KELOX®

Multilayer Pipe System

The Advanced Connection

KE KELIT®
INNOVATIVE PIPE SYSTEMS

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Table of contents

Note:
Prior to the first KELOX application in this handbook, please inform yourself about the installation guidelines and particularly about the joining technology.

Quality targets of KE KELIT

1. Our quality targets go beyond the quality of the products and encompass all areas that are required in ÖNORM EN ISO 9001.

2. An order-accompanying quality assurance system is already intended to guarantee the prevention of errors by integrating suppliers and customers.

3. Every employee is responsible for the quality of his own work. A high level of motivation forms the basis for constant self-assessment.

4. We regard the fulfilment of specific market requirements and customer requirements as a precondition for the utmost customer satisfaction.

5. Responsibility for the environment now and in the future gives us the motivation to manufacture, long-lasting products in environmentally compatible processes.

Senator Karl Egger eh.
Managing Director

Approvals - tests System testing

Not just individual parts but the entire system are subject to basic and periodic testing. To ensure the specified quality targets are attained, two types of monitoring take place:

Certified quality assurance system by Quality Austria
ÖNORM EN ISO 9001 – Reg.No. AT 00366/0
ÖNORM EN ISO 14001 – Reg.No. AT 02097/0
ÖNORM EN ISO 10005 – Reg.No. AT 00001/0
ÖNORM EN ISO 50001 – Reg.No. AT 0126/0

Self-monitoring in the KELIT quality laboratory:

- Raw material parameters
- Dimensions and tolerances
- Processing quality, surfaces
- Pipe marking

Third-party monitoring by authorised testing institutes:

- System testing, material identity
- Fitting tests

The ÖVGW quality mark registration number W 1.235 is awarded for the combination of self-monitoring and third-party monitoring.
FW-Vienna approval dated 30. 4. 1996

ÖNORM registration according to EN ISO 21003
Registration Number 96345 and 97500
ÖNORM EN 806-series and ÖNORM B 2531
Pipe sizing in accordance with DIN 1988-300
Drinking water suitability in accordance with ÖNORM B 5014-1 and -3

Codemark No *)
BCS-144116-CMNZ

Watermark No *)
WM-022381

*) depending on the product

Technical rules

DVGW Worksheet W 534/2004, Quality Standard QS-W 402

Threaded fittings

- Tapered male threads and parallel female threads conform
- to ÖNORM EN 10226
- Parallel connections which are not sealed on the thread conform to ISO 228-1

Patents

International proprietary rights:
Austrian Patent 410 706
Europ. Patent 1150 056

The KELOX multilayer pipe

The structure

All five layers are produced and joined together in one work process. The metal stabilisation pipe is welded in a manner which protects the stability of the pipe

Characteristics

- minimal internal stress
- can be modulated
- virtually endless (up to 200 m/roll), but also available in straight lengths (5 m)
- absolutely oxygen-tight, 100 % impermeable to water vapour
- electrically detectable under plaster
- low thermal expansion (λ = 0.025 mm/mK)
- thermal conductivity (λ = 0.45 W/mK
- smooth inside wall (pipe roughness: 0.007 mm),

Advantages

- fully-developed complete system
- universally implementable
- pipe product range: d14, 16, 20, 25, 32, 40, 50, 63 and 75 mm
- choice of compression fittings, press fittings and push fittings

Operating conditions

- Drinking water installations Class 2 according to ÖNORM EN ISO 21003
  Operating temperature: 70°C – 10 bar / tmax 80°C
- Radiator connection: Class 5 according to ÖNORM EN ISO 21003
  Operating temperature: tmax 80°C – 10 bar / tmax 90°C
- Cold water: **0°– 20°C – 16 bar** – ONLY use KELOX press fittings
- Compressed air max. **10 bar** ONLY use KELOX press fittings
- Vacuum up to **– 0.6 bar** ONLY use KELOX press fittings
- Inert gases, technical fluids upon request

Quality assurance

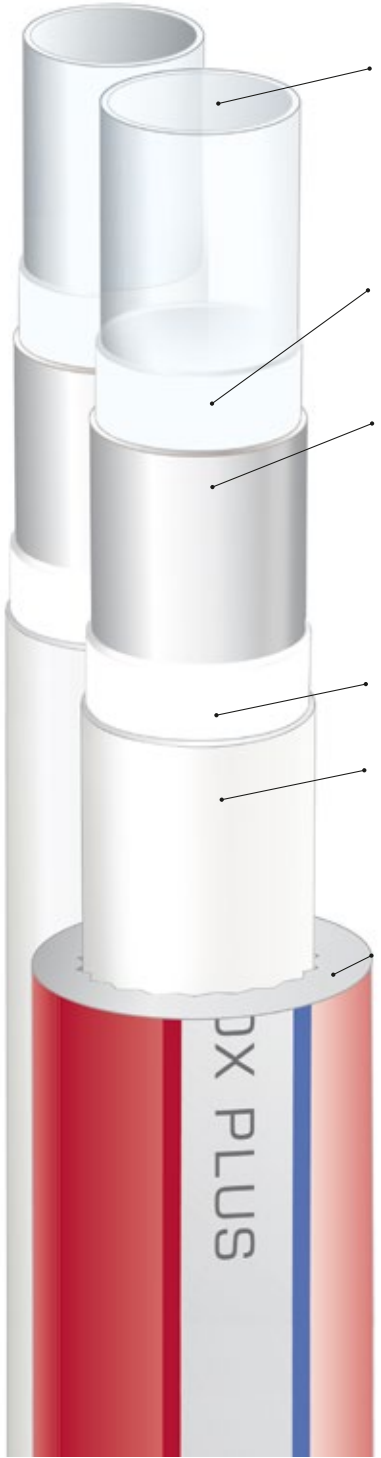
We carry out strict quality testing to meet the requirements of national and international standards and regulations:

Self-monitoring in the KELIT quality laboratory:

- Raw material parameters
- Dimensions
- Manufacturing quality
- Bursting pressure
- Behaviour under heat conditions

Third-party monitoring by authorised testing institutes

- System testing
- Internal pressure – resistance to creep
- Expansion testing
- Test for peeling of the composite
- Hygienic/toxicological suitability
- Oxygen-tightness
- Testing of the pipe joints: under vacuum, under tensile load, under thermal cycle testing, under pressure surge, under reverse bending testing
- All tests are carried out to ÖNORM EN ISO 21003



1 **Inside layer**
PE-RT, resistant to all substances in water, physiologically unobjectionable, smooth and seamless.
The unmistakable structure of the KELOX multilayer pipes provides their safety! Colour: transparent

2 **Internal bonding** layer Resistant to temperature, resistant to ageing, power-transmitting layer made of a special material

3 **Stabilising pipe Metal sheet pipe**
made of aluminium and welded along its length (elongation at tear: 12%)
This pipe is responsible for the exceptional resistance to pressure.
Low thermal expansion, mechanical stability.
E module: $70 \cdot 10^3$ N/mm^2
impermeable to gas and water vapour

4 **External bonding layer**
Identical material to 2

5 **External protective layer** Identical material to the internal layer.
Resistant to all construction chemicals. High mechanical resistance, stabilised against UV rays.
Colour: white

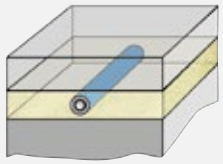
6 **Insulation**
Closed-cell foam PE electron cross-linked
Thermal conductivity (λ) at:
20° C : 0.036 W/mK
40° C : 0.039 W/mK
Water vapour diffusion coefficient μ:
10,000 μ = effective vapour barrier.
Compliant with EU Directive 2011/65/EU CFC-free foamed. Bubble structure as sound insulation.
Suitable for building sites, resistant to tearing
Can be pushed back to leave room for press fitting. Sleeve film made of polyolefins and aluminium.

KELOX multilayer pipes - hot water applications

Heat emission in watts/m in floor area at 20° C room temperature

KELOX Plus pipe KM134

	Structure	Advantages	Applications
Medium pipe:	KELOX multilayer pipe	• no water absorption • suitable for building site use • robust • moderate thermal insulation	• cold water area • radiator connections in intermediate ceilings • water pipelines in hot and cold water areas
Dimension:	d14, 16, 20, 25, 32		
Insulation:	PEX soft foam		
Insulation thickness:	**4 mm**		
Jacket:	Polyethylene film, water proof and robust		
Colour:	**blue**		

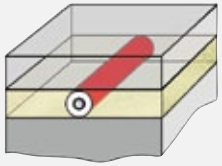


15°C Calculation base

KM134	Insulation	Medium temperature				
mm x s	mm	40°C	60°C	70°C	80°C	90°C
14x2	4	3,4	6,4	7,8	9,3	10,8
16x2	4	3,7	7,0	8,5	10,1	11,7
20x2,25	4	4,1	7,6	9,4	11,1	12,9
25x2,5	4	5,0	9,1	11,2	13,3	15,4
32x3	4	5,8	10,8	13,6	15,8	18,2

KELOX Plus pipe KM130

Medium pipe:	KELOX multilayer pipe	• high thermal insulation • no water absorption • suitable for building site use • robust	• radiator connections in ceilings above unheated rooms • water pipelines in hot and cold water areas
Dimension:	d14, 16, 20, 25, 32		
Insulation:	PEX soft foam		
Insulation thickness:	**9 mm**		
Jacket:	Polyethylene film, water proof and robust		
Colour:	**red**		

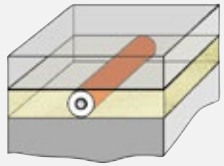


15°C Calculation base

KM130	Insulation	Medium temperature				
mm x s	mm	40°C	60°C	70°C	80°C	90°C
14x2	9	3,2	6,0	7,3	8,7	10,1
16x2	9	3,4	6,5	8,0	9,4	10,9
20x2,25	9	4,0	7,1	8,8	10,4	12,1
25x2,5	9	4,5	8,4	10,3	12,2	14,2
32x3	9	5,4	10,2	12,5	14,9	17,2

KELOX Plus pipe KM133

Medium pipe:	KELOX multilayer pipe	• good thermal insulation • no water absorption • suitable for building site use • robust	• radiator connections in ceilings above unheated rooms • insulation required for cold and hot water pipelines
Dimension:	d16, 20, 25, 32		
Insulation:	PEX soft foam		
Insulation thickness:	**13 mm**		
Jacket:	Polyethylene film, water proof and robust		
Colour:	**orange**		

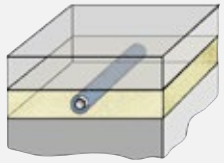


15°C Calculation base

KM133	Insulation	Medium temperature				
mm x s	mm	40°C	60°C	70°C	80°C	90°C
16x2	13	3,4	6,3	7,9	9,2	10,6
20x2,25	13	3,8	7,1	8,7	10,4	12,0
25x2,5	13	4,3	8,1	10,0	11,9	13,8
32x3	13	5,2	9,9	12,2	14,6	16,9

KELOX Pro pipe KM140

Medium pipe:	KELOX multilayer pipe	• sufficient thermal insulation to prevent condensation • protection against damage • jacket pipe waterproof	• lengthwise waterproof of pipe-in-pipe design in the ceiling area • heating and hot and cold water pipes, without specific insulation requirement
Dimension:	d16, 20		
Jacket:	corrugated, waterimpermeable PE HD pipe		
Colour:	**blue**		



15°C Calculation base

KM140	Corrugater pipe	Medium temperature				
mm x s	AD mm	40°C	60°C	70°C	80°C	90°C
16x2	25	4,2	7,8	9,6	11,4	13,6
20x2,25	28	5,0	9,1	11,2	13,3	15,9

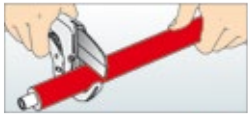
Due to the off-centre position of the medium pipe in the corrugated pipe, an extra margin of 10 % was included in the calculation!

KELOX Pro-Plus-Rohr KM144

Medium pipe:	KELOX multilayer pipe	• optimised thermal insulation to prevent condensation • protection against damage • jacket pipe waterproof	• lengthwise waterproof pipe-in-pipe design in the ceiling area • reduced heat loss by approx. 10–15 % compared to KM140
Dimension:	d16, 20		
Jacket:	corrugated, water-im permeable PE HD pipe		
Insulation:	**4 mm** analogous to KM134		
Colour:	**blue**		

Joining

1. Cut KELOX multilayer pipes with thermal insulation to length according to the installation instructions (page 18 to 25).
2. Push back insulation in order to expose the medium pipe for joining.
3. The joining of the medium pipe takes place according to the installation instructions (page 18 to 25).



KELOX-ULTRAX press fitting

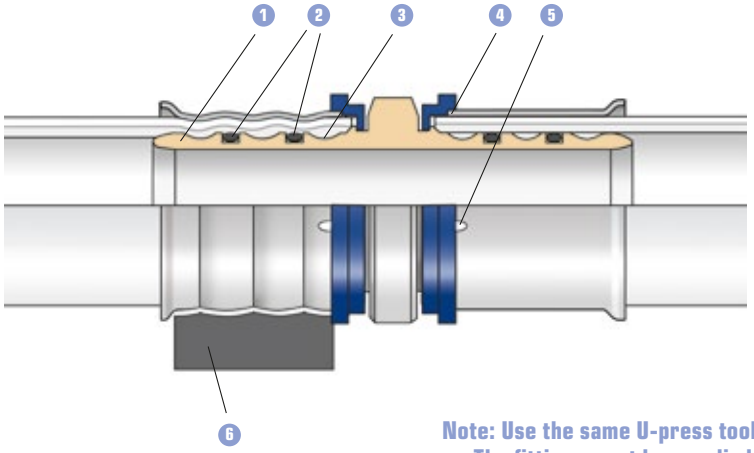
Requirement for the KELOX-ULTRAX press fitting
- permanently impermeable
- compact design
- longitudinally friction-locked
- DVGW (W534) approval in the flush-mounted area
- „leak before pressed“ in the dimensions d16 – 50 mm
- pressing – U-profile

The material
- stress-free annealed brass
- non-porous metal plating
- stainless steel pressing sleeve
- synthetic, ageing-resistant EPDM O-rings

The solution
- The tried-and-tested KELOX-ULTRAX press fitting for pipes
- d16 – 50 mm “leak before pressed”
- KELOX KM press fitting for d63 – 75 mm pipes

Implementation
- For all applications in the surface-mounted and flush-mounted area

Material and structure
1. Body made of high-quality brass with non-porous metal plating
2. Two O-rings made of EPDM
3. Special „leak before pressed“ profile
4. Pressing sleeve made of stainless steel with pressing jaw guide
5. Viewing window as insertion control
6. Pressing jaw with U-profile



KELOX-WINDOX-U press fitting

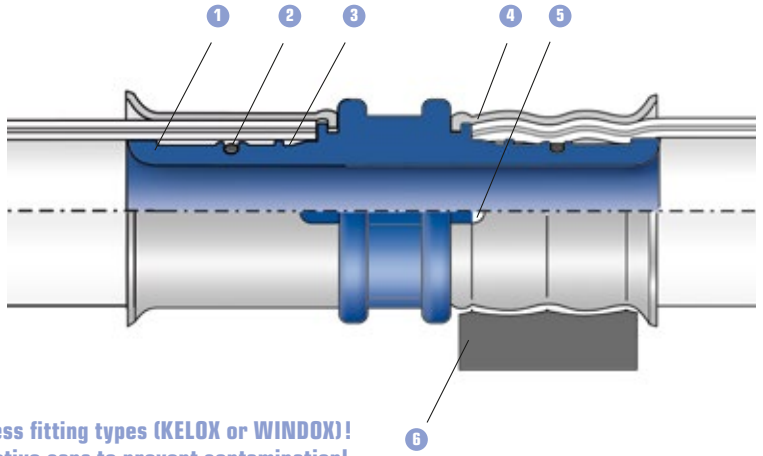
Required properties of the KELOX-WINDOX-U press fitting

- permanently watertight
- suitably robust for on-site conditions
- compact design
- halogen-free
- impermeable to oxygen
- DVGW approval for flush-mounted installations
- “leak before pressed” function in sizes d16 – 75 mm
- U-profile pressing
- **NO liquid sealant should be used for sealing the threads, PPSU male threads can be sealed with hemp, teflon tape, the thread sealant “Twineflon by Ulith or PTFE thread sealant by Fermit.**

The solution
The tried-and-tested KELOX-WINDOX-U press fitting for pipe sizes d16 – 75 mm

Applications
For all surface-mounted and flush-mounted applications

Materials and structure
1. WINDOX PPSU body made by high pressure molding
2. O-ring made of EPDM
3. Special “leak before pressed” profile
4. Stainless steel sleeve with alignments for pressing
5. Viewing window for checking the insertion depth
6. U profile jaws



Note: Use the same U-press tools for all press fitting types (KELOX or WINDOX)! The fittings must be supplied with protective caps to prevent contamination!

KELOX-PROTEC push fitting

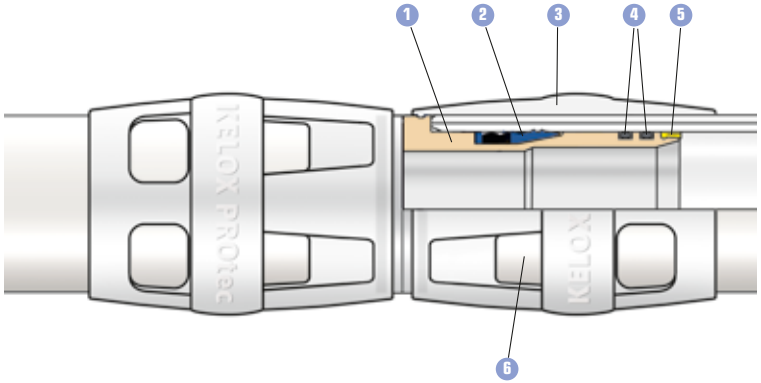
Requirements for the KELOX-PROTEC push fitting
- permanently impermeable
- non-detachable push fitting
- longitudinally friction-locked
- diffusion-tight
- DVGW (W534) approval in the flush-mounted area
- insertion prevention of non-calibrated pipes

The solution
The tried-and-tested KELOX-PROTEC push fitting
for d16–32 mm pipes

Implementation
For hot and cold water and heating applications in the surface-mounted and flush-mounted area. Not suitable for compressed air or vacuum!

Material and design

1. Body of the fittings made of high-quality brass d16–32 mm with non-porous metal plating
1. Couples, elbows 90° and tees made of high-quality PPSU are also available to choose from in the dimensions d16–25mm
2. 2K-GRAB RING holding components made of glass fibre reinforced polyamide and elastomer
3. Push sleeve made of transparent polyamide
4. Two synthetic, ageing-resistant O-rings made of EPDM
5. Protector ring made of highly durable plastic, prevents the insertion of non-calibrated pipes
6. Closed visual inspection window



The fittings must be supplied with protective caps to prevent contamination!

KELOX euro thread fitting

Requirements for the KELOX compression fitting:
- longitudinally friction-locked
- detachable compression fitting, however, non-detachable pipe connection
- prevention of electrochemical dipoles
- no contact between medium water and aluminium layer

The solution
The multiple sealing KELOX compression fitting for pipes
of d14–25 mm

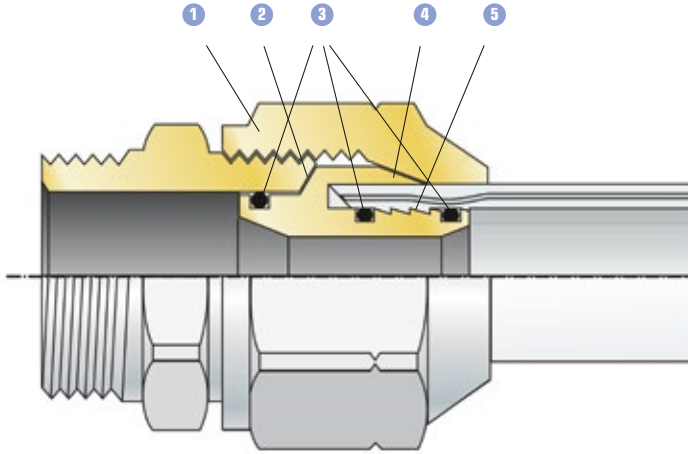
Application
For connections to manifolds and radiators in surface-mounted installations

Tightening torques

d14–18 mm:	min. 40 Nm	The minimum tightening torques apply at temperatures of approx. 10–30° C (ambient temperature)
d20mm:	min. 45 Nm	
d25mm:	min. 60 Nm	

Material and design

1. Nut made of high-quality brass with non-porous metal plating
2. Metal conical seal
3. Three O-rings made of EPDM
4. Compression sleeve made of high-quality brass with non-porous metal plating
5. Interlocking teeth for longitudinal friction-locking

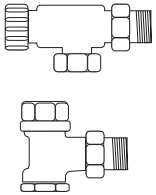


Compatibility of the KELOX compression fittings

KM210 KELOX connection kit

Brass with non-porous metal plating, for connecting to radiator valves and radiator return compression fittings 1/2" female thread according to DIN or EN 215; incl. pressure screw. Male thread, support sleeve with O-rings and clamping ring
Dim. d14 – 16 mm

compatible with



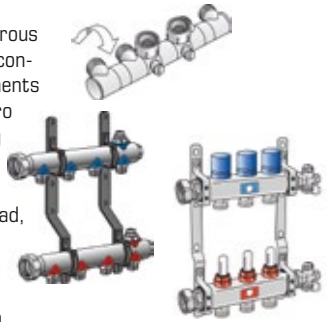
KM212 KELOX Connection kit

compatible with

KM212 - Heimeier
with 1/2" female thread standard valves V-exact, F-exact Valves with low resistance Microtherm Regulux Regulux N

KM220 Euro thread fitting

Brass with non-porous metal plating, for connecting to components with 3/4" male euro thread conforming to EN 215, includes a nut with a female thread, a support sleeve with O-rings and a clamping ring
Dim. d14 – 25 mm



compatible with

Danfoss	Herz	Oventrop	Heimeier	Simplex	Stelrad
with 3/4" male thread RLV-K RLV-KS VHS	with 3/4" male thread 1-7724-37 7733 7745 7746 7748 3937 3948 7173 7175 Herz 3000	with 3/4" male thread Multiflex V Multiflex F	with 3/4" male thread Standard valves Valves with low resistance E-Z System Vekolux N Regulux	with 3/4" male thread AG/N AG/M radiator block D1 E1, D2, E2, D22, N2, FE2, U2 and D5	with 3/4" male thread MHD34 2MAD34 MHE34 2MAD34 MSV 2MHS

KM220 KELOX euro thread fitting

Brass with non-porous metal plating, for connection to KELIT components with a 3/4" male euro thread conforming to EN 215, includes a nut with a female thread, support sleeve with O-rings and a clamping ring
Dim. d14 – 25 mm

compatible with

Typical examples of compression fittings

KM210 - Danfoss	KM210 - Herz	KM210 - Oventrop
with 1/2" female thread RA-N RA-UN RLV	mit 1/2" female thread 7723 7724 7728 3923 3924 Model series D with DIN connection thread	with 1/2" female thread model series A model series A2 Model series AV6 Model series F

KM310E

KM320E

KM340E

KM355E

KM365E

KM366E

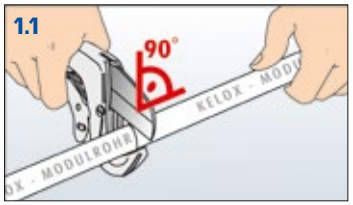
Installation instructions for KELOX compression fittings

Only for trained installers!

Easy steps to achieve a tight KELOX compression fitting

1. Cut to length
Always cut at right angles. Straighten the pipe from the coil before cutting

1.1 Cut to length using either pipe cutter WZ932 (for sizes d14–20 mm) or pipe cutter WZ130 (for sizes d14–25 mm)



1.2 d25 pipe can also be cut with pipe cutter WZ935

2. Always turn the chamfering tool clockwise, both going into and out of the pipe!

2.1 Click the universal handle onto the WZ915 calibration mandrel and rotate clockwise as far as it will go.

The multi-sized calibration mandrel WZ916 or WZ916A can also be used.

2.2 Alternatively, a slow running drill or power screwdriver can be used (max. 500 rpm). Remove the handle for this.

This achieves the following:

- Cutting angle corrected to 90°
- Inner pipe wall is calibrated
- Deburred on the outside
- inner bevel covering the whole circumference of at the end of the pipe with a depth of approx. 1 mm **– visual check !**

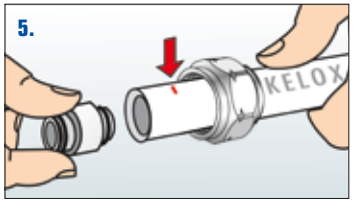
3. Marking the insertion depth with compression fitting

On the protective housing, every calibration mandrel contains a relevant marking possibility for drawing the correct insertion depth of the screw-on nozzle onto the pipe. (Marking becomes visible after tightening the compression fitting)

3.1 For the calibration of radiator fittings, the WZ916A multi-calibration mandrel is available with removable protective covers.

