STEELOX®

robust - superior - flexible

KE KELIT®
INNOVATIVE PIPE SYSTEMS

® by KE KELIT 201013 STEELOX_HB_EN_2020-24.11.2020-01.00

STEELOX®

Multilayer composite pipe

robust - superior - flexible

KE KELIT®

INNOVATIVE PIPE SYSTEMS

Contents

The world's first flexible stainless steel piping system up to d25mm

Note:
Please consult this handbook for installation rules, specifically in regard to the joining technology, prior to using STEELOX for the first time.

KE KELIT quality targets

1. Our quality targets extend beyond the quality of the products themselves and include all areas required by ÖNORM EN ISO 9001.

2. Suppliers and customers are integrated into the order-related quality assurance system to ensure that errors are prevented at an early stage.

3. All employees are responsible for the quality of their own work, and should be highly motivated to perform continuous self-assessment.

4. In our view, meeting specific market and customer demands is the prerequisite to achieving the highest levels of customer satisfaction.

5. A responsible attitude towards the environment, both now and in the future, is the driving force that pushes us to manufacture long-lasting products using environmentally-friendly processes.

Senator Karl Egger

Honorary Managing Director

Certifications – Tests – System testing

Both the individual parts and the entire system are subject to basic and regular tests. Multiple forms of monitoring are employed to ensure that we meet the specified quality targets:

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 at the KE KELIT quality laboratory:

- Raw material parameters
- Dimensions and tolerances
- Processing quality
- Internal pressure creep behavior
- Behavior during warm storage

Tthird-party monitoring by authorized testing authorities:

- System testing, material identity
- Fittings tests

The ÖVGW quality mark with the registration number W1.833 is awarded for the combination of self-monitoring and third-party monitoring.

ÖNORM registration in accordance with B 5175
Registration number 001731

ÖNORM EN 806 series and ÖNORM B 2531
Sizing according to DIN 1988-300
Suitability for drinking water in conformity with ÖNORM B 5014-1 and -3

Technical regulations

Quality standard QS-W 301

Threaded fittings

- Tapered male thread and straight female thread conform to ÖNORM EN 10226
- Straight connections that are not sealed on the thread conform to ISO 228-1

STEELOX system overview

The structure

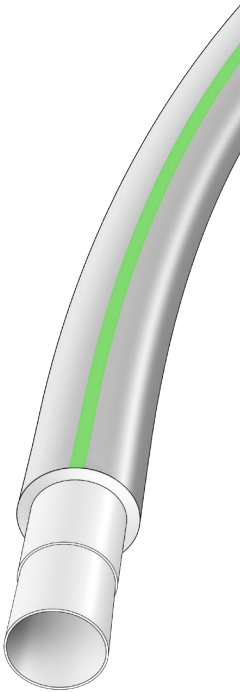
All three layers are fabricated and joined together in a single process. The stainless steel inner pipe is welded with low heat exposure.

Properties

- Minimal residual stress
- Can be modulated
- Virtually endless (up to 100 m/roll), but also available in straight lengths (5 m)
- Completely oxygen-tight, 100% impermeable to water vapor
- Electrically detectable when concealed
- Low thermal expansion (α): 0.025 mm/mK
- Thermal conductivity (λ): 0.45 W/mK
- Smooth inner wall (pipe roughness): 0.01 mm

Benefits

- Well-engineered integrated system
- robust - superior - flexible
- Available as pre-insulated model
- Pipe product range: d16, 20 and 25
- Proven press-fit connections



Applications

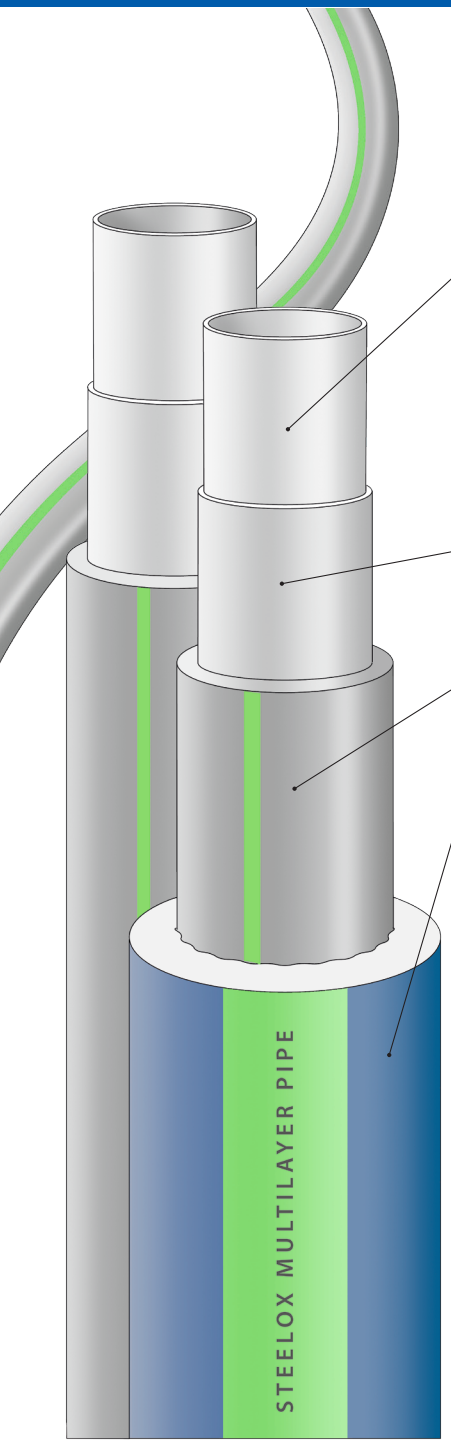
- ÖNORM B 5175 Class 2 - 70°C/10 bar,
  max. operating temperature of 80°C
  Temperature in event of accident 100°C (max. 100 h)
- Cold water: 0° – 20°C / 16 bar

Quality assurance

We perform rigorous quality testing to meet the requirements of national and international standards and regulations:

Third-party monitoring by authorized testing authorities:

- System testing
- Expansion testing
- Peel test of the composite
- Hygienic/toxicological suitability
- Oxygen-tightness
- Pipe connector testing:
  - under vacuum
  - under tensile loads
  - in a thermal cycling test
  - in pressure surges in a reverse bending test
- All testing is performed based on ÖNORM B 5175



1 Inner layer

Stainless steel: hygienic, physiologically safe, smooth, high pressure and temperature resistance thanks to the outstanding material properties of the end-to-end stainless steel inner pipe.

Material: 1.4435
Thickness: 0.1mm

2 Inner bonding layer

Temperature-stable, non-aging, force-transmitting intermediate layer.

3 Outer layer

PE-RT: hygienic, physiologically safe, smooth, and seamless.
Color: gray

4 Insulation

PE electron crosslinked,

100% closed cell

Density: ~ 30 kg/m^3,

Thermal conductivity (λ) at:
20°C : 0.038 W/mK
40°C : 0.040 W/mK

Water vapor resistance factor (μ) = 7,000 effective vapor barrier

Fire behavior according to ÖNORM EN 13501-1,

Environmentally friendly:
CFC-free foam

Convoluted texture for sound insulation, tear-proof

Sleeve film made of polyolefins and aluminum can be pushed back to make room for press fitting, marked with green stripe for quick identification.

STEELOX - thermally insulated

STEELOX Plus pipe SMX134

Structure	Benefits	Applications
Medium pipe: STEELOX Size: d16, 20, 25 Insulation: PEX soft foam Insulation thickness: **4mm** Jacket: Polyethylene film, waterproof, robust **Color: blue**	• Does not absorb water • Suitable for construction site use • Robust • Moderate thermal insulation	• Cold and hot water systems in plumbing Applications as specified in ÖNORM H 5155

STEELOX Plus pipe SMX130

Medium pipe: STEELOX Size: d16, 20, 25 Insulation: PEX soft foam Insulation thickness: **9mm** Jacket: Polyethylene film, waterproof, robust **Color: red**	• High thermal insulation • Does not absorb water • Suitable for construction site use • Robust	• Cold and hot water systems in plumbing Applications as specified in ÖNORM H 5155

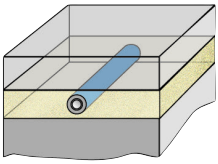
STEELOX Plus pipe SMX133

Medium pipe: STEELOX Size: d16, 20, 25 Insulation: PEX soft foam Insulation thickness: **13mm** Jacket: Polyethylene film, waterproof, robust **Color: orange**	• High thermal insulation • Does not absorb water • Suitable for construction site use • Robust	• Cold and hot water systems in plumbing Applications as specified in ÖNORM H 5155

STEELOX Pro pipe SMX140

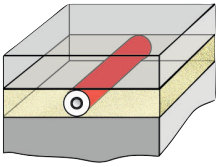
Medium pipe: STEELOX Size: d16, 20, 25 Jacket: corrugated, water-impermeable PE HD piping **Color: blue**	• Sufficient insulation to prevent condensation • Protection against damage • Waterproof jacket pipe	• Longitudinally waterproof pipe-in-pipe design in ceiling installations • Plumbing pipes with no special insulation requirements

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



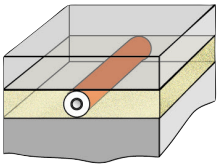
15°C used as calculation basis

KM134	Insul.	Medium temperature				
mm x s	mm	40°C	60°C	70°C	80°C	90°C
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



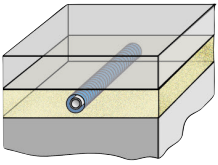
15°C used as calculation basis

KM130	Insul.	Medium temperature				
mm x s	mm	40°C	60°C	70°C	80°C	90°C
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



15°C used as calculation basis

KM133	Insul.	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



15°C used as calculation basis

KM140	Corr. 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-center positioning of the medium pipe within the corrugated pipe, an extra 10% has been included in the calculation.

STEELOX press-fit connection

Requirements for STEELOX press-fitting

- Permanently leakproof
- Compact design
- Longitudinally friction-locked
- “Leak before pressed” in sizes d16–25mm
- Press-fitting using specially developed STEELOX SX profile

The material

- Dezincification resistant brass (DZR)
- Non-porous metal-plating
- Stainless steel pressing sleeve
- Synthetic, aging-resistant EPDM O-rings

The solution

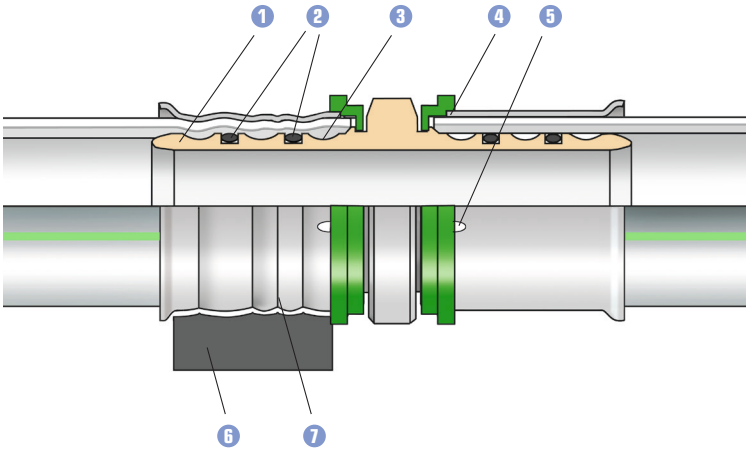
- The STEELOX press-fit connection for pipes measuring d16–25mm is a “leak before pressed” solution
- Zeta-optimized fittings d16–25mm are “leak before pressed”

Application

For visible and concealed installations

Material and structure

1. Body made of high-quality, dezincification resistant brass
2. Two EPDM O-rings
3. Special “leak before pressed” profile
4. Stainless steel pressing sleeve with double pressing jaw guide
5. Viewing window as insertion aid
6. STEELOX pressing jaws with SX profile
7. STEELOX pressing mark of the SX profile (depending on the pressing jaw orientation: on the side facing the pipe or the fitting)



Installation instructions for STEELOX press fittings

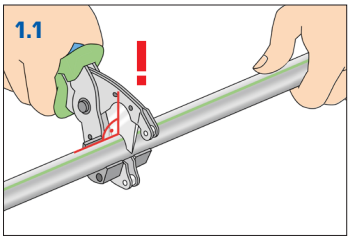
For trained installers only!

