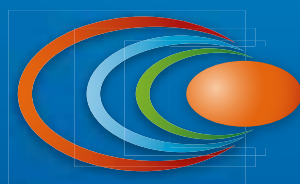


EMMETI

Alpert pipe Gerpex LBP / Gerpex press fittings

Distribution system for thermosanitary systems
with multilayer pipes and brass fittings



Heating & Plumbing





EMMETI **The new factory for Multilayer pipe**

The 9th of January on 2009 Emmeti opened, in Fontanafredda (PN) loc. Le Forcate, the PE-Xb/Al/PE-Xb and PE-RT/Al/PE-RT multilayer pipe factory.

The two production lines, the crosslinking chamber, the coating line, the automatic packaging, the raw-material warehouse and the Laboratory, are housed within a 10,000 m² facility.

The laboratory, equipped with the most modern devices for product analysis and checks, ensures maximum reliability and safety of the finished product and its compliance with the latest standards.

The production capacity of the plant, once up to speed, is 36,000,000 metres per year.




By means of this factory, in addition to the facility in Ponte S. Marco (BS), with the production of press and compression fittings, means that Emmeti is placed on the European market among the few companies able to offer its own complete multilayer system.



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DVGW W534 certificate: System consisting of multilayer pipes Alpert and press fittings Gerpex LBP

| | | |
|---|---|--|
|  | |  CERT |
| DVGW type examination certificate DVGW-Baumusterprüfzertifikat | | DW-8501CS0372 <small>Registration Number Registriernummer</small> |
| Field of Application <i>Anwendungsbereich</i> | products of water supply <i>Produkte der Wasserversorgung</i> | |
| Owner of Certificate <i>Zertifikatinhaber</i> | EMMETI S.p.A. Via Brigata Osoppo, 166, I-33074 Vigonovo di Fontafredda (PN) | |
| Distributor <i>Vertreiber</i> | EMMETI S.p.A. Via Brigata Osoppo, 166, I-33074 Vigonovo di Fontafredda (PN) | |
| Product Category <i>Produktart</i> | installation systems and system joints: drinking water installation system (8501) | |
| Product Description <i>Produktbezeichnung</i> | drinking water installation system consisting of compression connectors made of brass, leak before pressed (type M-MV) and multilayer pipes made of PE-RT/AL/PE-RT and PE-Xb/AL/PE-Xb | |
| Model <i>Modell</i> | Gerpex LBP | |
| Test Reports <i>Prüfberichte</i> | type testing: V183/17 from 11.10.2017 (IMA) | |
| Test Basis <i>Prüfgrundlagen</i> | DVGW W 534-(P) (01.07.2015) DVGW CERT ZP 8500 (09.03.2017) UBA METALLE (15.03.2017) UBA ELASTOM (16.03.2016) DVGW W 270 (01.11.2007) | |
| Date of Expiry / File No. <i>Ablaufdatum / Aktenzeichen</i> | 11.10.2022 / 17-0525-WNE | |
| 07.11.2017 Fk A-1/2 <small>Date, Issued by, Sheet, Head of Certification Body Datum, Bearbeiter, Blatt, Leiter der Zertifizierungsstelle</small> |  | DVGW CERT GmbH Zertifizierungsstelle Josef-Wimmer-Str. 1-3 53123 Bonn Tel. +49 228 91 88 - 888 Fax +49 228 91 88 - 993 www.dvgw-cert.com info@dvgw-cert.com |
| <small>DVGW CERT GmbH is an accredited body by DAkkS according to DIN EN ISO/IEC 17065:2013 for certification of products for energy and water supply industry.</small> | |  Deutsche Akkreditierungsstelle D-ZE-16028-01-05 |
| <small>DVGW CERT GmbH ist von der DAkkS nach DIN EN ISO/IEC 17065:2013 akkreditierte Stelle für die Zertifizierung von Produkten der Energie- und Wasserversorgung.</small> | | |

System consisting of Alpert pipes, and press fittings Gerpex LBP:



KIWA certificate according to UNI EN ISO 21003: System consisting of multilayer pipes Alpert and press fittings Gerpex LBP

CERTIFICATE



Numero KIP-098340/01

Sostituisce n.a.

Emesso 22.03.2018

Prima emissione 22.03.2018

Rapporto 100901265

Contratto K15-01

Pagina 1 di 1

CERTIFICATO DI PRODOTTO KIWA-UNI

PRODUCT CERTIFICATE KIWA-UNI

Kiwa Cermet Italia dichiara che i prodotti
Kiwa Cermet Italia hereby declare that the products

Sistemi multistrato per il trasporto di acqua calda e fredda all'interno degli edifici
Multilayer piping systems for hot and cold water installation inside buildings

Marchio del sistema/System Trade mark: **Gerpex LBP**
 composto da/made of:
 Tubo multistrato/Multilayer Pipe: **GERPEX RA/ALPERT**
 Raccordi/Fittings: **GERPEX LBP**

| DN and wall thickness | Layers Material | Application Class | Pressure | Fittings |
|-----------------------|-----------------|-------------------|----------|---|
| 16x2,0 Al0,2 | PE-Xb/Al/PE-Xb | 2 and 5 | 10 bar | Brass press fittings LBP profile B, TH, U, H, F |
| 20x2,0 Al0,25 | PE-Xb/Al/PE-Xb | 2 and 5 | 10 bar | Brass press fittings LBP profile B, TH, U, H, F |
| 26x3,0 Al 0,3 | PE-Xb/Al/PE-Xb | 2 and 5 | 10 bar | Brass press fittings LBP profile B, TH, U, H, F |
| 32x3,0 Al 0,4 | PE-Xb/Al/PE-Xb | 2 and 5 | 10 bar | Brass press fittings LBP profile B, TH, U, H, F |
| 16x2,0 Al 0,2 | PE-RT/Al/PE-RT | 2 and 5 | 10 bar | Brass press fittings LBP profile B, TH, U, H, F |
| 20x2,0 Al 0,25 | PE-RT/Al/PE-RT | 2 and 5 | 10 bar | Brass press fittings LBP profile B, TH, U, H, F |

Sistema Costruito da/System Manufactured by: **Emmeti S.p.a.**
 33074 - Fontanafredda (PN)

In base ai test di tipo nonché alle ispezioni periodiche condotte da Kiwa sono ritenuti conformi ai requisiti del Documento Tecnico Ki-0410 basato sulla normativa UNI EN ISO 21003-5:2009 e al D.M. 174 e quindi marcati Kiwa-UNI. La validità di questo certificato è soggetta al risultato positivo delle sorveglianze periodiche. *Based upon type tests and on Kiwa's periodic factory inspections the products are considered in compliance with the requirement of Technical Document Ki-0410, based on the standard UNI EN ISO 21003-5:2009 e al D.M. 174 and consequentially marked Kiwa-UNI. The validity of this certificate is subject to the positive result of periodic surveillance visits*

Il presente certificato viene rilasciato in accordo al Regolamento Kiwa Cermet Italia per la Certificazione di prodotto ed è composto da 1 pagina. *This certificate is issued in accordance with the Kiwa Cermet Italia regulations for Product Certification and consists of 1 pages*

Chief Operating Officer
 Giampiero Belcredi




SGQ N° 007A SSI N° 006G
 SGA N° 010D FSM N° 0041
 PRD N° 069B

Kiwa Cermet Italia S.p.A.
 Società con socio unico, soggetta all'attività di direzione e coordinamento di Kiwa Italia Holding Srl
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 Tel +39. 0438 411755
 Fax +39.0438 22428
 E-mail: info@kiwacermet.it
www.kiwa.it

System consisting of Alpert pipes, and press fittings Gerpex LBP:

kiwa UNI sizes: Ø16, Ø20

DVGW W534 certificate: System consisting of multilayer pipes Alpert and press fittings Gerpex



DVGW type examination certificate DVGW-Baumusterprüfzertifikat

DW-8501BR0520
Registration Number
Registriernummer

| | |
|---|--|
| Field of Application <i>Anwendungsbereich</i> | products of water supply <i>Produkte der Wasserversorgung</i> |
| Owner of Certificate <i>Zertifikatinhaber</i> | EMMETI S.p.A. Via Brigata Osoppo, 166, I-33074 Vigonovo di Fontafredda (PN) |
| Distributor <i>Vertreiber</i> | EMMETI S.p.A. Via Brigata Osoppo, 166, I-33074 Vigonovo di Fontafredda (PN) |
| Product Category <i>Produktart</i> | installation systems and system joints: drinking water installation system (8501) |
| Product Description <i>Produktbezeichnung</i> | drinking water installation system consisting of compression connectors made of metal, type M-MV and multilayer pipe PE-RT/Al/PE-RT |
| Model <i>Modell</i> | ALPert |
| Test Reports <i>Prüfberichte</i> | supplement test: V001/16.1A from 20.09.2016 (IMA) type testing: B446/14.3 from 23.10.2015 (IMA) type testing: B274/10.1 from 04.10.2011 (IMA) mechanical test: B215/10+B218.3/08 from 06.08.2010 (IMA) type testing: 329206/0.1/4035 from 20.09.2006 (SKZ) |
| Test Basis <i>Prüfgrundlagen</i> | DVGW W 534-(P) (01.07.2015) UBA METALLE (19.01.2016) BGA KTW (12.12.1985) DVGW W 270 (01.11.2007) |
| Date of Expiry / File No. <i>Ablaufdatum / Aktenzeichen</i> | 13.11.2021 / 16-0056-WNA |

16028-004-02

20.09.2016 GI A-1/2

Date, Issued by, Sheet, Head of Certification Body
Datum, Bearbeiter, Blatt, Leiter der Zertifizierungsstelle

DVGW CERT GmbH is an accredited body by DAkkS according to DIN EN ISO/IEC 17065:2013 for certification of products for energy and water supply industry.

DVGW CERT GmbH ist von der DAkkS nach DIN EN ISO/IEC 17065:2013 akkreditierte Stelle für die Zertifizierung von Produkten der Energie- und Wasserversorgung.