4. The plastic/aluminium chips must be removed from the calibration tool/protective cage after each calibration process.

5. Slide the nut and nozzle of the compression fitting onto the end of the KELOX pipe.



5.1 Joining
Important! The minimum tightening torques apply at temperatures of approx. 10 – 30° C (ambient temperature)

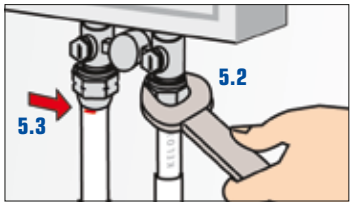
Size	Tightening torques
d 14 – 18	min. 40 Nm
d 20	min. 45 Nm
d 25	min. 60 Nm

5.2 The nut is now tightened sufficiently on a counter piece (3/4" euro thread). This presses the KELOX pipe tightly with longitudinal tension and all of the seals become functional.

5.3 After joining, the marking of the insertion depth is visible next to the nut.

Joints which have not been tightened may still remain tight during the pressure test thanks to the O-rings. A risk is posed during a pressure test with air if the pipe and fittings have drifted apart.
Only when the fitting has been tightened is the longitudinal friction-locking assured.

Therefore, perform a visual check of ALL joints



For assembly corrections, the joints may be rotated after processing!

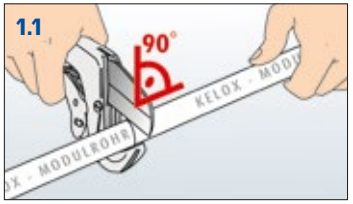
Installation instructions for KELOX-ULTRAX press fittings

Only use trained assembly specialists!

Easy steps for a tight KELOX-ULTRAX press fitting

1. Cut to length
Always at right angles - therefore straighten materials supplied in coils beforehand!

1.1 Cut to length d16 – 20 mm with WZ932 pipe cutter or d16 – 25 mm with WZ130 pipe cutter



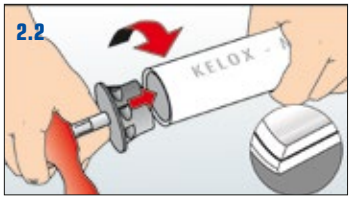
1.2 d32 – 75mm cut to length with the WZ935 pipe cutter

2. Always calibrate and chamfer turning clockwise, both into and out of the pipe!

2.1 d16–32 mm
Click the universal handle onto the WZ915 calibration mandrel and rotate clockwise as far as it will go to click on.

2.2 d40–75 mm

Turn in the WZ913 deburring tool clockwise as far as it will go.



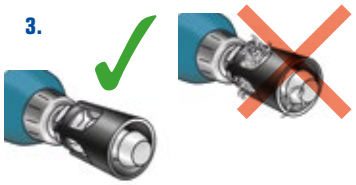
2.3 Alternatively, a slow running drill or power screwdriver can be used (max. 500 rpm).

Remove the handle for this. This achieves the following:

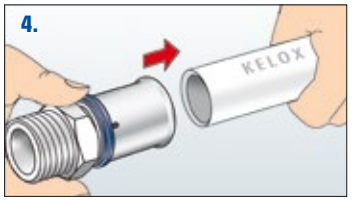
- Cutting angle corrected to 90°
- Inner pipe wall is calibrated
- Deburred on the outside
- Surrounding inner bevel at the end of the pipe with a depth of approx. 1 mm **– visual check !**

- Ensure that pipes that have already been joined to a fitting at one end **DO NOT** turn when the pipe is being calibrated at the other end! If necessary, use WZ939 KELOX pipe holder!

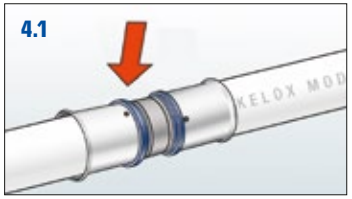
3. The plastic/aluminium chips MUST be removed from the calibration tool/protective cage after each calibration process.



4. Pushing on the press fitting WITHOUT using excessive force!
Push the pressed fitting straight onto the calibrated pipe end, **NOT** at an angle, as far as it will go.

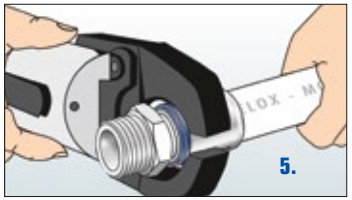


4.1 Check for the correct insertion depth on the viewing windows of the press fittings! Make the press connection immediately after joining the pipe connection!



5. Pressing KELOX-ULTRALAX
Fit the KELOX-conform pressing tool with the correctly sized KELOX pressing jaws (U-profile).

The pressing sleeves of the moulded parts are fitted with a double stop mechanism, which also ensures that the press jaw is positioned correctly (U-profile), even in difficult installation situations.

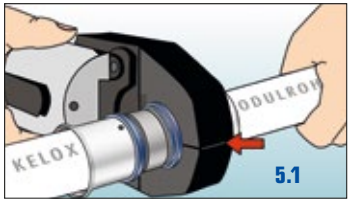


Additional test safety

leak before pressed» does not replace the visual check. The design, in conjunction with the special profile geometry, allows the UNpressed fittings of d16-50mm to be identified and localised with certainty during the functional test.
Simply press – done!

5.1 The pressing procedure is completed when the pressing jaws are completely closed. Open the pressing jaws again and lift the pressing tool off of the pressed part.
The pressing procedure can only be performed once!

The same procedure applies if the WZ983 manual pressing tool is used.



UN pressed joints can specifically pose a danger with an air pressure test if the pipe and fitting separate. from one another. The axial connection will only be created by pressing.

Therefore, perform a visual check of ALL joints!!

The fitting can be rotated after the joint has been made should any adjustments be required!

Installation guidelines for the KELOX-WINDOX-U press fittings

Only qualified installers should install the system!

The easy way to make a watertight KELOX-WINDOX-U press connection

1. Straighten the pipe from the coil and make sure that the pipe is cut at right angles.

1.1 Use either the pipe cutter WZ932 (for sizes d16–25 mm) or the pipe cutter WZ130 (for sizes d16–d25 mm)

1.2 The pipe cutter WZ935 is used for cutting pipe sizes d32–75 mm

2. **Always turn the chamfering tools clockwise when inserting into and removing from the pipe**

2.1 For sizes d16–32 mm click the handle on to the chamfering tool and turn the tool clockwise as far as it will go.

2.2 For sizes d40–d75 mm use the deburring tool WZ913. Turn the tool clockwise as far as it will go.

2.3 Alternatively the handle of the tool can be removed and the tool can be connected to a slow speed drill or power screwdriver (maximum of 500 rpm)

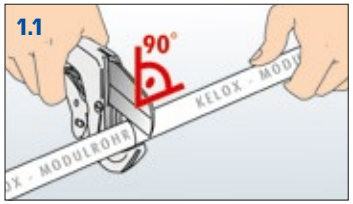
The result:

- The angle of the cut is corrected to 90°
- The inside surface of the pipe is chamfered
- The outside surface of the pipe is deburred.
- The internal chamfer is approx. 1mm deep round the whole of the pipe.

Take a look at the pipe to check!

Pipes which have already been connected at one end should not rotate while they are being chamfered at the other end. To prevent this happening, the pipe holder WZ939 may be used.

3. **Ensure that the plastic and aluminium cuttings are removed from the chamfering tool each time the pipe is chamfered.**



4. **Push the press fitting on to the pipe without using excessive force**

Push the press fitting straight on to the chamfered end of the pipe and **NOT** at an angle. Push the fitting as far as it will go.

4.1 Check whether the pipe has been fully inserted by looking at the viewing window. Press the fitting immediately after pipe and fitting have been connected.

5. Pressing the KELOX windox U fitting

Fit the correct KELOX pressing tools (U profile) for the required size. Position the pressing jaws centrally over the sleeve of the fitting and press.

Extra safety feature

Although the fitting has a "leak before pressed" feature a visual check of the joint should still be made.
The design of the fitting and its special profile makes it possible to reliably locate fittings which have not been pressed.

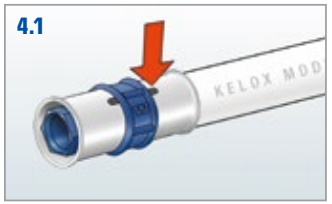
Just press and the work is done!

5.1 The pressing procedure is finished when the jaws have closed completely. The jaws can then be opened and removed from the fitting.
A press fitting can only be pressed once!
The procedure is the same for the manual pressing tool WZ983.

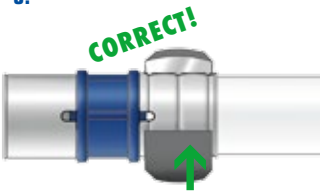
Fittings which have not been pressed may present danger if the pressure test is carried out with compressed air and the pipe and fitting have drifted apart. Longitudinal friction-locking is only achieved after the fitting has been pressed.

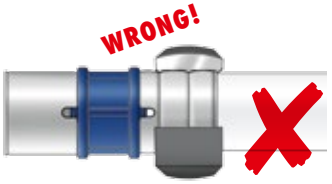
Make a visual check of all the joints!

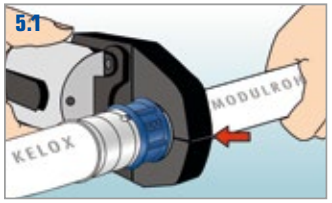
The fitting can be rotated after the joint has been made should any adjustments be required.



5.







The fitting can be rotated after the joint has been made should any adjustments be required!

Our KELOX-PROTEC concept
To your advantage

Easy
NO expensive tools are required. Complete range of fittings for sizes d16 – 32 mm

Secure
The fitting is NOT demountable. The sealing function takes priority. The pipe and fitting are connected on the inside of the pipe by a grab ring. The protector ring acts as a barrier to prevent pipes that have not been chamfered from entering the fitting. This protects the O-rings from damages. If the fittings have been connected correctly the joint will be watertight and resistant to any pull-out of the pipe. Check the viewing window to make sure.

Easy to handle
The body of the fitting is the ideal size and is no problem for flush-mounted installations. The slim design makes it possible to insulate after installation.

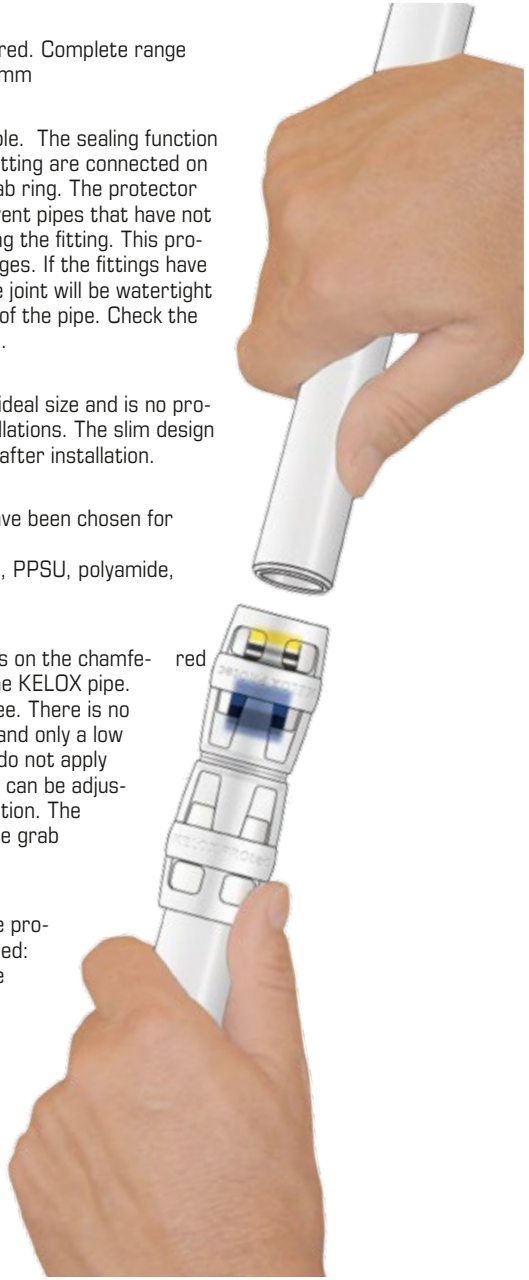
Robust
State-of-the art-materials have been chosen for the fitting
Pore-free metal plated brass, PPSU, polyamide, PA-GF, nano-coated EPDM

Suited for on-site conditions
The sealing of the joint occurs on the chamfered and clean inside surface of the KELOX pipe. EPDM O-rings are grease-free. There is no problem with contamination and only a low amount of force is required (do not apply any extra grease). The fitting can be adjusted and rotated after installation. The cap on the fitting protects the grab ring and O-rings.

Approved
Comprehensive testing of the product range has been completed: Water hammer, temperature cycles, high pressure, tensile strength etc…
Certified by DVGW and ÖVGW

KE KELIT patent

All the relevant components of the fitting are protected by patents. Licenses have been granted to European partners.



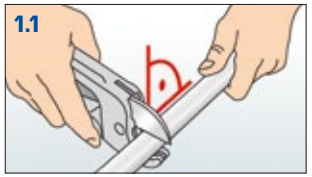
Installation guidelines for the KELOX-PROTEC push fitting

Only qualified installers should install the system!

1. Cut to length
Straighten the pipe from the coil and cut off the required length of pipe. Ensure that the pipe is cut at right angles.

1.1 Use either the pipe cutter WZ932 (for sizes d16 – 20 mm) or the pipe cutter WZ130 (for sizes d16 – d25 mm)

1.2 The pipe cutter WZ935 is used for cutting d32 mm pipe



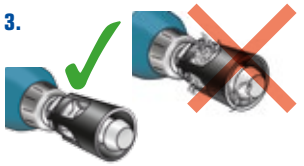
2. Always turn the chamfering tools clockwise when inserting into and removing from the pipe!

2.1 For sizes d16–32 mm click the handle on to the chamfering tool and turn the tool clockwise as far as it will go.

2.2 Alternatively the handle of the tool can be removed and the tool can be connected to a slow speed drill or power screwdriver (maximum of 500 rpm)

The result:
- The angle of the cut is corrected to 90°
- The inside surface of the pipe is chamfered
- The outside surface of the pipe is deburred
- The internal chamfer is approx. 1 mm deep round the whole of the pipe

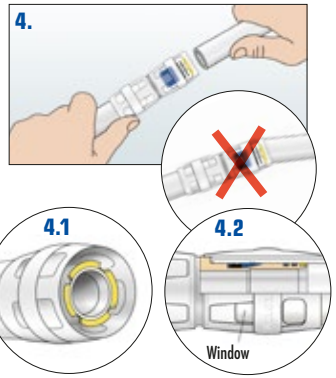
Take a look at the pipe to check!
Pipes which have already been connected at one end should not rotate while they are being chamfered at the other end. To prevent this happening, the pipe holder WZ939 may be used.



3. Ensure that the plastic and aluminium cuttings are removed from the chamfering tool each time the pipe is chamfered.

4. Push the press fitting straight on to the chamfered end of the pipe and **NOT** at an angle. Push the fitting as far as it will go

4.1 An intact protector ring blocks the entry of pipes which have **NOT** been chamfered.



The result:
- Watertight joint
- Longitudinal friction-locking provided by the grab ring
- Method for ensuring the pipe is fully inserted.

4.2 During the pressure test and when in operation the pipe should not pull back to an extent that the end of the pipe becomes visible in the viewing window of the fitting.

The fitting can be rotated after the joint has been made should any adjustments be required!

Important points to note when installing the KELOX system

1. Follow the guidelines carefully and KELOX joints will be secure.
2. It is essential that the system is installed by a qualified professional.
3. Pressure testing will not cover up errors made during installation or non-compliance with the installation guidelines (pages 18–25 and 55–57).
4. The recommended pressure tests (pages 35 and 46-49) are no guarantee that no errors were made during installation.
5. A pressure test is only a snapshot of the current status of a section of the system.
6. The long-term performance of the system is documented in the appropriate standards and is monitored by authorised institutes.
7. The quality of the system is dependent to a large degree on the care taken during the installation.

Invest 5 seconds of your time to check the joint

3 seconds

Check that the end of each pipe has been chamfered around the whole of its circumference

This ensures:

- The pipe has been correctly chamfered.
- The O-rings cannot be displaced or damaged.
- Pipes can be joined without excessive force.

2 seconds

Check that the pipe has been fully inserted.

This ensures:

- Longitudinal friction-locking when the joint is made
- Activation of the grab ring in the push fitting

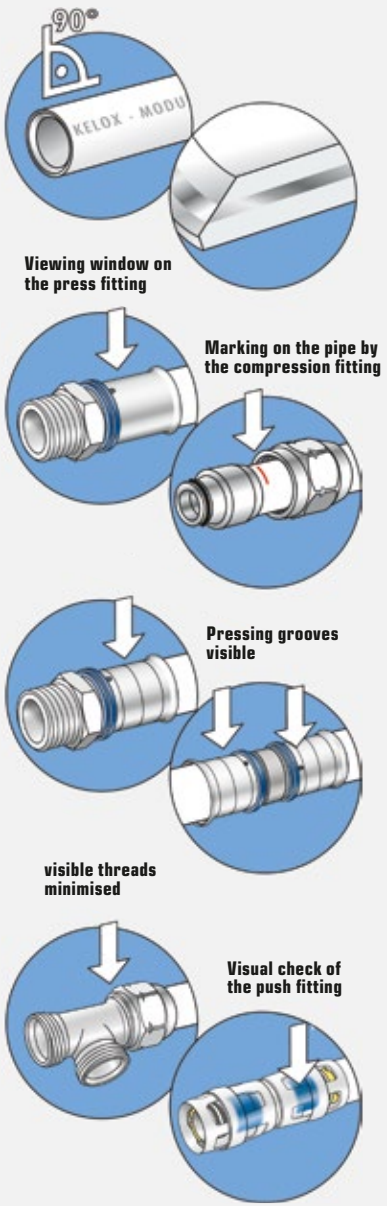
0 seconds

Leave as little time as possible between inserting the pipe and making the joint.

This ensures:

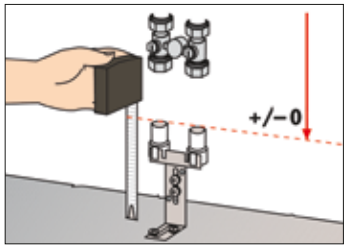
- Pressing of the joint has not been forgotten
- Tightening of the compression fitting has not been forgotten
- The push fitting joint is secured once the pipe has been fully inserted.

"Push – and it's done!"

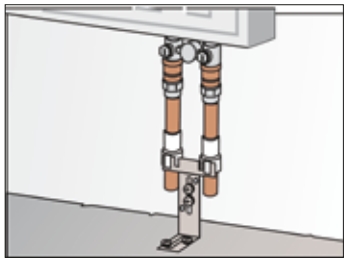


Installation instructions

KM598V KELOX radiator connecting set

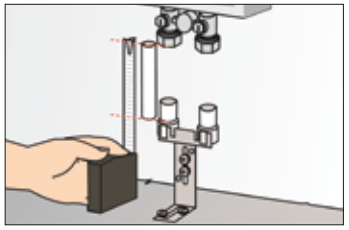


1. Install the radiator. Adjust the comb so that the upper edges of the plastic fixtures are at the same level as the screed.



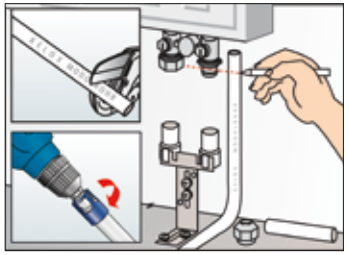
2. Fit the plastic fixtures in the appropriate slots in the comb. Put the assembly gauges into the plastic fixtures and connect them to the radiator. Fix the metal bracket to the floor.

2.1 To prevent noise transmission, wrap the bracket and the comb in insulation or install them completely within the floor insulation.



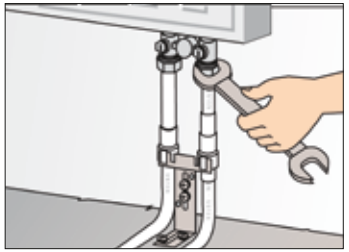
3. Measure the distance from the bottom edge of the nut to the bottom of the plastic fixtures and cut the guide pipe to this length using the KELOX pipe cutter.

4. Prepare the Kelox multilayer pipes as described in the installation instructions (pages 18–19). Push the plastic fixtures and guide pipes over the pipes which are going to be connected to the radiator.



5. Fit the plastic fixtures to the comb. Connect the KELOX pipes to the valves using compression fittings.

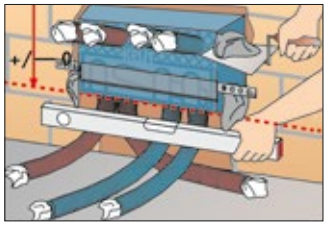
6. Ensure that the guide pipes are pushed up to the compression fittings before the screed is installed.



The guide pipes protect the exposed pipes, increase the lateral stability of the Kelox pipes and represent an aesthetically pleasing solution.

Installation instructions

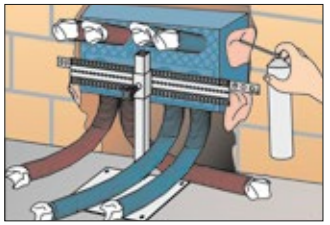
KM597 insulation wall block, KM595 Quattrox radiator block, KM595Z two pipe radiator block



1. Determine the position of the installation and the type of radiator. The positions of the connections cannot be changed afterwards.

1.1 The bottom edge of the insulation block should be at the same level as the height of the finished floor and fit into the wall structure

1.2 The holes in the insulation block are for fixing to the assembly aid. The block is either embedded in the wall or in foam when it is fixed permanently in the wall.

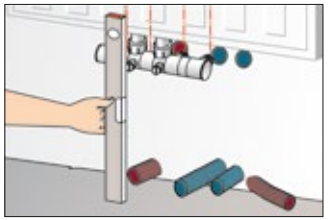


2. The conduit pipes for protecting the connecting pipes come from the wall and rest on the floor. The ends of the pipes should all be protected from dirt.

2.1 Quattrox: For sizes d16 and d20 it is recommended that the pipes do not cross over, as is shown in the picture.

2.2 For size d20 the radius of the conduit pipes should be kept as large as possible.

2.3 The plastering work can now be done. The wall must be completely dry before the pipes can be pushed through the conduit.

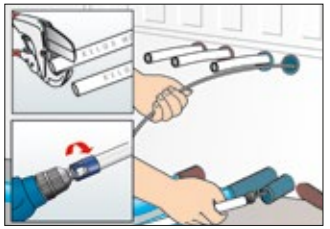


3. Installing the radiator

3.1 Cut the conduit pipes to the length where they are flat in the plaster

3.2 Install the radiators and ensure that the radiator valve set is positioned by the conduit pipes

3.3 Remove the valve set from the radiator



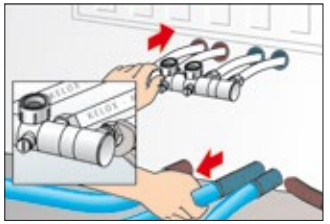
3.4 Take the feeder spring and feed the Kelox multilayer pipes into the conduit pipes. Ensure that enough of the pipe sticks out of the conduit pipes.

3.5 Cut approximately 20 mm from the end of the pipes which have been deformed. Chamfer the pipes as described in the installation guidelines on pages 18–19 and prepare for joining.

3.6 Connect the valve set to the pipe using the KELOX compression fittings. Push the pipes back into the wall so that only the length of pipe required to the radiator sticks out.