When working with STEELOX, all tools must be in flawless condition. Damaged or worn tools must be replaced immediately.

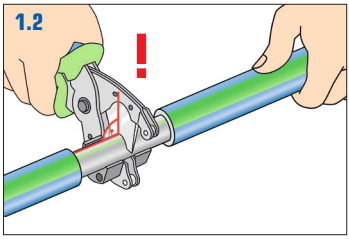
Rolled product MUST be straightened before being cut to length.

1. Cut to length

1.1. When cutting the desired length of piping, always make a true right-angle cut using the WZ532 pipe cutter. For pre-insulated pipes, remove enough insulation from the cutting area before making the cut. Be careful **NOT** to damage the STEELOX pipe during this process.

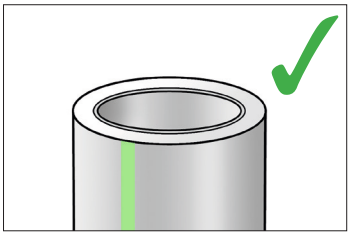


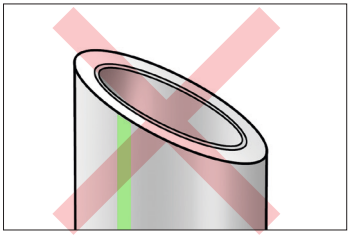
1.2. Rotating the piping slightly about the rotation axis when cutting makes this step easier.



CAUTION!

Cutting the pipe to length will result in a sharp edge that can cause injury. Immediately after cutting, deburr the cut edge using the WZ516 multi pipe deburring tool.





Installation instructions for STEELOX press fittings

2. Deburr

Screw on the WZ516 multi pipe deburring tool all the way to the stop to deburr the cut edge.

This achieves the following:

- Outside is deburred
- Rounded-off cut edge around the perimeter of the pipe's inner wall

Pipes that have already been inserted into a fitting should **NOT** turn during deburring.

2.1. Chips must be removed from the deburring tool after **every** deburring procedure.

2.2. Perform a visual check.

3. Bend

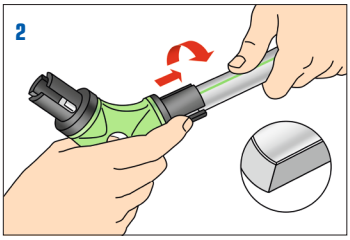
3.1. The pipes are easily bent by hand or using the WZ590 internal bending spring.
Be sure to avoid kinks. - Note the permitted bending radii. (see Page 38)

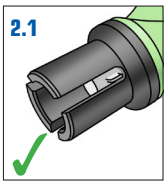
3.2. Material buckling can occur during bending. Adhere to the specified bending radii to avoid critical buckling.

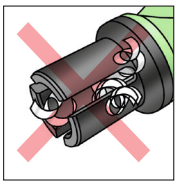
3.3. Never bend the pipe more than once. - Maximum 1x 90°

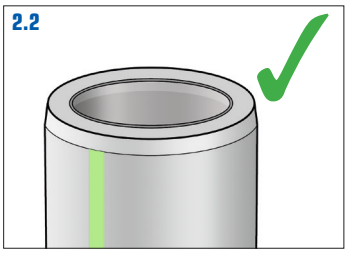
3.4. Avoid tight bending radii directly after connections due to the risk of breakage (cutting effect of the support sleeve).

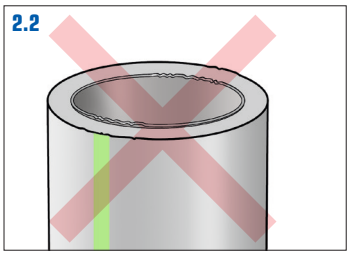
Damaged or worn tools must be replaced immediately.











Permitted bending radii:

Pipe	By hand	With bending spring
d16	8 x d	5 x d
d20	8 x d	6 x d
d25	8 x d	7 x d

4. Push the press fittings on WITHOUT force

Push the press fitting straight—**WITHOUT** tilting—onto the de-burred pipe end all the way to the stop.

4.1. Check the correct insertion depth in the viewing windows of the press fittings. Perform the pressing immediately after joining the pipe connection.

Pressing STEELOX

Fit the STEELOX-compatible pressing tool with the special correctly-sized STEELOX pressing jaws (SX profile).

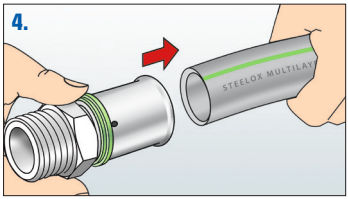
5. The pressing sleeves of the fitting are equipped with a double stop mechanism, which ensures that the special STEELOX SX profile pressing jaw is correctly positioned, even in difficult installation situations.

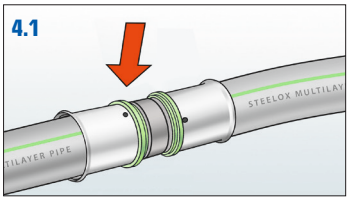
Additional testing security
"leak before pressed" does not eliminate the need for a visual check.
Thanks to the design, in conjunction with the special profile geometry, it is possible to reliably detect and localize unpressed fittings during the functional test.
– Just press – and done!

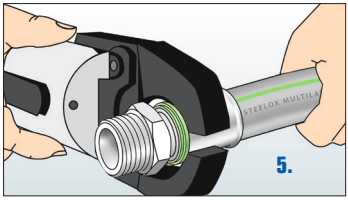
5.1. The pressing procedure is complete once the pressing jaws are completely closed. Open the pressing jaws and lift the pressing tool off the pressed part.

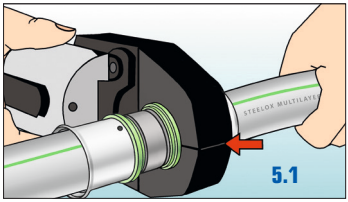
Never perform the pressing process more than once.

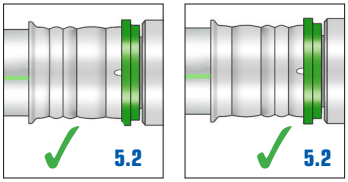
5.2. Depending on the orientation of the press jaws, the grooved pressing mark of the STEELOX SX profile may be located on the side facing either the pipe or the fitting.











Connections that were **NOT** pressed can pose a risk, especially during an air-pressure test, because the pipe and fitting may slide apart.
The longitudinal friction lock is only achieved through the pressing.

Therefore, you must perform a visual check on ALL connections.

Do not rotate connections once they have been pressed.

Drinking water installation

The STEELOX system is ÖNORM-tested and ÖVGW-registered and -approved. In addition, ÖNORM B 5175 specifies the following criteria for this application case:

- ÖNORM B 5175 Class 2 - 70°C/10 bar, max. operating temperature of 80°C – Temperature in event of accident 100°C (max. 100 h)
- Permanent pressure resistance of 10 bar
- Suitable for drinking water in conformity with ÖNORM B 5014 for pipes and fittings
- Permanently leakproof connections in concealed installations
- Connections are resistant to pressure surges
- The STEELOX system does an outstanding job of meeting these criteria.

Benefits

- Pipe right from the coil with practically zero waste
- Durability of stainless steel combined with flexibility of modular piping systems in one system
- Pipe by the roll is thermally insulated at the factory
- Straight lengths for uncovered installations
- Size range: d16, 20 and 25 mm
- Zeta-optimized fittings available
- Fast pipe installation
- No deposits thanks to smooth inner surface
- Minimal longitudinal expansion, comparable to metal pipes
- Fittings made of dezincification resistant brass (DZR) with non-porous metal plating

Practical information for ÖNORM B 5019 and B 5021

In the interest of meeting hygiene requirements, please note the following information:

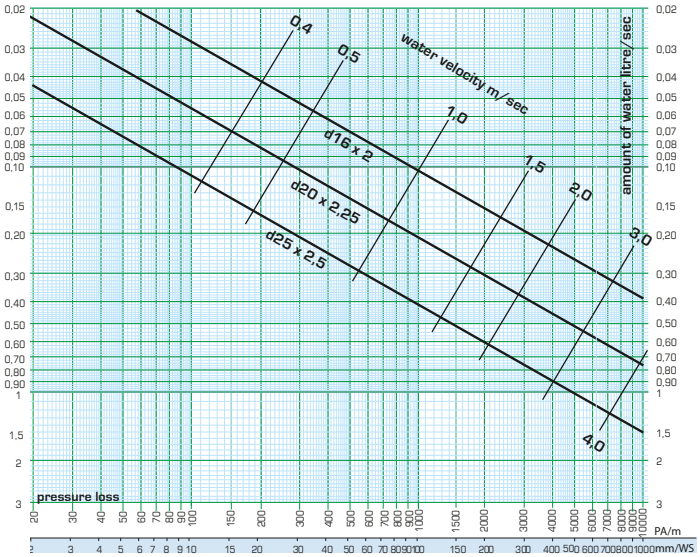
- Size all pipes correctly. Follow the rule of thumb: “As small as possible, but as large as necessary” (Page 17 - Page 23).
- Insulate the systems in the riser shafts. Make sure the cold water systems does not exceed 25°C (page 24).
- Disconnect rarely used points of use from the central water heating system. Avoid long periods of non-use.
- Eliminate all dead legs by disconnecting line sections that have been removed from service.
- Ensure that system components remain clean during delivery, storage, and installation.
- Install monitors and drains.
- We recommend installing multiple monitors in easily accessible locations.
- After a pressure test in drinking water systems that are not placed in service immediately upon installation, perform a leakage test using oil-free compressed air or inert gases (pages 26–27).
- Note the following for flushing and placing pipes into service:
- When placing a drinking water system into service, thoroughly flush the entire network with hygienically flawless drinking water (page 35).
- Create system documentation.

Sizing and pressure loss for STEELOX plumbing systems

Information on calculating the individual resistance values can be found on page 18 of the STEELOX handbook.
STEELOX d16, 20, 25

Pressure losses are calculated according to the Nikuradse formula:
$R = 8.48455 \cdot 10^{9} \cdot \dot{m}^{1.7749} \cdot di^{-4.807}$
Pipe roughness: 0.01 mm
Water temperature 45°C

R = pipe friction pressure gradient	(Pa/m)
$\dot{m}$ = mass flow	(l/s)
di = inner pipe diameter	(mm)



STEELOX sizing, pressure loss

The total pressure loss (Δp) for a STEELOX system is calculated by multiplying the length of the pipeline (l) by the pipe friction pressure gradient (R), and then adding the sum (Σ) of the individual resistance values (Z)

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

The selection of pipe size for the water system depends on:

- The available water pressure and geodetic height difference
- The pressure loss from instruments and minimum flow pressure (fittings)
- The pipe friction pressure gradient and flow velocities
- The individual resistance values of the fittings
- The type, number and simultaneous operation of the points of use

Calculated flow velocity in m/s, a flow duration of piping section	< 15 min	>_ 15 min
Consumption lines: Partial sections with resistance coefficients ζ < 2.5 for the individual resistance values[a]	5 m/s	2 m/s
Consumption lines: Partial sections with resistance coefficients ζ >– 2.5 for the individual resistance values[b]	2.5 m/s	2 m/s

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

Guidelines for circulation systems according to DIN 1988-300

The circulation system should be designed so that the temperature difference between the inlet and outlet of the drinking water storage tank does not exceed 5 K. The temperature of the hot water may not fall below 55°C at any point within the system.
For economic reasons, the flow velocity in circulation systems should be approx. +0.2–0.5 m/s, in exceptional cases up to a maximum of 1.0 m/s.