DVGW CERT GmbH
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Josef-Wirmer-Str. 1-3
53123 Bonn

Tel. +49 228 91 88 - 888
Fax +49 228 91 88 - 993

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info@dvgw-cert.com

KIWA certificate according to UNI EN ISO 21003: System consisting of multilayer pipes Alpert and press fittings Gerpex

Certificate



Numero KIP-065084/04

Sostituisce KIP-065084/03

Emesso 15.06.2016

Prima emissione 20.10.2011

Rapporto 110901256

Contratto K15-01

Pagina 1 di 1

CERTIFICATO DI PRODOTTO KIWA-UNI

PRODUCT CERTIFICATE KIWA-UNI

Kiwa Cermet Italia dichiara che i prodotti
Kiwa Cermet Italia hereby declare that the products

Sistemi multistrato per il trasporto di acqua calda e fredda all'interno degli edifici
Multilayer piping systems for hot and cold water installation inside buildings

Marchio del sistema/System Trade mark:
 composto da/made of:

EMMETI-ALPERT

Tubo multistrato/Multilayer Pipe:
 Raccordi/Fittings:

**EMMETI-ALPERT
 EMMETI-GERPEX**

| Model | Type and nominal dm and wall tickness | Layers Material | Application class / Pressure | Fittings |
|--------|---------------------------------------|-----------------|------------------------------|------------------------------------|
| ALPERT | M-pype dn16x2,0 A10,20 | PE-RT/Al/PE-RT | 2 and 5/10bar | Brass press fittings profile B, TH |
| | M-pype dn20x2,0 A10,25 | PE-RT/Al/PE-RT | 2 and 5/10bar | Brass press fittings profile B, TH |

Sistema Costruito da/System Manufactured by:

Emmeti S.p.a.
 33074 - Fontanafredda (PN)

In base ai test di tipo nonché alle ispezioni periodiche condotte da Kiwa possono essere ritenuti conformi ai requisiti del Documento Tecnico Ki - 0410 basato sulla normativa ISO21003:2008 ed al D.M. 174/2004 e quindi marcati Kiwa-UNI
La validità di questo certificato è soggetta al risultato positivo delle sorveglianze periodiche

Based upon type tests and on Kiwa's periodic factory inspections, the products can be considered to be in compliance with the requirement of Technical Document Ki - 0410, based on the standard ISO21003:2008 and to D.M. 174/2004 and consequentially marked Kiwa-UNI

The validity of this certificate is subject to the positive result of periodic surveillance visits

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Chief Operating Officer
 Giampiero Belcredi



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www.kiwa.it
www.kiwacermet.it



SGQ N° 007A SSI N° 006G
 SGA N° 010D FSM N° 004I
 PRD N° 069B

Quality controls

The whole manufacturing process of Emmeti Alpert multilayer pipe is subject to strict controls carried out before, during and after production from the raw materials through to the finished product.

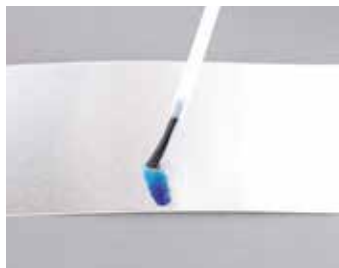
The production department and analytical laboratory, carry out checks including the following:



MFI (Melt Flow Index)
Verify compliance of the polymer raw materials to be used.



Peeling
Test resistance to delamination between the inner layer and the aluminium.



INK Test
Ensure that the strip of aluminium is clean.



Resistance to internal pressure
Test resistance to a specific internal pressure at 95 °C; the pressure value is chosen as a function of the type of pipe (maximum diameter, aluminium thickness) and the duration of the test (22h, 165h, 1000h), by referring to the relative regression curves.



Dimensional control in production
Automatic computerised control of pipe dimensions.



Thermal cycles
Test on a system consisting of the pipe and fittings and subjected to 5000 temperature cycles (20 to 95 °C) of 30 minutes each with a pressure of 10 bar.



Ball Test
To ensure that there are no occlusions or deformations on the inside of the pipe by using compressed air to pass a ball through the pipe.



Pressure cycles
Test on a system consisting of the pipe and fittings and subjected to 10,000 pressure cycles (from 1 to 30 bar) at 23 °C with a frequency of 0.5 Hz.



Enlargement Test
Test performed both in production and in the laboratory to verify the quality of welds and the adhesion of individual layers.



Vibration test
Vibration test on a system consisting of pipe and fittings which is subjected to 330 alternating bending cycles with an internal pressure of 15 bar at room temperature.

Fields of application

The Emmeti system consisting of Alpert multilayer pipes and Gerpex press fittings represents a modern and efficient solution used to build heating and sanitary systems with multilayer pipes, made from not cross-linked with high resistance to high temperature polyethylene (PE-RT) and aluminium, and special fittings.

The fittings are available in two different versions: press-fittings and screw-fittings. The wide range of fittings and the various fastening options make the system a complete and highly reliable product.

The system is suitable for:

- Heating systems
- Chilled water air-conditioning systems
- Hydraulic systems
- Compressed air systems (*)

(*) An adequate filtering system has to be in place to avoid contact between compressor lubricant oil and O-rings included into the fittings.

For the transport of other fluids, please contact our Technical Support service for the suitable checks.



The advantages of a complete system

Greater resistance to high temperatures

Resistance to temperatures up to a maximum of 95 °C.

Greater resistance to pressure

Resistance to pressures up to a maximum of 10 bar, at a temperature of 70 °C, for 50 years.

Contained linear expansion

The linear expansion in relation to a variation in temperature is comparable with that of copper.

Thermal insulation

The system is available with an insulating coating having the following fire reaction class: C_L-S1-d0 (EN 13501-1).

Low load losses

The smooth surface of the pipe prevents limescale deposits and promotes the smooth flow of fluid thus considerably reducing pressure drops across the system.

A higher water flow rate is attainable

The pipe has considerable resistance to mechanical erosion from solid particles that the water normally carries with it.

Resistance to crushing and abrasion

This is due to the resistance of the aluminium layer and of the layers of PE-X used in the pipe's construction.

Impermeability to oxygen

The aluminium layer makes the Alpert pipe impermeable to gasses and therefore to oxygen that would cause corrosion of the system's metal components.

Resistance to external chemical agents

Alpert pipes embedded in walls or buried under flooring can be, due to their qualities, placed in "acidic" and "alkali" environments.

Complete resistance to electrochemical corrosion

This characteristic is obtained thanks to the materials used in the pipe construction and the fittings special dielectric element.

Reduced weight and rapid installation

Thanks to its low specific weight and the ability to bend easily, the Alpert pipe is extremely easy to install.

Once bent into the desired position, the pipe remains in that position in the same way a metallic pipe would do.

Connecting pipe fittings is quick and simple giving it a significant advantage over using traditional jointing methods

Features of the system



Avoiding electrical voltage

Multilayer Alpert pipes are made with a combination of aluminium and cross-linked polyethylene. Both the inner and outer pipes wrap around the aluminium pipe, effectively sealing it.

This design eliminates any direct electrical contact with the metal part of the tube.

In addition, at each joint, the Gerpex multilayer pipes are isolated from the joint fitting by means of a plastic ring.

This ensures that no direct current flow can be generated and avoids induced electrical voltage across the pipe system.

Chemical resistance

The chemical characteristics PE-RT make the Alpert pipe system resistant to of the following substances:

- Plaster, concrete, mortar and cement
- Disinfectants and cleaning agents complying with DVGW technical sheet W291 and DIN 2000
- All natural materials containing drinking water according to DIN 2000
- Anti corrosives according to DIN 1988 part 4

Multilayer Alpert pipes must be protected from substances such as bitumen, grease, solvents and mineral oils.

For compatibility with other chemical compounds, reference should be made to the ISO/TR 10358:1993 tables.

Gerpex LBP and Gerpex pipe fittings must be protected with an appropriate coating if used in environments exposed to the danger of corrosion such as being laid in continuous flooring, in spaces with permanent humidity, in the presence of aggressive gases or concealed in direct contact with cement mortar or binders of lime.

O-ring seals (in EPDM) are not compatible with petroleum products and therefore the use of lubricants derived from petroleum is prohibited.

The Gerpex system can be used with water and glycol mixtures to reach temperatures down to -10 °C.

Heat insulation

The hot water distribution networks for domestic use or heating, must be insulated in compliance with current legislation.

The Alpert pipes pre-insulated with a sheath can be used in these systems for the distribution of cold or refrigerated water (air conditioning systems), preventing the risk of condensate (after verification in compliance with the UNI EN ISO 12241- 2002 Standard).

Resistance to UV rays

The multilayer pipes must be protected from exposure to direct sunlight. They therefore must be covered during transport or storage, if they do not have the original packaging.

The Alpert pipes laid freely without protective pipes must be protected from prolonged exposure to solar rays (several months) by a covering.

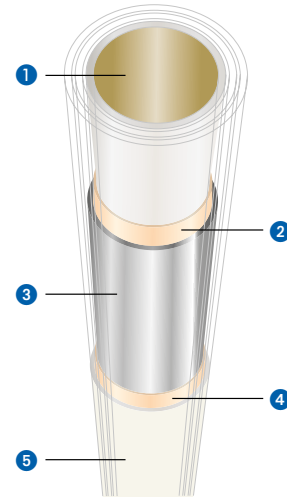
The UV protection function of the Alpert pipes can only be performed by the insulating layer (insulated Alpert), by opaque sheets or by wrapping them in dark materials

No hygiene risks

The Alpert multilayer pipes are approved for use in installations with drinking water. The lack of hygiene risks, meaning suitability for hot and cold drinking water, has been certified in compliance with the KTW Directives by the DVGW research institute and is subject to constant external control.

The use of the Alpert system in sanitary systems is ensured by certificates of fitness for drinking water in compliance with current legislation. The Alpert multilayer pipes contribute considerably to preventing the proliferation of legionella, thanks to the smooth surface of the internal pipe in PE-X, which does not promote deposits.

Multilayer pipe Alpert



Construction

Multilayer pipe for plumbing systems made of composite material, made homogeneous and united through a technologically advanced process with which a pipe PE-RT (not cross linked polyethylene with high resistance at high temperature) is realized, reinforced by a butt-welded aluminum core covered externally with another PE-RT layer. Alpert pipes combine the processing and durability advantages of a plastic pipe with the sturdiness and dimensional stability to temperature and pressure of a metal pipe.

- ❶ Inner pipe PE-RT
- ❷ Bonding layer connecting the inner pipe to the aluminium pipe
- ❸ Butt-welded aluminium pipe, thickness 0.2 mm for size 16x2; thickness 0,25 mm for size 20x2
- ❹ Bonding layer connecting the outer pipe to the aluminium piping
- ❺ Outer pipe (PE-RT)

The range

The Alpert tube is available in rolls in the diameters DN 16 and 20, bare and pre-insulated with sheath in coated polyethylene foam.

Dimensional data

| Alpert Ø pipe external Ø | mm | 16 | 20 |
|-----------------------------|------|-------------|---------|
| Alpert pipe internal Ø | mm | 12 | 16 |
| Overall thickness | mm | 2 | 2 |
| Aluminum sheet thickness | mm | 0,20 | 0,25 |
| Weight (1) | Kg/m | 0,10 | 0,13 |
| Water content | l/m | 0,11 | 0,20 |
| Insulation thickness (2) | mm | 6 | 6/9 |
| Packs nude pipe (roll) | m | 100/200/500 | 100/240 |
| Packs insulated pipe (roll) | m | 50/100 | 50 |

(1) Bare pipe

(2) For insulated pipes only

Pipe technical data

Classes of application (UNI ISO 21003 - see table on next page "Classification of the conditions of use"): 2/10 bar; 5/10 bar

Maximum operating conditions for 50 years:

- Design temperature $T_D = 70 \text{ }^\circ\text{C}$

- Design pressure $p_D = 10 \text{ bar}$

Max. temperature for short periods: $95 \text{ }^\circ\text{C}$

Coefficient of linear expansion: $0.026 \text{ mm/m } ^\circ\text{C}$

Thermal conductivity: $0.45 \text{ W/m } ^\circ\text{C}$

Minimum radius of bending: $5 \times \text{Ø pipe}$

Surface roughness of internal pipe: $7 \text{ }\mu\text{m}$

Fire reaction class: E_L (EN 13501-1)

Technical data of insulating sheath

Material: Closed-cell expanded polyethylene, covered with a film in extruded LD-PE.