4. Connect the valve set to the radiator

NOTE. If an alignment template is being used the radiator can only be installed when the paintwork has been completed

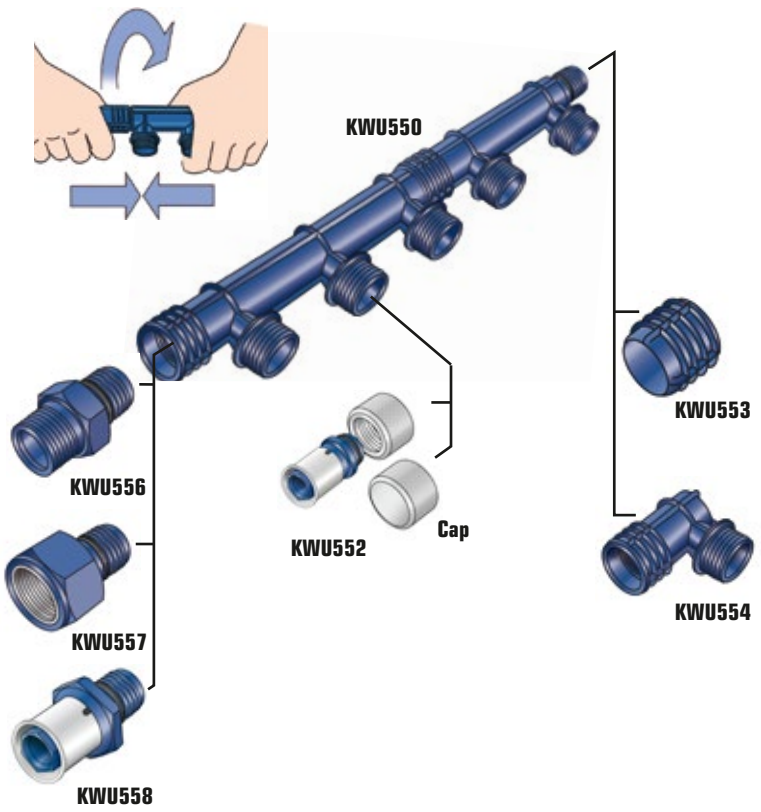


The valve set and the insulation wall block make professional connections from the wall possible without the need for joints in the floor or chiselling in the wall after plastering. Correctly insulated, they also provide an aesthetically-pleasing solution.

Example of how to install KM597P4 and KM595

KELOX-WINDOX-U manifold

In line with KE KELIT´s philosophy of supplying components made of plastic for transporting water, a manifold system made of Windox-PPSU has been added to the product range. The manifold can be installed in both hot/cold water and heating systems.



The following components are available for the manifold:

KWU550 — **KELOX-WINDOX-U manifold**

The individual manifold modules made of PPSU have threads so that they can be connected to each other. The outlets are ¾" male threads which fit to the fittings KWU552

No. of outlets	PU
2 outlets one-sided	2
2 outlets one-sided	2
4 outlets two-sided	2

KWU552 — **KELOX-WINDOX-U fittings**

¾" female thread fittings or end caps, made of PPSU, for WINDOX manifolds

Size	PU
16	10
20	10
End cap	10

KWU553 — **KELOX-WINDOX-U manifold cap**

Manifold end cap for closing the manifold KWU550. The connection is made manually.

Size	PU
	10

KWU554 — **KELOX-WINDOX-U manifold extension**

90° elbow for extending the manifold KWU550 by one outlet. It also closes the manifold. It can be connected manually.

Size	PU
3/4"	5

KWU556 — **KELOX-WINDOX-U manifold connector; male thread**

Manifold connector made of PPSU with a male thread. It connects the individual manifold modules manually

Size	PU
3/4"	10

DO NOT use liquid sealants or thread sealants

KWU557 — **KELOX-WINDOX-U manifold transition fitting; female thread**

Transition fitting made of Windox PPSU. It is connected to the manifold manually.

Size	PU
3/4"	10

DO NOT use liquid sealants or thread sealants

KWU558 — **KELOX-WINDOX-U manifold press transition fitting**

Manifold connector with press adaptor made of Windox-PPSU. It is connected manually to the manifold.

Size	PU
20	5
25	5
32	5

KM519 — **KELOX-WINDOX-U manifold bracket**

The bracket is used for fixing the manifold in the cabinet KM570. It can also be mounted by screw. The distance between the brackets is 200mm. It is made of galvanised steel and has two noise-preventing clamps.

Size	PU
32–200	1

Two-pipe heating system with a central manifold

Design criteria for an efficient system

As a result of the short runs from the manifold to the individual radiators but also taking into account the extra losses at the system components (e.g. valves), the pressure loss can be assumed to be **250–400 Pa/m**

The "spaghetti system" - The ideal solution both for installing and comfort

Advantages

- Only one pipe size from the manifold
- No connections in the floor
- Every pipe to the radiator can be managed separately
- If a radiator is defect energy is saved because there is no circulation in the pipe system

The classic two-pipe heating system

Design criteria for an efficient system

Taking into account the total length of the piping and the extra losses at the system components (e.g. valves) the pressure loss can be assumed to be **100–200 Pa/m**

The standard option tried and trusted

Advantages

- Same temperature for all of the radiators (source of comfort)
- Recognised system for calculating heat costs
- Typical system for renovation of old buildings
- Well suited for skirting boards

The one-pipe heating system

Design criteria for an efficient system

Taking into account the total length of the main riser in one pipe systems and the extra losses at the system components (pipes branching off from the riser, Z values of 4 way valves …) the pressure loss can be assumed to be **100–200 Pa/m**

The "saving option" – quick and value for money

Advantages

Using 4-way valves

- no connections in the floor
- very quick installation
- only one pipe size after the riser

Insulation for heating and hot water systems (ÖNORM H 5155)

ÖNORM H5155 is the standard applied for insulating domestic systems. It simplifies and regulates the design, installation and maintenance of insulation.

- The purpose of ÖNORM H 5155 is to specify the minimum thickness of insulation required to minimise the transfer of heat from the medium to its surroundings and vice-versa.
- ÖNORM H 5155 applies for the insulation of all components in heating and drinking water systems.
- The insulation varies according to the type of installation and its location within the building (e.g. in front-wall installations, intermediate ceilings or in heated rooms etc…..)
- Follow Ke Kelit's recommendations with regards to comfort and noise reduction
- See page 45 for insulation of cold water pipes.

ÖNORM H 5155 permits a lambda value of 0.047 W/mK for KELOX hot water and heating pipes at an average temperature of 50°C and an external coefficient of heat transfer of 9 W/m²K

The lambda value of the pre-insulated KELOX plus pipes is 0.036 W/mK at 20 °C. As a result, less insulation is required to meet the requirements of the standard. The comparison between the standard thickness and the corresponding thickness of KELOX plus pipes is shown below:

Standard thickness 5 mm ≙ KM134 KELOX plus pipe with 4 mm

Standard thickness 10 mm ≙ KM130 KELOX plus pipe with 9 mm

Standard thickness 15mm ≙ KM133 KELOX plus pipe with 13mm

Extract from the standard ÖNORM H 5155. The outside diameters have, however, been amended to the actual outside diameters of KE KELIT pipes.

Outside diameter of the pipe	16	20	25	32	40	50	63	75
Location of pipe system	**minimum insulation thickness (mm)**							
Utilities room	20	20	25	30	40	55	70	70
Unheated room	20	20	25	30	40	55	70	70
Heated room	10	10	15	15	20	30	35	35
Installation shaft; installation corridor, mostly bordering on unheated areas	20	20	25	30	40	55	70	70
Intermediate ceiling; double floor; Installation shaft mostly bordering on heated areas	10	10	15	15	20	30	35	35
Flush-mounted installations; floor in unheated rooms	10	10	10	10	10	10	10	10
Flush-mounted installations; floor in heated rooms	5	5	5	5	10	10	10	10

Attention should be paid to the laws and standards concerning insulation which apply in the country where the products are being installed.

Dimensioning and pressure loss of KELOX heating lines

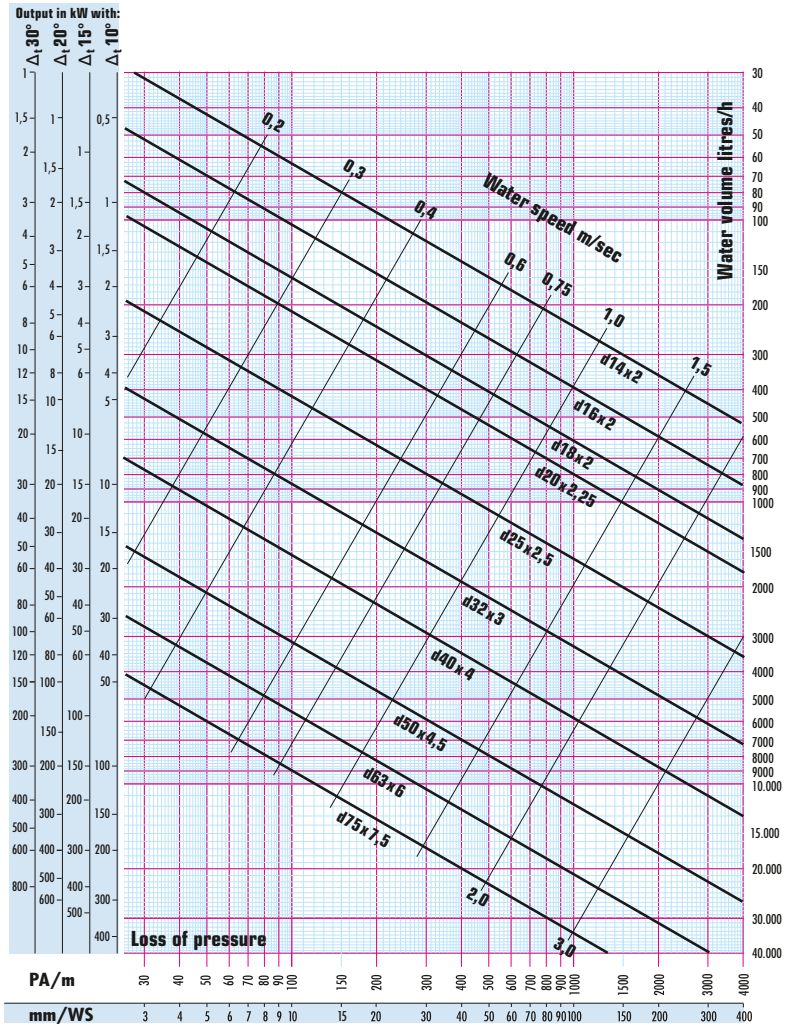
The calculation of the individual resistances can be found in the KELOX handbook on Page 38.
KELOX multilayer pipe d: 14, 16, 20, 25, 32, 40, 50, 63, 75 mm

The pressure losses are calculated according to the Nikuradse formula:

$$R = 3{,}62315 \cdot 10^3 \cdot \dot{m}^{1{,}70651} \cdot di^{-4{,}64237}$$

Pipe roughness: 0.007 mm

R = Pipe friction pressure gradient (Pa/m)
$\dot{m}$ = Mass flow (l/h)
di = Pipe inside diameter (mm)



Pressure test for heating systemst

KE KELIT recommends performing the leak-tightness test on the basis of "pressure tests for radiator installations" according to ÖNORM EN 14336. Attention! Prior to every pressure test, ensure that all points of the assembly instructions (page 18 to 25) have been conscientiously carried out.

When using "leak before pressed" fitting, a functional test must be performed according to manufacturer's specifications

For temperature differences (> 10 K) between the ambient temperature and the filling water temperature, after filling the system with drinking water, a waiting time of 30 minutes must be observed for the temperature equalisation.

Test pressure: 0.05 MPa (0.5 bar) up to max. 0.2 MPa (2 bar)
Testing duration: After temperature equalisation between pipe and test medium, 15 minutes.
Test differential pressure: 0.0 bar

Finally, all pipe joints must be subjected to a visual inspection.

If a pressure test is performed with air or inert gases, the functional test may be omitted!

Pressure test

The piping system is tested at a pressure equal to 1.3 times the operating pressure. The pressure measurement device should preferably be at the lowest position in the system.
The temperature equalisation between ambient and filling water must be taken into account after the testing pressure is generated. The testing pressure should be restored after the waiting time, if necessary.
All containers, devices and fittings that are not suitable for the testing pressure should be disconnected from the system during the pressure test. The system is filled with filtered water and bled completely. During the test, a visual check of the pipe connector fittings must be performed.

KELIT recommends a testing time of 1 hour.

Calculated testing pressure: ..... bar
Testing time ..... hour

☐ During the testing time, NO loss of pressure was determined.
☐ The system contains .... as anti-freeze
☐ The system contains NO anti-freeze and has therefore be emptied com pletely for safety reasons.

Place: .....

Object: .....

System pressure: .....

Confirmation

Clerk: .....

Date: ..... Time: from ..... until .....

Client: .....

Signature/stamp

The drinking water installation

The KELOX multilayer pipe is ÖNORM-tested and ÖVGW-registered and approved, furthermore, ÖNORM EN ISO 21003 prescribes the following criteria for this application case:

- max. operating temperature 70° C – short-term 80° C
- long-term pressure-tight 10 bar
- suitable for drinking water in accordance with ÖNORM B 5014/1 for pipes and fittings
- permanently tight connections in the flush-mounted area
- resistance to pressure surges of the connections
- The KELOX system fulfils these conditions in an excellent manner

Advantages

- pipe from the reel, virtually not cuttings
- pipe from the reel, thermally insulated in the factory
- straight lengths for open installation
- a balanced range of sizes, from d16–75 mm
- quick installation
- no deposits on the smooth inside
- minor linear expansions, comparable to metal pipes
- fittings made of stress-free, annealed specialist brass, non-porous metal plating
- fully plastic system when using WINDOX-U PPSU fittings
- KELOX-PROTEC push system

Practically relevant information on ÖNORM B 5019

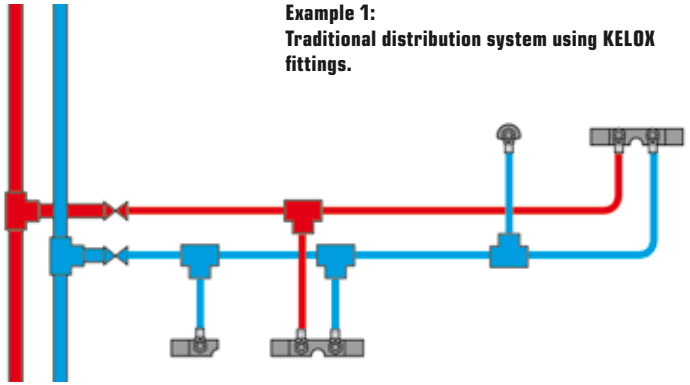
In order to comply with the hygiene requirements, please note the following points:

- Correct sizing of the pipes. Motto: as small as possible, as large as necessary (page 38–44)
- Insulating the pipes in the shafts. The cold water pipeline should not exceed 20°C (page 45)
- Remove rarely-used extraction points from the central hot water circuit. Avoid long downtimes!
- No dead pipelines – cut off any dormant pipeline sections
- Ensure that the system components are kept clean during delivery, storage and installation
- Install monitoring and drainage devices
- It is recommended to install several monitoring devices at places which are easy to access
- Pressure testing in drinking water systems, which are not immediately put into operation after installation should be tested for leaks with oil-free compressed air or inert gases (page 46–47)
- Flushing and commissioning
- The complete drinking water installation must be rinsed intensively with hygienic drinking water during the course of commissioning (page 53)
- Preparation of system documentation

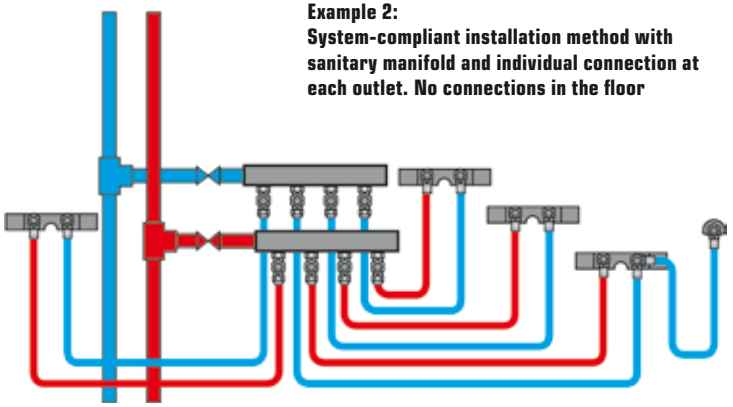
KELOX

Installation options

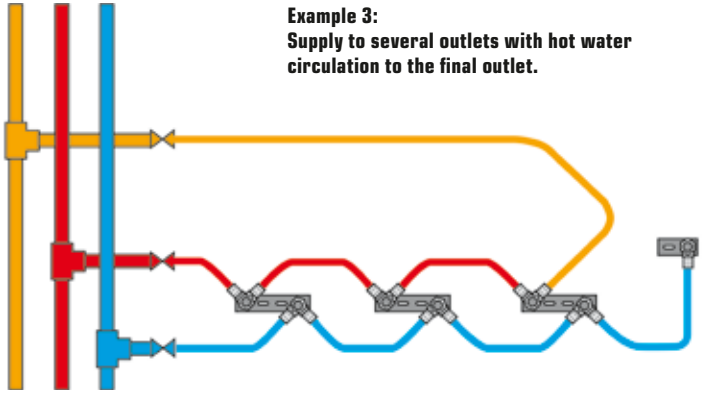
Example 1:
Traditional distribution system using KELOX fittings.



Example 2:
System-compliant installation method with sanitary manifold and individual connection at each outlet. No connections in the floor



Example 3:
Supply to several outlets with hot water circulation to the final outlet.



Sizing, loss of pressure of KELOX multilayer pipes

The total pressure loss (Δp) of a KELOX system is calculated from the pipeline length (l) times the pipe friction pressure gradient (R), plus the sum (Σ) of the individual resistances (Z)

Total pressure loss Δp: $\Delta p = (l \cdot R + \Sigma Z)$ **in Pa**

The selection of the pipe dimension for the water pipelines is dependent on:

- available water pressure, geodetic height difference
- pressure loss from apparatus and minimum flow pressure (fittings)
- pipe friction pressure gradient, flow speeds
- individual resistances of the moulded parts
- type, number and simultaneousness of the extraction points

Permitted flow speeds in accordance with DIN 1988-300

Computed flow speed m/s, a flow duration of Line section	< 15 min	≥ 15 min
Consumption lines: Partial sections with resistance coefficients ζ < 2.5 for the individual resistances	5	2
Consumption lines: Partial sections with resistance coefficients ζ ≥ 2.5 for the individual resistances	2,5	2

[a] e.g. piston valve, ball valve, angle seat valves [b] e.g. globe valve

Guidelines for circulating pipe systems in accordance with DIN 1988-300
For hygienic reasons the circulating system should be designed so that the temperature at any point in the system is no lower than 5K below the operating temperature. The hot water must not fall below 55°C at any point in the system. For economic reasons, the flow velocity in circulating systems should be approx. 0.2–0.5 m/s and in exceptional circumstances up to a maximum of 1.0 l/s.

Calculation of the individual resistances (Z) with typical moulded parts:

$$Z = \zeta \cdot \frac{v^2 \varrho}{2}$$

ϱ = Density kg/m³
v = computed flow speed
ζ = Loss coefficient

Dimension d mm	Coupling irrelevant ζ	Ellbow 90° ζ	Ellbow 45° ζ	T-piece outlet with dividing flow ζ	T-piece outlet with dividing flow ζ	Wall disk ζ	Euro thread fitting ζ
							
16	4,3	17,3	-	5,9	17,9	12,9	3,4
20	2,4	10,1	-	3,3	10,0	9,8	2,8
25	1,7	7,1	2,0	2,3	8,4	-	5,0
32	0,7	4,5	1,5	1,1	4,8	-	-
40	0,6	3,3	1,3	0,8	3,4	-	-
50	0,4	2,5	1,0	0,4	2,5	-	-
63–75	0,5	2,4	1,0	1,1	2,5	-	-

Pipe sizing in accordance with ÖNORM EN 806-3

With the calculation method, the ascertainment of the pipe dimension takes place for normal installations for up to a maximum of 12 housing units. This method is used for cold water and hot water pipelines. The definition for normal installations can be found in ÖNORM EN 806-3 Point 4.2
For specialist installations, such as hospitals, sanatoriums, hotels, schools etc., in accordance with ÖNORM B 2531, e DIN 1988/300 must be used for the calculation. See pages 40–43.

Extraction point	Q_A l/s	Q_{min}	LU
Washstand, sink, bidet, cistern	0,1	0,1	1
Dishwasher, shower head, sink basin, household kitchen sink, washing machine[a]	0,2	0,15	2
Urinal flusher	0,3	0,15	3
Bathtub drain	0,4	0,3	4
Tap fitting for garden / garage	0,5	0,4	5
Commercial kitchen sink DN 20, bathtub drain	0,8	0,8	8
Pressure flusher DN 20	1,5	1,0	15
a) For commercial washing machines according to the manufacturer's specifications			

1 load value (LU) corresponds to an extraction fitting flow Q_A of 0.1 l/s.

With respect to the efficiency, the flow speed should be a minimum of 1 m/sec. With respect to the flow noises, 2 m/sec should not be exceeded with collective supply lines, rising mains and storey pipelines. With individual supply lines, flow speeds of max. 4 m/sec. are permitted.

After the addition of the already-weighted load values (LU), the pipeline diameter (d) can be selected in accordance with the inner diameter (di) from the following table.

Example:
The following outlets need to be connected to one riser pipe:

4 bathtubs	4	x	LU 4	= 16
2 showers	2	x	LU 2	= 8
4 washstands	4	x	LU 1	= 4
4 cisterns	4	x	LU 1	= 4
4 kitchen sinks	4	x	LU 2	= 8
4 dishwashers	4	x	LU 2	= 8
2 washing machines	2	x	LU 2	= 4
Total load value (LU)				52

Result:
in accordance with ÖNORM EN 806-3, this results in the following table for KELOX d32 x 3 mm.

Dimension d x s mm	Inner diameter di mm	Flow rate l/m	Load value LU	largest individual value LU	max. pipe Length m
16x2	12,0	0,113	3	-	9
16x2	12,0	0,113	4	-	5
16x2	12,0	0,113	5	4	4
20x2,25	15,5	0,189	10	5	-
25x2,5	20,0	0,314	20	8	-
32x3	26,0	0,531	55	-	-
40x4	32,0	0,804	180	-	-

Guidelines for sizing

Extract from DIN 1988-300

1. Determining the calculated flow rate and minimum flow pressures of the outlet fittings

The calculation flow $\dot{V}_R$ is an assumed extraction fitting flow value for the calculation step. Guideline values of the calculation flows for conventional fittings are shown in the table. The calculation flow $\dot{V}_R$ as a mean value results from the following equation:

$$\dot{V}_R = \frac{\dot{V}_{min} + \dot{V}_{max}}{2}$$

2. Calculation sum flows and allocate to the partial sections

Against the direction of flow - ending at the respective furthest-away extraction point and at the supply line - the calculation flows are added together and the sum flows that are calculated in this way are then allocated to the respective line sections. The respective partial section starts with the fitting at which the sum flow or the diameter changes.
At the junction point of the cold water pipeline to the drinking water heater, the sum flows of the cold and hot water side are added together.

3. Use of the conversion curve from the sum flow to the peak flow

With the calculation of pipeline systems, all extraction points should basically be used with their calculation flows.
The exception from this is the case where a utilisation unit, a second sink, a shower tray in addition to the bathtub, a bidet, a urinal or discharge valves exist in anterooms or toilet facilities. They are not taken into account in the sum flow.

4. Simultaneousness depending on building type

The peak flow calculation takes place on the basis of the sum flow, the simultaneousness of the water extraction is dependent on the type of use of the building (e.g. in flats, hotels etc.).
In general, it is not anticipated that all connected extraction points are fully opened simultaneously.
On pages 42 and 44, you will find the conversion curves for the various building types.

5. Select pipe diameter

Calculate pipe diameter and pipe friction pressure gradient, as well as related computed flow speed. (Pressure loss diagram page 44).

6. Comparison of pressure loss with available pressure

The total pressure loss for the calculated pipe diameter should essentially reach the available pressure difference, but not exceed it.

7. Minimum flow pressures and calculation flows ($\dot{V}_R$: l/s) of conventional drinking water extraction points

Minimum flow pressure bar	Type of drinking water Extraction point	Dimension	$\dot{V}_R$: l/s
	Drainage valve		
0,5	without aerator [a]	DN 15	0,30
0,5		DN 20	0,50
0,5		DN 25	1,00
1,0	with aerator	DN 10	0,15
1,0		DN 15	0,15
	Mixing valves [b, c] for		
1,0	Shower tub	DN 15	0,15
1,0	Bathtubs	DN 15	0,15
1,0	Kitchen sinks	DN 15	0,07
1,0	Wash stands	DN 15	0,07
1,0	Bidet	DN 15	0,07
	Household machines		
0,5	Dishwasher	DN 15	0,07
0,5	Washing machine	DN 15	0,15
	WC bowl and urinals		
1,0	Flushing valve for urinal bowl manual or electronic	DN 15	0,30
1,2	Flushing valve for WC	DN 20	1,00
0,5	Cistern according to EN 14124	DN 15	0,13

a) Without connected apparatus (e.g. lawn sprinkler)

b) The specified calculation flow must be invoiced for the cold and hot water connection

c) Elbow valves for (e.g. washstand fittings and hose connections for showers) are to be taken into account as individual resistances or minimum flow pressure of the extraction fitting

Important note:
The manufacturers of valves must state the minimum flow pressure and the calculation flows ($\dot{V}_R$) for fittings. The manufacturer's information absolutely must be considered when measuring the pipe diameter, if it lies above the values listed in the table, then the drinking water installation must be sized according to the manufacturer's instructions.

