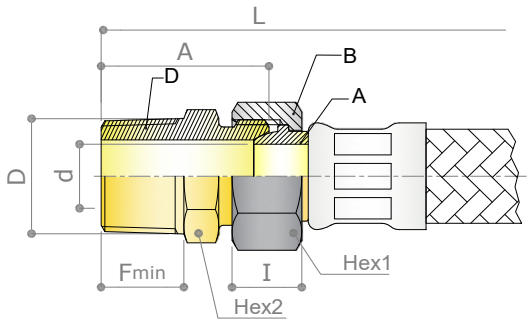
Use only fixed hexagonal keys to tighten the fitting. Every other tool can damage the fitting.

| n. | Description | Material |
|---|---|---|
| A | Fitting | CW617N (EN12164) CuZn40Pb2 |
| B | Union nut | CW617N (EN12165) CuZn40Pb2 Nickel Plated |

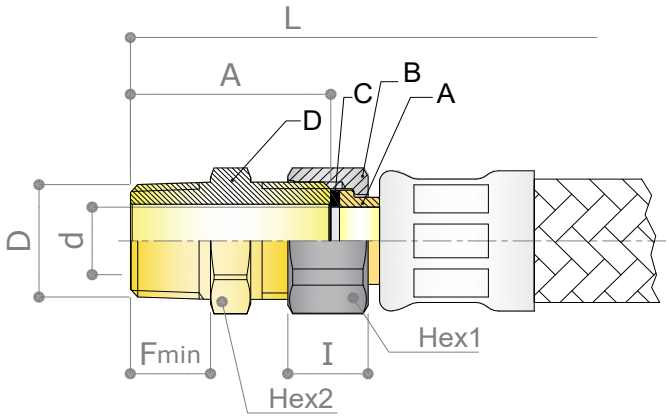
# Fitting with Union Male - UM

| Technical features | |
|---|---|
| Connection | Union female + niple MxM |
| Thread (union) | NPT |
| Nominal pressure | 16 bar - 230 psi |
| Max medium temperature | 90°C - 194°F |
| Min medium temperature | 5°C - 41°F (-10°C - 14°F if water+glycol). No frost |
| Available connections | 1/2" to 2" |
| Torque | 22 Nm max |

In order to guarantee watertight seal, additional sealant is needed between union and fixed connection. Gasket between union and union end included (Only for 1 1/4" to 2").




1/2" to 1" - Gasket-less




1 1/4" to 2"

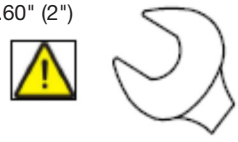
| CONNECTION | DIAMETER | DN13 | DN19 | DN25 | DN32 | DN40 | DN50 |
|---|---|---|---|---|---|---|---|
| Male | 1/2” | √ | | | | | |
| | 3/4” | | √ | | | | |
| | 1” | | | √ | | | |
| | 1 1/4” | | | | √ | | |
| | 1 1/2" | | | | | √ | |
| | 2" | | | | | | √ |

| DN | d* | |
|---|---|---|
| | mm | Inch |
| DN13 | 9 | 0,4" |
| DN19 | 15 | 0,6" |
| DN25 | 20 | 0,8" |
| DN32 | 26 | 1.02" |
| DN40 | 32 | 1.26" |
| DN50 | 41 | 1.61" |

| D | 1/2" | | 3/4" | | 1" | | 1 1/4" ** | | 1 1/2" # | | 2" # | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mm | Inch | mm | Inch | mm | Inch | mm | Inch | mm | Inch | mm | Inch |
| I | 14 | 0,55" | 14 | 0,55" | 15 | 0,6" | 18 | 0.71" | 22 | 0.87" | 25 | 1" |
| Hex1 | 21 | 0,83" | 30 | 1,18" | 34 | 1,34" | 46 | 1.81" | 55 | 2.16" | 65 | 2.56" |
| Fmin | 18 | 0,71" | 17 | 0,70" | 22 | 0,87" | 22 | 0.87" | 22 | 0.87" | 22 | 0.87" |
| A | 37 | 1.46" | 38.5 | 1.52" | 45 | 1.77" | 49 | 1.93" | 51 | 2.01" | 56 | 2.20" |
| Hex2 | 22 | 0.87" | 27 | 1.06" | 36 | 1.42" | 42 | 1.65" | 49 | 1.93" | 60 | 2.36" |