Calculation of individual resistance values (Z) for typical fittings:

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

ϱ = density kg/m³
v = calculated flow velocity
ζ = loss coefficient

Size	Equal coupling	90° elbow	90° zeta elbow	Run tee with diverging flow	Zeta run tee with diverging flow	Branch tee with diverging flow	Zeta branch tee with diverging flow	Wall plate	Zeta wall plate
d mm	ζ	ζ	ζ	ζ		ζ		ζ	ζ
16	4.3	17.3	7.1	5.9	5.9	17.9	9.6	12.9	6.7
20	2.4	10.1	2.8	3.3	2.4	10.0	4.8	9.8	2.9
25	1.7	7.1	2.5	2.3	1.9	8.4	4.0	-	-

Sizing according to ÖNORM EN 806-3

This calculation method is used to determine the pipe size for standard installations up to a maximum of 12 residential units. The method is used for cold and hot water pipelines. Standard installations are defined in ÖNORM EN 806-3 Point 4.2.
For special installations, such as those in hospitals, sanatoriums, hotels, schools, nursing homes, etc., use DIN 1988/300 to calculate the pipe sizing as required by ÖNORM B 2531. (See pages 20–23.)

Point of use	Q_A l/s	Q_{min} l/s	LU
Bathroom vanity, sink, bidet, toilet tank	0.1	0.1	1
Dishwasher, shower head, utility sink, household kitchen sink, washing machine[a]	0.2	0.15	2
Urinal flusher	0.3	0.15	3
Bathtub faucet	0.4	0.3	4
Spigots for garden/garage	0.5	0.4	5
Commercial kitchen sink DN 20, bathtub faucet	0.8	0.8	8
Flush valve DN 20	1.5	1.0	15

[a] For commercial washing machines, see manufacturer specifications.
Loading unit (LU) is equal to a point-of-use fitting flow Q_A of 0.1 l/s.

With regard to efficiency, the flow velocity should be at least 1 m/s.
In order to keep flow noise at a reasonable level, main supply systems, risers, and floor distribution systemss should not exceed 2 m/s.
In the case of individual supply systems, flow velocities of up to 4 m/s are permissible.

Example:

The following are all connected to a riser:

1 bathtub	1 x LU 4	=	4
1 shower	1 x LU 2	=	2
1 bathroom vanity	1 x LU 1	=	1
1 toilet tank	1 x LU 1	=	1
1 washing machine	1 x LU 2	=	2
Total loading units (LU)			10

Result:
According to ÖNORM EN 806-3, the table below indicates STEELOX d20 x 2.25mm

After adding in the previously weighted loading units (LU), the pipeline diameter (d) can be selected using the inner diameter (di) from the table below.

Size d x s mm	Inner diameter di mm	Water flow rate l/m	Loading units LU	Largest individual 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	-

Sizing guidelines

Excerpt from DIN 1988-300

1. Calculation flow rate $\dot{V}_R$

Determining the calculation flow rates and minimum flow pressures of the point-of-use fittings. The calculation flow rate $\dot{V}_R$ is an assumed point-of-use flow rate for the calculation step. Reference values for the calculation flow rates of common fittings are provided in the table.The $\dot{V}_R$ calculation flow rate is the mean value resulting from the following equation:

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

2. Calculation of total flows and allocation to partial sections

Against the direction of flow—ending at both the most distant point of use and at the supply line—the calculation flows are added up, and the resulting total flow rates are then allocated to the corresponding line sections.
The respective partial section begins with the fitting at which the total flow rate or the diameter changes.
At the junction point of the cold water line for the drinking water heater, the total flow rates of the cold and hot water sides are added together.

3. Use of conversion curve to convert total flow rate to peak flow rate

When calculating pipeline systems, always include all points of use with their calculation flow rates.
The exception to this rule is the case where, in a single utilization unit (UU), a second sink, a shower in addition to a bathtub, a bidet, a urinal, or taps in anterooms of toilet facilities are installed. These are not included in the total flow rate.

4. Simultaneous operation depending on building type

The peak flow rate is calculated as a function of the total flow rate, while the simultaneousness of the water usage depends on the type of use for the building (e.g., in apartments, hotels, etc.).
It is generally assumed that not all connected points of use are fully open at the same time.
The following pages provide conversion curves for the various building types.

5. Selection of pipe diameter

Calculate the pipe diameter and pipe friction pressure gradient, as well as the related calculated flow velocity. (See pressure loss diagram on page 17.)

6. Comparison of pressure loss with available pressure

The total pressure loss for the calculated pipe diameters should essentially approximate the available pressure difference without exceeding it.

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

Minimum flow pressure bar	Type of drinking water point of use	Size	$\dot{V}_R$ l/s
	Spigots and faucets		
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	Showers	DN 15	0.15
1.0	Bathtubs	DN 15	0.15
1.0	Kitchen sinks	DN 15	0.07
1.0	Bathroom vanities	DN 15	0.07
1.0	Bidets	DN 15	0.07
	Household appliances		
0.5	Dishwasher	DN 15	0.07
0.5	Washing machines	DN 15	0.15
	Toilets and urinals		
1.0	Flush valve for urinal manual or electronic	DN 15	0.30
1.2	Flush valve for toilet	DN 20	1.00
0.5	Toilet tank according to EN 14124	DN 15	0.13

a) With no devices connected (e.g., lawn sprinkler).

b) The indicated calculation flow rate must be included in the calculation for the connection on the cold and warm water side.

c) Angle valves, e.g. for bathroom vanity fixtures and shower hose connections, should be included as individual resistances or in the minimum flow pressure of the point-of-use fitting.

Important information:
Fixture manufacturers are required to state the minimum flow pressure and calculation flow rates $\dot{V}_R$ for their fixtures. Always take the manufacturer's information into consideration when sizing the pipe diameter. If these values are greater than those provided in the table, the drinking water installation must be sized using the manufacturer's specifications.

Notes:
Points of use not covered by the table as well as fittings and fixtures of the same type, but with fitting flow rates or minimum flow pressures greater than those stated, must also be included according to the manufacturer's specifications.

Excerpt from DIN 1988-300

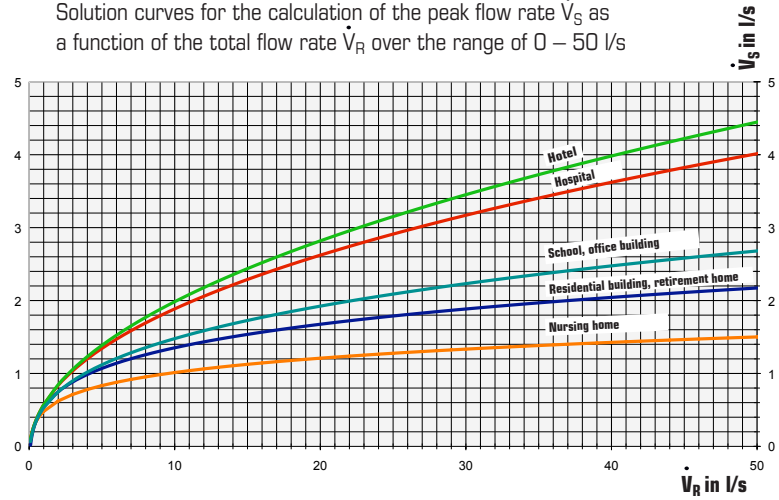
For the building types indicated in the table, the peak flow rate $\dot{V}_S$ is calculated within the following scope:

$$\Sigma \dot{V}_R : 0.2 \text{ to} \leq 500 \text{ l/s}$$

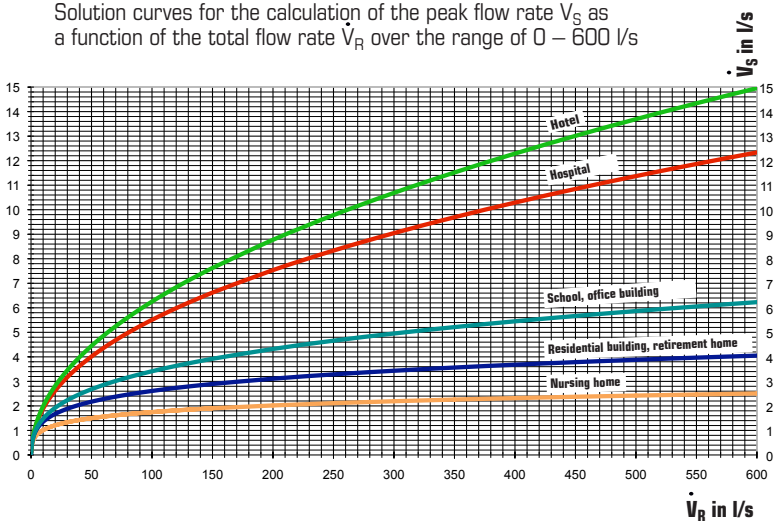
The peak flow rate ($\dot{V}_S$) is calculated based on the building type using the constants from the table (page 23) as follows:

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

Solution curves for the calculation of the peak flow rate $\dot{V}_S$ as a function of the total flow rate $\dot{V}_R$ over the range of 0 – 50 l/s



Solution curves for the calculation of the peak flow rate $\dot{V}_S$ as a function of the total flow rate $\dot{V}_R$ over the range of 0 – 600 l/s



STEELOX®

Constants (a, b, c) for peak flow rate by building type

Building type	Constant		
	a	b	c
Residential building	1.48	0.19	0.94
Assisted-living facility, retirement home	1.48	0.19	0.94
Patient ward in hospital	0.75	0.44	0.18
Hotel	0.70	0.48	0.13
School and office building	0.91	0.31	0.38
Nursing home	1.40	0.14	0.92

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

Utilization units (UU)

A room that contains points of use and is located within a residential building (e.g., bathroom, kitchen, housekeeping room), or in a non-residential building where it can be assumed that usage is residential in nature. Experience has shown that, in the direction of flow towards the end of the branch line and in the floor distribution of UUs, the flow rates from the calculation are too high, since in most cases no more than two points of use are ever open at the same time, e.g., in a bathroom.

For this reason, the peak flow rate in each partial section of a UU is set to no more than the total flow rate of the two largest points of use installed on the partial section (also applies to single-UU situations where the calculation results in a smaller flow rate).

If a second UU is connected to a partial section (e.g., in the riser), the peak flow rates of both UUs are added together, provided that the resulting peak flow rate is less than the value calculated using the equation. Otherwise, the peak flow rate must be determined using the respective equation.

Permanent consumers

The flow rate of a permanent consumer is added to the peak flow rate of the other points of use. Water usage with a duration of more than 15 minutes, e.g. a garden sprinkler valve, are considered to be permanent consumption.

Series systems

Calculation here is based on the total flow rate. The degree of simultaneous water usage must be defined together with the system operator. If they can occur simultaneously, the peak flow rates of the series system must be added together.

Special buildings, commercial and industrial facilities

For special buildings (i.e., other than those indicated above), industrial plants, agricultural buildings, nurseries and market gardens, slaughterhouses, dairies, business establishments, commercial laundry facilities, catering companies, public baths, etc., the peak flow rate must be determined from the total flow rate in consultation with the facilities operator. If they occur simultaneously, the peak flow rates for the sections of the drinking water installation must be added together.

Insulation for cold water pipelines according to ÖNORM H 5155

ÖNORM H 5155 provides standard values for insulating building service installations, in order to standardize and simplify the design, installation and maintenance of insulation systems.

- The purpose of ÖNORM H 5155 is to specify insulation thicknesses for minimizing the transfer of heat from transport media to the surrounding environment and vice versa.
- ÖNORM H 5155 applies to the insulation of all components in heating and drinking water systems.
- Insulation also varies depending on the type of installation and the location of the systems (e.g., false-wall installations, false ceilings, heated rooms, etc. ...)
- Follow KE KELIT's recommendations, which also factor in comfort aspects such as noise reduction and more.
- See page 25 for insulation of hot water pipes.