Note:
Extraction points that are not recorded in the table and apparatus of the same type, with larger fitting flows or minimum flow pressures than stated must also be taken into account according to the manufacturers' specifications.

Extract from DIN 1988-300

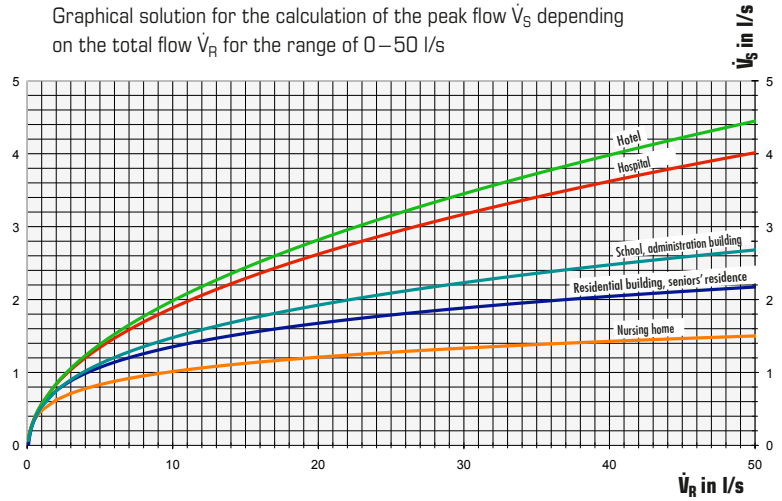
For the building types indicated in the table, the peak flow $\dot{V}_S$ is calculated in the following scope:

$\Sigma \dot{V}_R$: 0,2 bis ≤ 500 l/s

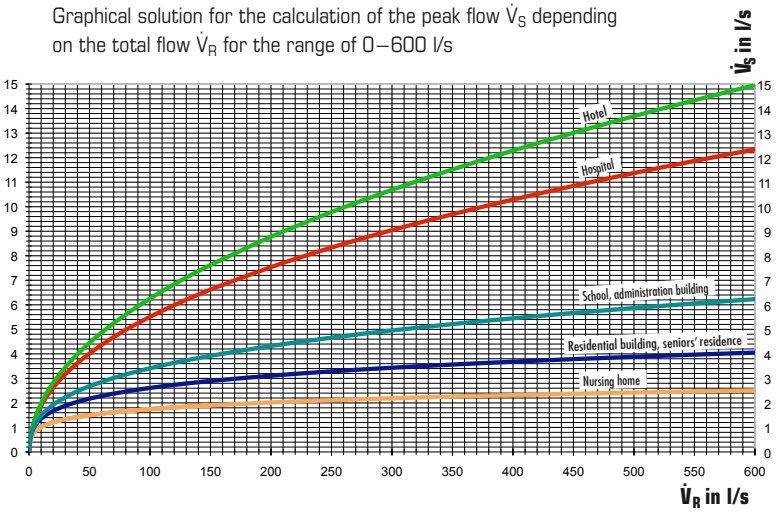
Depending on the building type, the peak flow ($\dot{V}_S$) is calculated with the constants included in the table (page 43) as follows:

$$\dot{V}_S : a \left(\Sigma \dot{V}_R\right)^b - c$$

Graphical solution for the calculation of the peak flow $\dot{V}_S$ depending on the total flow $\dot{V}_R$ for the range of 0–50 l/s



Graphical solution for the calculation of the peak flow $\dot{V}_S$ depending on the total flow $\dot{V}_R$ for the range of 0–600 l/s



Constants (a, b, c) for the peak flow depending on building type

Building type	Constant a	b	c
Residential building	1,48	0,19	0,94
Installation for assisted living, seniors' residence	1,48	0,19	0,94
Ward in hospital	0,75	0,44	0,18
Hotel	0,70	0,48	0,13
School and administration building	0,91	0,31	0,38
Nursing home	1,40	0,14	0,92

Exceptions to the calculation of the peak flow $\dot{V}_S$

Utilisation units

A room with extraction point in a residential building (e.g. bathroom, kitchen, housekeeping room) or also in a non-residential building, if use similar to residential is assumed. From experience, in the direction of flow towards the end of the branch line and in the storey distribution of utilisation units, the flow of the calculation are too high, because usually no more than two extraction points are opened at the same time, e.g. in a bathtub.
Therefore, the peak flow in each partial section of a utilisation unit is set to a maximum of both of the largest extraction points installed in the partial section (also applies to cases in a utilisation unit, where not smaller flow results from the calculation).
If a second utilisation unit is connected to a partial section (e.g. in the riser pipe), the peak flows of both utilisation units are added together, provided that the resulting peak flow is less than according to the equation of the computed value. Otherwise, the peak flow is determined according to the respective equation.

Permanent consumers

The flow of the permanent consumer is added to the peak flow of the other extraction points. Permanent consumption is regarded as water extractions with a duration of more than 15 min., e.g. garden sprinkler valve.

Series systems

The basis for the calculation is the sum flow. The simultaneousness of water extraction must be defined with the operator. The peak flows of the series system are to be added up, if they can occur simultaneously.

Special buildings, commercial and industrial plants

With special buildings (other than those indicated above), including industry buildings, agriculture buildings, gardening buildings, slaughterhouses, dairies, shops, laundries, large kitchens, public baths etc. the peak flow must be determined from the total flow in co-operation with the facilities operator. The peak flows of the sub-zones of the drinking water installation must be added up if they coincide.

Pipe sizing and pressure loss of KELOX sanitary lines

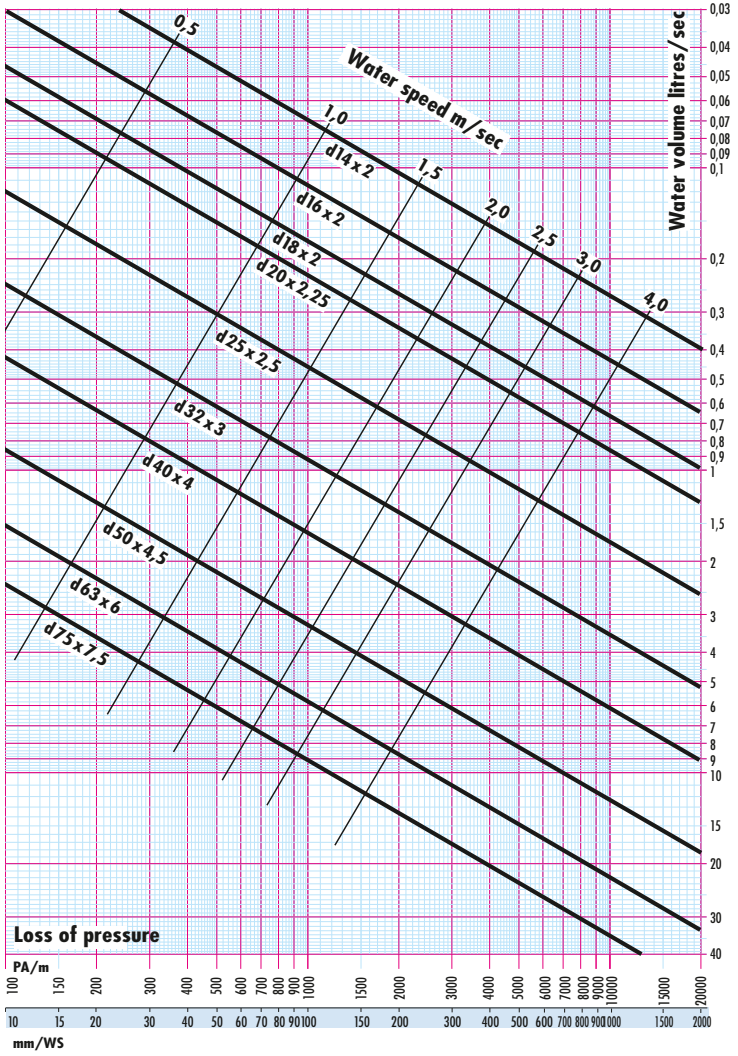
The calculation of the individual resistances can be found in the KELOX handbook on Page 38.
KELOX multilayer pipe d: 14, 16, 20, 25, 32, 40, 50, 63, 75 mm

The calculation of the pressure losses takes place according to the Nikuradse formula:

$$R = 3{,}62315 \cdot 10^{3} \cdot \dot{m}^{1{,}70651} \cdot di^{-4{,}64237}$$

Pipe roughness: 0.007 mm

R	= Pipe friction pressure gradient	(Pa/m)
$\dot{m}$	= Mass flow	(l/h)
di	= Pipe inside diameter	(mm)



Insulation for cold water pipelines (ÖNORM H 5155)

ÖNORM H5155 is the standard applied for insulating domestic systems. It simplifies and regulates the design, installation and maintenance of insulation.

- The purpose of ÖNORM H 5155 is to specify the minimum thickness of insulation required to minimise the transfer of heat from the medium to its surroundings and vice-versa.
- ÖNORM H 5155 applies for the insulation of all components in heating and drinking water systems.
- The insulation varies according to the type of installation and its location within the building (e.g. in front-wall installations, intermediate ceilings or in heated rooms etc.....)
- Follow Ke Kelit's recommendations with regards to comfort and noise reduction
- See page 33 for insulation of heating and hot water pipes.

ÖNORM H 5155 permits a lambda value of 0.047 W/mK for KELOX cold water pipes at an average temperature of 0°C and an external coefficient of heat transfer of 9 W/m²K

The lambda value of the pre-insulated KELOX plus pipes is 0.036 W/mK at 20°C. As a result, less insulation is required to meet the requirements of the standard. The comparison between the standard thickness and the corresponding thickness of KELOX plus pipes is shown below:

Standard thickness 4 mm ≙ KM134 KELOX Plus pipe with 4 mm
Standard thickness 9 mm ≙ KM130 KELOX Plus pipe with 9 mm
Standard thickness 13 mm ≙ KM133 KELOX Plus pipe with 13 mm

Extract from the standard ÖNORM H 5155. The outside diameters have, however, been amended to the actual outside diameters of KE KELIT pipes.

Outside diameter of the pipe	16	20	25	32	40	50	63	75
Location of pipe system	**minimum insulation thickness (mm)**							
Utilities room	13	13	13	13	19	25	25	25
Exposed piping in unheated room	9	9	9	9	13	19	19	19
Exposed piping in heated room	13	13	13	13	19	25	25	25
Installation shaft or corridor alongside hot water pipes	13	13	13	13	19	25	25	25
Installation shaft or corridor where there are no hot water pipes	9	9	9	9	13	19	19	19
Intermediate ceiling, raised floor, dry wall, in-wall installation, distribution pipes in floors	13	13	13	13	19	25	25	25
Front wall installation, floor (storey and individual supply lines)	4	4	4	4	9	13	13	13
Front wall installations, floor, next to hot water circulating pipelines (storey and individual supply lines)	13	13	13	13	19	25	25	25

Attention should be paid to the laws and standards concerning insulation which apply in the country where the products are being installed.

Pressure test – Drinking water systems with air or inert gases in accordance with ÖNORM B 2531

The pressure test with air or inert gases (a. or i.g.) takes place in a 2-stage procedure comprised of the tightness test and the load test. The tightness test for pipelines ≤ DN 50/ OD 63 can be performed in 2 versions.

The pressure test with a. or i.g. may take place in phases and does not replace the final pressure test with drinking water!
The pressure test must essentially be performed in oil-free and dust-free a. or i.g. and is suitable for all pipeline materials. In buildings with increased hygiene requirements (e.g. with medical facilities), inert gas must be used for the pressure test.

Due to the compressibility of the medium, no test pressure above 300 kPa (3 bar) may be applied for the pressure test with a. or i.g. for safety reasons.

Higher test pressures mean a larger safety risk and do not increase the testing accuracy.

The safety of persons and goods during the test must be observed. Splitting into small line sections for the pressure test provides higher testing accuracy Step-by -step pressure increase is meaningful as an additional safety measure.
All line openings must be impermeably sealed with a stopper or blind flange with sufficient strength compared to the test pressure. With the pressure test with a. or i.g., the connection points of the pipeline sections must be accessible and visible, vent valves are to be provided for releasing the test pressure without danger.
If leaks are determined or if a loss of pressure is noticeable, all connections must be tested with appropriate bubble-forming test equipment for tightness, after remedying the leaks, the pressure test must be repeated.

Two-stage pressure test for all pipelines ≤ DN 50/OD 63

Comprised of a tightness test according to version 1 or 2 and load test

Tightness test - version 1
Test pressure 15 kPa (150 mbar) – test duration 60 min. Display accuracy of the pressure measuring device 0.1 kPa (1 mbar)

Tightness test - version 2
Test pressure 100 kPa (1 bar) – test duration 60 min. Display accuracy of the pressure measuring device 5 kPa (50 mbar), additionally, all connection points in the system must be checked for tightness with appropriate bubble-forming test equipment.

Load test
Test pressure 100 kPa (3 bar) – test duration 10 min. Display accuracy of the pressure measuring device 10 kPa (100 mbar)

Two-stage pressure test for all pipelines > DN 50/OD 63

Comprised of a tightness test and load test

Tightness test
Test pressure 15 kPa (150 mbar) – test duration 90 min. Display accuracy of the pressure measuring device 0.1 kPa or standpipe 0.1 kPa (1 mbar), additionally, all connection points can be checked in the system for tightness with appropriate bubble-forming test equipment.

Load test
Test pressure 100 kPa (1 mbar) – test duration 10 min. Display accuracy of the pressure measuring device 10 kPa (100 mbar)

KELOX

Pressure test log in accordance with ÖNORM B 2531 for KELOX drinking water systems

Test medium: Air or inert gases

Client: .....

Contractor: .....

Object: ..... test section: .....

Pipe materials and dimensions: .....

Ambient temperature: ..... Temperature equalisation: ☐

Highest system operating pressure MDP: ..... Visual inspection: ☐

Two-stage pressure test for all pipelines ≤ DN 50/OD 63:
Comprised of a tightness test according to version 1 or 2 and load test

Tightness test – Version 1 ☐
Test pressure 15 kPa (150 mbar) – test duration 60 minutes

Tightness test – Version 2 ☐
Test pressure 100 kPa (1 mbar) – test duration 60 minutes
additionally, all connection points in the system must be checked for tightness with appropriate bubble-forming test equipment

Load test ☐
Test pressure 300 kPa (3 mbar) – test duration 10 minutes

Two-stage pressure test for all pipelines > DN 50/OD 63: Comprised of a tightness test and load test

Tightness test ☐
Test pressure 15 kPa (150 mbar) – test duration 90 minutes
additionally, all connection points in the system can be checked for tightness with appropriate bubble-forming test equipment.

Load test ☐
Test pressure 100 kPa (1 mbar) – test duration 10 minutes

Comment
After successful pressure testing, we recommend the preparation of a confirmed test log.
The pressure test with air or inert gases does not replace the pressure test with drinking water in accordance with ÖNORM EN 806-4, this must be performed directly prior to commissioning of the system.

Confirmation

Clerk: .....

Date: ..... Time: from ..... until .....

Client: .....

.....

Pressure test for drinking water systems with drinking water

When using "leak before pressed" fitting, a functional test must be performed according to manufacturer's specifications

For temperature differences (> 10 K) between the ambient temperature and the filling water temperature, after filling the system with drinking water, a waiting time of 30 minutes must be observed for the temperature equalisation.

Test pressure: 0.05 MPa (0.5 bar) up to max. 0.2 MPa (2 bar)
Testing duration: After temperature equalisation between pipe and test medium, 15 minutes.
Test differential pressure: 0.0 bar

Finally, all pipe joints must be subjected to a visual inspection.

If a pressure test is performed with air or inert gases, the functional test may be omitted!

Pressure test for drinking water in accordance with ÖNORM EN 806-4

The pressure test with drinking water is a combined tightness and load test and must take place for all lines in accordance with ÖNORM EN 806-4. Pipes and other pipeline sections are to be measured for the highest system operating pressure (MDP) in accordance with ÖNORM EN 805 or ÖNORM EN 806 series.

But they must be designed as a minimum for a system operating pressure (MDP) or nominal pressure (PN) of 1.0 kPa (10 bar).

As the test pressure in accordance with ÖNORM EN 806-4 must amount to 1.1 times the highest system operating pressure, the pressure test must be performed with a minimum of 1.1 MPa (11 bar)

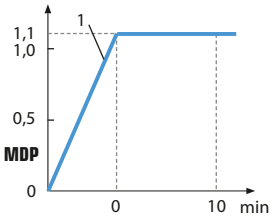
Display precision of the pressure measurement device (preferably positioned at the lowest point) 0.02 MPa (0.2 bar).
Based on the pipe materials and dimensions, test method "A" applies for the tightness and load test in accordance with ÖNORM EN 806-4.

Test method A - test time 10 minutes

- For all multiple-layer compound systems of **d14–75mm**
- For all metal pipe systems of **d12 – 108mm**
- For all plastics (e.g. PP, PE, PEX, PB inter alia) **≤ DN 50/OD 63**
- For all combined systems (metal systems-multiple layer- compound systems with plastics) **≤ DN 50/OD 63**

The system must be filled with water, completely bled and all extraction points closed.

The test pressure (1) must be applied with pumps and maintained for 10 minutes. During this time the test pressure must remain constant and no fall in pressure may occur.



KELOX

Pressure test log

in accordance with ÖNORM EN 806-4 for KELOX drinking water systems
Test medium: Drinking water

Client: .....

Object: .....test section: .....

Pipe materials and dimensions: .....

Functional test according to manufacturer's specifications
Test pressure: 0.05 MPa (0.5 bar) up to max. 0.2 MPa (2 bar)
Test duration: 15 minutes

Ambient temperature: .....System bled ☐

Temperature equalisation Visual inspection ☐

Functional test performed: yes ☐ no ☐

Pressure test for drinking water systems with a minimum of 1.1 MPa (11 bar)

Highest system operating pressure MDP: ..... Test pressure 1.1 x MDP: .....

Pipe: d14 ..... m	Pipe: d25 .....m	Pipe: d50 ..... m
Pipe: d16 ..... m	Pipe: d32 .....m	Pipe: d63 ..... m
Pipe: d20 ..... m	Pipe: d40 .....m	Pipe: d75 ..... m

Test method A – test time 10 minutes

Metal and multiple-layer composite pipe systems - all dimensions
Plastic systems and combined systems with plastics ≤ DN 50/OD 63

Visual inspection ☐ The system is tight ☐

Comment:

- **Temperature fluctuations can influence the testing pressure!**
- **Every pressure test is a snapshot of the actual state and cannot be a guarantee against installation errors.**
- **After successful pressure testing, we recommend the preparation of a confirmed test log.**

Confirmation

Clerk: .....

Date: ..... Time: from ..... until .....

Client:.....

.....

Expansion behaviour of KELOX pipelines

Thermal expansion in a lengthwise direction

During heating, all materials are subject to increasing volume/a change in length. The linear expansion must be taken into consideration with every pipeline, depending on the installation situation.

The longitudinal expansion is dependent on the pipe length, the temperature increase and the expansion coefficient, however, independently from the dimension.

Calculation of the longitudinal expansion:

$$\Delta_l = l \cdot \Delta_t \cdot \alpha$$

Δ_l = Specific linear expansion (mm)
l = Pipe length, installation length (m)
Δ_t = Temperature difference (K)
α = Expansion coefficient (mm/mK)

Material properties

Material	Expansion coefficient α mm/mK	E module 60° N/mm²
Galv. steel	0,012	220.000
Stainless steel	0,015	200.000
Copper	0,016	130.000
KELOX	**0,025**	**4.240**
KELEN	0,140	300
PEX	0,175	540

This means: Under the influence of temperature, the KELOX multilayer pipe expands comparably to metallic materials.

Expansion legs of openly installed pipes

Openly installed KELOX pipelines, which are exposed to thermal expansion, must receive appropriate expansion compensation. This is taken into consideration by arranging bending legs in conjunction with fixed points and bearings. Even if the temperature only occurs temporarily, the expansion compensation must be design for this temperature difference. Compensation always takes place between two fixed points and between two fixed points and directional changes (bending leg).

Calculation of the bending leg:

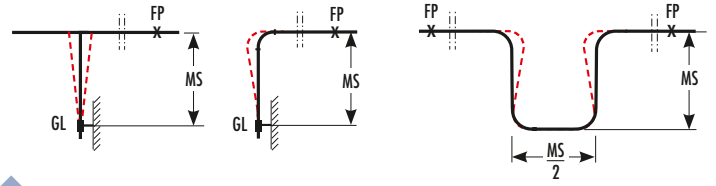
$$MS = 30 \cdot \sqrt{d \times \Delta_l}$$

d = Outer pipe diameter (mm)
30 = Material constant for KELOX
MS = Minimum leg length (mm) e.g.: from 90° elbow to the next fixed point

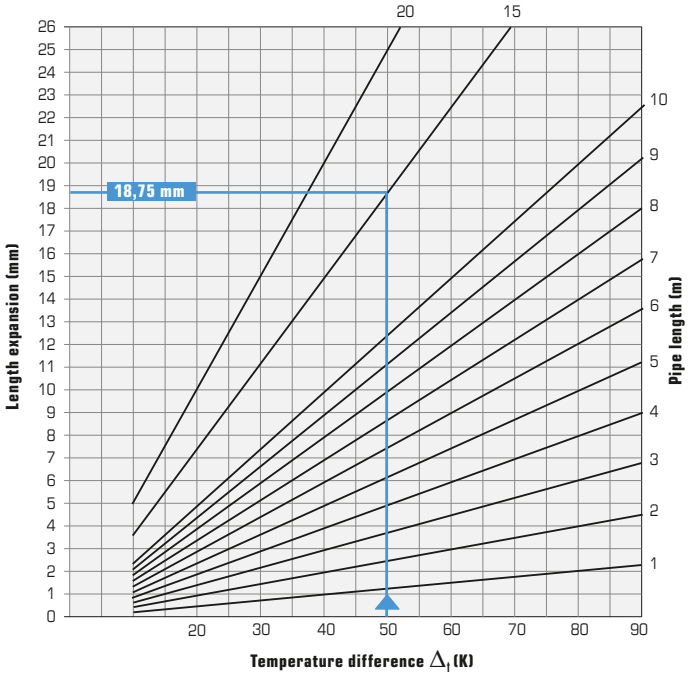
Example:

A pipe d50mm is installed over a length of 15 m. Δ_t = 50 K
Question: Which expansion leg needs to be prescribed to compensate the expansion?

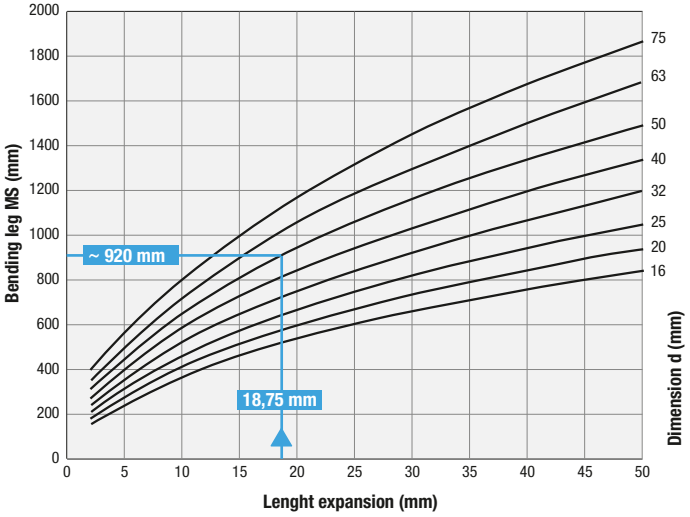
Δ_l = $15 \cdot 50 \cdot 0{,}025$
Δ_l = 18,75 mm expansion
MS = $30 \cdot \sqrt{50 \cdot 18{,}75}$
MS = ~ 920 mm leg length



Thermal length change of KELOX multilayer pipes based on α = 0.025 mm/mK



Determination of bending leg of KELOX multilayer pipes based on material constant = 30



Thermal expansion forces of KELOX pipes

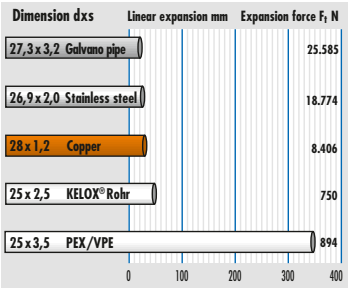
Materials-specific forces occur with the linear expansion. According to the rules of engineering, the specific thermal expansion force is calculated.