* minimum flow passage
** Octagonal nut
# According to availability, nut can be octagonal. Hex1: 52 mm-2.05" (1 1/2"); 66 mm-2.60" (2")

| n. | Description | Material |
|---|---|---|
| A | Fitting | CW617N (EN12164) CuZn40Pb2 |
| B | Union Nut | CW617N (EN12165) CuZn40Pb2 Nickel Plated |
| C | Gasket | EPDM |
| D | Niple | CW617N (EN12164) CuZn40Pb2 |



Use only fixed hexagonal keys to tighten the fitting. Every other tool can damage the fitting.

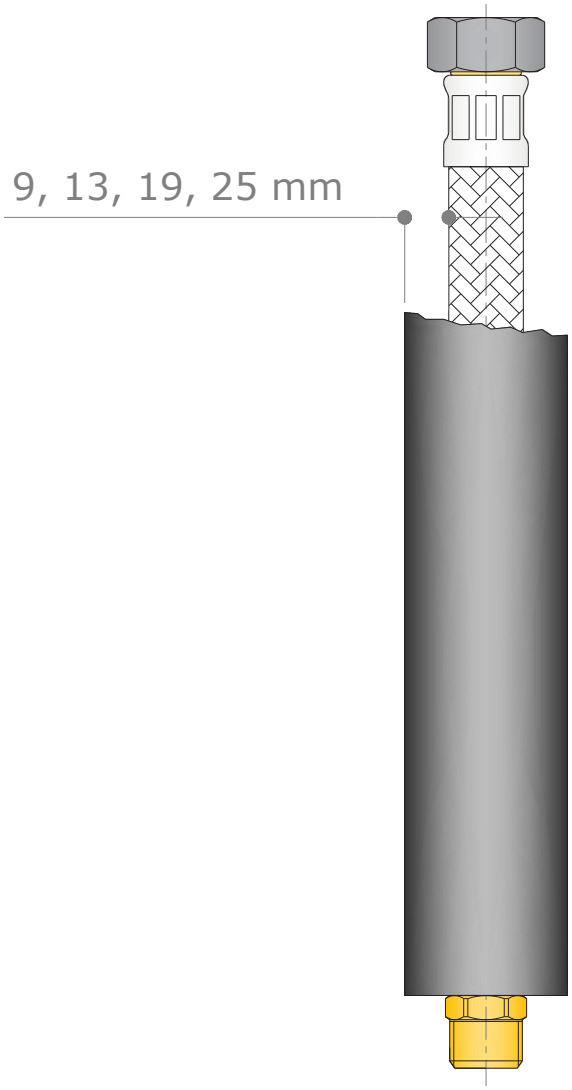
# Thermal insulation

EvoFLEX NPT flexible hoses are available with several thicknesses of thermal insulation. This is very important to get energy savings by reducing the heat exchange with the environment during the heating season, and to avoid the humidity condensation during the cooling season.
During the EvoFLEX flexible hoses installation with thermal insulation, installer should:

- pay attention to avoid any damage to the insulation and stainless steel braid
- protect the insulation externally by apllaying a PVC or Aluminum layer around the insulation within 48 hours after the installation
- guarantee space enough between next flexible hoses; the optimal distance between two flexible hoses is 40 mm (1.6")

Following insulation thicknesses are avilable; please verify on the table in the next page the availability according to Nominal Diameter:

- 9 mm - 0.35"
- 13 mm - 0.51"
- 19 mm - 0.75"
- 25 mm - 1"