ÖNORM H 5155 specifies a lambda value λ of 0.036 W/mK for cold water pipes at an average temperature of 0°C and an external heat transfer coefficient of 9 W/m²K.

Because pre-insulated STEELOX Plus pipes have a lambda value (λ) of 0.038 W/mK at 20°C, the insulation thicknesses required by ÖNORM can be met with the following STEELOX Plus pipes:

Insulation thickness 4 mm ≙ SMX134 STEELOX Plus pipe with 4 mm
Insulation thickness 9 mm ≙ SMX130 STEELOX Plus pipe with 9 mm
Insulation thickness 13 mm ≙ SMX133 STEELOX Plus pipe with 13 mm

Excerpt from ÖNORM H 5155, Table 6. In this case, however, the DN/OD values have been adapted to the specific KE KELIT pipe dimensions.

Outer diameter of pipe d	16	20	25
Installation location	**Minimum insulation thickness (mm)**		
Utility room	13	13	13
Unheated room, exposed	9	9	9
Heated room, exposed	13	13	13
Installation shaft or corridor, WITH hot water pipes	13	13	13
Installation shaft or corridor, WITHOUT hot water pipes	9	9	9
False ceiling, raised floor, lightweight partition wall, in-wall installation, floors (distribution systems only)	13	13	13
False-wall installation, floors (floor supply and individual supply lines)	4	4	4
False-wall installation, floors, next to hot-water circulating pipes (floor and individual supply systems)	13	13	13

Country-specific standards and laws regarding pipe insulation must be taken into consideration and complied with.

Insulation for hot water pipelines according to ÖNORM H 5155

ÖNORM H 5155 provides standard values for insulating building service installations, in order to standardize and simplify the design, installation and maintenance of insulation systems.

- The purpose of ÖNORM H 5155 is to specify insulation thicknesses for minimizing the transfer of heat from transport media to the surrounding environment and vice versa.
- ÖNORM H 5155 applies to the insulation of all components in heating and drinking water systems.
- Insulation also varies depending on the type of installation and the location of the system (e.g., false-wall installations, false ceilings, heated rooms, etc. ...)
- Follow KE KELIT's recommendations, which also factor in comfort aspects such as noise reduction and more.
- See page 24 for insulation of cold water pipes.

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

Because pre-insulated STEELOX Plus pipes have a lambda value (λ) of 0.038 W/mK at 20°C, the insulation thicknesses required by ÖNORM can be met with the following STEELOX Plus pipes:

Insulation thickness 5 mm ≙ SMX134 STEELOX Plus pipe with 4 mm
Insulation thickness 10 mm ≙ SMX130 STEELOX Plus pipe with 9 mm
Insulation thickness 15 mm ≙ SMX133 STEELOX Plus pipe with 13 mm

Excerpt from ÖNORM H 5155, Table 2. In this case, however, the DN/OD values have been adapted to the specific KE KELIT pipe dimensions.

Outer diameter of pipe d	16	20	25
Installation location	**Minimum insulation thickness (mm)**		
Utility room	20	20	25
Unheated room	20	20	25
Heated room	10	10	15
Installation shaft or corridor mostly adjacent to unheated areas	20	20	25
False ceiling, raised floor, installation shaft or corridor mostly adjacent to unheated areas	10	10	15
In-wall installation, floors in unheated rooms	10	10	10
In-wall installation, floors in heated rooms	5	5	5

Country-specific standards and laws regarding pipe insulation must be taken into consideration and complied with.

Pressure test – drinking water systems with air or inert gases according to ÖNORM B 2531

The pressure test with air or inert gases is performed in a 2-stage process comprising a leak test and a load test. The leak test for pipelines ≤ DN 50/ OD 63 can be performed in 2 ways.

The pressure test using air or inert gases can be performed in sections and is not a substitute for the final pressure test with drinking water.

The pressure test must be performed with essentially oil- and dust-free air or inert gases and is suitable for all pipe materials. Inert gas must be used where the pressure test is conducted in buildings with increased hygienic requirements (e.g., in medical facilities).

Due to the compressibility of the medium, test pressures above 300 kPa (3 bar) may not be applied for safety reasons when using air or inert gases for the pressure test.

Higher test pressures pose a higher safety risk and do not increase the testing accuracy.

Take necessary precautions to keep people and objects safe during the test. Splitting the pipeline into small pipe sections during the pressure test results in higher testing accuracy and therefore greater safety. A gradual pressure increase is useful as an additional safety precaution.

All pipe openings must be closed tightly using plugs or blind flanges with enough strength to withstand the test pressure. When performing a pressure test using air or inert gases, the connections between the pipeline parts must be accessible and visible, and bleed valves must be available to ensure a safe discharge of the test pressure.

If leaks are found or a pressure drop is noticed, all connections must be checked for tightness using suitable bubble-forming leak detectors. Once the leaks have been removed, the pressure test must be repeated.

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

Comprising a leak test according to version 1 or 2 and a load test

Leak test – version 1

Test pressure 15 kPa (150 mbar) – test duration 60 min. Display accuracy of the pressure gauge or standpipe 0.1 kPa (1 mbar)

Leak test – version 2

Test pressure 100 kPa (1 bar) – test duration 60 min. Display accuracy of the pressure gauge 5 kPa (50 mbar). In addition, all connections in the system must be checked for tightness using suitable bubble-forming leak detectors

Load test

Test pressure 300 kPa (3 bar) – test duration 10 min. Display accuracy of the pressure gauge 10 kPa (100 mbar)

Pressure test report in conformity with ÖNORM B 2531 for STEELOX drinking water systems

Test medium: air or inert gases

Client: .....

Contractor: .....

Property: ..... Test section:.....

Pipe materials and sizes: .....

Ambient temperature: .....Temperature equalization: ..... ☐

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

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

Leak test – version 1 ☐

Test pressure 15 kPa (150 mbar) – test duration 60 minutes

Leak test – version 2 ☐

Test pressure 100 kPa (1 bar) – test duration 60 minutes

Additionally, all connections in the system must be checked for tightness with suitable bubble-forming leak detectors

Load test ☐

Test pressure 300 kPa (3 bar) – test duration 10 minutes

Notes

After a successful pressure test, we recommend preparing a confirmed test report.

The pressure test using air or inert gases does not eliminate the need for the pressure test with drinking water required by ÖNORM EN 806-4, which must be performed as a final step before the system is placed into service.

Confirmation

Responsible person: .....

Date: ..... Time: from ..... to .....

Client: .....

Pressure test for drinking water systems using drinking water according to ÖNORM EN 806-4

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

For temperature differences (> 10 K) between the ambient temperature and fill water temperature, a waiting time of 30 minutes must be adhered to after filling the system with drinking water so the temperature can equalize.

Test pressure: 0.05 MPa (0.5 bar) up to max. 0.2 MPa (2 bar)
Test duration: 15 minutes after temperature equalization between pipe and test medium.
Test differential pressure: 0.0 bar
A visual check must then be performed on all pipe connections.

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

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

The pressure test using drinking water is a combined leak and load test and, according to ÖNORM EN 806-4, must be performed on all pipes. Pipes and other pipeline parts must be sized for the highest system operating pressure (MDP) according to ÖNORM EN 805 and the ÖNORM EN 806 series.

However, they must be designed for at least a system operating pressure (MDP) or nominal pressure (PN) of 1.0 MPa (10 bar).

Because ÖNORM EN 806-4 requires that the test pressure be 1.1 times the highest system operating pressure, the pressure test must be conducted with at least 1.1 MPa (11 bar).

Display accuracy of the pressure gauge (preferably positioned at the lowest point): 0.02 MPa (0.2 bar).

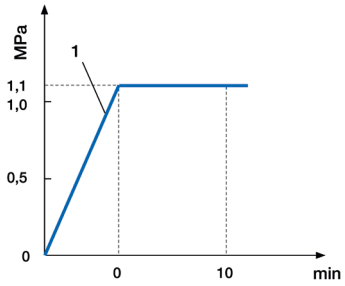
Based on the pipe materials and sizes, test method "A" should be used as a leak and load test for STEELOX according to ÖNORM EN 806-4.

Test method A – test duration 10 minutes

- For all multilayer composite systems with **d14–75mm**
- For all metal pipe systems with **d12–108mm**
- For all plastics (e.g. PP, PE, PEX, PB and others) ≤ **DN 50/OD 63**
- For all combined systems (metal and multilayer composite systems with plastics) ≤ **DN 50/OD 63**

The system must be filled with water, all air must be bled out, and all points of use must be closed.

The test pressure (1) must be applied with pumps and maintained for 10 minutes. During this time, the test pressure must remain constant, without any decreases.



Pressure test report in conformity with ÖNORM EN 806-4 for STEELOX drinking water systems

According to ÖNORM 806-4 for STEELOX drinking water systems, test medium: drinking water

Client: .....

Property: ..... Test section:.....

Pipe materials and sizes: .....

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: ..... Air bled from system ☐

Temperature equalization ☐ Visual inspection ☐

Functional test performed: yes ☐ no ☐

Pressure test for drinking water systems with at least 1.1 MPa (11 bar)

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

Pipe: d16 .....m Pipe: d20 .....m Pipe: d25 .....m

Test method A – test duration 10 minutes ☐
Metal systems and multilayer composite pipe systems – all sizes
Plastic systems and combined systems with plastics ≤ DN 50/OD 63

Visual inspection ☐ System is tight ☐

Notes:
- **Temperature fluctuations can influence the test pressure.**
- **Each pressure test represents a snapshot of the actual situation and cannot provide a guarantee against installation errors.**
- **After a successful pressure test, we recommend preparing a confirmed test report.**

Confirmation

Responsible person: .....

Date: ..... Time: from ..... to .....

Client: .....

Pressure test for drinking water systems using drinking water, with prior test performed using air or inert gases

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

If a pressure test was performed using air or inert gases according to ÖNORM B 2531, the functional test may be omitted.

Pressure test for drinking water systems using drinking water according to ÖNORM B 2531, with prior test performed using air or inert gases

This pressure test is only permissible if a pressure test has already been performed using air or inert gases according ÖNORM B 2531.

It is a combined leak and load test and, according to ÖNORM EN 806-4, must be performed on all pipes within buildings and premises, but with a reduced system pressure of 0.9 MPa (9 bar).

If components (e.g., safety valves) that cannot withstand the system test pressure are to be installed, suitable measures must be taken.

However, they must be designed for at least a system operating pressure (MDP) or nominal pressure (PN) of 1.0 MPa (10 bar).

If a pressure test was performed using air or inert gases, the functional test can be performed with 0.9 MPa (9 bar) according to ÖNORM B 2531.

Display accuracy of the pressure gauge (preferably positioned at the lowest point): 0.02 MPa (0.2 bar).

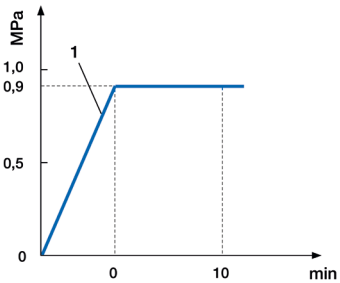
Based on the pipe materials and sizes, test method "A" should be used as a leak and load test for STEELOX according to ÖNORM EN 806-4.

Test method A – test duration 10 minutes

- For all multilayer composite systems with **d14–75mm**
- For all metal pipe systems with **d12–108mm**
- For all plastics (e.g. PP, PE, PEX, PB and others) ≤ **DN 50/OD 63**
- For all combined systems (metal and multilayer composite systems with plastics) ≤ **DN 50/OD 63**

The system must be filled with water, all air must be bled out, and all points of use must be closed.

The test pressure (1) must be applied with pumps and maintained for 10 minutes. During this time, the test pressure must remain constant, without any decreases.



Pressure test report in conformity with ÖNORM B 2531 for STEELOX drinking water systems

Pressure test for drinking water systems using drinking water according to ÖNORM B 2531, with prior test performed using air or inert gases.