Thermal conductivity (at $40 \text{ }^\circ\text{C}$): $\leq 0,040 \text{ W/mK}$ (UNI EN ISO 8497).

Fire reaction class: $C_L-s1-d0$ (EN 13501-1).

Thickness of covering: compliant with attachment B- TAB 1 of Italian Presidential Decree 412/93 per tubazioni correnti for pipes that run within structures that do not face onto the exterior, nor onto heated rooms.

Classification of the conditions of use (UNI ISO 21003-1)

| Application class | Design temperature T_D (°C) | Time ^b at T_D (years) | T_{max} (°C) | Time at T_{max} (years) | T_{mal} (°C) | Time at T_{mal} (hours) | Field of application |
|-------------------|-------------------------------|------------------------------------|----------------|---------------------------|----------------|---------------------------|--|
| 1 ^a | 60 | 49 | 80 | 1 | 95 | 100 | Hot water (60 °C) |
| 2 ^a | 70 | 49 | 80 | 1 | 95 | 100 | Hot water (70 °C) |
| 4 ^b | 20 + | 2,5 | 70 | 2,5 | 100 | 100 | Underfloor heating and low temperature radiators |
| | 40 + | 20 | | | | | |
| | 60 | 25 | | | | | |
| 5 ^b | 20 + | 14 | 90 | 1 | 100 | 100 | High temperature radiators |
| | 60 + | 25 | | | | | |
| | 80 | 10 | | | | | |

Note:

T_D Design temperature


T_{max} Max design temperature for short periods

T_{mal} Malfunctioning temperature


a) A Country can choose both class 1 or class 2 to comply with its national legislation.

b) Where more than one design temperature for time and associated temperature appears for any class, they should be aggregated. The symbol "+" in the table implies a temperature profile of the mentioned temperature over time (e. g. the design temperature profile for 50 years for class 5 is 20 °C for 14 years followed by 60 °C for 25 years, 80 °C for 10 years, 90 °C for 1 year and 100 °C for 100 h).

Marking example of Alpert pipe 16x2

EMMETI alpert PE-RT/AL/PE-RT Type II 16x2 Tmax = 95 °C UNI EN ISO 21003 **kiwa**  Class 2/10 bar, 5/10 bar DVGW DW8501BR0520 - DW-8501CS0372 Made in Italy hh:mm gg/mm/aa lotto mtr m

Key

| | |
|--|---|
| EMMETI alpert | Trade name pipe |
| PE-RT/AL/PE-RT Type II | Layer material indication |
| 16x2 | External diameter and wall thickness (mm) |
| Tmax = 95 °C | Maximum temperature for short periods |
| UNI EN ISO 21003 kiwa  | KIWA certification according to technical regulation UNI EN ISO 21003 |
| Class 2/10 bar, 5/ 10 bar | Application classes combined with operating pressure |
| DVGW | Reference to the German certification DVGW |
| DW8501BR0520 | Certificate number in according to German technical regulation DVGW W 534 - Alpert system |
| DW8501CS0372 | Certificate number in according to German technical regulation DVGW W 534 - Gerpex LBP system |
| Made in Italy | Pipe made in Italy |
| hh:mm gg/mm/aa lotto | Time, date, production batch |
| mtr m | Progressive roll length |

EMMETI alpert PE-RT/AL/PE-RT Type II 16x2 Tmax = 95 °C UNI EN ISO 21003 **kiwa**  Class 2/10 bar, 5/10 bar DVGW DW8501BR0520 - DW8501CS0372 Made in Italy hh:mm gg/mm/aa lotto mtr m

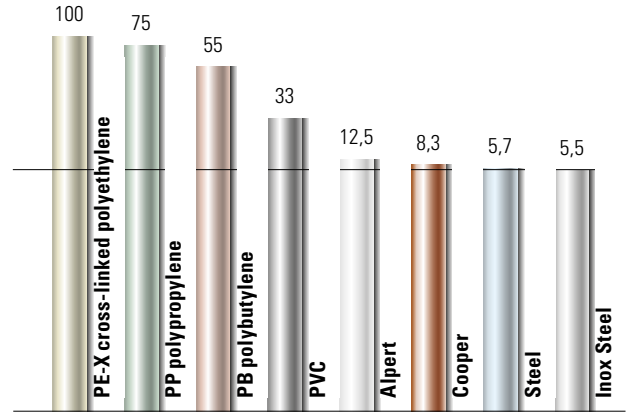
Certification and quality

The features and performance of Alpert pipe are verified and certified by numerous quality marks and international standards. In particular, Alpert pipes have obtained the DVGW certificate of quality regarding the prestigious German institution Technical Regulation W542, as well as KIWA in accordance with UNI EN ISO 21003.

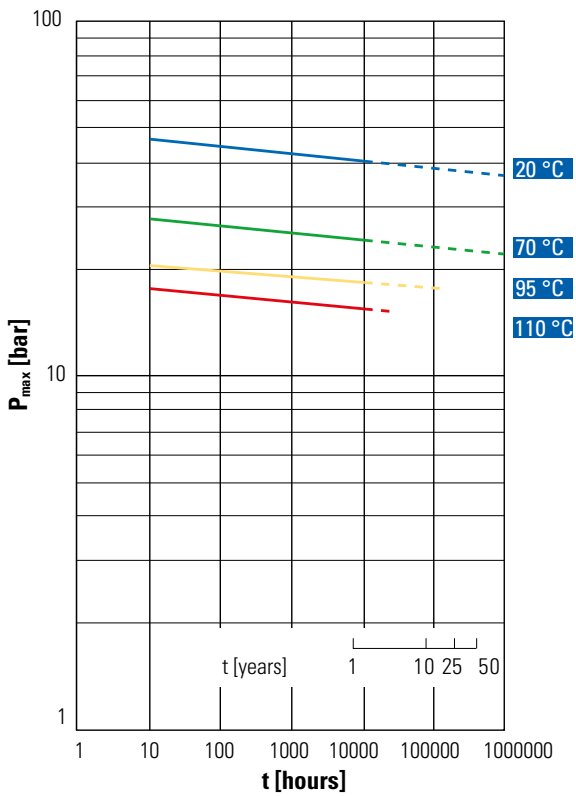
Drinking water

The use of systems consisting of Alpert pipes and press fittings Gerpex LBP and Gerpex in medical facilities is guaranteed by the certificate of suitability for drinking water according to the current national legislation in force (Italian Ministerial Decree 174 of the Ministry of Health) as well as compliance with the requirements by the German institute KTW.

linear thermal expansion for 10 m pipes of different materials $\Delta T 50\text{ }^\circ\text{C}$ (values expressed in mm)



Regression curves Alpert pipe (Ø 16 x 2)



Reading example

The maximum pressure (p_{max}) for a duration of 50 years at a certain temperature is identified by intersecting the straight line (vertical) pertaining to the 50 years with the straight line (coloured) pertaining to the temperature.

Note the expected operating pressure (p_{es}), the safety coefficient will be equal to $k_s = p_{max} / p_{es}$.

Press fittings Gerpex

Features

Gerpex Emmeti press-fittings have been designed to be installed in conjunction with electric or manual pressing devices.

This type of joint has become increasingly more popular due to its extremely simple and quick installation, along with the high level of temperature and pressure resistance.

The jaw, specific for every diameter of fittings, compresses a stainless steel sleeve, which secures the pipe onto the core of the fitting. The hydraulic and mechanical sealing is guaranteed by the special profile of the fitting and the double O-ring.

After pressing, the fitting produces a joint with maximum stability and duration, which makes it particularly suitable in embedded installations.



Construction details

The stainless steel sleeve is connected to the fitting along with the blue plastic ring.

Each sleeve has the indication of the diameter.

The plastic ring has four important functions:

- impedes prevents electric contact between the layer of aluminium of the pipe and the brass body of the fitting, thus preventing the risk of possible corrosion,
- it allows the installer to check, via the sight holes, that the pipe has been inserted fully into the fitting,
- it guides the correct positioning of the jaws around the sleeve,
- fixes the sleeve to the fitting.

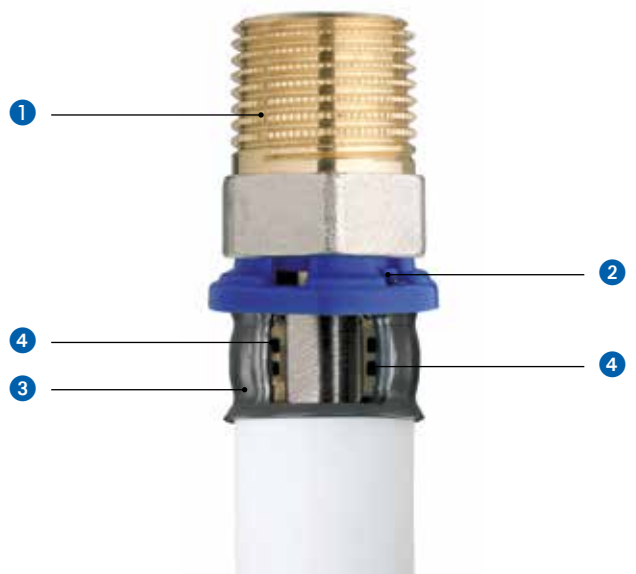
① CW617N (UNI EN 12165) e CW614N (UNI EN 12164) brass body*
Threads: UNI EN ISO 228-1, UNI EN 10226

② PA 6 sleeve ring

③ AISI 304 stainless steel sleeve

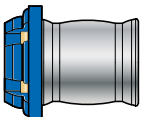
④ EPDM dual o-ring

* nickel-plated only on surface non in contact with fluid.