Thermal expansion forces are dependent on the dimension (pipe cross-section surface) and temperature change, regardless of the pipe length.

Calculation of the thermal expansion force:

$$F_t = \frac{E \cdot A \cdot \alpha \cdot \Delta_t}{1000}$$

F_t = Expansion force (N)
E = E-module (N/mm²)
A = Pipe cross-section surface (mm²)
α = Expansion coefficient (mm/mK)
Δ_t = Temperature difference (K)



Example:

KELOX d 25x2,5 A = 176,71mm²
E-module E = 4240 N/mm²
Expansion coefficient: α = 0,025 mm/mK
Installation temp.: tv = 20°C
Medium temp.: tm = 60°C
Temperature diff.: Δt = 40 K

$$F_t = \frac{4240 \cdot 176{,}71 \cdot 0{,}025 \cdot 40}{1000}$$

F_t = ~ 750 N Expansion force

Installation rules regarding linear expansion For the installation, meaningful routing should be ensured with appropriate expansion options. The suppliers of mounting clamps can offer solutions, if necessary.

Flush-mounted pipelines Pipelines in brickwork are prevented from expanding due to the friction forces which occur, insulated pipes offer additional expansion options. Direct contact should be avoided between flush-mounted pipelines and fittings with the brickwork, tiles, mortar etc. through appropriate insulation.

Exposed pipelines The installation of KELOX multilayer pipes is similar to copper, the high flexibility of the pipes benefits expansion loops. Exposed pipelines (cellar pipelines, riser pipes etc.) should be mounted on the basis of the structural circumstances, as well as the recognised rules of engineering. Fixed points should not be directly attached to fittings that cause a change in direction (page 52 - expansion example). The mounting of vertical pipe (risers etc.) may, as a rule, exclusively take place with fixed points, in this case, the mounting should take place directly above or below where the pipe branches off from the riser.

Pipes installed in the floor Axial movement of the multilayer pipes is possible in the insulation and the resulting linear expansion must be compensated for. Changes in the direction of the insulation at right angles provides an opportunity for the expansion to be compensated for by the insulation over the fittings. No compensation is required for pipes which are directly embedded in screed or concrete. Foot sound and heat insulation should also be accounted for.

Flushing log in accordance with ÖNORM B 2531 Drinking water system – Flushing medium – Drinking water

Client:.....

Contractor: .....

Object: .....test section: .....

Pipe material: ..... Date: .....

In order to fulfil the requirements of ÖNORM EN 806-4, proceed as follows.

Table 2: Guideline values for the minimum number of extraction points to be opened

Largest nominal widths of the line in the current flushing section (DN/ID)	20	25	32	40	50	65	80	100
Minimum number of extraction points to be opened	2	2	4	6	8	12	18	28
Opened for flushing:								

Comment: Regardless of the flushing procedure, each extraction point should be opened fully once during the course of commissioning.
According to ÖNORM EN 806-4, the flushed pipelines must be properly commissioned after a maximum of 7 days. The flushing process with a water/air mixture is described in accordance with ÖNORM EN 806-4.

- ☐ The drinking water that is used for flushing has been filtered (no particles greater than or equal to 150 µm)
- ☐ Hot and cold water lines were flushed separately.
- ☐ Circulation lines were flushed section-by-section, directly prior to entry into the water heater.
- ☐ Minimum number of extraction points were defined in accordance with Table 2
- ☐ All shut-off valves and control valves were completely opened during the flushing process.
- ☐ Sensitive fittings (e.g. magnetic valves, flushing valves, thermostatic valves, control valves) and apparatus (e.g. drinking water heaters) were replaced with adapters or bridged in accordance with the manufacturers' specifications.
- ☐ Die Installation was flushed in phases, starting with the first starting with the first riser pipe after the main shut-off.

The proper flushing of the system is confirmed

Installation company/fitter.....

Client .....

Noise protection

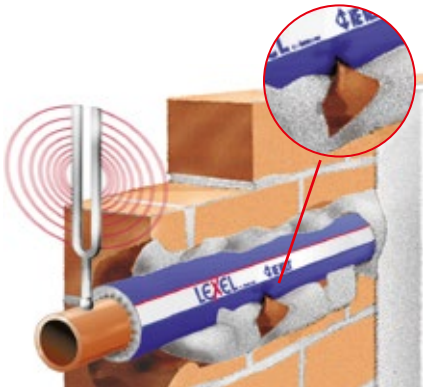
The purpose of all noise protection measures is to protect persons in common rooms from unpleasant annoyances due to sound transmission. According to DIN 4109 protectable spaces include, inter alia, living rooms, bedrooms, classrooms, offices and work rooms.
The following measures are recommended in DIN 4109:

- Use of low-noise fittings
- Acoustic decoupling on pipe fastener and wall brackets, z.B. KMU485, KWU485, KMP485 or KMU485SB, KWU485SB and KMP485SB, etc.
- Use of KELOX pipes already insulated in the factory: KM130, KM133 and KM134 or enclosure with noise-suppressing insulation and simultaneous structure-borne sound insulation (e.g. LEXEL)
- Avoidance of high pressures and flow rates
- Admissible resting pressure of 5 bar before the extraction points should not be exceeded
- Use of structure-borne noise insulating pipe fasteners (e.g. rubber inserts)
- Particular observance of protectable spaces

The noise level for protectable spaces is defined in accordance with ÖNORM B 8115.

- Consistent noises, such as heating pumps, flow noises from drinking water or heating systems etc. ≤ 25 dB (A)
- Short-term noises, e.g. WC flushing, wastewater noises, lifts etc. ≤ 30 dB (A)

Increased noise protection by 5 db (A) below the values required by ÖNORM B 8115 must always be arranged separately!



Important!
Noise bridges may occur due to damaged insulation or mortar residues between pipelines, walls or screeds, which transmit the noise unhindered. Therefore, preferably gap-free decoupling using pipe insulation should be aimed for in the interest of good noise protection.

A single noise bridge can already virtually undo all other noise-protection applications that have been carried out!

Summary of the installation guidelines

1. The KELOX multilayer pipe system is made of plastic and requires careful handling in relation to shock, impact, nicks and kinks. The KELOX system components are well-protected in their original packaging. Nevertheless, all components (fittings and pipes) should be protected from mechanical and weather-related damage.

2. Store and transport all KELOX system components with care. The external protective layer is stabilised against UV influences; however do not expose the pipes to long-lasting, direct sunlight. Completed systems/system parts must be protected with appropriate measures from exposure to UV rays. The conventional storage and processing times are not affected by this.

3. Observe the processing instructions for the screw, press and push connections (page 18 to 25)
Vitally important!
cut straight - calibrate precisely - slide on completely - press or screw - inserted = tight

4. For metallic inner threads in the KELOX system, use fittings and connectors with a cylindrical thread!
DO NOT join to any threaded pipes or cast iron fittings!
We recommend using hemp in conjunction with approved sanitary sealing paste (e.g. Fermit, hole paste etc.).
Only apply the amount of hemp that allows the thread tips to still be seen. By using too much hemp, the risk exists of damaging the inner thread. By inserting hemp shortly after the first thread turn, crooked screwing-in is avoided.

As an alternative to hemp, Teflon strips or sealing threads may be used, with the **Twineflon** name from **ulith**, or **PTFE sealing thread**s by **Fermit**.

Important!
NO chemical sealants, such as liquid sealant, 1-component or 2-component adhesive may be used for sealing the KELOX-PPSU fittings.
As a general rule: Never overtighten threads!

5. Guideline values for support widths: The specified bracket distances prevent water-filled horizontally or vertically installed KELOX pipelines are effectively prevented from buckling.
At temperatures above 60° C, the support widths are reduced by approx. 10 %.

Pipe	Temperature	Horizontal cm	Vertikal cm
d 14–16	up to 60°	120	155
d 20	up to 60°	130	170
d 25	up to 60°	150	195
d 32	up to 60°	160	210
d 40	up to 60°	170	220
d 50	up to 60°	200	260
d 63	up to 60°	220	285
d 75	up to 60°	240	310

6. The design of the KELOX pipes makes them resistant to corrosion. With regard to noise, condensation and heat loss the pipes should be insulated according to the standard. By insulating the whole of the system, including the fittings, the joints can be protected from dirt, damage and penetrating concrete sludge or similar.

Summary of the installation guidelines

7. Direct contact between KELOX PPSU installation systems and solvents/building materials containing solvents, such as paints, sprays, installation foams, adhesives (e.g. Armaflex-Kleber 520 etc.) must be avoided. Any existing aggressive solvent components may lead to impairments of the plastic material, under unfavourable circumstances.

- As media containing ammonia, chlorides an nitrate may cause stress cracks, the materials and tools used, as well as the ambient conditions, must be free from these, in order to avoid impairment of the metal materials.
- No building foams or two-component mortars based on methylacrylate, isocyanate or acrylate may be used for fastening the system parts.
- Cold welding substances, such as those used for welding PVC protective films, which contain acetone or tetrahydrofurane (THF) may not be used.

8. KELOX multilayer pipes have defined expansion properties. These must be taken into consideration in the planning and installation (page 50–52).

No provision for expansion must be made in the flush-mounted area:
For openly installed pipes:
For longer line sections, a split of the expansion zones can be achieved with a targeted selection of the fixing points. The suppliers of mounting clamps can offer usable solutions (fixing points, sliding clamps, double clamps...), if necessary

9. Avoid hot bending of pipes. KELOX multilayer pipes are easily bendable, without springback.

Avoid kinks! Do not install pipes that are damaged or incorrect! With tight radii, please use the following from the tools available: **Bending spring or pipe bending tool. Avoid tight bending radii directly after connections due to risk of breakage (cutting effect of the support sleeve).**

Permitted bending radii:

Pipe	from hand	by WZ925	by WZ920
d 14	5 x d	3,5 x d	3 x d
d 16	5 x d	3,5 x d	3 x d
d 20	5 x d	3,5 x d	3 x d
d 25	5 x d	4 x d	4 x d
d 32	–––	4 x d	–––
d 40	–––	4 x d	–––

ÖNORM EN ISO 21003

10. Classification of the operating conditions for KELOX multilayer pipe systems in accordance with EN ISO 21003

Application class	Calculation temperature	Operating duration	tmax	Operating duration at tmax.	max. admissible operating pressure
Class 2 Hot water supply	70°C	49 years	80°C	1 year	10 bar
Class 5 Radiator-connection	20°C + cumulative 60°C + cumulative 80°C	14 years 25 years 10 years	90°C	1 year	10 bar
Cold water	20°C	50 years			10 bar
Cold water	20°C	50 years			16 bar*

* only in combination with KELOX press fittings

11. The application temperature of KELOX installation pipe systems should not fall below –10 °C. With higher negative temperatures, it is recommended to stored system components in tempered or heated rooms directly prior to processing.

12. Each water and heating installation must be subjected to a pressure test in accordance with the standard. KM258 stoppers for pressure testing and KM259 compression fittings for pressure testing area available for this.

When using "leak before pressed" fitting, a functional test must be performed according to KE KELIT.

Keep a log of the pressure test. (Page 35 and 46–49)

13. In relation to anti-freeze, ethylene or propylene glycol up to a maximum concentration of 35% do not cause any problem for KELOX. When using alternative anti-free additives, the suitability and approval or application instructions of the suppliers should be observed.

14. Short-term exposures of up to 80°C according to ÖNORM EN ISO 21003 do not cause any problem for the KELOX multilayer pipe system. Avoid longer time periods/higher temperatures. Please note the valid guidelines/standards/

- The disinfection of a drinking water pipeline system must be performed in accordance with the KE KELIT disinfection guideline – **www.kekelit.com**

  For the disinfectants listed in ÖNORM B 5019 or B 5021 (e.g. chlorine, chlorine dioxide, ozone etc.), the concentrations and exposure times must be observed and may not be exceeded.

  If disinfection is performed contrary to the KE KELIT disinfection guidelines or the concentrations and times stated in the standards, damage to material cannot be ruled out.

- **According to ÖNORM B 5019, thermal disinfection must always take priority over chemical disinfection!**

  ÖNORM H 5195/-1 defines the pH value and the water hardness (dH) of heating and refilling water. The functionality of valves, control devices etc. can be influenced by this.

15. As KELOX installation pipes are not electrically conductive, they cannot be used for equipotential bonding and therefore also do not need to be earthed.

16. To ensure the guarantee services (warranty agreement with the Federal Guild of Construction), KELOX system components must be exclusively used in each installation case.

17. Fault-free installation of the KELOX multilayer pipe system requires a minimum of tools. For your safety, we recommend using the original tools that have been tried and tested many times in practice and their regular servicing.

18. Don't hesitate to consult our application engineers if you are in any doubt. There is no optimal solution for every case, but we can always help!

19. You can watch installation videos using the KE KELIT QR code.

www.youtube.com/kekelit

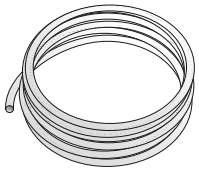
Product range overview

The KELOX multilayer pipe system is constantly adapted to practical requirements and is systematically enhanced. Please see the respective valid KELOX multilayer pipe price list for the current status of the supply range. The short symbols, e.g. KMU100 = multilayer pipe or KMU420 = press elbow 90°, simplify the ordering process significantly and are therefore requested in your order.

Operating conditions

- Drinking water installations Class 2 according to ÖNORM EN ISO 21003. **Operating temperature: 70 °C – 10 bar / tmax 80 °C**
- Radiator connection: Class 5 according to ÖNORM EN ISO 21003
- **Operating temperature: tmax 80 °C – 10 bar / tmax 90 °C**
- Cold water: **0 °– 20 °C – 16 bar** – ONLY use KELOX press fittings
- Compressed air max. **10 bar** ONLY use KELOX press fittings
- Vacuum up to **– 0.6 bar** ONLY use KELOX press fittings
- inert gases, technical fluids upon request

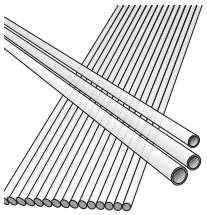
KM100 KELOX multilayer pipe



KELOX multilayer pipe oxygen and water vapour barrier; 5-layered composite pipe made of PE-RT/Alu/PE-RT. Application conforming to EN ISO 21003.
Sanitary application: Class 2 70°C – 10 bar / tmax 80°C.
Radiator connection: Class 5 tmax 80°C – 10 bar /tmax 90°C
Colour: white/transparent, reel material

Size d x s	Content l/m	Weight kg/m	PU m
14 x 2	0,078	0,09	200
16 x 2	0,113	0,11	200
20 x 2,25	0,189	0,15	100
25 x 2,5	0,314	0,22	50
32 x 3	0,531	0,32	50

KM110 KELOX multilayer pipe



KELOX multilayer pipe oxygen and water vapour barrier; 5-layered composite pipe made of PE-RT/Alu/PE-RT. Application conforming to EN ISO 21003.
Sanitary application: Class 2 70°C – 10 bar / tmax 80°C
Radiator connection: Class 5 tmax 80°C –10 bar /tmax 90°C
Colour: white/transparent
Straight length: 5m

Size d x s	Content l/m	Weight kg/m	PU m
16 x 2	0,113	0,11	125
20 x 2,25	0,189	0,15	90
25 x 2,5	0,314	0,24	50
32 x 3	0,531	0,33	30
40 x 4	0,804	0,55	20
50 x 4,5	1,320	0,75	20
63 x 6	2,042	1,25	15
75 x 7,5	2,826	1,78	5

KM111 KELOX multilayer pipe nipple

KELOX multilayer pipe nipple made of PE-RT/Al/PE-RT, calibrated on both sides for the shortest connection between two moulded parts

Size d x s	Content l/m	Length mm	PU m
16 x 2	0,113	71	10
20 x 2,25	0,189	71	10
25 x 2,5	0,314	83	10
32 x 3	0,531	83	10

KM134 KELOX Plus pipe – 4mm

KELOX-ULTRAX multilayer pipe oxygen and water vapour barrier; 5-layer composite pipe made of PE-RT/Al/PE-RT; 4 mm closed-cell soft foam insulation applied in the factory and protective sleeve made of viscoplastic PE foil. Operating conditions conforming to ÖNORM EN ISO 21003
Sanitary application: Class 2 70°C – 10 bar / tmax 80°C.
Radiator connection: Class 5 tmax 80°C –10 bar /tmax 90°C
Insulation thickness: 4 mm
Colour: blue, reel material

Size d x s	Content l/m	Weight kg/m	PU m
14 x 2	0,078	0,13	50
16 x 2	0,113	0,15	50
16 x 2	0,113	0,15	100
20 x 2,25	0,189	0,19	50
25 x 2,5	0,314	0,26	25
32 x 3	0,531	0,38	25

KM130 KELOX Plus pipe – 9mm

KELOX-ULTRAX multilayer pipe oxygen and water vapour barrier; 5-layer composite pipe made of PE-RT/Al/PE-RT; 9 mm closed-cell soft foam insulation applied in the factory and protective sleeve made of viscoplastic PE foil. Operating conditions conforming to ÖNORM EN ISO 21003
Sanitary application: Class 2 70°C – 10 bar / tmax 80°C.
Radiator connection: Class 5 tmax 80°C –10 bar /tmax 90°C
Insulation thickness: 9 mm
Colour: red, reel material

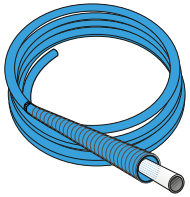
Size d x s	Content l/m	Weight kg/m	PU m
14 x 2	0,078	0,16	50
16 x 2	0,113	0,18	50
16 x 2	0,113	0,18	100
20 x 2,25	0,189	0,23	50
25 x 2,5	0,314	0,31	25
32 x 3	0,531	0,44	25

KM133 KELOX Plus pipe – 13mm

KELOX-ULTRAX multilayer pipe oxygen and water vapour barrier; 5-layer composite pipe made of PE-RT/Al/PE-RT; 13 mm closed-cell soft foam insulation applied in the factory and protective sleeve made of viscoplastic PE foil. Operating conditions conforming to ÖNORM EN ISO 21003.
Sanitary application: Class 2 70°C – 10 bar / tmax 80°C.
Radiator connection: Class 5 tmax 80°C –10 bar /tmax 90°C.
Insulation thickness: 13 mm
Colour: orange, reel material

Size d x s	Content l/m	Weight kg/m	VPE m
16 x 2	0,113	0,21	50
20 x 2,25	0,189	0,27	50
25 x 2,5	0,314	0,36	25
32 x 3	0,531	0,50	25

KM140 KELOX Pro-pipe



KELOX-ULTRAX multilayer pipe
oxygen and water vapour barrier;
5-layer composite pipe made of
PE-RT/Al/PE-RT; with sleeve made
of corrugated water-impermeable
sleeve tube applied in the factory
and protective sleeve made of PE-HD
Operating conditions conforming to
ÖNORM EN ISO 21003
Sanitary application: Class 2
70°C – 10 bar / tmax 80°C
Radiator connection: Class 5 tmax
80°C –10 bar /tmax 90°C
Colour: blue, reel material

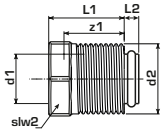
Size d/Ad	Content l/m	PU m
16/25	0,113	50
20/28	0,189	50

KM144 KELOX Pro-Plus pipe

KELOX-ULTRAX multilayer pipe
oxygen and water vapour barrier;
5-layer composite pipe made of
PE-RT/Al/PE-RT; with sleeve made
of corrugated water-impermeable
sleeve tube made of PE-HD applied
in the factory and 4 mm closed-cell
soft foam insulation and protective
sleeve made of viscoplastic PE foil.
Operating conditions conforming to
ÖNORM EN ISO 21003
Sanitary application: Class 2
70°C – 10 bar / tmax 80°C
Radiator connection: Class 5
tmax 90°C – 10 bar
Colour: blue, reel material

Size d/Ad	Content l/m	VPE m
16/25/4	0,113	50
20/28/4	0,189	50

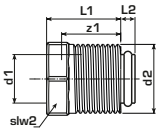
KM210 KELOX connection kit



For connection on 1/2" radiator valves (female thread) according to DIN or EN215, brass with non-porous metal plating, including pressure screw with male thread, support sleeve with O-rings and clamping ring.
Compatible with:
DANFOSS, OVENTROP, HERZ DIN

d1 mm	d2 Inch	L1 mm	L2 mm	z1 mm	slw2 mm
14	1/2"	22	4,5	17,5	22
16	1/2"	22	4,5	17,5	22

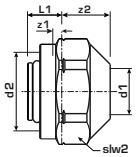
KM212 KELOX connection kit



For connection on 1/2" radiator valves (female thread) according to DIN or EN215, brass with non-porous metal plating, including pressure screw with male thread, support sleeve with O-rings and clamping ring.
Compatible with: HEIMEIER

d1 mm	d2 Inch	L1 mm	L2 mm	z1 mm	slw2 mm
14	1/2"	22	5,5	18	22
16	1/2"	22	5,5	18	22

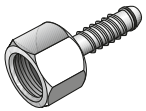
KM220 KELOX Euro compression fitting

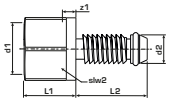


For connection to installation components with 3/4" EUROCONE (male thread) according to EN215, brass with non-porous metal plating, including nut with female thread, support sleeve with O-rings and clamping ring.
Identification: circumferential notch on the thread

d1 mm	d2 Inch	L1 mm	z1 mm	z2 mm	slw2 mm
14	3/4"	11	3	15	30
16	3/4"	11	3	15	30
20	3/4"	11	3	15	30
25	3/4"	11	3	23	38

KM258 KELOX Stopper for pressure testing

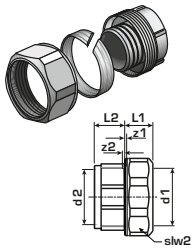




Reusable stopper for pressure testing KELOX multilayer pipes, replacement O-rings upon request. Cut off the end of the pipe after unscrewing the stopper for pressure testing!
NOT suitable for permanent use!

d2 mm	d1 Inch	L1 mm	z1 mm	L2 mm	slw2 mm
16	1/2"	22	5	30	27
20	1/2"	22	5	30	27
25	1/2"	22	7	38	27
32	1/2"	22	7,5	42	30
40	1/2"	22	8	41	34

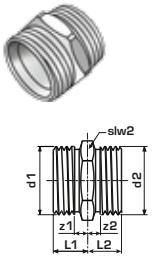
KM259 KELOX compression fitting for pressure testing with fem. thread



Reusable thread fitting for pressure testing KELOX pipes with female thread. Cut off the end of the pipe after unscrewing the compression fitting for pressure testing!
NOT suitable for permanent use

d1 mm	d2 Inch	L1 mm	L2 mm	z1 mm	z2 mm	slw2 mm
50	6/4“	24,5	25,5	1,5	2	67

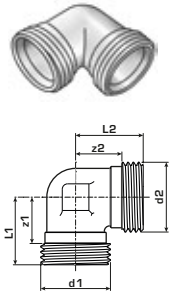
KM310E KELOX thread coupling with male thread



Coupling made of brass with non-porous metal plating; two male threads suited for connection to the KM220 Euro thread fitting

d1/d2 Inch	L1/L2 mm	z1/z2 mm	slw2 mm
3/4“	13	4,5	27

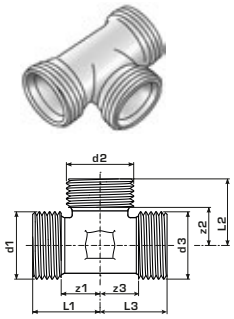
KM320E KELOX thread elbow 90° male thread



Elbow made of brass with non-porous metal plating; two male threads suited for connection to the KM220 Euro thread fitting

d1/d2 Inch	L1/L2 mm	z1/z2 mm
3/4“	26	18

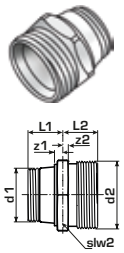
KM340E KELOX thread tee male thread



Tee made of brass with non-porous metal plating; three male threads suited for connection to KM220 Euro thread fitting

d1/d2/d3 Inch	L1/L2/3 mm	z1/z2/z3 mm
3/4“	26	19

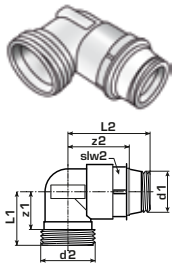
KM355E KELOX male thread adaptor



Connector or adaptor made of brass with non-porous metal plating; pre-sealed ½” and ¾” male thread suited for connection to KM220 Euro thread fitting

d1 Inch	d2 Inch	L1 mm	L2 mm	z1 mm	z2 mm	slw2 mm
1/2“	3/4“	15	13	4	2	26

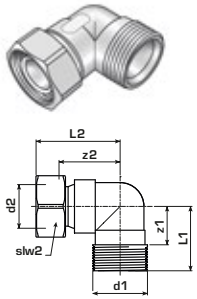
KM365E KELOX male thread elbow adaptor 90°