Test medium: drinking water

Client: .....

Property: ..... Test section:.....

Pipe materials and sizes: .....

Ambient temperature: ..... Air bled from system ☐

Temperature equalization ☐ Visual inspection ☐

Functional test performed: yes ☐ no ☐

Combined air and drinking water test for drinking water systems after pressure test performed with air or inert gases according ÖNORM B 2531 at least 0.9 MPa (9 bar)

Highest system operating pressure MDP: .... Test pressure 0.9 x MDP: **....**

Pipe: d16 .....m Pipe: d20 .....m Pipe: d20 .....m

Test method A – test duration 10 minutes ☐

Metal systems and multilayer composite pipe systems – all sizes

Plastic systems and combined systems with plastics ≤ DN 50/OD 63

Visual inspection ☐ System is tight ☐

Notes:

- **Temperature fluctuations can influence the test pressure.**
- **Each pressure test represents a snapshot of the actual situation and cannot provide a guarantee against installation errors.**
- **After a successful pressure test, we recommend preparing a confirmed test report.**

Confirmation

Responsible person: .....

Date: ..... Time: from ..... to .....

Client: .....

Expansion behavior of STEELOX multilayer composite pipe

Longitudinal thermal expansion

When heated, all materials experience an increase in volume or a change in length. In every piping network, the linear expansion specific to the installation system must be taken into consideration.

The linear expansion depends on the pipe length, the increase in temperature and the expansion coefficient, but does not depend on the pipe size.

Calculating the linear 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)

This means:
Under the influence of temperature, the expansion by STEELOX is comparable to metallic materials.

Material characteristics

Material	Expansion coefficient α mm/mK	E-modulus 60° N/mm2
Galv. steel	0.012	220,000
Stainless steel	0.015	200,000
Copper	0.016	130,000
STEELOX	**0.025**	**4,240**
KELOX	0.025	4,240
KELEN	0.150	300
PEX	0.175	540

Expansion bends for exposed pipes

When subjected to a thermal expansion, STEELOX pipes in exposed installations must undergo a corresponding expansion compensation. This can be accounted for by providing expansion bends in combination with anchor points and bearings. Even if the temperature exposure is only brief, the expansion compensation must be designed to handle this temperature difference. Compensation always takes place between two anchor points, or between an anchor point and a change in direction (expansion bend).

Calculating the expansion bends:

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

d = outer pipe diameter (mm)

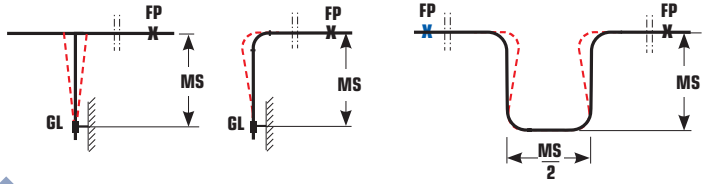
30 = STEELOX material constant

MS = minimum bend length (mm)
e.g.: from 90° elbow to the next anchor point

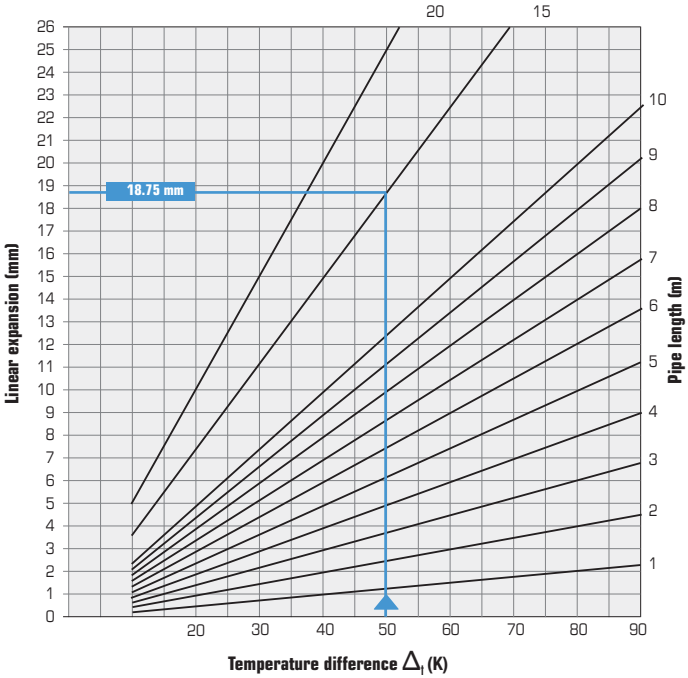
Example:

A pipe with d20mm is run over a length of 15 m. Δt = 50 K
Question: Which expansion bend should be used to compensate the expansion?

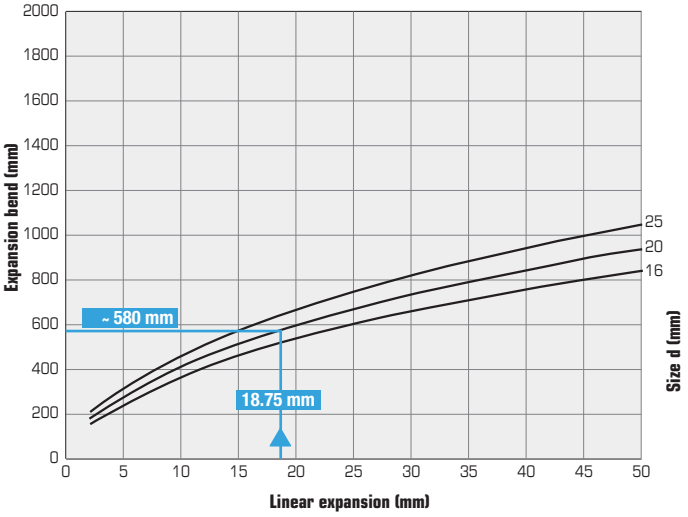
Δl = 15 · 50 · 0.025
Δl = 18.75 mm expansion
MS = $30 \cdot \sqrt{20 \cdot 18.75}$
MS = ~ 580 mm bend length



Thermal linear change of STEELOX based on α = 0.025 mm/mK



Determining the expansion bend for STEELOX based on a material constant = 30



Thermal expansion forces for STEELOX multilayer composite pipe

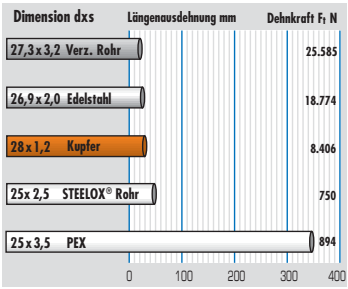
Material-specific forces are generated during linear expansion. The specific thermal expansion force is calculated in accordance with standard industry practice.

Thermal expansion forces depend on the size (cross-sectional area of the pipe) and the change in temperature, regardless of the pipe length.

Calculating the thermal expansion force:

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

- F_t = expansion force (N)
- E = E-modulus (N/mm²)
- A = cross-sectional area of pipe (mm²)
- α = thermal expansion coefficient (mm/mK)
- Δ_t = temperature difference (K)



Example:

STEELOX d 25x2.5	A	=	176.71 mm²
E-modulus	E	=	4240 N/mm²
Expansion coeff.:	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 During installation, always route the pipe appropriately while ensuring adequate opportunities for expansion. If necessary, suppliers of mounting clamps can provide solutions.

Pipelines installed in-wall Pipes installed in masonry walls are hindered from expanding by the friction forces that occur. Insulated piping offers an additional expansion possibility. Direct contact by in-wall pipes and fittings with the masonry, tiles, mortar, etc. should always be prevented through the use of suitable insulation.

Exposed pipelines STEELOX is typically installed in a manner similar to copper, as the high flexibility of the pipes facilitates the deflection in the expansion bends. Exposed pipes (basement piping, risers, etc.) are mounted based on the specific structural conditions and in accordance with generally accepted engineering practice. Anchor points should not be installed directly at fittings that cause a change in direction (see page 32 for expansion example). Vertical piping (risers, etc.) can normally be mounted solely using anchor points. In this case, the piping should be secured directly above or below the location where pipes branch off from the riser.

Pipes in raised floors Multilayer composite pipe can move axially in the insulation, which is why the expected linear changes must be taken into consideration. Right-angle changes in direction in the insulation must be designed so that the linear expansion which occurs is compensated by the insulation in the area of the fitting. Because of their plastic deformability, pipes directly embedded in floor screed or concrete do not require compensation. However, the requirements for thermal and noise insulation must be observed.

Flushing report in conformity with ÖNORM B 2531 for drinking water systems – flushing medium – drinking water

Client: .....

Contractor: .....

Property: ..... Test section: .....

Raw material: ..... Date: .....

To meet the requirements of ÖNORM EN 806-4, follow the information provided below.

Standard values for the minimum number of points of use to be opened

Largest nominal width of line in section being flushed (DN)	20	25	32	40	50	65	80	100
Minimum number of points of use to be opened	2	2	4	6	8	12	18	28
Opened for flushing:								

Notes: Regardless of the flushing procedure, each point of use should be fully opened once when the system is being placed in service.

According to ÖNORM EN 806-4, the pipes must be properly placed in service no later than 7 days after being flushed.
The flushing process with an air/water mixture is described in ÖNORM EN 806-4.

- ☐ The drinking water used for flushing was filtered (no particles greater than or equal to 150 µm)
- ☐ The hot and cold water lines were flushed separately.
- ☐ Circulation lines were flushed in sections, directly prior to entry into the hot water heater.
- ☐ The minimum number of points of use was defined in conformity with ÖNORM.
- ☐ All shut-off and control valves were completely open during the flushing process.
- ☐ Sensitive fittings (e.g., solenoid valves, flush valves, thermostatic fittings, control valves) and devices (e.g., drinking water heaters) were replaced with adapters or bypassed according to manufacturer specifications.
- ☐ The installation was flushed in sections, beginning with the first riser after the main shut-off.

Proper flushing of the system is hereby confirmed.

Installation company / fitter: .....

Client: .....

Sound insulation

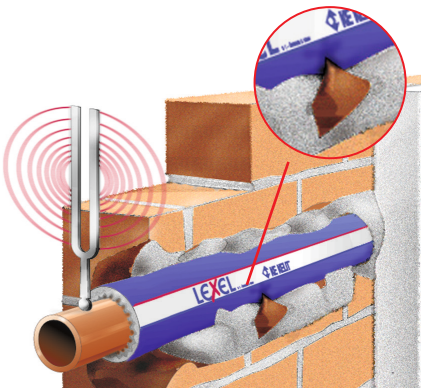
The purpose of all sound insulation measures is to protect people from being disturbed by bothersome sound transmitted in common rooms. According to DIN 4109, rooms requiring insulation include living rooms, bedrooms, classrooms, offices and work areas, among other spaces. DIN 4109 recommends the following measures:

- Use of low-noise fittings
- Acoustic decoupling on pipe mounts and wall plates, such as SMX485 or SMX485SB, etc.
- Use of factory-insulated STEELOX pipes: SMX130, SMX133 and SMX134 or enclosure with noise-suppressing insulation and with simultaneous structure-borne sound isolation (e.g., LEXEL)
- Avoidance of high pressures and flow velocities
- Not exceeding permissible resting pressure of 5 bar before points of use
- Use of structure-borne noise insulating pipe mounts (e.g., rubber inserts)
- Paying special attention to spaces requiring insulation

ÖNORM B 8115 defines the noise level for spaces requiring insulation.

- Constant noises, such as recirculating pumps, flow noises from drinking water or heating lines, etc. ≤ 25 dB (A)
- Temporary noises, such as toilet flushing, wastewater noises, elevators, etc. ≤ 30 dB (A)

Increases of the sound insulation by 5 dB (A) below the values required by ÖNORM B 8115 must always be arranged separately.



Caution! Damaged insulation or residual mortar between the pipelines, wall or floor screed can cause the formation of sound bridges, which transmit noise unhindered. In the interest of effective sound insulation, acoustic decoupling using pipe insulation should therefore be as gap-free as possible.