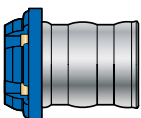
Compatible pressing profiles

B - KSP 1



| PROFILI | | SIZE | | | |
|---------|--|------|----|----|----|
| | | 16 | 20 | 26 | 32 |
| B | | ✓ | ✓ | ✓ | ✓ |
| TH | | ✓ | ✓ | ✓ | ✓ |
| F | | - | - | - | - |

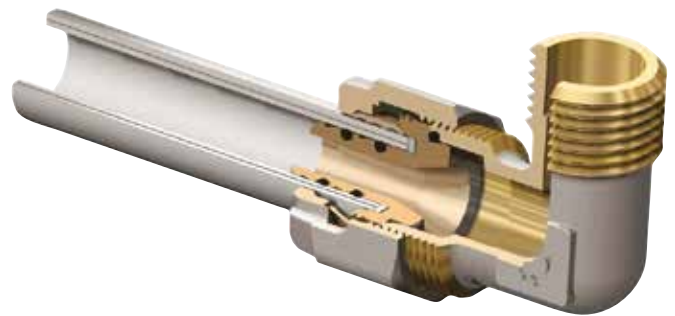
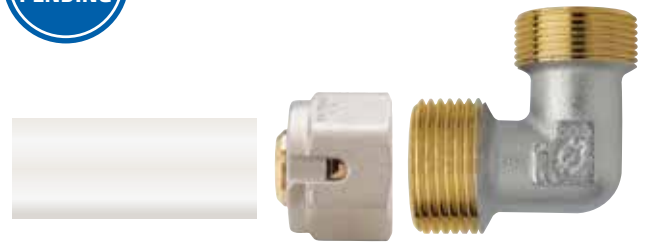
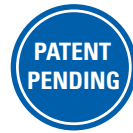
TH - KSP 11



Compression fittings

Features

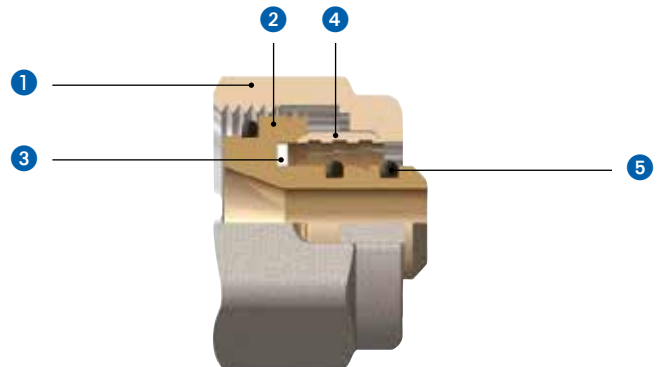
The use of compression fittings makes easier the installation of the multilayer system, and moreover it requires very few tools.
The 24x19 thread allows the use of a single type of fittings in combination to four seals with different sizes, thus rationalising stocks.
The hydraulic seal is ensured by means of the system with three O-rings and a pipe-shaped toothed ogive.
All the fittings are equipped with a special PTFE ring that electrically isolates the pipe aluminium layer from the brass fitting.



Construction details

The single body seal is supplied with its components (nut, ogive, adaptor) already assembled and ready for insertion into the pipe.
The opening on the nut makes it possible to verify if the fitting has been inserted all the way down to the Seat point.

- 1 Nut in brass CW617N (UNI EN 12165)
- 2 Adaptor in brass CW614N (UNI EN 12164)
- 3 Washer in PTFE
- 4 Serrated hose-clamp in brass CW614N (UNI EN 12164)
- 5 O-Ring seals in EPDM



The range

Alpert bare pipe in coils



| Size | Mts. pack |
|--------|-----------------|
| 16 x 2 | 100 / 200 / 500 |
| 20 x 2 | 100 / 240 |

Galvanised steel phono-insulating pipe clamp collar

20x1.5 mm metal plate, M8/10 nut



| Size (mm) | Size (pollici) | Pcs. pack |
|-----------|----------------|-----------|
| 15-19 | 3/8" | 10 |
| 21-23 | 1/2" | 10 |

Alpert insulated pipe in coils

Closed cell cross-linked polyethylene insulating sheath, coated.
Insulating thermal conductivity at 40 °C: ≤ 0.040 W/m °C



| Size | Insulation thickness | Mts. pack |
|--------|----------------------|-----------|
| 16 x 2 | 6 mm* | 50/100 |
| 20 x 2 | 6 mm | 50 |
| 20 x 2 | 9 mm* | 50 |

* Compliant with Italian Presidential Decree 412/93 for pipes that run within structures that do not face onto the exterior, nor onto heated rooms.

Joint screw with plug

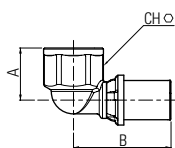
Ø 10 x 60 plug



| Size | Pcs. pack |
|----------|-----------|
| Ø 8 x 90 | 10 |

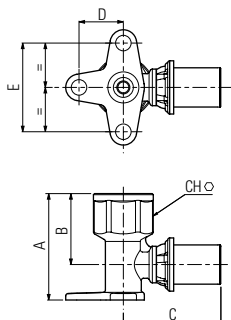
Press fittings Gerpex

Female connecting elbow



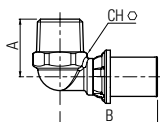
| Size | Profile | A mm | B mm | CH mm |
|-------------|----------|------|------|-------|
| 16 x Rp1/2" | B (KSP1) | 23,5 | 44 | 24 |
| 20 x Rp1/2" | B (KSP1) | 23,5 | 44 | 24 |
| 20 x Rp3/4" | B (KSP1) | 28 | 48 | 30 |

Female elbow with flange



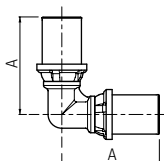
| Size | Profile | A mm | B mm | C mm | D mm | E mm | CH mm |
|-------------|----------|------|------|------|------|------|-------|
| 16 x Rp1/2" | B (KSP1) | 48 | 32 | 44 | 20 | 40 | 24 |
| 16 x Rp1/2" | B (KSP1) | 68 | 52 | 44 | 20 | 40 | 24 |
| 20 x Rp1/2" | B (KSP1) | 68 | 52 | 44 | 20 | 40 | 24 |
| 20 x Rp1/2" | B (KSP1) | 48 | 32 | 44 | 20 | 40 | 24 |
| 20 x Rp3/4" | B (KSP1) | 56 | 37 | 48 | 20 | 40 | 30 |

Male connecting elbow



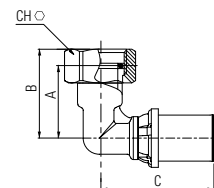
| Size | Profile | A mm | B mm | CH mm |
|------------|----------|------|------|-------|
| 16 x R1/2" | B (KSP1) | 26 | 44 | 22 |
| 20 x R1/2" | B (KSP1) | 26 | 44 | 22 |
| 20 x R3/4" | B (KSP1) | 31,5 | 48 | 27 |

Intermediate elbow



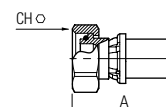
| Size | Profile | A mm |
|---------|----------|------|
| 16 x 16 | B (KSP1) | 44 |
| 20 x 20 | B (KSP1) | 44 |

Elbow with female swivel joint, flat seal



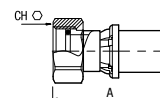
| Size | Profile | A mm | B mm | C mm | CH mm |
|------------|----------|------|------|------|-------|
| 16 x G1/2" | B (KSP1) | 26 | 32,8 | 44 | 25 |
| 20 x G3/4" | B (KSP1) | 28 | 34,5 | 47 | 30 |

Straight with female swivel nut, o-ring seal



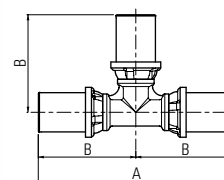
| Size | Profile | A mm | CH mm |
|-----------------------|----------|------|-------|
| Ø 16 - 24x19 | B (KSP1) | 45,5 | 27 |
| Ø 20 - 24x19 | B (KSP1) | 45,5 | 27 |
| Ø 16 - Eurocone G3/4" | B (KSP1) | 45,5 | 30 |
| Ø 20 - Eurocone G3/4" | B (KSP1) | 45,5 | 30 |

Straight with female nut, flat seal



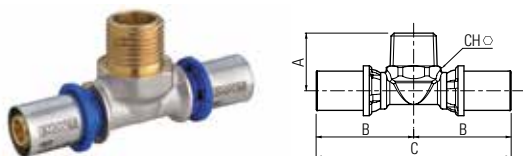
| Size | Profile | A mm | CH mm |
|------------|----------|------|-------|
| 16 x G3/8" | B (KSP1) | 41 | 19 |
| 16 x G1/2" | B (KSP1) | 41 | 25 |
| 16 x G3/4" | B (KSP1) | 42 | 30 |
| 20 x G1/2" | B (KSP1) | 41 | 25 |
| 20 x G3/4" | B (KSP1) | 42 | 30 |

Intermediate Tee joint



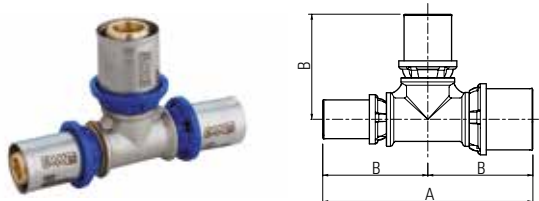
| Size | Profile | A mm | B mm |
|--------------|----------|------|------|
| 16 x 16 x 16 | B (KSP1) | 88 | 44 |
| 20 x 20 x 20 | B (KSP1) | 88 | 44 |

Intermediate male Tee with male branch



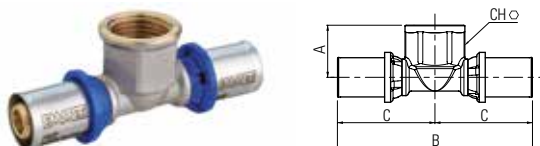
| Size | Profile | A mm | B mm | C mm | CH mm |
|-----------------|----------|------|------|------|-------|
| 16 x R1/2" x 16 | B (KSP1) | 26 | 44 | 88 | 22 |
| 20 x R1/2" x 20 | B (KSP1) | 26 | 44 | 88 | 22 |
| 20 x R3/4" x 20 | B (KSP1) | 31,5 | 48 | 96 | 27 |

Intermediate reducing Tee joint



| Size | Profile | A mm | B mm |
|--------------|----------|------|------|
| 16 x 20 x 16 | B (KSP1) | 88 | 44 |
| 20 x 16 x 16 | B (KSP1) | 88 | 44 |
| 20 x 16 x 20 | B (KSP1) | 88 | 44 |
| 20 x 20 x 16 | B (KSP1) | 88 | 44 |
| 20 x 26 x 20 | B (KSP1) | 96 | 48 |
| 20 x 32 x 20 | B (KSP1) | 106 | 53 |
| 26 x 16 x 20 | B (KSP1) | 96 | 48 |
| 26 x 16 x 26 | B (KSP1) | 96 | 48 |
| 26 x 20 x 16 | B (KSP1) | 96 | 48 |
| 26 x 20 x 20 | B (KSP1) | 96 | 48 |
| 26 x 20 x 26 | B (KSP1) | 96 | 48 |
| 26 x 26 x 16 | B (KSP1) | 96 | 48 |
| 26 x 26 x 20 | B (KSP1) | 96 | 48 |
| 32 x 16 x 32 | B (KSP1) | 106 | 53 |
| 32 x 20 x 20 | B (KSP1) | 106 | 53 |
| 32 x 20 x 26 | B (KSP1) | 106 | 53 |
| 32 x 20 x 32 | B (KSP1) | 106 | 53 |
| 32 x 26 x 20 | B (KSP1) | 106 | 53 |
| 32 x 32 x 16 | B (KSP1) | 106 | 53 |
| 32 x 32 x 20 | B (KSP1) | 106 | 53 |