Connector or elbow adaptor, rotatable, made of brass with non-porous metal plating; pre-sealed ½” and ¾” male thread suited for connection to KM220 Euro thread fitting

d1 Inch	d2 Inch	L1 mm	L2 mm	z1 mm	z2 mm	slw2 mm
1/2“	3/4“	25	39,5	17,5	30	24

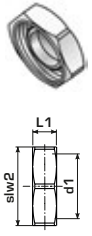
KM366E KELOX Euro thread fitting elbow adaptor 90° male/female thread



Euro thread fitting-elbow adaptor 90°, rotatable, made of brass with non-porous metal plating with 3/4” Euro thread and 3/4” Euro cone; suited for connection to KM220 Euro thread fitting

d1 Inch	d2 Inch	L1 mm	L2 mm	z1 mm	z2 mm	slw2 mm
3/4“	3/4“	31	40	20	29	30

KM370E KELOX thread cap female thread

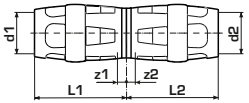


End cap made of brass with non-porous metal plating; female thread; for closing off the coupling parts and the KM595 Quattrox radiator block

d1 Inch	L1 mm	slw2 mm
3/4“	9	30

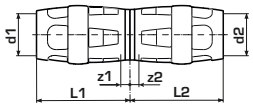
KELOX-PROTEC push fittings

KMP410 KELOX-PROTEC- coupling



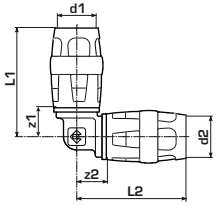
d1 mm	d2 mm	L1 mm	L2 mm	z1 mm	z2 mm
16	16	36	36	3	3
20	16	36	36	3	3
20	20	36	36	3	3
25	16	42,5	36	3,5	3
25	20	42,5	36	3,5	3
25	25	42,5	42,5	3,5	3,5
32	16	42,5	36	3,5	3
32	20	42,5	36	3,5	3
32	25	42,5	42,5	3,5	3,5
32	32	42,5	42,5	3,5	3,5

KWP410 KELOX-PROTEC- PPSU coupling



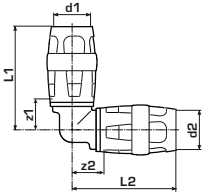
d1 mm	d2 mm	L1 mm	L2 mm	z1 mm	z2 mm
16	16	37,5	37,5	6	6
20	16	39	39	7	7,5
20	20	37,5	37,5	5,5	5,5
25	20	42,5	42,5	5	10,5
25	25	44	44	6,6	6,6

KMP420 KELOX-PROTEC elbow 90°



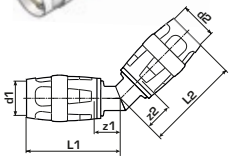
d1/d2 mm	L1/L2 mm	z1/z2 mm
16	47	14
20	48	15
25	59	20
32	62	23

KWP420 KELOX-PROTEC-PPSU elbow 90°



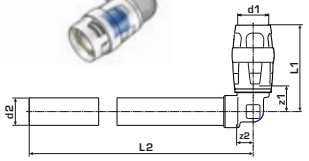
d1/d2 mm	L1/L2 mm	z1/z2 mm
16	46	14,5
20	48,5	16,5
25	58	20,5

KMP425 KELOX-PROTEC elbow 45°



d1/d2 mm	L1/L2 mm	z1/z2 mm
25	57	18
32	59	20

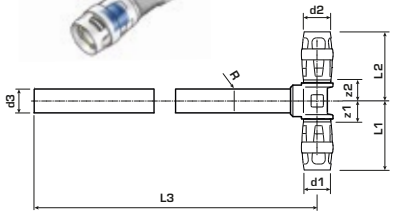
KMP430 KELOX-PROTEC radiator elbow 90°



d1 mm	d2 mm	L1 mm	L2 mm	z1 mm	z2 mm
16	15x1	46,5	330	13,5	9

Attention! Follow the instructions of the compression fitting manufacturers and, if necessary, use the support sleeves for connecting the copper!

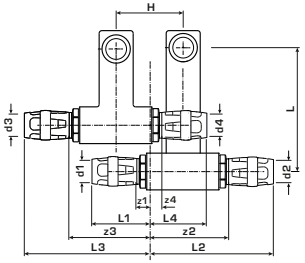
KMP432 KELOX-PROTEC radiator tee



d1/d2 mm	d3 mm	L1/L2 mm	z1/z2 mm	L3 mm	z3 mm	R degrees
16	15x1	46,5	13,5	330	9	45°
20	15x1	48,5	15,5	330	11,5	45°

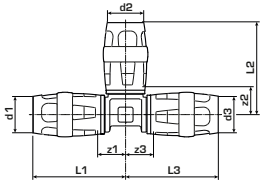
Attention! Follow the instructions of the compression fitting manufacturers and, if necessary, use the support sleeves for connecting the copper!

KMP435 KELOX-PROTEC skirting board connection kit



d1/d3 mm	d2/d4 mm	L1 mm	L2 mm	L3 mm	L4 mm	z1 mm	z2 mm	z3 mm	z4 mm	L mm	H mm	Verschr. inch
16	16	43	95	95	43	10	63	63	10	95	50	1/2''
16	ST	43	60	95	10	10	55	63	5	95	50	1/2''
ST	16	5	95	55	46	10	63	50	10	95	50	1/2''
16	20	43	95	95	43	10	62	60	10	95	50	1/2''
20	16	45	95	95	43	10	63	65	10	95	50	1/2''
20	20	45	95	95	45	10	62	60	10	95	50	1/2''
20	25	50	105	95	50	10	65	65	10	95	50	1/2''
25	20	50	95	105	45	10	65	60	7	95	50	1/2''
25	25	50	105	105	50	10	65	65	10	95	50	1/2''

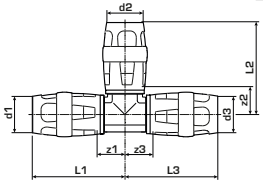
KMP440 KELOX-PROTEC tee



d1 mm	d2 mm	d3 mm	L1 mm	L2 mm	L3 mm	z1 mm	z2 mm	z3 mm
16	16	16	47	47	47	13,5	13,5	13,5
16	20	16	49	49	49	16	16	16
20	16	16	49	49	49	16	16	16
20	16	20	49	49	49	16	16	16
20	20	16	49	49	49	16	16	16
20	20	20	49	49	49	16	16	16
25	16	16	59	53	53	20	20	20
25	16	20	58	53	53	19	20	19
25	16	25	58	58	52	19	19	19
25	20	20	58	52	53	19	20	19
25	20	25	59	59	52	20	19	20
25	25	25	59	59	59	20	20	20
32	16	32	63	63	55	24	22	24
32	20	32	63	63	56	24	23	24
32	25	25	63	63	63	24	24	24
32	25	32	63	63	63	24	24	24
32	32	32	63	63	63	24	24	24

KWP440 KELOX-PROTEC-PPSU tee

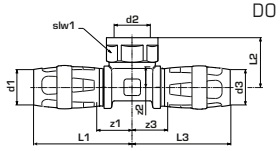
d1 mm	d2 mm	d3 mm	L1 mm	L2 mm	L3 mm	z1 mm	z2 mm	z3 mm
16	16	16	46	47	46	15	15	15
20	16	16	48	48	48	16	16	17
20	16	20	49	51	49	17	16	17
20	20	20	49	49	49	17	17	17
25	16	25	58	57	58	21	16	21
25	20	20	55	55	55	18	23	23
25	20	25	58	55	58	21	23	21
25	25	25	58	60	58	21	21	21



KMP447 KELOX-PROTEC tee with female adaptor

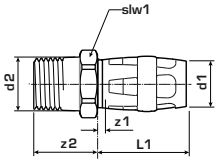
d1/d3 mm	d2 Inch	L1/L3 mm	L2 mm	z1/z3 mm	z2 mm	slw1 mm
16	1/2''	51	26	18	12,5	24
20	1/2''	51	29	18	12,5	24
25	1/2''	61	35	22	15	30
25	3/4''	61	35	22	15	30
32	1/2''	61	39	22	22,5	30
32	3/4''	61	39	22	22,5	30

DO NOT join to any threaded pipes or cast iron fittings!



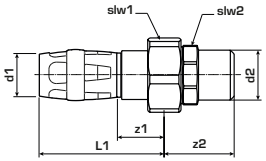
KMP450 KELOX-PROTEC adaptor with male thread

d1 mm	d2 Inch	L1 mm	z1 mm	z2 mm	slw1 mm
16	1/2''	33	3	28	24
20	1/2''	33	3	28	24
20	3/4''	33	3	33	30
25	3/4''	39	3,5	40	30
25	1''	39	3,5	36	38
32	1/2''	39	3,5	30	24
32	3/4''	39	3,5	31	30
32	1''	39	3,5	39	38



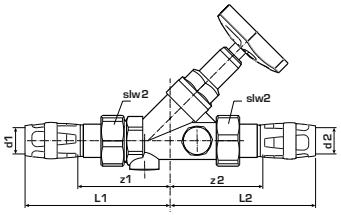
KMP451 KELOX-PROTEC union with male thread

d1 mm	d2 Inch	L1 mm	z1 mm	z2 mm	slw1 mm	slw2 mm
16	1/2''	50,5	14,5	33	30	25
20	1/2''	50,5	14,5	33	30	25
20	3/4''	50,5	14,5	36	30	32
25	3/4''	60	18	36	30	32
25	1''	60	18	42	38	39
32	1''	61	19	42	47	39



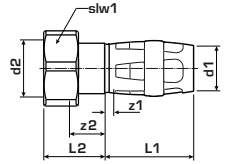
KMP452 KELOX-PROTEC slanted seat valve

d1/d2 mm	L1 mm	L2 mm	z1 mm	z2 mm	slw2 mm
16	92	92	60	60	30
20	92	92	60	60	30
25	104	104	65	65	38
32	114	114	75	75	47



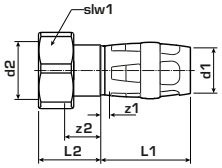
KMP455 KELOX-PROTEC union with female thread

d1 mm	d2 Inch	L1 mm	L2 mm	z1 mm	z2 mm	slw1 mm
16	1/2"	36	23	3	14,5	30
16	3/4"	36	23	3	14,5	30
20	3/4"	36	23	3	14,5	30
25	3/4"	42,5	25,5	3	18	30
25	1"	43	29	3,5	18	38
32	3/4"	42,5	29	4,5	20	30
32	1"	42,5	30	4,5	19	47
32	5/4"	42,5	31	4,5	19	47

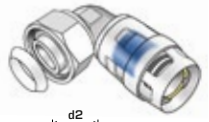


KMP455K KELOX-PROTEC union with female thread and wedge seal

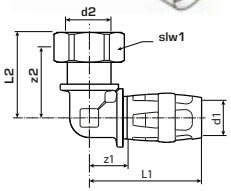
d1 mm	d2 Inch	L1 mm	L2 mm	z1 mm	z2 mm	slw1 mm
16	1/2"	36	24,5	3	20	24
20	1/2"	36	25	3	20	24
20	3/4"	36	25	3	21,5	30
25	3/4"	42,5	30	3	26	30
32	3/4"	42,5	30	3,5	26	30



KMP456K KELOX-PROTEC union 90° with female thread and wedge seal

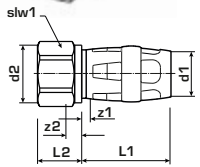


d1 mm	d2 Inch	L1 mm	L2 mm	z1 mm	z2 mm	slw1 mm
16	1/2''	53	45	20	38	24
20	1/2''	53	45	20	38	24



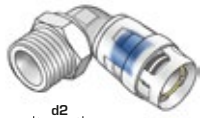
KMP457 KELOX-PROTEC adaptor with female thread

d1 mm	d2 Inch	L1 mm	L2 mm	z1 mm	z2 mm	slw1 mm
16	1/2"	36	18	3	6	24
20	1/2"	36	18,5	3	6,5	24
20	3/4"	36	19,5	3	6,5	32
25	3/4"	42,5	19,5	3,5	6,5	32
25	1"	43	23	3,5	7	38
32	1"	42,5	23	3,5	7	38

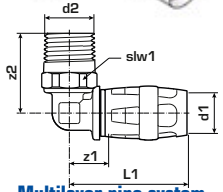


DO NOT join to any threaded pipes or cast iron fittings!

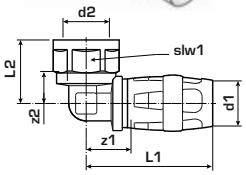
KMP460 KELOX-PROTEC elbow adaptor 90° with male thread



d1 mm	d2 Inch	L1 mm	z1 mm	z2 mm	slw1 mm
16	1/2"	49	16	34	21
20	1/2"	49	16	34	21
20	3/4"	49	16	34	27
25	3/4"	59	20	42	27
32	1"	62	23	51	34



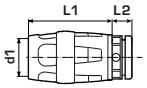
KMP467 KELOX-PROTEC elbow adaptor 90° with female thread



d1 mm	d2 Inch	L1 mm	z1 mm	L2 mm	z2 mm	slw1 mm
16	1/2"	51	18	29	17	24
20	1/2"	51	18	29	18	24
20	3/4"	54	21	35	17	30
25	3/4"	61	22	35	18	30
32	1"	65	26	42	22	38

DO NOT join to any threaded pipes or cast iron fittings!

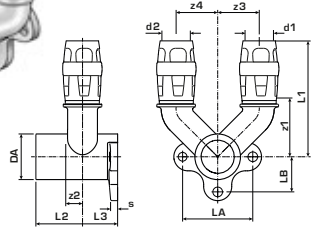
KWP471 KELOX-PROTEC-PPSU end cap



d1 mm	L1 mm	L2 mm
16	36	8,5
20	36	8,5

KMP477 KELOX-PROTEC double-U wall bracket with female thread

d1/d2 mm	IG Inch	DA mm	L1 mm	L2 mm	L3 mm	z1 mm	z2 mm
16	1/2"	26,5	64,5	26,5	20	31,5	9
20	1/2"	26,5	64,5	26,5	20	31,5	9



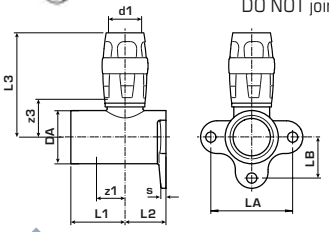
z3/z4 mm	LA mm	LB mm	s mm
25,5	40,0	20	4
25,5	40,0	20	4

DO NOT join to any threaded pipes or cast iron fittings!

KMP480 KELOX-PROTEC wall bracket 90° with female thread

d1 mm	IG Inch	DA mm	L1 mm	L2 mm	L3 mm	z1 mm	z3 mm	LA mm	LB mm	s mm
16	1/2"	26,5	26,5	20	51	11	18	40	20	4
20	1/2"	26,5	26,5	20	51	11	18	40	20	4
20	3/4"	32	30	19	53	14	20	44	22	4
25	3/4"	32	30	19	65	14	26	40	20	4

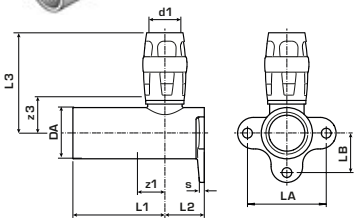
DO NOT join to any threaded pipes or cast iron fittings!



KMP480L KELOX-PROTEC wall bracket 90° with female thread 20 mm

d1 mm	IG Inch	DA mm	L1 mm	L2 mm	L3 mm	z1 mm	z3 mm	LA mm	LB mm	s mm
16	1/2"	26,5	46	20	51	11	18	40	20	4
20	1/2"	26,5	46	20	53	11	18	40	20	4

DO NOT join to any threaded pipes or cast iron fittings!

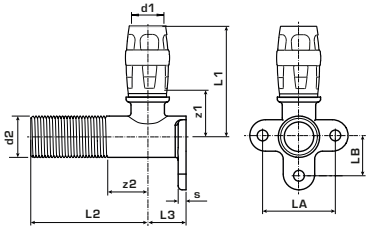


KMP481 KELOX-PROTEC wall bracket 90° with male thread 50mm

d1 mm	d2 Inch	L1 mm	L2 mm	L3 mm	z1 mm	z2 mm	LA mm	LB mm
16	1/2"	60	60	20	27	10	40	20
20	1/2"	60,5	60	20	27,5	10	40	20

KMP481L Wall bracket 90° with male thread 80mm

d1 mm	d2 Inch	L1 mm	L2 mm	L3 mm	z1 mm	z2 mm	LA mm	LB mm
20	1/2"	60,5	90	20	27,5	10	40	20



KMP485 KELOX-PROTEC connection set

With KMP480 wall bracket; sound-insulated; stopper, metal frame, plugs and fastening elements

DO NOT join to any threaded pipes or cast iron fittings!

Size	PU unit
16x1/2" single con.	1
16x1/2" 8–10 cm	1
16x1/2" 15 cm	1
20x1/2" single con.	1
20x1/2" 8–10 cm	1
20x1/2" 15 cm	1

KMP485L — KELOX-PROTEC connection set – 20mm

With KMP480L wall bracket extended by 20 mm; sound-insulated; stopper, metal frame, plugs and fastening elements.

DO NOT join to any threaded pipes or cast iron fittings!

Size	PU unit
16x1/2" single con.	1
16x1/2" 8–10 cm	1
16x1/2" 15 cm	1
20x1/2" single con.	1
20x1/2" 8–10 cm	1
20x1/2" 15 cm	1

KMP485SB — KELOX-PROTEC connection set with syphon elbow

With KMP480 wall bracket; sound-insulated; stopper, metal frame, plugs and fastening elements, incl. syphon adaptor elbow and GI nipple d30

DO NOT join to any threaded pipes or cast iron fittings!

Size	PU unit
16x1/2" 8–10 cm	1
16x1/2" 15 cm	1
20x1/2" 8–10 cm	1
20x1/2" 15 cm	1

KMP485SL — KELOX-PROTEC connection set with syphon elbow 20

With KMP480 wall bracket extended by 20 mm; sound-insulated; stopper, metal frame, plugs and fastening elements, incl. syphon adaptor elbow and GI nipple d30

DO NOT join to any threaded pipes or cast iron fittings!

Size	PU unit
16x1/2" 8–10 cm	1
16x1/2" 15 cm	1
20x1/2" 8–10 cm	1
20x1/2" 15 cm	1

KMP487 — KELOX-PROTEC double-U connection set

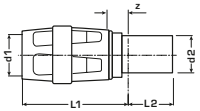
With KMP477 double-U wall bracket; sound-insulated; stopper, metal frame, plugs and fastening elements

DO NOT join to any threaded pipes or cast iron fittings!

Size	PU unit
16/16x1/2" 15 cm	1
20/20x1/2" 15 cm	1

KMP489 — KELOX-PROTEC – STEELFIX adaptor

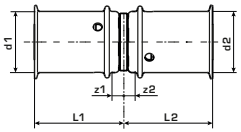
Press adaptor for connecting STEELFIX pipe size to KELOX-ULTRAX push-fit coupling



d1 mm	d2 mm	L1 mm	L2 mm	z mm
16	15	47	20	14
20	18	47	20	14
20	22	47	21	16
25	22	55	21	16
32	28	55	23	15

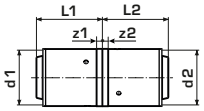
KELOX-ULTRAX press fittings
KELOX press fittings

KMU410 — KELOX-ULTRAX coupling



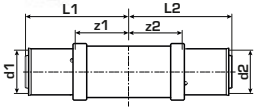
d1 mm	d2 mm	L1 mm	L2 mm	z1 mm	z2 mm
16	16	26	26	3,5	3,5
18	16	27,5	27	4,5	4,5
20	16	28	25	2,5	2,5
20	18	28,5	26	3	3
20	20	29	29	3,5	3,5
25	16	36,5	26	3,5	3,5
25	20	36	28,5	3	3
25	25	36	36	3	3
32	20	36	36	3	3
32	25	36	36	3	3
32	32	36	36	3	3
40	25	52	43	5	5
40	32	50	41	4	4
40	40	54	54	8	8
50	32	56	46	8	8,5
50	40	56	55	8	8
50	50	56	55	7,5	7,5

KM410 — KELOX coupling



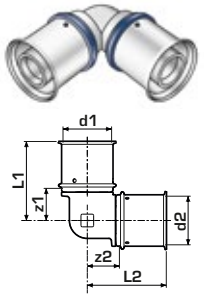
d1 mm	d2 mm	L1 mm	L2 mm	z1 mm	z2 mm
63	40	66	66	4	4
63	50	66	66	3	3
63	63	66	66	3	3
75	50	66	66	3	3
75	63	66	66	2	2
75	75	67	67	3	3

KM415 — KELOX repair coupling



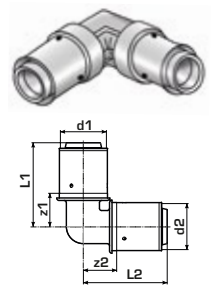
d1/d2 mm	L1/L2 mm	z1/z2 mm
25	60	31
32	62	30
40	74	30

KMU420 KELOX-ULTRAX elbow 90°



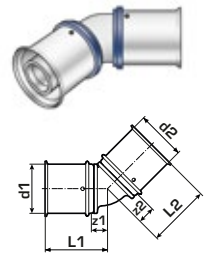
d1/d2 mm	L1/L2 mm	z1/z2 mm
16	35	12,5
20	40	14
25	51	18
32	53	20
40	77	28
50	83	33

KM420 KELOX elbow 90°



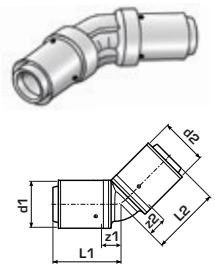
d1/d2 mm	L1/L2 mm	z1/z2 mm
63	102	38
75	107	43

KMU425 KELOX-ULTRAX elbow 45°



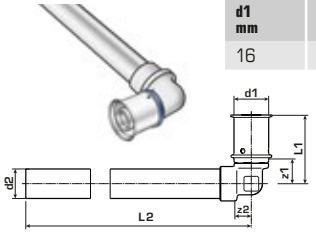
d1/d2 mm	L1/L2 mm	z1/z2 mm
32	44	10
40	58	12
50	61	13

KM425 KELOX elbow 45°



d1/d2 mm	L1/L2 mm	z1/z2 mm
63	91	28
75	104,5	40

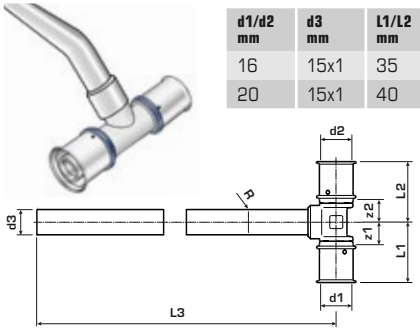
KMU430 KELOX-ULTRAX radiator elbow 90°



d1 mm	d2 mm	L1 mm	L2 mm	z1 mm	z2 mm
16	15x1	35	330	12	9

Attention! Follow the instructions of the compression fitting manufacturers and, if necessary, use the support sleeves for connecting the copper!

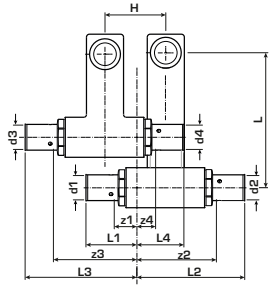
KMU432 KELOX-ULTRAX radiator tee



d1/d2 mm	d3 mm	L1/L2 mm	z1/z2 mm	L3 mm	z3 mm	R degrees
16	15x1	35	12,5	330	9	45°
20	15x1	40	14,5	330	11,5	45°

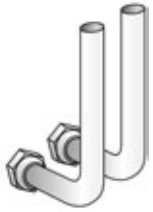
Attention! Follow the instructions of the compression fitting manufacturers and, if necessary, use the support sleeves for connecting the copper!