A single sound bridge is enough to negate virtually every other sound-protection measure taken.

Summary of the installation guidelines

1. The STEELOX pipe system must be handled carefully to avoid shocks, impacts, nicks and kinks. STEELOX system components are adequately protected in their original packaging. However, all components (fittings and pipes) must still be protected against mechanical and weather-related damage.

2. Suitable measures must be taken to protect STEELOX system components, fully installed systems, and system components against long periods of direct sunlight and exposure to UV rays. This does not apply to typical storage and working times.

3. Please observe the fitting guidelines for the press-fit connections (pages 13 through 15)
CAUTION! Cutting the pipe to length will result in a sharp edge that can cause injury. Immediately after cutting, deburr the cut edge using the WZ516 multi deburring tool.

Always remember:

cut at right angles – deburr accurately – slide fittings all the way on – press

4. Use fittings and connectors with straight threads for metal female threads in STEELOX systems.
DO NOT join threaded pipe or malleable iron fittings!
We recommend using hemp in combination with an approved plumbing sealing compound (e.g., Fermit, Locherpaste thread sealant, etc.).

Only apply so much hemp that the thread tips are still visible. Using too much hemp can potentially damage the female thread. Applying hemp shortly after the first thread turn can help prevent cross-threading.

Always remember: Do not overtighten the threads.

5. Reference values for span widths:
The buckling of water-filled, horizontally or vertically laid STEELOX pipes

Pipe	Temperature	Horizontal cm	Vertical cm
d16	Up to 60°	120	155
d20	Up to 60°	130	170
d25	Up to 60°	150	195

is effectively prevented with the clamp spacing specified above. For temperatures above 60°C, these span widths decrease by approx. 10%.

6. According to ÖNORM B 2531, surface-mounted and concealed fittings installed on or in the wall run the risk of transferring heat to the fitting and the cold water when they are connected to circulating hot water systems. This risk can be reduced by connecting a non-circulating connecting line before the fitting.

7. Thanks to their design, STEELOX system components are protected against corrosion. However, they still require noise, condensation and thermal insulation to the ÖNORM H 5155 standard (see pages 24 and 25).
By insulating the entire system, including the fittings, joints can be protected against dirt, debris, damage, and also against the ingress of concrete slurry and other similar substances.

8. Contact between the STEELOX system and aggressive chemicals must be avoided.
Because substances containing ammonia, chloride or nitrate can cause tension cracks, all materials and consumables used, as well as the ambient installation conditions, must be free of these substances to prevent adverse effects on the metal materials.

- Do not use installation foams or two-component grout based on methyl acrylate, isocyanate or acrylate when mounting the system parts.
- Do not use any cold-welding materials, such as those used to weld PVC protective film, that contain acetone or tetrahydrofuran (THF) must not be used.

9. STEELOX products have defined expansion properties.
These properties must be taken into consideration during the design and installation phases (pages 32–34).
Do not provide any expansion compensation in concealed installations.
For exposed pipes: In longer piping sections, divide the line into different expansion zones through the deliberate selection of anchor points. If necessary, suppliers of mounting clamps can provide viable solutions (sliding clamps, double clamps, ...).

10. Never hot-bend STEELOX pipes. The pipes are easily bent by hand or using the internal bending spring.
Avoid kinks and critical compression.

Never install pipes that have been damaged or handled/worked improperly. For tight radii, please use the WZ520 bending spring.

Avoid tight bending radii immediately after connections due to the risk of breakage (cutting effect of the support sleeve).

Permitted bending radii:

Pipe	By hand	With bending spring
d16	8 x d	5 x d
d20	8 x d	6 x d
d25	8 x d	7 x d

ÖNORM B 5175

11. Classification of operating conditions for STEELOX systems according to ÖNORM B 5175

Application class	Calculation temperature for T_D	Service life T_D	t_{max}	Service life at $_{max}$	t_{mal}	Service life at $_{mal}$	Max. permiss. operating pressure
Class 2 hot water supply	70°C	49 years	80°C	1 year	95°C	100 hours	10 bar
Cold water	20°C	50 years					10 bar
Cold water	20°C	50 years					16 bar

12. STEELOX installation pipe systems should not be worked on at temperatures below –10°C. At colder negative temperatures, we recommend storing the system components in temperature-controlled or heated rooms directly prior to fitting work.

13. Every drinking water installation must be subjected to a pressure test in accordance with the standard. **KE KELIT also requires the performance of a functional test.** Document the pressure test using the report form provided.
(See pages 26–31.)

14. When pressing STEELOX press fittings, use only the STEELOX pressing jaws with the special SX profile.

15. With regard to frost protection, STEELOX can handle ethylene or propylene glycol up to a max. concentration of 30% without any problems. If using alternative antifreeze additives, note the suitability and approval information, as well as any application instructions, provided by the supplier.

16. According to ÖNORM B 5175, temporary loads of up to 80°C are not a problem for STEELOX multilayer composite piping. Avoid loads over longer periods and at higher temperatures. Comply with all applicable guidelines and standards.

- The disinfection of the drinking water piping system must be performed in accordance with the KE KELIT disinfection guideline – **www.kekelit.com**
- For disinfectants listed in ÖNORM B 5019 and B 5021 (e.g., chlorine, chlorine dioxide, ozone, etc.), adhere to the respective concentrations and exposure times and never allow them to be exceeded.
  If the disinfection is performed in nonconformity with KE KELIT's disinfection guideline and/or the concentrations and exposure times specified in the standards, there can be no guarantee that the material will not be damaged.
- **According to ÖNORM B 5019, a thermal disinfection is always preferable to a chemical disinfection.**
- Copper and copper ions have a destabilizing effect and should therefore be avoided in the installations.

17. Corrosion

- STEELOX can be used for water treatment systems in domestic applications (e.g., water softeners), and for applications involving distilled water, water containing glycol, and reverse osmosis or demineralized water.

Mixed installation

STEELOX pipes and fittings can be used without a problem with fixtures and fittings made of stainless steel and non-ferrous metals.

When used in combination with galvanized or base metal fittings and fixtures, contact corrosion may occur. This can be avoided through the use of a fixture or spacer made of plastic or non-ferrous metal with a minimum length of 50 mm.

18. The STEELOX installation system is electrically conductive, for which reason it must be incorporated into the main equipotential bonding conductor for electrical systems (grounding). This must be carried out by a licensed electrical contractor.

19. Use only STEELOX system components in each installation case. Failure to do so will void the warranty.

20. Proper installation of the STEELOX system requires a small number of tools. Use original tools when fitting pipe and be sure to maintain the tools regularly.

21. In case of doubt, do not hesitate to contact our application technicians. There may not be an optimal solution for every case, but we can always help.

22. Installation videos can be viewed using the KE KELIT QR code. - **www.youtube.com/kekelit**

STEELOX product overview

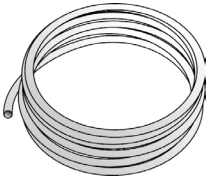
The STEELOX system is continuously adapted to meet changing engineering requirements, and is systematically enhanced. The most up-to-date version of our available product range can be found in the current STEELOX price list.

We kindly ask that you use the short product ID (e.g., SMX100 = modular pipe, SMX420 = 90° elbow) when ordering, as this will simplify the process.

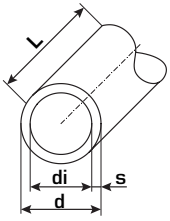
Applications

- Drinking water installation:
  ÖNORM B 5175 Class 2 - 70°C/10 bar, max. operating temperature of 80°C – Temperature in event of accident 100°C (max. 100 h)

SMX100 STEELOX multilayer composite pipe

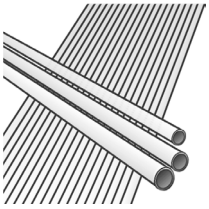


STEELOX pipe conforming to ÖNORM B 5175, oxygen and water vapor barrier multilayer stainless steel/PE-RT composite pipe
Classification of operating conditions according to ÖNORM B 5175 – Class 2:
70°C/10 bar, max. application temperature of 80°C – temperature in event of accident 100°C (max. 100 h)
Color: silver
Rolls

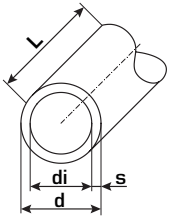


d mm	s mm	di mm	Weight kg/m	Capacity l/m	L m
16	2	12	0.11	0.113	100
20	2.25	15.5	0.15	0.189	100
25	2.5	20	0.22	0.314	50

SMX110 STEELOX multilayer composite pipe

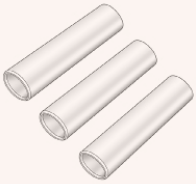


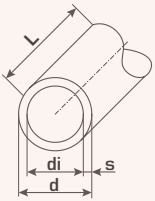
STEELOX pipe conforming to ÖNORM B 5175, oxygen and water vapor barrier multilayer stainless steel/PE-RT composite pipe
Classification of operating conditions according to ÖNORM B 5175 – Class 2:
70°C/10 bar, max. application temperature of 80°C – temperature in event of accident 100°C (max. 100 h)
Color: silver
Straight length: 5 m



d mm	s mm	di mm	Weight kg/m	Capacity l/m	L m
16	2	12	0.11	0.113	5
20	2.25	15.5	0.15	0.189	5
25	2.5	20	0.22	0.314	5

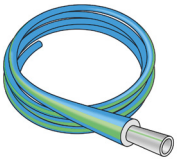
SMX111 STEELOX multilayer composite pipe nipple



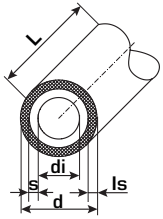


d mm	s mm	di mm	Weight kg/m	Capacity l/m	Lenght mm	L m
16	2	12	0.11	0.113		5
20	2.25	15.5	0.15	0.189		5
25	2.5	20	0.22	0.314		5

SMX134 STEELOX Plus pipe – 4 mm

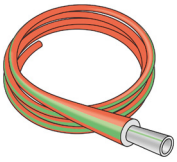


STEELOX pipe conforming to ÖNORM B 5175, oxygen and water vapor barrier multilayer stainless steel/PE-RT composite pipe, with factory-applied 4 mm closed-cell soft foam insulation and jacket made of viscoplastic PE film
Classification of operating conditions according to ÖNORM B 5175 – Class 2:
70°C/10 bar, max. application temperature of 80°C – temperature in event of accident 100°C (max. 100 h)
Insulation thickness: 4 mm
Color: blue
Rolls

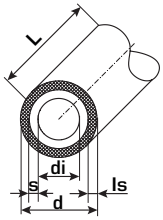


d mm	s mm	di mm	Weight kg/m	Capacity l/m	L m	ls mm
16	2	12	0.15	0.113	50	4
20	2.25	15.5	0.19	0.189	50	4
25	2.5	20	0.26	0.314	25	4

SMX130 STEELOX Plus pipe – 9 mm

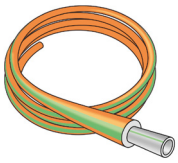


STEELOX pipe conforming to ÖNORM B 5175, oxygen and water vapor barrier multilayer stainless steel/PE-RT composite pipe, with factory-applied 9mm closed-cell soft foam insulation and jacket made of viscoplastic PE film
Classification of operating conditions according to ÖNORM B 5175 – Class 2:
70°C/10 bar, max. application temperature of 80°C – temperature in event of accident 100°C (max. 100 h)
Insulation thickness: 9 mm
Color: red
Rolls

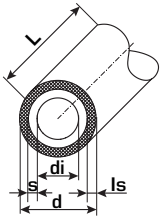


d mm	s mm	Weight kg/m	Capacity l/m	L m	ls mm
16	2	0.18	0.113	50	9
20	2.25	0.23	0.189	50	9
25	2.5	0.31	0.314	25	9