Intermediate Tee joint with female branch



| Size | Profile | A mm | B mm | C mm | CH mm |
|------------------|----------|------|------|------|-------|
| 16 x Rp1/2" x 16 | B (KSP1) | 23,5 | 88 | 44 | 24 |
| 16 x Rp3/4" x 16 | B (KSP1) | 28 | 96 | 48 | 30 |
| 20 x Rp1/2" x 20 | B (KSP1) | 23,5 | 88 | 44 | 24 |
| 20 x Rp3/4" x 20 | B (KSP1) | 28 | 96 | 48 | 30 |
| 26 x Rp1/2" x 20 | B (KSP1) | 21,5 | 93 | 48 | 24 |

Straight intermediate union joint



| Size | Profile | A mm | B mm | CH mm |
|---------|----------|------|------|-------|
| 16 x 16 | B (KSP1) | 73 | 34,5 | 16 |
| 20 x 20 | B (KSP1) | 73 | 34,5 | 20 |

Straight intermediate reducing union joint



| Size | Profile | A mm | B mm | CH mm |
|---------|----------|------|------|-------|
| 20 x 16 | B (KSP1) | 73 | 34,5 | 20 |
| 26 x 16 | B (KSP1) | 71 | 35,5 | 23 |
| 26 x 20 | B (KSP1) | 71 | 35,5 | 23 |
| 32 x 16 | B (KSP1) | 73 | 36,5 | 29 |
| 32 x 20 | B (KSP1) | 73 | 36,5 | 29 |

Straight male union joint



| Size | Profile | A mm | CH mm |
|------------|----------|------|-------|
| 16 x R1/2" | B (KSP1) | 50,8 | 22 |
| 20 x R1/2" | B (KSP1) | 50,8 | 22 |
| 20 x R3/4" | B (KSP1) | 54,5 | 27 |

Straight female union joint



| Size | Profile | A mm | CH mm |
|-------------|----------|------|-------|
| 16 x Rp1/2" | B (KSP1) | 49,5 | 24 |
| 20 x Rp1/2" | B (KSP1) | 49,5 | 24 |
| 20 x Rp3/4" | B (KSP1) | 52 | 30 |

Screw seals

Monoblocco fitting 24x19 for multilayer pipe, nickel-plated



| Size | Thread |
|--------|--------|
| 16 x 2 | 24x19 |
| 20 x 2 | 24x19 |

Monoblocco fitting 3/4" Eurocone for multilayer pipe, nickel-plated



| Size | Thread |
|--------|---------------|
| 16 x 2 | 3/4" Eurocone |
| 20 x 2 | 3/4" Eurocone |

3-piece fittings 24x19 and 3/4" Eurocone for multilayer pipe, nickel-plated



| Size | Thread |
|--------|---------------|
| 16 x 2 | 24x19 |
| 16 x 2 | 3/4" Eurocone |
| 20 x 2 | 3/4" Eurocone |

Derivation tightening wrench CH 27 - 30

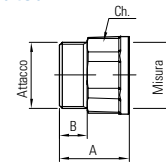


CH 27 spanner for tightening takeoffs until DN 18



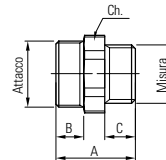
Fittings to be tightened

Straight female joint, nickel -plated



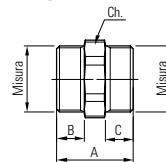
| Size | Thread | A mm | B mm | CH mm |
|--------|--------|------|------|-------|
| Rp1/2" | 24x19 | 25 | 10 | 25 |
| Rp3/4" | 24x19 | 27 | 10 | 31 |

Straight male joint, nickel -plated



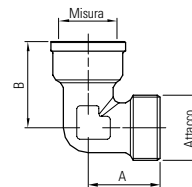
| Size | Thread | A mm | B mm | C mm | CH mm |
|-------|--------|------|------|------|-------|
| R1/2" | 24x19 | 28,5 | 10 | 11 | 25 |
| R3/4" | 24x19 | 29,5 | 10 | 12 | 31 |

Straight joint double jointed nickel-plated



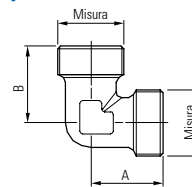
| Size | A mm | B mm | C mm | CH mm |
|-------|------|------|------|-------|
| 24x19 | 27,5 | 10 | 10 | 25 |

Female elbow joint nickel-plated



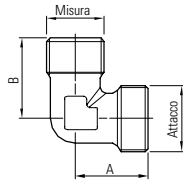
| Size | Thread | A mm | B mm |
|--------|--------|------|------|
| Rp1/2" | 24x19 | 26 | 31 |
| Rp3/4" | 24x19 | 29 | 33,5 |

Double-jointed elbow nickel-plated



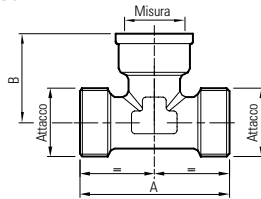
| Size | A mm | B mm |
|-------|------|------|
| 24x19 | 26 | 27,5 |

Male elbow joint nickel-plated



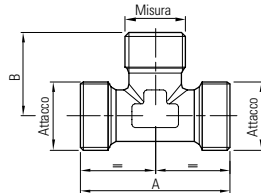
| Size | Thread | A mm | B mm |
|-------|--------|---------|---------|
| R1/2" | 24x19 | 26 | 29 |
| R3/4" | 24x19 | 29 | 31 |

Tee joint female nickel-plated



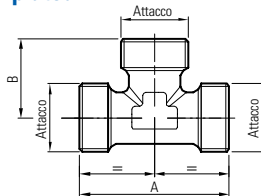
| Size | Thread | A mm | B mm |
|--------|--------|---------|---------|
| Rp1/2" | 24x19 | 52 | 31 |
| Rp3/4" | 24x19 | 58 | 33,5 |

Tee joint male nickel-plated



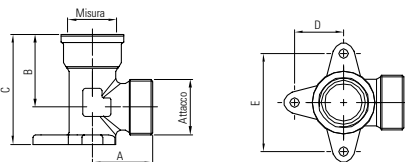
| Size | Thread | A mm | B mm |
|-------|--------|---------|---------|
| R1/2" | 24x19 | 52 | 29 |
| R3/4" | 24x19 | 58 | 31 |

Tee-joint three-piece nickel-plated



| Size | Thread | A mm | B mm |
|----------|--------|---------|---------|
| 20x20x20 | 24x19 | 52 | 27,5 |

Elbow joint female with flange nickel-plated



| Size | Thread | A mm | B mm | C mm | D mm | E mm |
|--------|--------|---------|---------|---------|---------|---------|
| Rp1/2" | 24x19 | 26 | 31 | 47 | 21 | 42 |

Galvanized bracket for flanged elbow



Tooling



Manual pressing machine

360° rotating head
Telescopic arms, extendable 300 mm
Instrument weight: approximately 3.3 Kg
Instrument length: 560 - 860 mm
Thrust force: min. 30 kN
Press fittings: from DN 14 to DN 32

Dies for manual pressing machine



| Size | Profile |
|--------|---------|
| 16 x 2 | B(KSP1) |
| 20 x 2 | B(KSP1) |
| 26 x 3 | B(KSP1) |
| 32 x 3 | B(KSP1) |

14.4 V battery powered pressing machine SPM32 for Gerpex jaws from DN 14 to DN 75



Weight including charger: 3.9 Kg
Dimensions LxHxS: 390x310x95
Feed force: min. 32kN - Power supply: 14.4 V
Battery charger: 230 V, 50 Hz
Battery capacity: 2.6 Ah
Charging time: 45 min approx.
Pressing performance: approx. 235 (DN20)
Pressing time: from 4 to 7 depending on DN
Operation temperature range: -20 °C ÷ 40 °C
360° rotating head
Automatic piston retraction
USB connection for remote diagnosis
Optical malfunction report and working state indicator
Complete with metal case, battery 14.4 V, battery charger, USB cable, analysis software.

230 V powered pressing machine SPM32 for Gerpex jaws from DN 14 to DN 75



Weight including charger: 4.5 Kg
230 V adapter weight: 840 g
Dimensions LxHxS: 390x310x95
Feed force: min. 32kN
Power supply: 230 V, 50 Hz
Max loading: 30 A
Adapter voltage output: 14,4 V
Pressing time: from 4 to 7 depending on DN
Operation temperature range: -20 °C ÷ 40 °C
360° rotating head
Automatic piston retraction
USB connection for remote diagnosis
Optical malfunction report and working state indicator - Complete with metal case, 230 V adapter, USB cable, analysis software.

Installing the system

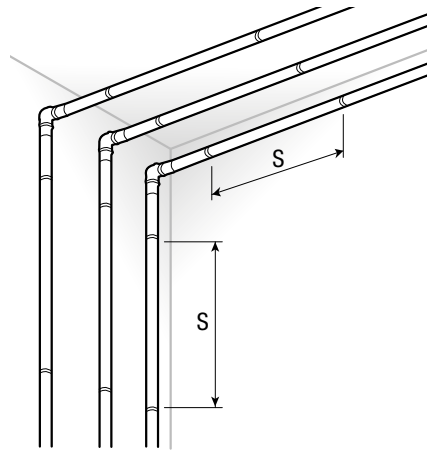
All installation operations must be carried out at temperatures above -10 °C and below 45 °C to avoid any possible damage to the materials. In case of temperatures below 0 °C, store the materials (pipes and fittings) at a higher temperature before use.

Surface mounted installation

In surface mounted installations, in false ceilings, in the gaps of dry wall systems (e.g. plasterboard) and in shafts, the pipes must be adequately secured with suitable collars placed at a distance of no more than a certain value that depends on the size of the pipe.

Maximum distance "S" for bracketing surface mounted pipes (see following figure):

| Pipe dimension | Maximum Distance (S) for bracketing (cm) |
|----------------|--|
| 14 x 2 | 100 |
| 16 x 2 | 100 |
| 18 x 2 | 125 |
| 20 x 2 | 125 |
| 26 x 3 | 150 |
| 32 x 3 | 200 |
| 40 x 3,5 | 200 |
| 50 x 4 | 250 |
| 63 x 4,5 | 250 |
| 75 x 5 | 250 |

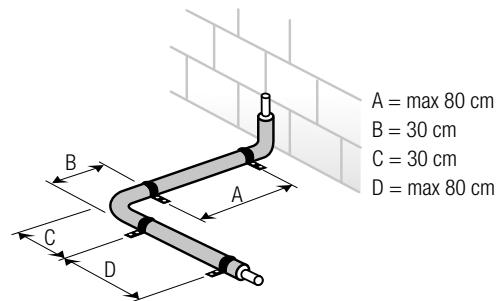


Surface embedded installation

In surface embedded installations, the pipes must be suitably secured with ties and there must be a minimum distance between them of 80 cm on straight lengths, and placed 30 cm before and after each bend. For this type of installation it is preferable to lay insulated pipe that has a foam sheath covering or pass the pipe through flexible tubing.

Press fittings: in laying concealed piping, the press fittings must be protected from corrosion that can result from contact with chemicals contained in plasters and mortars.

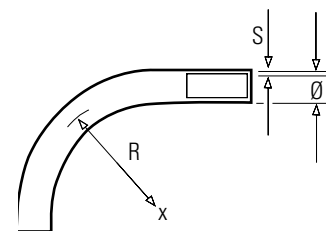
It is possible to use boxing, adhesive tapes specifically adapted for such applications, or coverings in an expanded plastic material that has been adequately sealed.