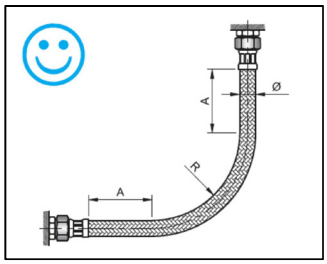
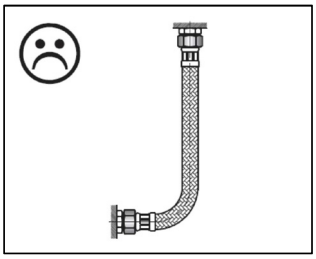
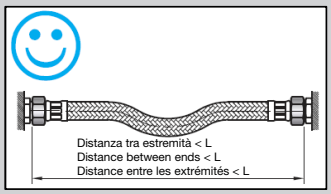
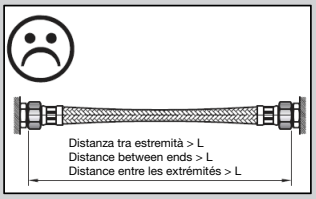
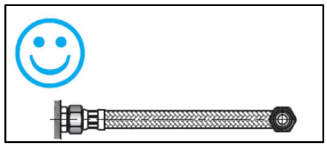
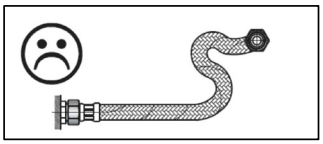
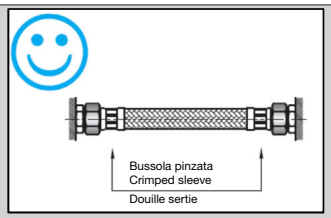
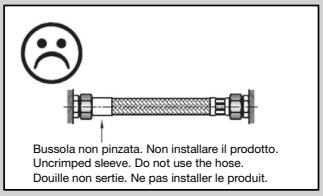
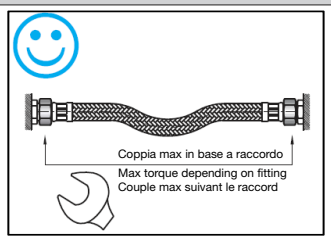
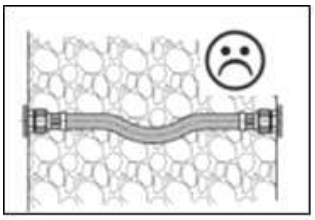
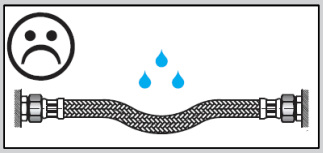
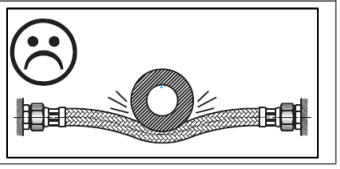

| Technical features | |
|---|---|
| Material | CFC free closed cellular elastomer |
| ODP | 0 |
| GWP | 0 |
| Calorific value | 4060 [kcal/kg] - 7303 [btu/lb] |
| Temperature range (UNI ISO 188/98) | -40°C - +105°C / -40°F - +221°F |
| Application fields | Heating, cooling and ventilation installations. Sanitary installations |

| Property | Value | Standard | Certifying body |
|---|---|---|---|
| Thermal conductivity (λ)<br>at 0°C<br>at +40°C | <br>0,034 W/mK<br>0,039 W/mK | <br>EN ISO 8497<br>DIN 52613 52612 | FIW - Munich |
| Vapour permeability (μ) | ≥ 7200 | EN 13469 / DIN 52615 | FIW - Munich |
| Ozone resistance | Eccellente | ISO 7326/91 | Cerisie - Milan |
| UV resistance | Good | UNI ISO 4892/2.94 | Cerisie - Milan |
| Chemical resistance | Good for diluted acids, diluted bases and glycol.<br>Good for oils | - | Internal test |
| Water absorption | ≤ 5% | ASTM1056 | Internal test |
| Corrosion risk | Meets the requirements | DIN 1988/88 Part 7 - EN13468/2001 | Cerisie - Milan |