SMX133 STEELOX Plus pipe – 13 mm

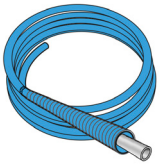


STEELOX pipe conforming to ÖNORM B 5175, oxygen and water vapor barrier multilayer stainless steel/PE-RT composite pipe, with factory-applied 13mm closed-cell soft foam insulation and jacket made of viscoplastic PE film
Classification of operating conditions according to ÖNORM B 5175 – Class 2:
70°C/10 bar, max. application temperature of 80°C – temperature in event of accident 100°C (max. 100 h)
Insulation thickness: 13 mm
Color: orange
Rolls

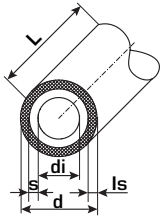


d mm	s mm	di mm	Weight kg/m	Capacity l/m	L m	ls mm
16	2	12	0.21	0.113	50	13
20	2.25	15.5	0.27	0.189	50	13
25	2.5	20	0.36	0.314	25	13

SMX140 STEELOX Pro pipe

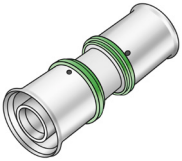


STEELOX pipe conforming to ÖNORM B 5175, oxygen and water vapor barrier multilayer stainless steel/PE-RT composite pipe, with factory-applied sleeve consisting of corrugated, water-impermeable PE-HD sleeve tube
Classification of operating conditions according to ÖNORM B 5175 – Class 2:
70°C/10 bar, max. application temperature of 80°C – temperature in event of accident 100°C (max. 100 h)
Color: blue
Rolls

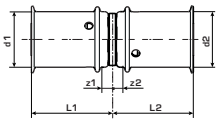


d mm	s mm	di mm	Weight kg/m	Capacity l/m	L m
16	2	12	0.18	0.113	50
20	2.25	15.5	0.23	0.189	50

SMX410 STEELOX coupling

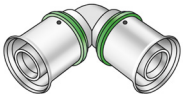


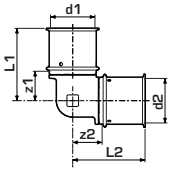
Press-fit coupling, equal or reduced, made of dezincification resistant brass (DZR) with non-porous metal plating, incl. support sleeves with O-rings and stainless steel pressing sleeves, "leak before pressed"



d1 mm	d2 mm	L1 mm	z1 mm	L2 mm	z2 mm
16	16	25	1	25	1
20	16	27	1	25	1
20	20	27	1	27	1
25	20	34	1	27	1
25	25	34	1	34	1

SMX420 STEELOX 90° elbow

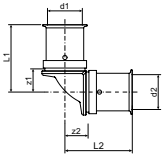




Press-fit 90° elbow for change of direction with minimal radius, made of dezincification resistant brass (DZR) with non-porous metal-plating, incl. support sleeves with O-rings and stainless steel pressing sleeves, "leak before pressed"

d1 mm	d2 mm	L1 mm	z1 mm	L2 mm	z2 mm
16	16	35	10	35	10
20	20	40	12.5	40	12.5
25	25	50	16	50	16

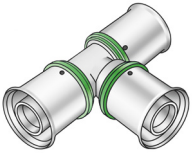
SMX420Z STEELOX 90° zeta elbow

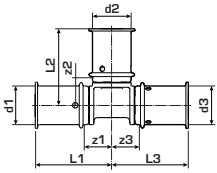


Zeta-optimized press-fit 90° elbow for change of direction with minimal radius, made of brass with non-porous metal plating, incl. support sleeves with O-rings and stainless steel pressing sleeves, "leak before pressed"

d1 mm	d2 mm	L1 mm	z1 mm	L2 mm	z2 mm
16	16	35	12.5	35	12.5
20	20	40	14	40	14
25	25	51	18	51	18

SMX440 STEELOX tee

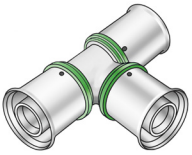


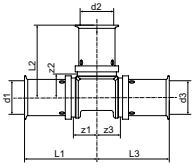


Press-fit tee, equal or reduced, made of dezincification resistant brass (DZR) with non-porous metal plating, incl. support sleeves with O-rings and stainless steel pressing sleeves, "leak before pressed"

d1 mm	d2 mm	d3 mm	L1 mm	z1 mm	L2 mm	z2 mm	L3 mm	z3 mm
16	16	16	25	10	25	10	25	10
20	16	16	27	12	25	12	25	12
20	16	20	27	12	25	12	27	12
20	20	20	27	13	27	13	27	13
25	16	20	34	15	25	15	27	15
25	16	25	34	15	25	15	34	15
25	20	20	34	15	27	15	27	15
25	20	25	34	14	27	16	34	14
25	25	25	34	16	34	16	34	16

SMX440Z STEELOX zeta tee

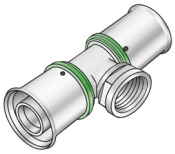


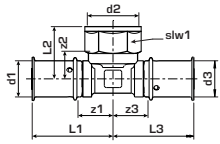


Zeta-optimized press-fit tee, equal or reduced, made of brass with non-porous metal plating, incl. support sleeves with O-rings and stainless steel pressing sleeves, "leak before pressed"

d1 mm	d2 mm	d3 mm	L1 mm	z1 mm	L2 mm	z2 mm	L3 mm	z3 mm
16	16	16	35	12.5	35	12.5	35	12.5
20	20	20	40	14.5	40	14.5	40	14.5
25	25	25	49	16	50	16	49	16

SMX447 STEELOX tee with female thread branch

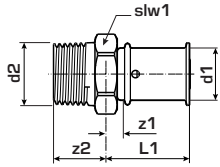




Press-fit tee with female thread branch, made of dezincification resistant brass (DZR) with non-porous metal-plating, incl. support sleeves with O-rings and stainless steel pressing sleeves, "leak before pressed"
DO NOT join threaded pipe or malleable iron fittings!

d1 mm	d2 inches	d3 mm	L1 mm	z1 mm	L2 mm	z2 mm	L3 mm	z3 mm	slw1 mm
16	1/2"	16	40	15	26	13	40	15	24
20	1/2"	20	43	15	28	15	43	15	24

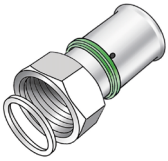
SMX450 STEELOX adapter with male thread

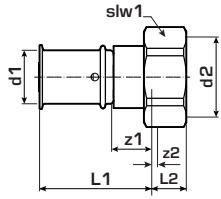


Press-fit adapter with male thread for sealing, made of dezincification resistant brass (DZR) with non-porous metal plating, incl. support sleeves with O-rings and stainless steel pressing sleeves, "leak before pressed"

d1 mm	d2 inches	L1 mm	z1 mm	z2 mm	slw1
16	1/2"	25	4	21	22
20	1/2"	28	4	21	27
20	3/4"	28	4	21	30
25	3/4"	35	4	21	33
25	1"	35	5	31	38

SMX455 STEELOX union with female thread

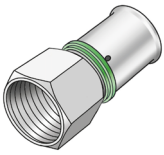


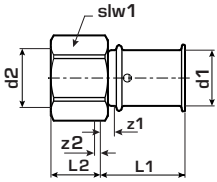


Press-fit union with female thread for connection to fittings and devices such as filters, manifolds, pumps, ... made of dezincification resistant brass (DZR) with non-porous metal plating, incl. support sleeves with O-rings and stainless steel pressing sleeves, "leak before pressed"

d1 mm	d2 inches	L1 mm	z1 mm	L2 mm	z2 mm	slw1 mm
16	1/2"	37	12	24	2	24
16	3/4"	38	13	26	3	30
20	3/4"	40	13	26	1.6	30
25	3/4"	51	16	27	3	30

SMX457 STEELOX adapter with female thread

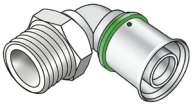


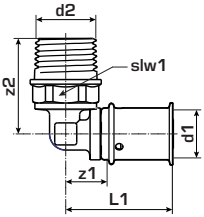


Press-fit adapter with female thread, made of dezincification resistant brass (DZR) with non-porous metal-plating, incl. support sleeves with O-rings and stainless steel pressing sleeves, "leak before pressed" for d16–50mm
DO NOT join threaded pipe or malleable iron fittings!

d1 mm	d2 inches	L1 mm	z1 mm	L2 mm	z2 mm	slw1 mm
16	1/2"	25	5	15	3	24
20	1/2"	27	5	15	3	24
20	3/4"	27	6	16	4	32
25	3/4"	34	6	16	4	32

SMX460 STEELOX 90° adapter elbow with male thread

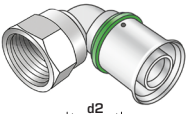


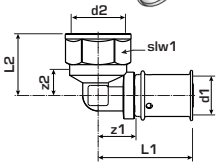


Press-fit adapter elbow with male thread for sealing, made of dezincification resistant brass (DZR) with non-porous metal plating, incl. support sleeves with O-rings and stainless steel pressing sleeves, "leak before pressed"

d1 mm	d2 inches	L1 mm	z1 mm	z2 mm	slw1 mm
16	1/2"	40	15	33	21
20	1/2"	42	15	33	21
20	3/4"	45	18	41	27
25	3/4"	52	18	41	27

SMX467 STEELOX 90° adapter elbow with female thread

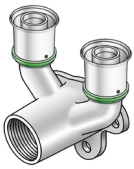




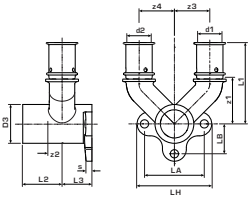
Press-fit adapter elbow with female thread, made of dezincification resistant brass (DZR) with non-porous metal-plating, incl. support sleeves with O-rings and stainless steel pressing sleeves, "leak before pressed"
DO NOT join threaded pipe or malleable iron fittings!

d1 mm	d2 inches	L1 mm	z1 mm	L2 mm	z2 mm	slw1 mm
16	1/2"	40	15	33	17	24
20	1/2"	42	15	33	17	24
20	3/4"	45	18	41	22	30
25	3/4"	52	18	41	22	30

SMX477 STEELOX double U wall plate with female thread

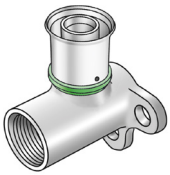


Double U press-fit wall plate with female thread, made of brass with non-porous metal plating, incl. support sleeves with O-rings and stainless steel pressing sleeves, "leak before pressed"
Total height:
1/2" – 46 mm
3/4" – 46.5 mm
DO NOT join threaded pipe or malleable iron fittings!

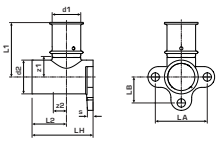


d1 mm	d2 mm	d3 inches	L1 mm	z1 mm	L2 mm	z2 mm	L3 mm	z3/z4 mm	LH mm	LB mm	LA mm	s mm
16	16	1/2"	57	35	27	10	20	25.5	50	21	39	4
20	20	1/2"	59	35	27	10	20	25.5	50	21	39	4
25	25	1/2"	75	44	27	11	20	25.5	50	21	39	4

SMX480 STEELOX 90° wall plate with female thread

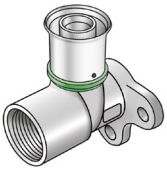


Press-fit wall plate with female thread, made of dezincification resistant brass (DZR) with non-porous metal-plating, incl. support sleeves with O-rings and stainless steel pressing sleeves, "leak before pressed"
Total height:
1/2" – 46 mm
3/4" – 52mm
DO NOT join threaded pipe or malleable iron fittings!