Minimum radius of bends

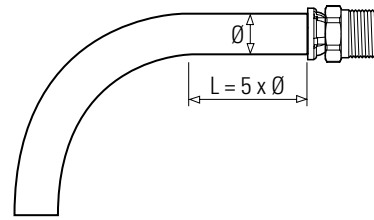
The bending of pipes must be carried out in accordance with the minimum values provided by the following table.

| Pipe dimension (Ø x S) | Minimum radius of bend R | Minimum radius of bend R with spring pipe bender | Minimum radius of bend R with hydraulic bender |
|------------------------|--------------------------|--|--|
| 14 x 2 | 5 x Ø | 3 x Ø | |
| 16 x 2 | 5 x Ø | 3 x Ø | |
| 18 x 2 | 5 x Ø | 3 x Ø | |
| 20 x 2 | 5 x Ø | 3 x Ø | |
| 26 x 3 | 8 x Ø | 4 x Ø | 4 x Ø |
| 32 x 3 | | | 4 x Ø |
| 40 x 3,5 | | | 4 x Ø |
| 50 x 4 | | | 4 x Ø |
| 63 x 4,5 | | | 4,5 x Ø |
| 75 x 5 | | | 5 x Ø |



It is preferable to use elbow unions to form curves on pipes with a diameter greater than 26 mm.

When bending the pipe you must also avoid putting pressure on the unions already installed and the distance between a union and the beginning of the bend must be greater than $5x\varnothing$, where \varnothing is the external diameter of the pipe.



Thermal expansion

During the installation phase, pay particular attention to thermal expansion that can particularly affect multilayer pipes. The elongation a pipe undergoes as a result of a variation in temperature can be calculated with the following formula:

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

where:

α is the coefficient of linear expansion, equal to 0.026 mm/m K for insulated pipes;

L is the initial length of the pipe (m);

ΔT is the temperature difference (K).

Example:

Length of pipe: 12 m

Temperature difference: 50 K

$\Delta L = 0.026 \times 12 \times 50 = 15,6 \text{ mm}$

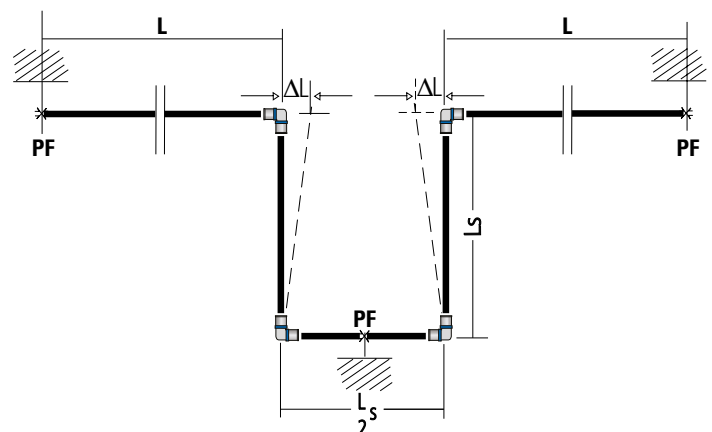
| ΔT | 10 | 20 | 30 | 40 | 50 | 60 | 70 |
|------------|------------------------------|-------|-------|--------|--------|--------|--------|
| L | ΔL | | | | | | |
| 0,1 | 0,026 | 0,052 | 0,078 | 0,104 | 0,130 | 0,156 | 0,182 |
| 0,2 | 0,052 | 0,104 | 0,156 | 0,208 | 0,260 | 0,312 | 0,364 |
| 0,3 | 0,078 | 0,156 | 0,234 | 0,312 | 0,390 | 0,468 | 0,546 |
| 0,4 | 0,104 | 0,208 | 0,312 | 0,416 | 0,520 | 0,624 | 0,728 |
| 0,5 | 0,130 | 0,260 | 0,390 | 0,520 | 0,650 | 0,780 | 0,910 |
| 0,6 | 0,156 | 0,312 | 0,468 | 0,624 | 0,780 | 0,936 | 1,092 |
| 0,7 | 0,182 | 0,364 | 0,546 | 0,728 | 0,910 | 1,092 | 1,274 |
| 0,8 | 0,208 | 0,416 | 0,624 | 0,832 | 1,040 | 1,248 | 1,456 |
| 0,9 | 0,234 | 0,468 | 0,702 | 0,936 | 1,170 | 1,404 | 1,638 |
| 1,0 | 0,260 | 0,520 | 0,780 | 1,040 | 1,300 | 1,560 | 1,820 |
| 2,0 | 0,520 | 1,040 | 1,560 | 2,080 | 2,600 | 3,120 | 3,640 |
| 3,0 | 0,780 | 1,560 | 2,340 | 3,120 | 3,900 | 4,680 | 5,460 |
| 4,0 | 1,040 | 2,080 | 3,120 | 4,160 | 5,200 | 6,240 | 7,280 |
| 5,0 | 1,300 | 2,600 | 3,900 | 5,200 | 6,500 | 7,800 | 9,100 |
| 6,0 | 1,560 | 3,120 | 4,680 | 6,240 | 7,800 | 9,360 | 10,920 |
| 7,0 | 1,820 | 3,640 | 5,460 | 7,280 | 9,100 | 10,920 | 12,740 |
| 8,0 | 2,080 | 4,160 | 6,240 | 8,320 | 10,400 | 12,480 | 14,560 |
| 9,0 | 2,340 | 4,680 | 7,020 | 9,360 | 11,700 | 14,040 | 16,380 |
| 10,0 | 2,600 | 5,200 | 7,800 | 10,400 | 13,000 | 15,600 | 18,200 |

L = Length (m)

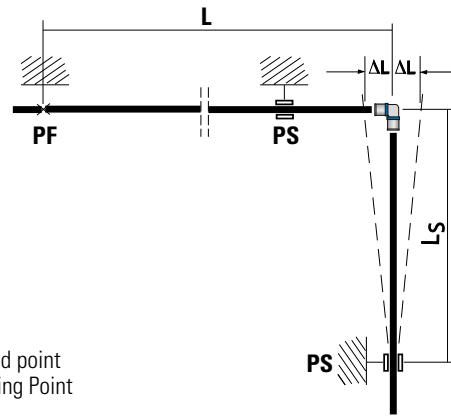
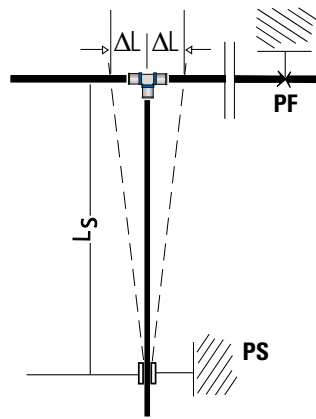
ΔT = Temperature difference (K)

ΔL = Longitudinal expansion (mm)

In surface mounted installations or installations in false ceilings and shafts, longitudinal thermal expansion can be compensated for through careful arrangement of fixed and sliding brackets (points), depending on the type of installation, thus providing suitable thermal expansion compensators.



FP: Fixed point
SP: Sliding Point



FP: Fixed point
SP: Sliding Point

Where:

$$L_s = C \times \sqrt{\varnothing \times \Delta L}$$

L_s = Length of compensator (mm)

\varnothing = External diameter of pipe (mm)

C = Material constant
(for multilayer metal-plastic pipes $C=33$)

With

$\Delta L = 15,6$ mm (previous example),

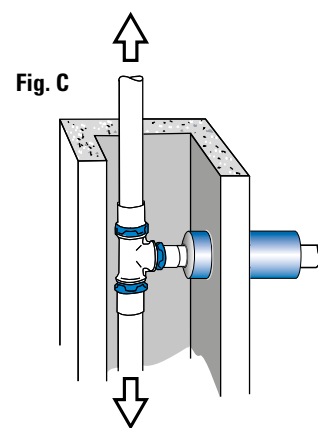
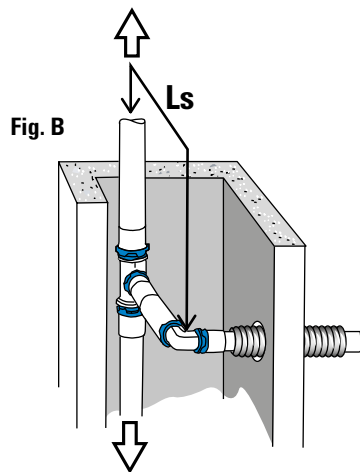
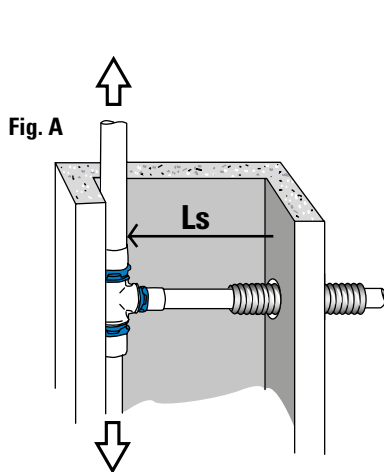
$\varnothing = 26$ mm

the result will be:

$$L_s = 33 \times \sqrt{26 \times 15,6} = 665 \text{ mm}$$

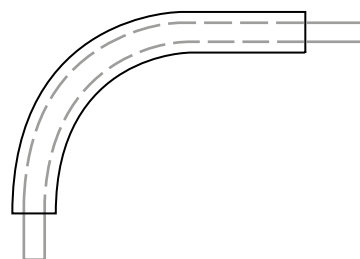
In order to guarantee the free movement of pipes in an installation inside a vertical shaft with horizontal branches, the branches must have a minimum free length L_s and the passage through the side wall of the shaft should be free and the pipe protected with a sheath (Fig. A and B).

In case the size of the shaft doesn't allow for a compensator of length L_s , the hole in the side wall should be increased in size and at the same time the tube should be protected with an insulating sheath of thickness $S \geq 1,5 \times \Delta L$ (Fig. C).



Where pipes are concealed or embedded in screed (laid in the floor), thermal expansion can be compensated for by creating an insulated curve at least every 10m (for example with an insulating foam sheath or by passing the pipe through flexible tubing).

Note: where the pipes are being used in radiant circuits (spiral or serpentine for underfloor heating/cooling), these guidelines do not apply!



System testing

The test must be carried out once the system is completed with the installation of the pipes and fittings, before walling the concealed parts definitely.

The system can be tested with potable, clean and filtered water, or compressed air, without oil.

Compressed air is suitable in particularly low temperatures, when there lies the risk of ice formation, and in potable water distribution systems, if too much time may elapse between the test and actual use, with consequent hygienic risks due to the presence of stagnant water inside the pipes.

Testing with water:

The test is carried out in two steps – leak test and hydraulic test – using pressure gauges with 0.1 bar resolution. In case of a difference in temperature > 10 K between the filling water and ambient temperature, the test must be carried out at least 30 minutes after filling.

Automatic venting and drainage systems must be closed properly to prevent compromising the test. The hydraulic test follows the leak test, if the latter is successful.