KM435 KELOX skirting board connection kit



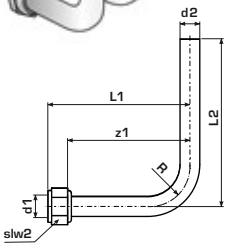
d1/d3 mm	d2/d4 mm	L1 mm	L2 mm	L3 mm	L4 mm	z1 mm	z2 mm	z3 mm	z4 mm	L mm	H mm	Verschr. inch
16	16	29	77	77	30	9	56	57	10	95	50	1/2"
16	ST	28	57	77	9	10	52	57	4	95	50	1/2"
ST	16	8	77	56	28	2	72	52	10	95	50	1/2"
16	20	28	80	80	28	5	60	60	5	95	50	1/2"
20	16	28	80	80	28	5	60	60	5	95	50	1/2"
20	20	28	75	62	36	5	56	10	5	95	50	1/2"
20	25	30	88	80	39	9	60	60	10	95	50	1/2"
25	20	40	80	88	28	13	60	60	8	95	50	1/2"
25	25	40	89	88	39	13	61	60	10	95	50	1/2"

KM437 KELOX skirting board elbow connection



d2 mm	d1/IG inch	L1 mm	L2 mm	z1 mm	slw2 mm	R degrees
15x1	1/2"	108	127	96	24	90°

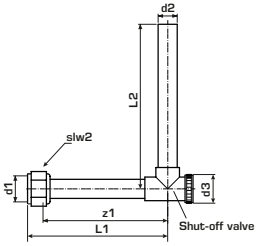
Attention! Follow the instructions of the compression fitting manufacturers and if necessary use the support sleeves for connecting the copper!



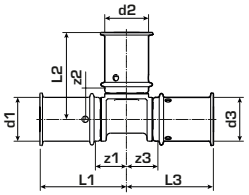
KM438 KELOX skirting board elbow connection with shut-off function

d2 mm	d1/IG inch	L1 mm	L2 mm	z1 mm	slw2 mm	d3 mm
15x1	1/2"	115	131	100	24	23

Attention! Follow the instructions of the compression fitting manufacturers and if necessary use the support sleeves for connecting the copper!

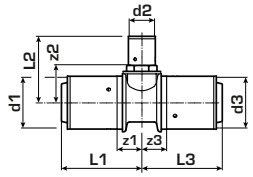


KMU440 KELOX-ULTRAX tee



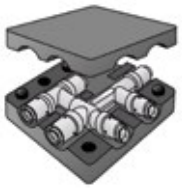
d1 mm	d2 mm	d3 mm	L1 mm	L2 mm	L3 mm	z1 mm	z2 mm	z3 mm
16	16	16	35	35	35	12,5	12,5	12,5
16	20	16	38	43	38	15,5	17	15,5
20	16	16	42	39	39	16	14,5	16
20	16	20	40	37	40	14,5	14,5	14,5
20	20	16	40	40	38	14,5	14,5	14,5
20	20	20	40	40	40	14,5	14,5	14,5
20	25	20	42	47	42	14,5	14,5	14
25	16	16	51	40	41	18	17,5	18
25	16	20	49	39	42	16	16,5	16,5
25	16	25	49	44	49	16	39	16
25	20	20	50	43	42	16,5	17,5	16,5
25	20	25	50	42	50	17	16,5	17
25	25	25	49	50	49	16	16	16
32	16	32	43	43	43	9,5	20,5	9,5
32	20	32	54	48	54	20	22,5	20
32	25	25	54	54	54	20	20	20
32	25	32	54	54	54	20	20	20
32	32	32	54	54	54	20	20	20
40	20	40	63	51	63	16	21	16
40	25	40	63	59	63	19	21	19
40	32	32	69	60	60	22	22	22
40	32	40	69	60	69	22	22	22
40	40	40	75	74	75	27,5	27,5	27,5
50	25	50	66	63	66	19	26	19
50	32	50	70	65	70	22	27	22
50	40	50	76	74	76	31	27,5	31
50	50	50	79	80	79	31,5	31,5	31,5

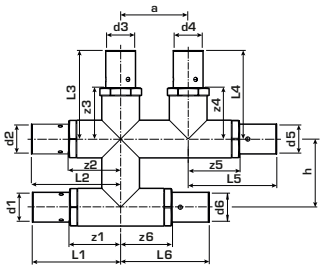
KM440 KELOX tee



d1 mm	d2 mm	d3 mm	L1 mm	L2 mm	L3 mm	z1 mm	z2 mm	z3 mm
63	25	63	78	62	78	65	50	65
63	32	63	78	62	78	65	52	65
63	40	63	85	81	85	21	45	21
63	50	63	85	88	85	28	53	28
63	63	63	98	98	98	37	37	37
75	40	75	107	90	107	43	49	43
75	50	75	107	94	107	43	56	43
75	75	75	108	108	108	44	44	44

KM441 KELOX double connection tee





Dimensions incl. insulation
L: 115mm
W: 115mm
H: 55mm

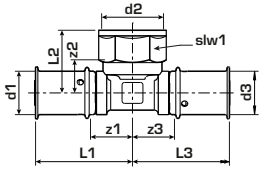
d1 mm	d2 mm	d3 mm	d4 mm	d5 mm	d6 mm	L1 mm	L2 mm	L3 mm	L4 mm
16	16	16	16	16	16	51	51	51	51
20	20	16	16	16	16	52	52	51	51
20	20	16	16	20	20	52	52	51	51
20	20	20	20	20	20	52	52	52	52

L5 mm	L6 mm	z1 mm	z2 mm	z3 mm	z4 mm	z5 mm	z6 mm	a mm	h mm
51	51	31	31	31	31	31	31	40	40
51	51	32	32	31	31	31	31	40	40
52	52	32	32	31	31	32	32	40	40
52	52	32	32	32	32	32	32	40	40

KMU447 KELOX-ULTRAX tee with female adaptor

d1/d3 mm	d2 Inch	L1/L3 mm	L2 mm	z1/z3 mm	z2 mm	slw1 mm
16	1/2"	40	27	17	14	24
20	1/2"	43	29	17	16	24
20	3/4"	57	32	19	19	30
25	1/2"	49	31	16	18	24
25	3/4"	63	34	19	19	30
32	1/2"	52	34	21	17	24
32	3/4"	64	37	19	22	30
40	3/4"	70	37	25	22	30
40	1"	70	41	24	25,5	41
50	1"	72,5	45	24	26	41

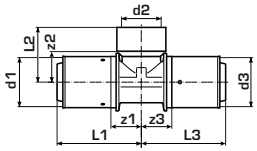
DO NOT join to any threaded pipes or cast iron fittings!



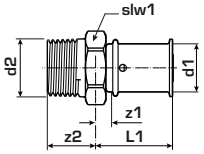
KM447 KELOX tee with female adaptor

d1/d3 mm	d2 Inch	L1/L3 mm	L2 mm	z1/z3 mm	z2 mm
63	1"	84	59	20	40
75	1"	94	62	22	46

DO NOT join to any threaded pipes or cast iron fittings!

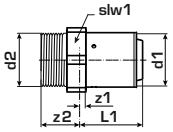


KMU450 KELOX-ULTRAX adaptor with male thread



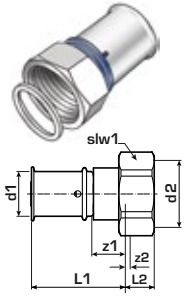
d1 mm	d2 Inch	L1 mm	z1 mm	z2 mm	slw1 mm
16	1/2"	28	5	18	24
16	3/4"	28	5	18	30
18	3/4"	28	5	18	30
20	1/2"	30	5	18	24
20	3/4"	30	5	20	30
20	1"	39	5	25	38
25	3/4"	38	5	20	30
25	1"	39	6	25	38
32	1"	39	6,5	25	38
32	5/4"	54	15	25	46
40	5/4"	54	15	25	46
40	6/4'	58	15	25	55
50	5/4"	54	15	25	46
50	6/4"	58	15	25	55
50	2"	64	18	28	65

KM450 KELOX adaptor with male thread



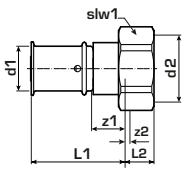
d1 mm	d2 Inch	L1 mm	z1 mm	z2 mm	slw1 mm
63	2"	64	4,5	33	74
75	2 1/2"	65	4,5	36	84

KMU455 KELOX-ULTRAX union with female thread



d1 mm	d2 Inch	L1 mm	L2 mm	z1 mm	z2 mm	slw1 mm
16	1/2"	37	12	11	2	30
16	3/4"	37	12	11	2,5	49
20	1/2"	37	12	11	2	30
20	3/4"	38	12	11	2	51
25	3/4"	38	12	11	2,5	51
25	1"	49	14	16	2,5	57
32	5/4"	50	15	17	2,5	67

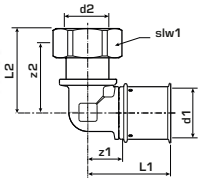
KMU455K KELOX-ULTRAX union with female thread and wedge seal



d1 mm	d2 Inch	L1 mm	L2 mm
16	1/2"	26	24,5
20	3/4"	26	25

z1 mm	z2 mm	slw1 mm
3	20	24
3	21,5	30

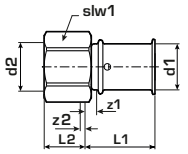
KMU456K KELOX-ULTRAX union 90° with female thread and wedge seal



d1 mm	d2 Inch	L1 mm	L2 mm
16	1/2''	43	45

z1 mm	z2 mm	slw1 mm
20	38	24

KMU457 KELOX-ULTRAX adaptor with female thread

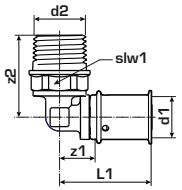


DO NOT join to any threaded pipes or cast iron fittings!

d1 mm	d2 Inch	L1 mm	L2 mm	z1 mm	z2 mm	slw1 mm
16	1/2"	27,5	15	3,5	2,5	24
16	3/4"	30	16	4	2	32
20	1/2"	30	15	4	2	24
20	3/4"	30	16	4	2,5	32
20	1"	37	16	4	4	38
25	3/4"	37	16	4	2,5	32
25	1"	37	19,5	4	4	38
32	1"	37	19,5	4	4	38
32	5/4"	45,5	24	4	4	50
40	5/4"	45,5	24	5	4	50
40	6/4"	45,5	30	5	4	58
50	6/4"	45,5	30	5	4	58
63	2"	70	29,5	2	4	74
75	1/2"	72	35	2	4	84

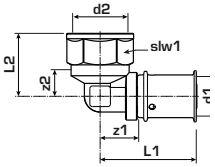
KELOX

KMU460 KELOX-ULTRAX adaptor 90° with male thread



d1 mm	d2 Inch	L1 mm	z1 mm	z2 mm	slw1 mm
16	1/2"	36	14	33	21
20	1/2"	40	14	32	21
20	3/4"	41	16	42	27
25	3/4"	50	17	42	27
25	1"	50	20	49	34
32	1"	53	20	49	34

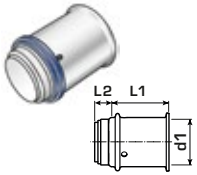
KMU467 KELOX-ULTRAX elbow adaptor 90° with female thread



d1 mm	d2 Inch	L1 mm	z1 mm	L2 mm	z2 mm	slw1 mm
16	1/2"	39	16	29	17	24
20	1/2"	56	31	29	17	24
20	3/4"	61	36	31	18	30
25	3/4"	68	35	33	18	30
25	1"	68	24	39	22	38
32	1"	58	24	39	22	38

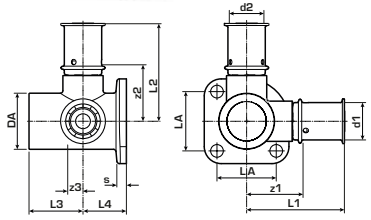
DO NOT join to any threaded pipes or cast iron fittings!

KMU471 KELOX-ULTRAX end cap



d1 mm	L1 mm	L2 mm
16	23	7
20	25	7
25	33	7
32	34	7

KMU475 KELOX-ULTRAX connecting tee with female thread



d1/d2 mm	IG Inch	DA mm	L1/L2 mm	L3 mm	L4 mm	z1/z2 mm	z3 mm	LA mm	s mm
16	1/2"	26,5	46	25,5	20,5	23,5	8	28	4
20	1/2"	26,5	49	25,5	20,5	23,5	8	28	4

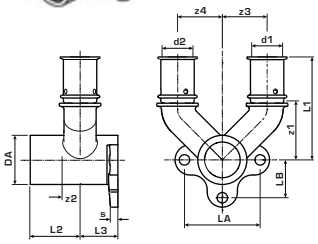
DO NOT join to any threaded pipes or cast iron fittings!

KMU477 KELOX-ULTRAX double-U wall bracket with female thread

d1/d2 mm	IG Inch	DA mm	L1 mm	L2 mm	L3 mm	z1 mm	z2 mm
16	1/2“	26	57	26,5	20	34,5	10
20	1/2“	26	67	26,5	20	41,5	10

z3/z4 mm	LA mm	LB mm	s mm
25	40	20	4
25	40	20	4

DO NOT join to any threaded pipes or cast iron fittings!

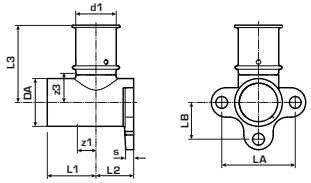


KMU480 KELOX-ULTRAX wall bracket 90° with female thread

d1 mm	IG Inch	DA mm	L1 mm	L2 mm	L3 mm	z1 mm	z3 mm
16	1/2“	26,5	26,5	21,5	42,5	15	20
20	1/2“	26,5	26,5	21,5	42,5	15	17
20	3/4“	30	34	22	46	17	20,5
25	3/4“	32	28	28	54	10	21

DO NOT join to any threaded pipes or cast iron fittings!

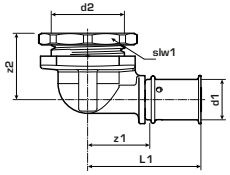
LA mm	LB mm	s mm
40	20	4
40	20	4
40	20	4
40	20	4



KMU482 KELOX-ULTRAX UPS elbow 90° with female thread

d1 mm	IG Inch	d2 mm	L1 mm	z1 mm	z2 mm	slw1 mm
16	1/2“	34x1,50	49	26	2,5	38

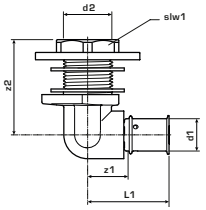
DO NOT join to any threaded pipes or cast iron fittings!



KMU483 KELOX-ULTRAX wall bushing 90° with female thread

d1 mm	d2 Inch	AG Inch	L1 mm	z1 mm	z2 mm	slw1 mm
16	1/2“	3/4“	46	23	53	34

DO NOT join to any threaded pipes or cast iron fittings!



KMU485 KELOX-ULTRAX connection set

With KMU480 wall brackets 90°; sound-insulated; stopper, metal frame, plugs and fastening elements.

DO NOT join to any threaded pipes or cast iron fittings!

Size	PU unit
16x1/2“ single con.	1
16x1/2“ 8–10 cm	1
16x1/2“ 15 cm	1
20x1/2“ single con.	1
20x1/2“ 8–10 cm	1
20x1/2“ 15 cm	1

KMU485SB KELOX-ULTRAX connection set with syphon elbow

With KMU480 wall brackets elbow 90°; sound-insulated; stopper, metal frame, plugs and fastening elements, incl. syphon adaptor elbow and GI nipple d30

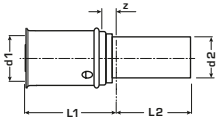
DO NOT join to any threaded pipes or cast iron fittings!

Size	VPE unit
16x1/2“ 8–10 cm	1
16x1/2“ 15 cm	1
20x1/2“ 8–10 cm	1
20x1/2“ 15 cm	1

KMU489 KELOX-ULTRAX – STEELFIX adapter

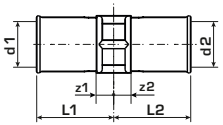
Press adaptor for connecting STEELFIX pipe size to KELOX-ULTRAX press coupling

d1 mm	d2 mm	L1 mm	L2 mm	z mm
16	15	35	20	12,5
20	18	35	20	9,5
20	22	35	21	11
25	22	44	21	11
32	28	44	23	11
40	35	63	26	18



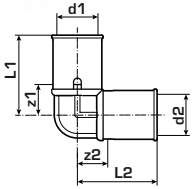
KELOX-WINDOX-U press fittings

KWU410 KELOX-WINDOX-U coupling



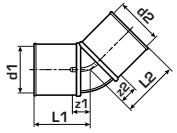
d1 mm	d2 mm	L1 mm	L2 mm	z1 mm	z2 mm
16	16	26,5	26,5	8	8
20	16	26,5	26,5	8	8
20	20	26,5	26,5	8	8
25	16	35,5	26,5	10	8
25	20	34,5	26,5	9	8
25	25	33	33	7,5	7,5
32	20	35,5	27,5	10	8
32	25	35,5	35,5	10	10
32	32	37	37	11,5	11,5
40	32	48,5	36,5	11,5	11,5
40	40	67	67	28	28
50	32	52,5	36,5	15,5	11,5
50	40	54	55	16	16
50	50	55	54	17	17
63	40	81	79	21	21
63	50	78	55,5	18	17,5
63	63	82,5	82,5	21,5	21,5
75	50	77	52	10	12
75	63	79,5	77	19	15
75	75	79	79	13,5	13,5

KWU420 KELOX-WINDOX-U elbow 90°



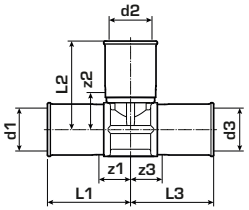
d1/d2 mm	L1/L2 mm	z1/z2 mm
16	31	12
20	33	14
25	43	17
32	47	21
40	71	34
50	77	40
63	106	46
75	115	49

KWU425 KELOX-WINDOX-U elbow 45°



d1/d2 mm	L1/L2 mm	z1/z2 mm
25	36	7
32	38	13
40	60	22
50	62	25
63	87	28
75	94	28,5

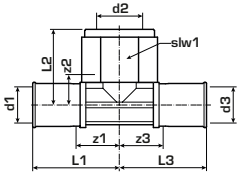
KWU440 KELOX-WINDOX-U tee



d1 mm	d2 mm	d3 mm	L1 mm	L2 mm	L3 mm	z1 mm	z2 mm	z3 mm
16	16	16	31	34	31	12	12	12
16	20	16	34	35	34	14,5	14	14,5
20	16	16	31	34	30	10,5	14	10,5
20	16	20	33	34	31	12	14	12
20	20	16	35	35	32	14	14	13
20	20	20	34	34	34	14	14	14
20	25	20	35	44	35	14,5	17,5	14,5
25	16	16	39	36	30	12	16	10,5
25	16	20	39	36	31	12	16	10,5
25	16	25	40	38	34	13	17	14,5
25	20	20	53	34	34	16,5	17	13
25	20	25	41	37	41	15	16	15
25	25	25	43	43	43	17	17	17
25	32	25	42	44	42	15,5	17,5	15,5
32	16	32	39	39	39	32	20	32
32	20	25	42	44	39	15,5	20,5	12,5
32	20	32	41	47	41	14	26,5	14
32	25	25	43	47	42	17	21	16
32	25	32	43	47	43	17	21	17
32	32	32	47	47	47	21	21	21
40	25	32	68	59	49	21	33	24
40	25	40	71	59	53	34	34	28
40	32	32	71	59	53	34	34	28
40	32	40	71	59	71	34	34	33
40	40	40	71	71	71	26	26	26
50	25	50	68	64	68	31	39	31
50	32	32	72	64	53	35	39	28
50	32	40	71	65	71	33	40	33
50	32	50	71	65	71	34	40	34
50	40	40	73	79	73	36	42	36
50	40	50	73	79	73	35	41	35
50	50	50	154	77	154	32	32	32
63	25	50	91	70	67	31	45	30
63	32	63	95	71	95	35	46	35
63	40	63	95	84	95	35	46	35
63	63	63	106	106	106	46	46	46
75	32	75	95	71	95	29	45,5	29
75	40	75	96	87	95	30,5	39	30,5
75	50	75	100	89	100	35	50	35
75	75	75	112	112	112	50,5	50,5	50,5

KWU447 KELOX-WINDOX-U tee with female adaptor

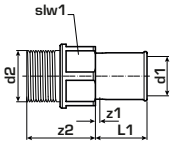
d1/d3 mm	d2 Inch	L1/L3 mm	L2 mm	z1/z3 mm	z2 mm	slw1 mm
16	1/2''	38	33	19	18	29
20	1/2''	38	35	19	19	30
20	3/4''	42	38	22	21	30
25	1/2''	49	40	23	23	37
25	3/4''	49	40	23	23	37



DO NOT join to any threaded pipes or cast iron fittings!
DO NOT use any liquid sealants!

KWU450 KELOX-WINDOX-U adaptor with male thread

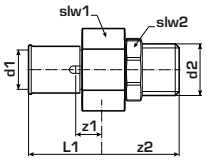
d1 mm	d2 Inch	L1 mm	z1 mm	z2 mm	slw1 mm
16	1/2''	21	2	28	24
20	1/2''	22	2	28	24
20	3/4''	22	2	28	24
25	3/4''	30	2,5	33	28
25	1''	29	2,5	39	34
32	1''	29	2,5	39	34
32	5/4''	29	2,5	45	-
40	5/4''	43	4	45	-
50	6/4''	48	5	43	-



DO NOT use any liquid sealants!
Only use sealing strips by "ulith" or "Fermit"!

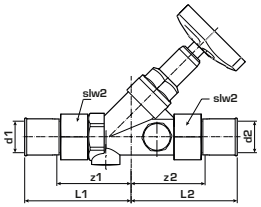
KWU451 KELOX-WINDOX-U union with male thread

d1 mm	d2 Inch	L1 mm	z1 mm	z2 mm	slw1 mm	slw2 mm
16	1/2''	28	8,5	33	30	25
20	1/2''	28	8,5	33	30	25
20	3/4''	28	8,5	36	30	32
25	3/4''	37	10	36	30	32
25	1''	37	10	42	46	39
32	1''	37	12,5	42	46	39
40	5/4''	47,5	10,5	44	46	49



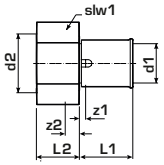
KWU452 KELOX-WINDOX-U slanted seat valve

d1/d2 mm	L1 mm	L2 mm	z1 mm	z2 mm	slw2 mm
16	66	66	47	47	30
20	71	71	54	54	30
25	84	84	60	60	40
32	95	95	72	72	46



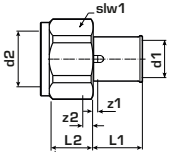
KWU455 KELOX-WINDOX-U union with female thread

d1 mm	d2 Inch	L1 mm	L2 mm	z1 mm	z2 mm	slw1 mm
16	3/4"	22	18	2,5	6	30
20	3/4"	22	18	2,5	6	30
25	1"	30	20	3,5	6,5	41
32	5/4"	30	21	5,5	7	46
40	6/4"	41	22	4	6,5	55
50	2 3/8"	41	30	4	5	75



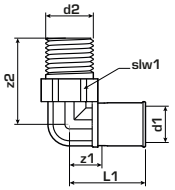
KWU457 KELOX-WINDOX-U adaptor with female thread

d1 mm	d2 Inch	L1 mm	L2 mm	z1 mm	z2 mm	slw1 mm
16	1/2"	20	20,5	2,0	3	32
20	1/2"	21,5	20,5	2,0	3	32
20	3/4"	21,5	25,5	2	5	38
20	1"	22	29	2	6	-
25	3/4"	25,5	25,5	3	5	38
32	1"	28	29	3,5	6	-
40	5/4"	45	32	3,5	7	-



DO NOT join to any threaded pipes or cast iron fittings!
DO NOT use any liquid sealants!

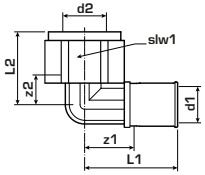
KWU460 KELOX-WINDOX-U adaptor 90° with male thread



d1 mm	d2 Inch	L1 mm	z1 mm	z2 mm	slw1 mm
16	1/2"	35	16	38	23
20	1/2"	36	16	40	24
20	3/4"	27	16	45	26
25	3/4"	44	18	48	26
32	1"	51	24	55	-

DO NOT use any liquid sealants!
Only use sealing strips by "ulith" or "Fermit"!

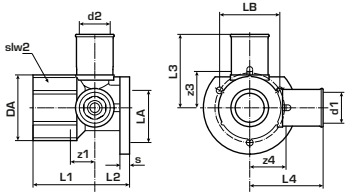
KWU467 KELOX-WINDOX-U elbow adaptor 90° with female thread



d1 mm	d2 Inch	L1 mm	z1 mm	L2 mm	z2 mm	slw1 mm
16	1/2"	40	21	34	16	32
20	1/2"	67	21	37	16	32
20	3/4"	71	21	40	20	38
25	3/4"	82	23	43	20	38
32	1"	89	31	46	25	45

DO NOT join to any threaded pipes or cast iron fittings!
DO NOT use any liquid sealants!