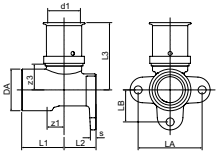


d1 mm	d2 inches	L1 mm	z1 mm	L2 mm	z2 mm	LH mm	LB mm	LA mm	s mm
16	1/2"	40	15	26.5	15	46	20	40	4
20	1/2"	42.5	15	26.5	15	46	20	40	4
25	3/4"	54	20	28	10	56	20	40	4

SMX480Z STEELOX zeta 90° wall plate with female thread

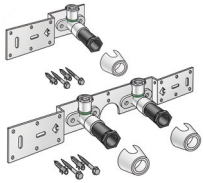


Zeta-optimized press-fit wall plate with female thread, made of brass with non-porous metal plating, incl. support sleeves with O-rings and stainless steel pressing sleeves, "leak before pressed"
Total height:
1/2" – 46 mm
3/4" – 52mm
DO NOT join threaded pipe or malleable iron fittings!



d1 mm	d2 inches	L1 mm	z1 mm	L2 mm	z2 mm	LH mm	LB mm	LA mm	s mm
16	1/2"	42.5	20	26.5	15	39	20	40	4
20	1/2"	42.5	17	26.5	15	39	20	40	4

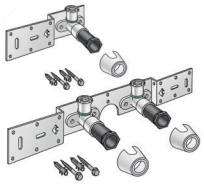
SMX485 STEELOX connecting set



With SMX480 90° elbow wall plate, sound insulated, plug, metal bracket, anchors, and fasteners
DO NOT join threaded pipe or malleable iron fittings!

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

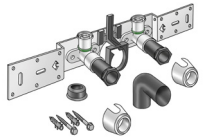
SMX485Z STEELOX Zeta connecting set



With SMX480Z Zeta-optimized 90° elbow wall plate, sound insulated, plug, metal bracket, anchors, and fasteners
DO NOT join threaded pipe or malleable iron fittings!

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

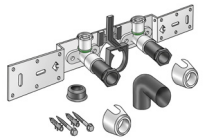
SMX485SB STEELOX connecting set with siphon elbow



With SMX480 90° elbow wall plate, sound insulated, plug, metal bracket, anchors, and fasteners, incl. siphon adapter elbow d50mm and GI nipple d30
DO NOT join threaded pipe or malleable iron fittings!

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

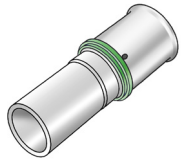
SMX485SZ STEELOX Zeta connecting set with siphon elbow

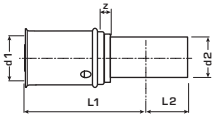


With SMX480Z Zeta-optimized 90° elbow wall plate, sound insulated, plug, metal bracket, anchors, and fasteners, incl. siphon adapter elbow d50mm and GI nipple d30
DO NOT join threaded pipe or malleable iron fittings!

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

SMX489 STEELOX – STEELFIX adapter



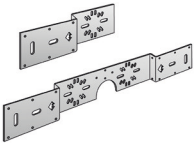


Press-fit adapter, straight, from Steelfix/Copperfix pipe dimension to STEELOX – pressing socket made of red brass with non-porous metal-plating, incl. support sleeves with O-rings and stainless steel pressing sleeves, "leak before pressed" CAUTION! Connection to pipe end only as a compression fitting or press-fit connection.

d1 mm	d2 mm	L1 mm	z1 mm	L2 mm
16	15	35	12.5	20
20	22	29	29	3
25	22	44	11	21

STEELOX accessories

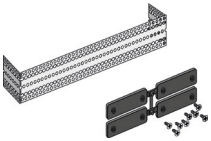
K85A KELIT connector rail



For mounting KELEN, KETRIX, KELOX and STEELOX elbow wall plates,made of galvanized sheet steel

Single connection cm	Ct./ PU
8–10	1
15/4.5 cm	1
15/1.5 cm	1

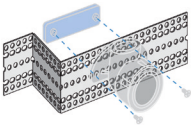
K85H KELIT hollow-wall mounting rail



For cutting-to-length and mounting the KELEN, KETRIX, KELOX and STEELOX connecting sets in drywall, incl. 4 anchors and 8 fastening screws

Length mm	Ct./ PU
350	1

K86L KELIT perforated metal rail



For mounting STEELOX elbow wall plates in all situations and at various installation distances, galvanized sheet steel.

Length m	Ct./ PU
2	50

K86D KELIT anchors for K86L

Anchors for perforated metal rail K86L, incl. sound insulation plates and fastening screws

Size	Ct./ PU
Anchors for K86L	10

K85K KELIT sound insulation cap

For acoustic decoupling of KELEN, KETRIX, KELOX and STEELOX elbow wall plates. CANNOT be use for mounting. Use ONLY in combination with a separate fitting mount.

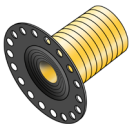
Size	Ct./ PU
SMX 16/20	1
SMX477 16/20	1

KM533 KELIT wall plate sealing disk

Safety spray protection, self-adhesive on one side, for watertight feed through wall plates in drywall installation as well as beneath ceramic tiling in wet rooms

Size	Ct./ PU
25/1/2"	1
28/3/4"	1

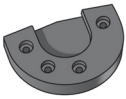
KM534 — Wall plate sealing collar



Seal for drywall and normal installation protruding from the wall, incl. 60 mm long plastic sleeve tube that can be cut to length. The installation plug can be screwed into the wall plate and easily removed during completion work.

Size	Ct./ PU
1/2"	1
3/4"	1

KM534W — Wall plate insulating liner



Insulating liner made of elastomer, for sliding onto SMX480, SMX480Z and SMX477 wall plates

Size	Ct./ PU
1/2"	1

K88 — KELIT pipe support

Galvanized sheet steel pipe support, sizes d16, 20, 25 on pipe, self-clamping design

Length: 2m

Size	Ct./ PU
16	40
20	40
25	40

STEELOX tools

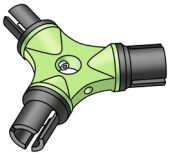
WZ515 STEELOX tool set

Tool set for fitting STEELOX system parts

Tool SET 1 includes:
WZ580 pressing jaws – SX d16-25,
WZ516 multi pipe deburring tool d16-25,
WZ532 pipe cutter d16-25,
WZ520 bending spring d16-20,
Special knife for stripping
STEELOX Plus pipes,
STEELOX installation manual,
packaged in carrying case.

Item	Ct./ VPE
Set 1	1
Case	1

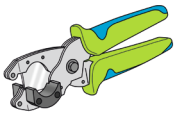
WZ516 STEELOX multi pipe deburring tool



Multi pipe deburring tool for rounding-off cut edges and applying inner bevel to STEELOX multilayer composite piping

Size mm	Ct./ VPE
16/20/25	1

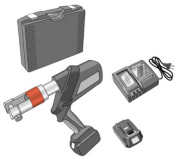
WZ532 STEELOX pipe cutter



For cutting STEELOX multilayer composite pipes up to d25 mm to length

Size	Ct./ PU
16-25	1
Replacement blade	1

WZ970 KELIT cordless press – Li-Ion



Electro-mechanical cordless press – LI-Ion 18V 3Ah (Klauke), for press-fitting:

KELOX / WINDOX press-fit system parts d16-75mm

STEELOX press-fit system parts d16-25mm

STEELFIX press-fit system parts d15-54mm

COPPERFIX press-fit system parts d15-54mm

COOLFIX press-fit system parts d12mm
incl. 2 rechargeable batteries 18V and 230V charger for 18V

	Ct./ VPE
SET-1 Li-Ion	1
Press base unit Li-Ion	1
Battery 18V/3Ah Li-Ion	1
Charger Li-Ion 18V	1
Case, blue	1

Caution! When using a different tool brand, a minimum pressing power of at least 30kN is required.

KE KELIT recommends servicing pressing tools annually to ensure proper function and to maintain the warranty. Please contact KE KELIT or the relevant tool manufacturers directly.

WZ580 STEELOX pressing jaws – SX

Pressing jaw inserts for press-fitting STEELOX system parts using WZ970 KELIT CORDLESS press tool
Item: SX profile

CAUTION! Only for use with STEELOX!

KE KELIT recommends servicing pressing tools annually to ensure proper function and to maintain the warranty. Please contact KE KELIT or the relevant tool manufacturers directly.

Size	Ct./ PU
16	1
20	1
25	1

WZ520 STEELOX bending spring

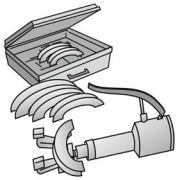
For bending STEELOX multilayer composite pipes to tight radii (smaller than 8d) without cross-section constriction, equipped with extension spring 0.9 m.

Spring length: 640mm

Extension spring 0.9 m available separately upon request.

Size	Ct./ PU
16	1
20	1

WZ925 KELIT pipe bending tool

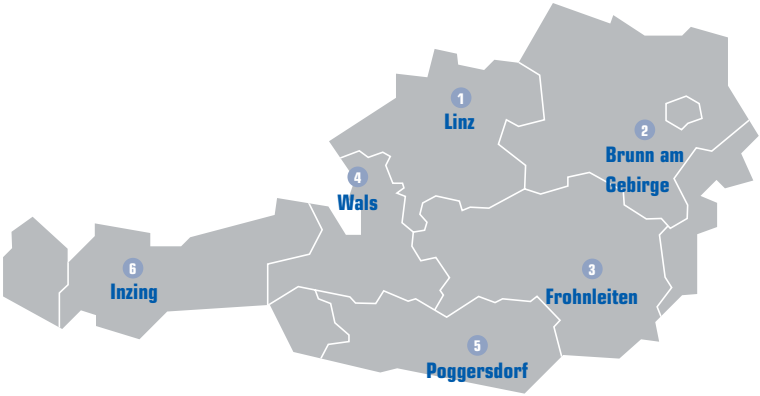


For making even bends on STEELOX multilayer composite pipes

Size	Ct./ PU
16-40	1

Representative offices, production and headquarters

Because the STEELOX system is such an important product line, parts are well-stocked throughout the entire wholesale heating and plumbing sector.



1 Production and main distribution center

KE KELIT GmbH

Ignaz-Mayer-Straße 17A-4020 Linz
PHONE +43 (0) 5 0779
FAX +43 (0) 5 0779 318
EMAIL office@kekelit.com
WEB www.kekelit.com

❶ Regional office for Upper Austria

KE KELIT GmbH
Ignaz-Mayer-Straße 17, A-4020 Linz
Phone +43 (0) 5 0779 740
Fax +43 (0) 5 0779 318
Email linz@kekelit.com

❷ Regional office for Vienna, Lower Austria, and Burgenland

KE KELIT Vienna Office
Campus 21, Liebermannstraße A02 603
A-2345 Brunn am Gebirge
Phone +43 (0) 5 0779 710
Fax +43 (0) 5 0779 729
Email wien@kekelit.com

❸ Regional office for Styria

KE KELIT Styria Office
Grazer Straße 10, A-8130 Frohnleiten
PHONE +43 (0) 5 0779 780
FAX +43 (0) 5 0779 789
EMAIL stmk@kekelit.com

❹ Regional office for Salzburg

KE KELIT Salzburg Office
Sironastraße 4/Top A, A-5071 Wals
PHONE +43 (0) 5 0779 750
FAX +43 (0) 5 0779 759
EMAIL sbg@kekelit.com

❺ Regional office for Carinthia

KE KELIT Carinthia Office
Wirtschaftspark 11, A-9130 Poggersdorf
PHONE +43 (0) 5 0779 790
FAX +43 (0) 5 0779 799
EMAIL kaernten@kekelit.com

❻ Regional office for Tyrol, and Vorarlberg

KE KELIT Tyrol Office
Bahnstraße 14b, A-6401 Inzing
PHONE +43 (0) 5 0779 760
FAX +43 (0) 5 0779 769
EMAIL tirol@kekelit.com

Representative offices, production and headquarters

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Production and main distribution center

KE KELIT GmbH

Ignaz-Mayer-Straße 17A-4020 Linz

PHONE +43 (0) 5 0779
FAX +43 (0) 5 0779 318
EMAIL office@kekelit.com
WEB www.kekelit.com

KE KELIT GmbH
A 4020 Linz, Ignaz-Mayer-Straße 17, Austria, Europe
PHONE +43 (0) 50 779 **EMAIL** office@kekelit.com

www.kekelit.com

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