The **leak test** is carried out by filling the system with water, keeping it at a pressure between 1 and 6.5 bar and visually checking each fitting and joint to detect any leak and/or unpressed fitting and/or joints that are not implemented correctly.

Warning! The Gerpex fittings do not have the Leak Before Pressed function, whereas the Gerpex LBP fittings do. This function allows unpressed fittings to be visually identified through water leaks that occur within a pressure range of 1 and 6.5 bar and is guaranteed and certified for Gerpex LBP fittings in combination with the Emmeti Gerpex RA and Emmeti Alpert pipes, using Emmeti Gerpex equipment).

The **hydraulic test for sanitary installations** is carried out according to EN 806-4, with a test pressure of 11 bar (1.1 x MDP), which is to be maintained for at least 30 minutes.

MDP= Maximum Design Pressure = 10 bar

The **hydraulic test for heating systems** is carried out according to EN 14336, with a test pressure of 1.3 x Operating Pressure, and in any case between 4 and 6 bar, which is to be maintained for at least 120 minutes.

Details are found in the two regulations.

Testing with air:

The test is carried out in two steps – leak test and load test – using pressure gauges with a 1 mbar resolution and an appropriate method of detection (e.g. soapy water). The load test follows the leak test, if the latter is successful.

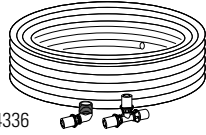
The **leak test** is carried out by filling the system with compressed air at a pressure between 110 and 150 mbar, which is to be maintained for at least 30 minutes, for volumes of up to 100 litres. In the case of greater volumes, the test duration must be increased by 10 minutes for every additional 100 litres.

The **load test** is carried out by filling the system with compressed air at a pressure of 3 bar (up to dimension 50x4) or 1 bar (for dimensions $\geq 63 \times 4.5$), which is to be maintained for at least 30 minutes in the case of volumes of up to 100 litres. In the case of greater volumes, the test duration must be increased by 10 minutes for every additional 100 litres.

At the end of the test, the installer must fill and provide the customer with the relevant report, which can be downloaded from the following link:



https://efrdoc.com/PP_Gerpex



Cod. 8900001 Rev.0 - 04/2018 - LP

GERPEX/GERPEX LBP SYSTEM
Report – Water pressure test according EN 14336
Heating water installations

1. Project data

- 1.1 Project _____
- 1.2 Building _____
- 1.3 Address _____
- 1.4 Customer _____
- 1.5 Installer _____
- 1.6 Date of installation _____
- 1.7 Pipes and fittings dimensions
 14x2 16x2 18x2 20x2 26x3
 32x3 40x3.5 50x4 63x4.5 75x5
- 1.8 Working pressure _____ bar

2. Leak test

- 2.1 Test pressure (1÷6.5 bar) _____ bar
- 2.2 Ambient temperature _____ °C
- 2.3 Water temperature _____ °C
- 2.4 Δ temperature (ambient-water)* _____ °C
- 2.5 Entire installation visually checked
- 2.6 Installation free of leaks
- 2.7 Pressure at the end of test _____ bar

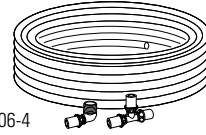
* for Δ > 10 K, test has to be carried out after 30 min. from filling.

3. Pressure test

- 3.1 Test pressure (=1.3 x Working pressure) TP** _____ bar
- 3.2 Time of test at TP (minimum 120 minutes) _____ min
- 3.3 Installation free of leaks
- 3.4 Pressure at the end of test _____ bar

** min. 4 to max. 6 bar.

Customer Date _____ Sign _____
Installer Date _____ Sign _____



Cod. 8900001 Rev.0 - 04/2018 - LP

GERPEX/GERPEX LBP SYSTEM
Report – Water pressure test according EN 806-4
Hot and cold plumbing water installations

1. Project data

- 1.1 Project _____
- 1.2 Building _____
- 1.3 Address _____
- 1.4 Customer _____
- 1.5 Installer _____
- 1.6 Date of installation _____
- 1.7 Pipes and fittings dimensions
 14x2 16x2 18x2 20x2 26x3
 32x3 40x3.5 50x4 63x4.5 75x5
- 1.8 Maximum design pressure (MDP) _____ bar

2. Leak test

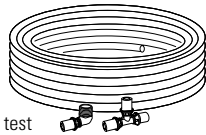
- 2.1 Test pressure (1÷6.5 bar) _____ bar
- 2.2 Ambient temperature _____ °C
- 2.3 Water temperature _____ °C
- 2.4 Δ temperature (ambient-water)* _____ °C
- 2.5 Entire installation visually checked
- 2.6 Installation free of leaks
- 2.7 Pressure at the end of test _____ bar

* for Δ > 10K, test has to be carried out after 30 min. from filling.

3. Pressure test

- 3.1 Test pressure (=1.1 x MDP) TP _____ bar
- 3.2 Time of test at TP (minimum 30 minutes) _____ min
- 3.3 Installation free of leaks
- 3.4 Pressure at the end of test _____ bar

Customer Date _____ Sign _____
Installer Date _____ Sign _____



Cod. 8900004 Rev.0 - 04/2018 - LP

GERPEX/GERPEX LBP SYSTEM
Report – compressed air or inert gas pressure test
Hot and cold plumbing / Heating water installations

1. Project data

- 1.1 Project _____
- 1.2 Building _____
- 1.3 Address _____
- 1.4 Customer _____
- 1.5 Installer _____
- 1.6 Date of installation _____
- 1.7 Pipes and fittings dimensions
 14x2 16x2 18x2 20x2 26x3
 32x3 40x3.5 50x4 63x4.5 75x5

2. Leak test

- 2.1 Test pressure (110÷150 mbar) _____ mbar
- 2.2 Time of test* _____ min
- 2.3 Entire installation visually checked
- 2.4 Installation free of leaks
- 2.5 Pressure at the end of test _____ bar

* Min. 30 minutes; for V > 100 L, 10 additional minutes for each additional 100 L.

3. Load test

- 3.1 Test pressure TP** _____ bar
- 3.2 Time of test at TP *** _____ min
- 3.3 Installation free of leaks
- 3.4 Pressure at the end of test _____ bar

** 3 bar ≤ 50x4; 1 bar ≥ 63x4.5.

*** Min. 30 minutes; for V > 100 L, 10 additional minutes for each additional 100 L.

Customer Date _____ Sign _____
Installer Date _____ Sign _____

Fittings mounting



Gerpex and Gerpex LBP press fittings system

Cutting

Cut the multilayer pipe with a pipe cutter or shears, verifying that the cut is perpendicular to the pipe axis.



Calibration - Flaring

Calibrate the cut end using the relevant calibrator, which calibrates and flares the cut end of the pipe (Fig. C).

The operation is essential, as it determines the correct internal diameter of the pipe and creates the rounded end that eases introduction of the fitting.



Fig. C

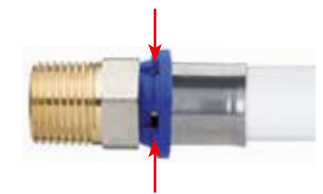


Fig. D

Insertion the fitting

Insert the fitting into the pipe fully home; the transparent plastic ring allows verification of correct positioning (Fig. D).

Pressing

Place the jaws around the sleeve (Fig. E) by aligning the collar of the plastic ring with the groove of the jaws (Fig. F).

Start the hydraulic press-fitting tool until it clicks, signalling the completion of the press-fitting operation (Fig. G).

The operation must be done carefully so that the pipes are kept free of any tension. Once the fitting has been pressed, avoid placing the joint under any tension.



Fig. E



Fig. F

Completion of pressing

Remove the pressing device and open the jaws again.



Fig. G

Screw compression fittings system

Cutting

Cut the multilayer pipe with a pipe cutter or shears, verifying that the cut is perpendicular to the pipe axis.



Calibration - Flaring

Calibrate the cut end using the relevant calibrator, which calibrates and flares the cut end of the pipe.

The operation is essential, as it determines the correct internal diameter of the pipe and creates the rounded end that eases introduction of the fitting.



Inserting the fitting

Insert the pipe into the Monoblocco fitting, checking correct introduction through the slot in the nut (Fig. A).



Fig. A

Screwing

Screw the nut and tighten using a hex wrench, without using excessive force. (Fig. B).



Fig. B

Distributed pressure drops

Alpert - Water at 10 °C

| DN 16x2 | | | DN 20x2 | | |
|---------|---------|-------------|---------|---------|-------------|
| G (l/h) | V (m/s) | Dp/m (Pa/m) | G (l/h) | V (m/s) | Dp/m (Pa/m) |
| 120 | 0,29 | 158 | 150 | 0,21 | 60 |
| 130 | 0,32 | 182 | 170 | 0,23 | 74 |
| 140 | 0,34 | 208 | 190 | 0,26 | 90 |
| 150 | 0,37 | 234 | 210 | 0,29 | 108 |
| 160 | 0,39 | 262 | 230 | 0,32 | 126 |
| 170 | 0,42 | 291 | 250 | 0,35 | 146 |
| 180 | 0,44 | 322 | 270 | 0,37 | 167 |
| 190 | 0,47 | 354 | 290 | 0,40 | 189 |
| 200 | 0,49 | 387 | 310 | 0,43 | 213 |
| 210 | 0,52 | 422 | 330 | 0,46 | 237 |
| 220 | 0,54 | 458 | 350 | 0,48 | 263 |
| 230 | 0,56 | 495 | 370 | 0,51 | 290 |
| 240 | 0,59 | 533 | 390 | 0,54 | 318 |
| 250 | 0,61 | 572 | 410 | 0,57 | 347 |
| 260 | 0,64 | 613 | 430 | 0,59 | 377 |
| 270 | 0,66 | 655 | 450 | 0,62 | 408 |
| 280 | 0,69 | 698 | 470 | 0,65 | 441 |
| 290 | 0,71 | 742 | 490 | 0,68 | 474 |
| 300 | 0,74 | 788 | 510 | 0,70 | 508 |
| 310 | 0,76 | 834 | 530 | 0,73 | 544 |
| 320 | 0,79 | 882 | 550 | 0,76 | 580 |
| 330 | 0,81 | 930 | 570 | 0,79 | 617 |
| 340 | 0,84 | 980 | 590 | 0,82 | 656 |
| 350 | 0,86 | 1031 | 610 | 0,84 | 695 |
| 360 | 0,88 | 1084 | 630 | 0,87 | 736 |
| 370 | 0,91 | 1137 | 650 | 0,90 | 777 |
| 380 | 0,93 | 1191 | 670 | 0,93 | 819 |
| 390 | 0,96 | 1246 | 690 | 0,95 | 863 |
| 400 | 0,98 | 1303 | 710 | 0,98 | 907 |
| 410 | 1,01 | 1360 | 730 | 1,01 | 952 |
| 420 | 1,03 | 1419 | 750 | 1,04 | 998 |
| 430 | 1,06 | 1479 | 770 | 1,06 | 1045 |
| 440 | 1,08 | 1539 | 790 | 1,09 | 1093 |
| 450 | 1,11 | 1601 | 810 | 1,12 | 1142 |
| 460 | 1,13 | 1664 | 830 | 1,15 | 1192 |
| 470 | 1,15 | 1728 | 850 | 1,17 | 1243 |
| 480 | 1,18 | 1793 | 870 | 1,20 | 1294 |
| 490 | 1,20 | 1858 | 890 | 1,23 | 1347 |
| 500 | 1,23 | 1925 | 910 | 1,26 | 1400 |
| 510 | 1,25 | 1993 | 930 | 1,28 | 1454 |
| 520 | 1,28 | 2062 | 950 | 1,31 | 1510 |
| 530 | 1,30 | 2132 | 970 | 1,34 | 1566 |
| 540 | 1,33 | 2203 | 990 | 1,37 | 1623 |
| 550 | 1,35 | 2275 | 1010 | 1,40 | 1680 |
| 560 | 1,38 | 2348 | 1030 | 1,42 | 1739 |
| 570 | 1,40 | 2422 | 1050 | 1,45 | 1799 |
| 580 | 1,42 | 2496 | 1070 | 1,48 | 1859 |
| 590 | 1,45 | 2572 | 1090 | 1,51 | 1920 |
| 600 | 1,47 | 2649 | 1110 | 1,53 | 1982 |
| 610 | 1,50 | 2727 | 1130 | 1,56 | 2045 |
| 620 | 1,52 | 2805 | 1150 | 1,59 | 2109 |