KWU475 KELOX-WINDOX-U connecting tee with female thread

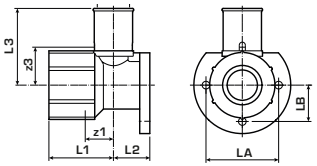


d1/d2 mm	IG Inch	L1 mm	L2 mm	L3/L4 mm	z1 mm	z3/z4 mm	DA mm	LA mm	LB mm	s mm
16	1/2"	30	20	42	16	23	34	27	31	5
20	1/2"	20	20	40	18	19	34	27	31	5

DO NOT join to any threaded pipes or cast iron fittings!
DO NOT use any liquid sealants!

KWU480 KELOX-WINDOX-U wall bracket 90° with female thread

d1 mm	IG Inch	L3 mm	L1 mm	L2 mm	z3 mm	z1 mm	LA mm	LB mm
16	1/2"	38	30	20	21	16	40	20
20	1/2"	39	20	20	26	18	40	20
20	3/4"	42	19	19	27	18	40	20



DO NOT join to any threaded pipes or cast iron fittings!
DO NOT use any liquid sealants!

KWU485 KELOX-WINDOX-U connection set

With KW480 wall brackets elbow 90°; sound-insulated; stopper, metal frame, plugs and fastening elements, "leak before pressed"
DO NOT join to any threaded pipes or cast iron fittings! DO NOT use any liquid sealants!

Size	PU unit
16x1/2" single con.	1
16x1/2" 8–10 cm	1
16x1/2" 15 cm	1
20x1/2" single con.	1
20x1/2" 8–10 cm	1
20x1/2" 15 cm	1

KWU485SB KELOX-WINDOX-U connection set with syphon elbow

With KW480 wall brackets elbow 90°; sound-insulated; stopper, metal frame, plugs and fastening elements, incl. syphon adaptor elbow and GI nipple "leak before pressed".
DO NOT join to any threaded pipes or cast iron fittings! DO NOT use any liquid sealants!

Size	PU unit
16x1/2" 8–10 cm	1
16x1/2" 15 cm	1
20x1/2" 8–10 cm	1
20x1/2" 15 cm	1

KWU4550 KELOX-WINDOX-U manifold

For manually screwing together the individual manifold module, made of Windox-PPSU main fittings are made with manifold connector parts, outlets of the manifold s with 3/4" male thread, suitable for connection adaptor KWU552

Size	PU unit
double one-sided	2
triple one-sided	2
quadruple two-sided	2

KWU552 KELOX-WINDOX-U connection adaptor

Press connection adaptor or blind cap 3/4" female thread, made of WINDOX-PPSU, for WINDOX-U manifold KWU550, "leak before pressed"

Size	PU unit
16	10
20	10
Cap	10

KWU553 KELOX-WINDOX-U manifold cap

Manifold cap, made of WINDOX PPSU, for manual screwing-on and closing of WINDOX-U manifold KWU550

Size	PU unit
	10

KWU554 KELOX-WINDOX-U manifold extension elbow

Extension elbow 90°, made of Windox-PPSU, for manual screwing-on, as an additional adaptor for closing the WINDOX-U manifold KWU550

DO NOT use any liquid sealants!

Only use sealing strips by "ulith" or "Fermit"!

Size	PU unit
3/4"	5

KWU556 KELOX-WINDOX-U manifold adaptor with male thread

Manifold connector with male thread made of Windox-PPSU for manual screwing into the WINDOX0U manifold KWU550
DO NOT use any liquid sealants!
Only use sealing strips by "ulith" or "Fermit"!

Size	PU unit
3/4"	5

KWU557 KELOX-WINDOX-U manifold adaptor female thread

Manifold connector with female thread made of Windox-PPSU for manually screwing into the WINDOX-U manifold KWU550

DO NOT join to any threaded pipes or cast iron fittings!
DO NOT use any liquid sealants!

Size	PU unit
3/4"	5

KWU558 KELOX-WINDOX-U manifold

Manifold connector with press adaptor made of Windox-PPSU for manually screwing into the WINDOX-U manifold KWU550, "leak before pressed"

Size	PU unit
20	5
25	5
32	3

KM519 KELOX-WINDOX-U manifold bracket

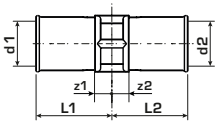
For attaching the WINDOX manifold KWU500 in the universal manifold housing frame KM570 or for screwing on, distance of the manifold bars 200mm, sheet steel galvanised with two acoustic-de-coupled pipe clamps

Also as manifold bracket for KM590E KELOX FB manifold

d/mm	PU unit
32/200	1

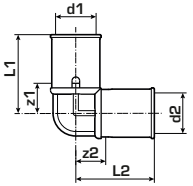
KELOX-PPSU press fittings

KWX410 KELOX-PPSU-coupling



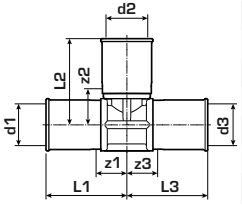
d1 mm	d2 mm	L1 mm	L2 mm	z1 mm	z2 mm
16	16	30	30	10	10
20	16	32	29	9	9
20	20	32	32	9	9
25	16	41	30	11	8
25	20	41	30	14	9
25	25	40	40	13	13
32	25	42	39	14	10
32	32	41	41	12	12

KWX420 KELOX-PPSU elbow 90°



d1/d2 mm	L1/L2 mm	z1/z2 mm
16	39	15
20	43	21
25	52	24
32	56	26

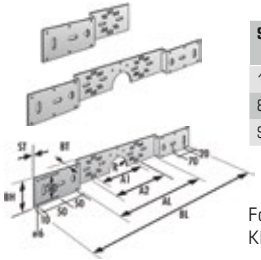
KWX440 KELOX-PPSU tee



d1 mm	d2 mm	d3 mm	L1 mm	L2 mm	L3 mm	z1 mm	z2 mm	z3 mm
16	16	16	40	40	40	15	15	15
16	20	16	40	42	40	18	18	18
20	16	16	42	40	40	18	18	18
20	16	20	42	40	42	18	18	18
20	20	16	42	42	41	18	18	19
20	20	20	42	42	42	18	18	18
25	16	25	50	44	50	23	25	23
25	20	20	52	47	45	25	25	23
25	20	25	52	50	52	25	26	25
25	25	25	52	52	52	24	24	24
32	20	32	53	52	53	25	29	25
32	25	25	53	56	54	25	30	27
32	25	32	56	58	56	28	30	28
32	32	32	56	56	56	28	28	28

KELOX accessories

K85A KELIT connector rail



Size	A1 mm	A2 mm	AL mm	BL mm	BH mm	BT mm	R mm	ST mm
15 cm	130	150	260	506	60	45	30	3
8–10 cm	80	100	210	456	60	45		3
Single connector				228	60	45		3

For attaching the wall bracket elbows, KELEN, KETRIX and KELOX, made of galvanised sheet steel

K85H KELIT cavity wall fastening rail

Size mm	BL mm	BH mm	BT mm	ST mm
350	350	60	40	3

For cutting to length and fastening connection sets, KELEN, KETRIX and KELOX, in drywalls, incl. 4 plugs and 8 fastening screws

K85K KELIT Noise protection cap

For acoustic decoupling of the wall bracket elbows, KELEN, KETRIX and KELOX.
Does NOT apply as mounting!

ONLY use in conjunction with separate fitting mount.

Size	PU unit
KWU 16/20x12"	1
KMU/KMP 16/20	1
KMU/KMP477 16/20	1

KM533 KELIT wall bracket sealing disk

Safety spray protection, self-adhesive on one side, for waterproof insertion of wall brackets for drywall installation, as well as under ceramic coverings in wet rooms

Size	PU unit
25/1/2"	1
28/3/4"	1

KM534 KELOX wall bracket sealing collar

Seal for drywall and normal installation from the wall, incl. 60mm plastic sleeve pipe, which can be cut to length. The building stopper can be screwed into the wall bracket and easily removed during finishing works.

Size	PU unit
1/2"	1
3/4"	1

KM534W KELOX wall bracket insulating underlay

Insulating underlay made of elastomer, for sliding onto the wall brackets

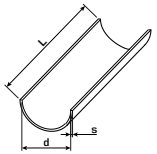
KMP480, KMP480L, KMP477, KMP481, KWU480, KWU475, KMU480, KMU475, KMU477

Size	PU unit
1/2"	1

K88 KELIT pipe support

Pipe support galvanised sheet steel, dimensions d16, 20, 25 and 32 on the pipe, self-clamping design

Length: 2 m



d mm	s mm	PU unit
16	0,6	40
20	0,6	40
25	0,6	40
32	0,6	40
40	0,6	20
50	0,6	20
63	0,6	20
75	0,6	20

KM580E KELOX radiator manifold

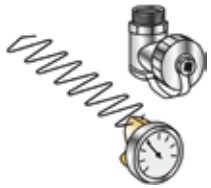
Flow and return bars with ¾" male euro threads for the heating circuits; air vent at the highest point; ends of the manifolds are closed; connections have union nut 1" flat seal; brass with non-porous metal plating; Labels for each heating circuit; sound-insulated plastic brackets

Operating conditions: tmax. 90°C/10bar

ATTENTION: WITHOUT KM220 Euro screw connection!

Size mm	PU unit
2 L: 125	1
3 L: 175	1
4 L: 225	1
5 L: 275	1
6 L: 325	1
7 L: 375	1
8 L: 425	1
9 L: 475	1
10 L: 525	1
11 L: 575	1
12 L: 625	1

KM592E KELOX manifold accessories



Fill and drain valve 1/2" elbow 90° - as replacement part for KM580E, KU590 and KC590
Fill and drain valve 1/2" elbow 90° - as replacement part for KM580E contact thermometer d35mm to 80

Size	PU unit
3/8" male thread	1
1/2" male thread	1
Contact thermometer	1

KM593A KELOX connection set

For manifold connection: reducer or nipple, flat seal
Brass with non-porous metal plating

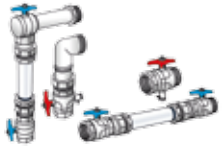
Size	PU unit
1"x3/4" redu.	1
1"x1" nipple	1

KM593E KELOX connection ball valve

Connection ball valves in straight or elbow shape for shutting off the manifolds, flat-sealing male thread to the manifold bar including seal (RF-elbow extended) brass non-porous metal plating

Size	PU unit
3/4“ straight	1
3/4“ elbow 90°	1
1“ straight	1
1“ elbow 90°	1

KM591E KELOX WMZ adaptor



Connection ball valves in straight or elbow shape for shutting off the manifolds, flat-sealing male thread to the manifold bar including seal (RF-elbow extended) Brass with non-porous metal plating

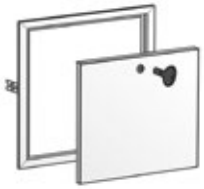
Size	PU unit
3/4“ straight	1
1“ elbow 90°	1

KM570 KELOX KELOX universal manifold cabinet carcass

Sendzimir zinc-coated universal sheet steel cabinet, connection option from below or on the side, height-adjustable feet, plaster trim element below the cabinet, width: 120mm, upgradable with a surface-mounted or flush-mounted visible part.
Number of manifold outputs on KM590E KELOX FB manifold coordinated!
Cabinet depth: 75mm Installation height: 600mm from the finished floor

Size	PU unit
1–4 L: 460 mm	1
5–8 L: 690 mm	1
9–12 L: 840 mm	1
Spezial size L: 1150 mm	1

KM571 KELOX UP-visible part



Sendzimir zinc-coated, lockable front doors and frame, powder-coated, plaster trim from manifold cabinet carcass max. 120mm under the front door, upgradable with a cylinder lock.
Colour: white (RAL 9010)
Height: 530mm

Size	PU unit
1–4 L: 530 mm	1
5–8 L: 760 mm	1
9–12 L: 910 mm	1
Special size L: 1220 mm	1
Cylinder lock	1

KM572 KELOX AP-visible part

Sendzimir zinc-coated, depth-adjustable surface-mounted visible part with magnetic bracket, powder-coated
Colour: white (RAL 9010)
Installation depth: 130mm
Installation height: 670mm above the finished floor

Size	PU unit
1–4 L: 530 mm	1
5–8 L: 760 mm	1
9–12 L: 910 mm	1
Special size L: 1220 mm	1

KELOX

KM595 QUATTROX radiator block

For valve radiators; 4 completely rotatable connections; straight-way or corner connection; for threading through the flow and return without any need to make connections in the floor; individual radiator connections can be isolated; ¾” female thread; union nut, ¾” male euro thread on the pipe side; brass with non-porous metal plating

Size	PU unit
4-pieces	1
A-nipple 1/2“x3/4“	
Cone for 3/4“ euro cone	

KM597P4 KELOX UP-wall block set

Wall block set for valve radiators; to be installed before plaster work is done; includes guiding pipes for threading the KELOX multilayer pipes according to the Quattrox method through to the radiator after the plastering has been done; suitable for flush-mounted installations

Width mm	Height mm	Depth mm	Pipe-line mm
280	150	70	500

KM595Z TWO-PIPE radiator block

For valve radiators with two pipe connections; straight-way or corner connection; individual radiator connections can be isolated; 3/4” female thread; union nut, 3/4” male euro thread on the pipe side; brass with non-porous metal plating

Size	PU unit
double corner connection	10
double connection	10

KM597 KELOX wall block set

Wall block set for valve radiators; to be installed before plaster work is done; includes guiding pipes for threading the KELOX multilayer pipes through to the radiator after the after the plastering has been done; suitable for drywall installation

Width mm	Height mm	Depth mm
150	150	75

KM597P2 KELOX UP-wall block set

Wall block set for valve radiators; to be installed before plaster work is done; includes guiding pipes for threading the KELOX multilayer pipes through to the radiator after the after the plastering has been done; suitable for flush-mounted installation

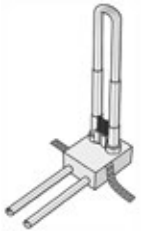
Width mm	Height mm	Depth mm
150	150	75

KM547 KELOX UP-wall block

Wall block for valve radiators; to be installed before plaster work is done; incl. KELOX multilayer pipes d16 between flow and return; for connecting to the radiator after it has been installed; suitable for flush-mounted installation

Type	Width mm	Height mm	Depth mm	Pipe-line mm	Elbow-length mm
1	150	150	50	300	150
2	100	115	35	500	250
3	150	150	50	500	250

KM549 KELOX floor block



Floor block for valve radiators, to be installed before the screed work is done, for subsequent connection to the radiators. With KELOX multilayer pipes d16 between flow and return, including foam-coated KM598V connection stabiliser for protecting the KELOX pipes during the screed work and during the floor installation work and foam-coated fastening lugs.

Length mm	Height mm	Depth mm	Pipe-line mm	Elbow-length mm
120	100	70	320	280

BF600T KELOX drywall radiator elbow box

Wall block for valve radiators, for installation in the drywall area for noise-insulated, foam-coated fastening lugs for installation between the drywall profiles with the BF605T drywall installation rail, incl. KELOX multilayer pipes for one-sided continuation in the wall area, CU pipes joined between the flow and return d15mm, with non-porous metal plating, for subsequent connection of the radiators, flow at top. Designation:
left: Connection pipe from the left
right: Connection pipe from the right
Attention! Follow the instructions of the compression fitting manufacturers and, if necessary, use the support sleeves for connecting the copper

Width mm	Height mm	Depth mm
140	80	70

BF602T KELOX drywall radiator T-box

Wall block for valve radiators, for installation in the drywall area for noise-insulated, foam-coated fastening lugs for installation between the drywall profiles with the BF605T drywall installation rail, incl. KELOX multilayer pipes for two-sided continuation in the wall area, CU pipes joined between the flow and return d15mm, with non-porous metal plating, for subsequent connection of the radiators, flow at top. Attention! Follow the instructions of the compression fitting manufacturers and, if necessary, use the support sleeves for connecting the copper

Width mm	Height mm	Depth mm
140	80	70

KM506 KELOX SL-UP- radiator T-box

Wall block for valve radiators, for installation in the flush-mounted area before plastering work, incl. KELOX multilayer pipes for two-sided continuation in the skirting board, CU pipes joined between the flow and return d15mm, with non-porous metal plating, for subsequent connection of the radiators, flow at top. Attention! Follow the instructions of the compression fitting manufacturers and, if necessary, use the support sleeves for connecting the copper

Width mm	Height mm	Depth mm
140	140	30

KM598V KELOX HK-radiator connection stabiliser

For valve radiators, comprised of one elbow (plastic) for fastening to bare concrete and height-adjustable, attachable plastic brackets, and 2 white plastic stabiliser pipes, pipe spacing of 40–60 mm

Dim.	PU unit
14/16	10

KM599 KELOX HK-radiator double rosette

Made of plastic, adjustable axis distance of 40–50 mm
Colour: white
W: 115 mm H: 70 mm

Dim.	PU unit
16	10
18–20	10

KM616 KELOX plug anchor

Knock-in plugs made of plastic, for fastening KELOX multilayer pipes in concrete

Dim. mm	PU unit
60	50
80	50

KELOX tools

WZ912 KELOX deburring and bevelling tool

For deburring and attaching the inside bevel to the KELOX multilayer pipe, incl. T-handle, mount suitable for slow-speed drills

Dim. mm	PU unit
14	1

WZ913 KELOX deburring tool

For deburring and attaching the inside bevel to the KELOX multilayer pipe, incl. T-handle, as a mount suitable for slow-speed drills

Dim. mm	PU unit
40	1
50	1
63	1
75	1

WZ915 KELOX calibration mandrelt

Calibration mandrels for deburring and applying the inner bevel to the KELOX multilayer pipe, mount for slow-running drill or KELOX universal click handle for insertion, suitable for all dimensions. Dimension d12 mm incl. handle, not suitable for calibration with drill.

Size mm	PU pieces
16	1
20	1
25	1
32	1
SET 1	1
SET 2	1
SET 3	1
SET 4	1
SET 5	1
SET 6	1
Click handle	1
Case	1

Calibration SET 1 comprised of: Calibration mandrel d16, 20, 25 and 1 universal click handle, packaged in case.
Calibration SET 2 comprised of: Calibration mandrel d16, 20, 25, 1 universal click handle, bending spring d16, 20, 25 and pipe cutter, packaged in case
Calibration SET 3 comprised of: Calibration mandrel d16, 20, 25, 1 universal click handle, bending spring d16, 20, 25, pipe cutter and pipe-holding pliers, packaged in case.
Calibration SET 4 comprised of: Calibration mandrel d16, 20, 25 and 1 universal click handle, packaged in case.
Calibration SET 5 comprised of: Calibration mandrel d16, 20, 25, 1 universal click handle, bending spring d16, 20, 25 and pipe cutter, packaged in case
Calibration SET 6 comprised of: Calibration mandrel d16, 20, 25, ¿32 and 1 universal click handle, WZ916A multicalibration mandrel, bending spring d16, 20, 25, pipe cutter and pipe-holding pliers, packaged in case

WZ916 KELOX multi calibration mandrel

Multi calibration mandrel for deburring and applying the inner bevel on the KELOX multilayer pipe

Dimensions: d16, 20 and 25 mm

Size mm	PU pieces
16/20/25	1

WZ916A KELOX multi calibration mandrel with removable protective cover

Multi-calibration mandrel for deburring and applying the inner bevel on the KELOX multilayer pipe with removable protective covers, specifically for processing HK connections

Dimensions: d16, 20 and 25 mm

Size mm	PU pieces
16/20/25	1

WZ130 KELIT pipe cutter

For cutting off KELIT pipes d16–40 Replacement blade for WZ130/2
Repair set for WZ130/2
Replacement bolt set for blade WZ130/2

Size	PU pieces
16–40	1
Spare blade-2	1
Rerair set-2	1
Spare bolt-2	1

WZ932 KELOX pipe cutter

For cutting KELOX multilayer pipes to length up to d20 mm

Size	PU pieces
14–20	1
Spare blade	1

WZ935 KELOX pipe cutter

For cutting KELOX multilayer pipes to length from d14–75 mm

Size	PU pieces
14–75	1
Replacement cutting wheel 14–75	1

WZ920 KELOX bending spring

For bending the KELOX multilayer pipes to a narrow radius (smaller than 5d) without reducing the internal diameter, the dimensions d16, 20 and 25 mm are equipped with a 1.2 m extension spring.
Spring length: 610 mm
Extension spring 1.2 m separately upon request

Size	PU pieces
14	1
16	1
20	1
25	1

WZ925 KELOX pipe bending tool

For creating even bends (smaller than 5d) on KELOX multilayer pipes

Size	PU pieces
16–40	1

WZ939 KELOX pipe holder

For holding short lengths of KELOX multilayer pipes of d16–32 mm during calibration

Size	PU pieces
16–32	1

WZ940 KELOX pipe winder

For torsion-free unrolling of KELOX pipes d16 up to a reel length of 500m, d20–25 mm up to a reel length of 300m, galvanised steel pipe, foldable, packed in a box

Size	PU unit
300/500	1

WZ953 KELOX radiator block installation tool

For setting up and fastening the KELOX-UP radiator boxes BF600T and BF602T

Size	PU unit
Mont. Hilfe	1

WZ955 KELOX pull-through spring

For pulling KELOX multilayer pipes through to the wall block set

Size	PU unit
14–20	1

WZ970 KELIT Akku - battery-operated pressing machine – Li-ion

Electromechanical rechargeable pressing machine Li-ion 18V 3Ah (Klauke), for pressing the KELOX and WINDOX press system parts d16–75 mm, STEELFIX press system parts d15-54 mm, COPPERFIX press system parts d15–54 mm, COOLFIX press system parts d12 mm incl 2 pieces battery 18 V and charging device 230 V for 18 V.

	PU unit.
SET-1 Li-Ion	1
Basic machine Li-Ion	1
Battery 14,4V 3,2 Ah Li-Ion	1
Charging device Li-Ion	1
Case	1

ATTENTION! If used for other brands, please note that a minimum of 30kN of pressing force is required!

KE KELIT recommends that pressing tools are inspected once a year to check that they are functioning correctly and to fulfil the conditions for the warranty.

Please contact KE KELIT or the manufacturer of the tools directly!

WZ980 KELOX pressing jaws – U

Pressing jaws inserts for pressing the KELOX and WINDOX system parts with a WZ970 or WZ970L KELIT battery-operated pressing machine

Designation: U-contour

KE KELIT recommends that pressing tools are inspected once a year to check that they are functioning correctly and to fulfil the conditions for the warranty.

Please contact KE KELIT or the manufacturer of the tools directly!

Size	PU unit
16	1
18	1
20	1
25	1
32	1
40	1
50	1
63	1

WZ987R KELOX press adaptor

Intermediate adapter (Rems) fits WZ970L KELOX battery-operated pressing machine, for pressing the KELOX system moulded parts d75 with WZ988R KELOX press ring-U
KE KELIT recommends that pressing tools are inspected once a year to check that they are functioning correctly and to fulfil the conditions for the warranty.

Please contact KE KELIT or the manufacturer of the tools directly!

Size	PU unit
75	1

WZ988R KELOX press ring – U

Press ring (Rems) for pressing the KELOX system parts d75 with WZ987R as an intermediate adapter and WZ970 KELOX battery-operated pressing machine

Designation: U-contour
Attention! Do not press without fittings!

KE KELIT recommends that pressing tools are inspected once a year to check that they are functioning correctly and to fulfil the conditions for the warranty.

Please contact KE KELIT or the manufacturer of the tools directly!

Size	PU unit
75	1

WZ983 KELOX manual pressing jaws – U

For manual pressing of the KELOX and WINDOX pressing system parts, manual pressing jaws packed in case, the inserts need to be ordered separately

Designation: U-contour

KE KELIT recommends that pressing tools are inspected once a year to check that they are functioning correctly and to fulfil the conditions for the warranty.

Please contact KE KELIT or the manufacturer of the tools directly!

Size	PU unit
Manual pressing jaws. 12–20	1
Inserts 16	1
Inserts 18	1
Inserts 20	1

Representative offices, production and headquarters

Please note that for technical printing reasons the numbers are written according to the common practice in the German speaking countries (i.e. the number and the decimals are separated by a comma).

Full technical back-up and support for the KELOX-Multilayer pipe system is provided by KE KELIT-Austria/Europe.

The network of sales partners, subsidiaries and agents is constantly being expanded. Please ask at the Austrian headquarters for the current status.

Production and central warehouse

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ÖNORM EN ISO 10005
ÖNORM EN ISO 50001

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