| FIRE RESISTANCE | Value | Standard | Certifying body |
|---|---|---|---|
| UK<br>Fire propagation<br>Surface spread of flame<br>Building Regulations | <br>I ≤ 12.0 i < 6<br>Class 1<br>Class 0 | <br>Bs476/7.1987<br>Bs476/6.1987 | Warrington Fire Global Service |
| Germany | B-$S_3$-$d_0$ BI-$S_3$-$d_0$ | DIN EN13051.1 | Diby - Berlino |
| France | B-$S_2$-$d_0$ BI-$S_3$-$d_0$ | AFNOR NF 487 | LNE France |
| Sweden | Klass II | NTFO36 | SP Boras |
| European standard | $B_L$-$S_3$-$d_0$ B-$S_3$-$d_0$ | EN13501-1.2007 | CSI Italy - LNE France |
| USA, Canada | Flame Class V-0 5V | UL94<br>UL746A UL746C | UL Lab. Inc. USA |

| Nominal Diameter | Thermal insulation thickness | Linear weight of insulation |
|---|---|---|
| **1/2" - DN13** | 9 mm - 0.35" | 0,050 kg/m - 0.034 lb/ft |
| | 13 mm - 0.51" | 0,075 kg/m - 0.050 lb/ft |
| | 19 mm - 0.75" | 0,113 kg/m - 0.076 lb/ft |
| **3/4" - DN19** | 9 mm - 0.35" | 0,050 kg/m - 0.034 lb/ft |
| | 13 mm - 0.51" | 0,075 kg/m - 0.050 lb/ft |
| | 19 mm - 0.75" | 0,120 kg/m - 0.080 lb/ft |
| | 25 mm - 1" | 0,195 kg/m - 0.131 lb/ft |
| **1" - DN25** | 19 mm - 0.75" | 0,120 kg/m - 0.080 lb/ft |

# General instructions for installation

| CORRECT | | INCORRECT | |
|---|---|---|---|
| Observe the minimum bending radius R and the minium straight length A calculated with the following formula:<br>R = 5 x DN<br>A = 3 x DN |  | The flexible hose is flattened and risks damage |  |
| Flexible hose must be long enough for the specific application. Please avoid any extre tension. The distance between two ends to be connected must be lower than the hose length L. Ends must be fixed. Do not connect the hose to expansion joints or movable parts. |  | Distance between two ends too long. Hose under tension.<br>Burst risk. |  |
| Please avoid any teraction, compression and torsion. Fitting must be at the same level. |  | Do not twist the hose. Fittings must not be misaligned. |  |
| Always check both sleeves are crimped before the installation; otherwise replace the product. |  | Sleeve not crimped (see beside).<br>Please do not mount the hose. |  |
| Please avoid all contact with any kind of material, object and substance.<br>Tighten unions by means of fixed hexagonal keys observing the maximum torque previously specified. |  | It is forbidden to embed the hose in the wall. Do not coat it with any substance. |  |
| | | Avoid the contact with any liquid. The hose braid may be damaged. Do not clean the hose surface with cloth with chemical substances. |  |
| | | It is forbidden to use the hose as support for calbles, pipes and any kind of duct. |  |

## Mounting instructions

- Before installation, please make sure that the hose is perfectly intact and it has not be damaged during the transportation or site movement.
- Do not assembly hoses in series.
- Do not install the hose close to heat source exceeding 90°C. Keep the hose away from open fire, blow lamps, welding slame and any other kind of heat source.
- Please use hoses only in dry and indoor locations. Long Uv exposition must be avoided.
- After installation, please do an installation test; test the circuit at 1.5 times the maximum pressure (10 bars minimum) for one hour. During the test, no swelling or leakage must occur.
- Beware of "electrolytic couples" such as iron/copper; please use suitable fittings connecting iron/iron or brass/copper.
- Leave the hoses in its original package until the assembly. Please avoid any hit or crash during storage and transportation.
- Do not connect electric ground to hoses and any other water piping. Turn off the water flow in case of long absence. Replace the hose n case of leakage and anyway before the guarantee expiration.

FRATELLI PETTINAROLI S.p.A.
CLIMATE SYSTEMS TECHNOLOGY

**Fratelli Pettinaroli Spa**
Via Pianelli, 38 - 28017 San Maurizio d'Opaglio (NO) - Italy
Tel. +39 0322 96217 - +39 0322 96545 - Fax +39 0322 96546
info@pettinaroli.com - www.pettinaroli.com