Alpert - Water at 50 °C

| DN 16x2 | | | DN 20x2 | | |
|---------|---------|-------------|---------|---------|-------------|
| G (l/h) | V (m/s) | Dp/m (Pa/m) | G (l/h) | V (m/s) | Dp/m (Pa/m) |
| 120 | 0,29 | 126 | 150 | 0,21 | 47 |
| 130 | 0,32 | 145 | 170 | 0,23 | 59 |
| 140 | 0,34 | 165 | 190 | 0,26 | 72 |
| 150 | 0,37 | 186 | 210 | 0,29 | 85 |
| 160 | 0,39 | 208 | 230 | 0,32 | 100 |
| 170 | 0,42 | 231 | 250 | 0,35 | 116 |
| 180 | 0,44 | 256 | 270 | 0,37 | 133 |
| 190 | 0,47 | 281 | 290 | 0,40 | 150 |
| 200 | 0,49 | 308 | 310 | 0,43 | 169 |
| 210 | 0,52 | 335 | 330 | 0,46 | 188 |
| 220 | 0,54 | 363 | 350 | 0,48 | 209 |
| 230 | 0,56 | 393 | 370 | 0,51 | 230 |
| 240 | 0,59 | 423 | 390 | 0,54 | 252 |
| 250 | 0,61 | 454 | 410 | 0,57 | 275 |
| 260 | 0,64 | 487 | 430 | 0,59 | 299 |
| 270 | 0,66 | 520 | 450 | 0,62 | 324 |
| 280 | 0,69 | 554 | 470 | 0,65 | 350 |
| 290 | 0,71 | 589 | 490 | 0,68 | 376 |
| 300 | 0,74 | 625 | 510 | 0,70 | 404 |
| 310 | 0,76 | 662 | 530 | 0,73 | 432 |
| 320 | 0,79 | 700 | 550 | 0,76 | 461 |
| 330 | 0,81 | 739 | 570 | 0,79 | 490 |
| 340 | 0,84 | 778 | 590 | 0,82 | 521 |
| 350 | 0,86 | 819 | 610 | 0,84 | 552 |
| 360 | 0,88 | 860 | 630 | 0,87 | 584 |
| 370 | 0,91 | 903 | 650 | 0,90 | 617 |
| 380 | 0,93 | 946 | 670 | 0,93 | 651 |
| 390 | 0,96 | 990 | 690 | 0,95 | 685 |
| 400 | 0,98 | 1035 | 710 | 0,98 | 720 |
| 410 | 1,01 | 1080 | 730 | 1,01 | 756 |
| 420 | 1,03 | 1127 | 750 | 1,04 | 793 |
| 430 | 1,06 | 1174 | 770 | 1,06 | 830 |
| 440 | 1,08 | 1222 | 790 | 1,09 | 868 |
| 450 | 1,11 | 1271 | 810 | 1,12 | 907 |
| 460 | 1,13 | 1321 | 830 | 1,15 | 946 |
| 470 | 1,15 | 1372 | 850 | 1,17 | 987 |
| 480 | 1,18 | 1423 | 870 | 1,20 | 1028 |
| 490 | 1,20 | 1476 | 890 | 1,23 | 1069 |
| 500 | 1,23 | 1529 | 910 | 1,26 | 1112 |
| 510 | 1,25 | 1583 | 930 | 1,28 | 1155 |
| 520 | 1,28 | 1637 | 950 | 1,31 | 1199 |
| 530 | 1,30 | 1693 | 970 | 1,34 | 1243 |
| 540 | 1,33 | 1749 | 990 | 1,37 | 1288 |
| 550 | 1,35 | 1806 | 1010 | 1,40 | 1334 |
| 560 | 1,38 | 1864 | 1030 | 1,42 | 1381 |
| 570 | 1,40 | 1923 | 1050 | 1,45 | 1428 |
| 580 | 1,42 | 1982 | 1070 | 1,48 | 1476 |
| 590 | 1,45 | 2042 | 1090 | 1,51 | 1525 |
| 600 | 1,47 | 2103 | 1110 | 1,53 | 1574 |
| 610 | 1,50 | 2165 | 1130 | 1,56 | 1624 |
| 620 | 1,52 | 2227 | 1150 | 1,59 | 1675 |

NOTE: 1 bar = 0.1 N/mm² = 100 kPa = 10 m c.a.

Alpert - water at 80 °C

| DN 16x2 | | |
|---------|---------|-------------|
| G (l/h) | V (m/s) | Dp/m (Pa/m) |
| 120 | 0,29 | 117 |
| 130 | 0,32 | 135 |
| 140 | 0,34 | 154 |
| 150 | 0,37 | 173 |
| 160 | 0,39 | 194 |
| 170 | 0,42 | 216 |
| 180 | 0,44 | 238 |
| 190 | 0,47 | 262 |
| 200 | 0,49 | 287 |
| 210 | 0,52 | 312 |
| 220 | 0,54 | 339 |
| 230 | 0,56 | 366 |
| 240 | 0,59 | 394 |
| 250 | 0,61 | 424 |
| 260 | 0,64 | 454 |
| 270 | 0,66 | 485 |
| 280 | 0,69 | 517 |
| 290 | 0,71 | 549 |
| 300 | 0,74 | 583 |
| 310 | 0,76 | 617 |
| 320 | 0,79 | 653 |
| 330 | 0,81 | 689 |
| 340 | 0,84 | 726 |
| 350 | 0,86 | 763 |
| 360 | 0,88 | 802 |
| 370 | 0,91 | 841 |
| 380 | 0,93 | 881 |
| 390 | 0,96 | 922 |
| 400 | 0,98 | 964 |
| 410 | 1,01 | 1007 |
| 420 | 1,03 | 1050 |
| 430 | 1,06 | 1094 |
| 440 | 1,08 | 1139 |
| 450 | 1,11 | 1185 |
| 460 | 1,13 | 1231 |
| 470 | 1,15 | 1279 |
| 480 | 1,18 | 1327 |
| 490 | 1,20 | 1375 |
| 500 | 1,23 | 1425 |
| 510 | 1,25 | 1475 |
| 520 | 1,28 | 1526 |
| 530 | 1,30 | 1578 |
| 540 | 1,33 | 1630 |
| 550 | 1,35 | 1684 |
| 560 | 1,38 | 1737 |
| 570 | 1,40 | 1792 |
| 580 | 1,42 | 1848 |
| 590 | 1,45 | 1904 |
| 600 | 1,47 | 1960 |
| 610 | 1,50 | 2018 |
| 620 | 1,52 | 2076 |

| DN 20x2 | | |
|---------|---------|-------------|
| G (l/h) | V (m/s) | Dp/m (Pa/m) |
| 150 | 0,21 | 44 |
| 170 | 0,23 | 55 |
| 190 | 0,26 | 67 |
| 210 | 0,29 | 80 |
| 230 | 0,32 | 93 |
| 250 | 0,35 | 108 |
| 270 | 0,37 | 124 |
| 290 | 0,40 | 140 |
| 310 | 0,43 | 157 |
| 330 | 0,46 | 176 |
| 350 | 0,48 | 195 |
| 370 | 0,51 | 215 |
| 390 | 0,54 | 235 |
| 410 | 0,57 | 257 |
| 430 | 0,59 | 279 |
| 450 | 0,62 | 302 |
| 470 | 0,65 | 326 |
| 490 | 0,68 | 351 |
| 510 | 0,70 | 376 |
| 530 | 0,73 | 402 |
| 550 | 0,76 | 429 |
| 570 | 0,79 | 457 |
| 590 | 0,82 | 485 |
| 610 | 0,84 | 515 |
| 630 | 0,87 | 544 |
| 650 | 0,90 | 575 |
| 670 | 0,93 | 606 |
| 690 | 0,95 | 638 |
| 710 | 0,98 | 671 |
| 730 | 1,01 | 705 |
| 750 | 1,04 | 739 |
| 770 | 1,06 | 774 |
| 790 | 1,09 | 809 |
| 810 | 1,12 | 845 |
| 830 | 1,15 | 882 |
| 850 | 1,17 | 920 |
| 870 | 1,20 | 958 |
| 890 | 1,23 | 997 |
| 910 | 1,26 | 1036 |
| 930 | 1,28 | 1076 |
| 950 | 1,31 | 1117 |
| 970 | 1,34 | 1159 |
| 990 | 1,37 | 1201 |
| 1010 | 1,40 | 1244 |
| 1030 | 1,42 | 1287 |
| 1050 | 1,45 | 1331 |
| 1070 | 1,48 | 1376 |
| 1090 | 1,51 | 1421 |
| 1110 | 1,53 | 1467 |
| 1130 | 1,56 | 1514 |
| 1150 | 1,59 | 1561 |

Fittings pressure drops

Fittings localised pressure drops can be obtained with the following formula,

known loss coefficients ξ of the single figures:

$$\Delta p = \xi \rho v^2 / 2$$

Δp = pressure drop (Pa = 0.01 mbar)

ξ = loss coefficient

ρ = fluid density [kg/m³]

| Water temperature [°C] | ρ [kg/m ³] |
|------------------------|-----------------------------|
| 20 | 998,2 |
| 40 | 992,2 |
| 60 | 998,3 |
| 80 | 971,8 |

v = speed of the fluid (m/s)

| Figura | ξ |
|--------|-------|
| | 1,8 |
| | 1,6 |
| | 2,4 |
| | 2,2 |
| | 2,4 |
| | 2,2 |
| | 2,4 |
| | 2,2 |
| | 1,8 |
| | 3,2 |
| | 3,0 |



Respect the environment!

For a correct disposal, the different materials must be divided and collected according to the regulations in force.

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