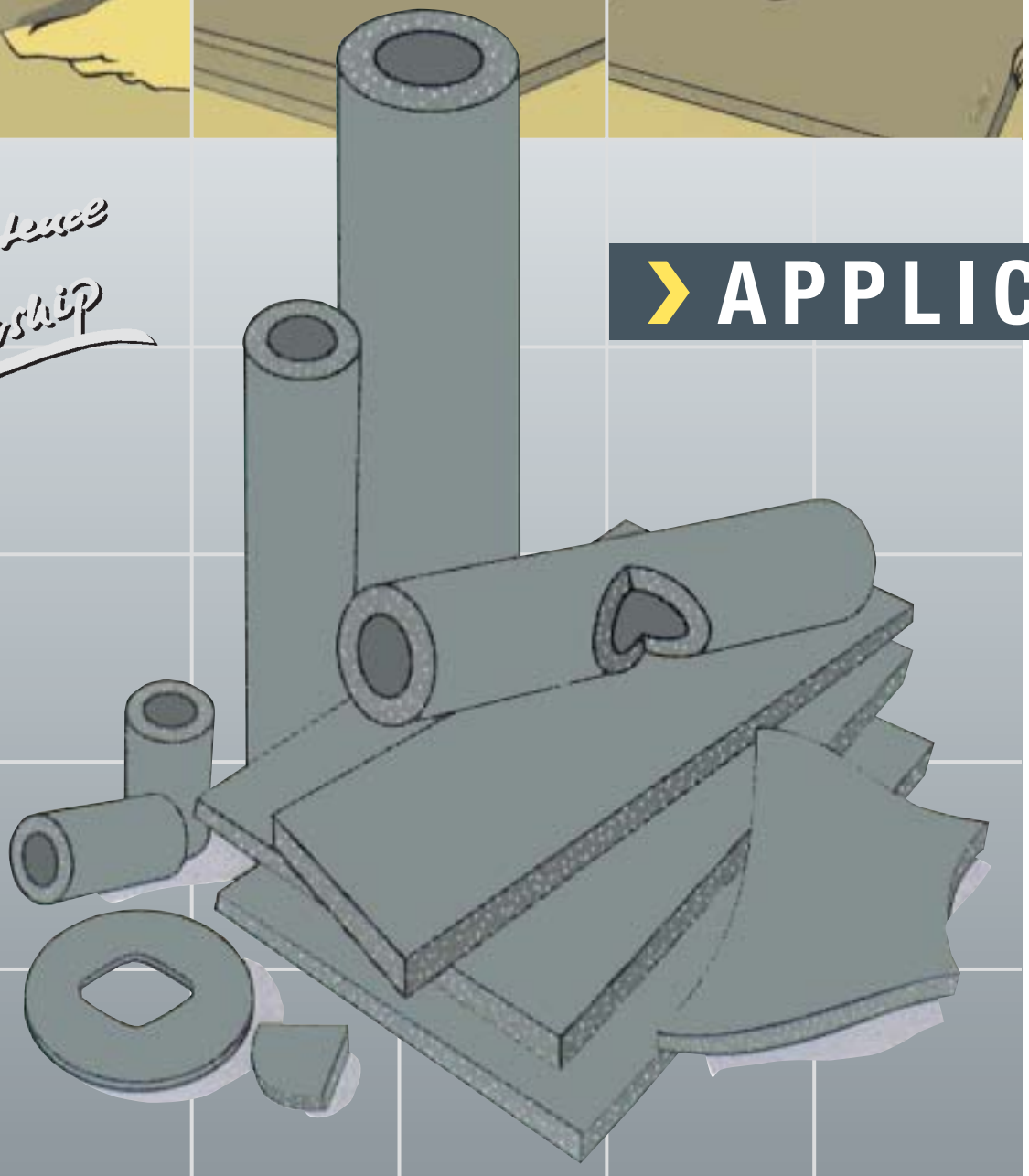
kaiflex®
INSULATION SYSTEMS

Competence and Partnership

› APPLICATION GUIDE



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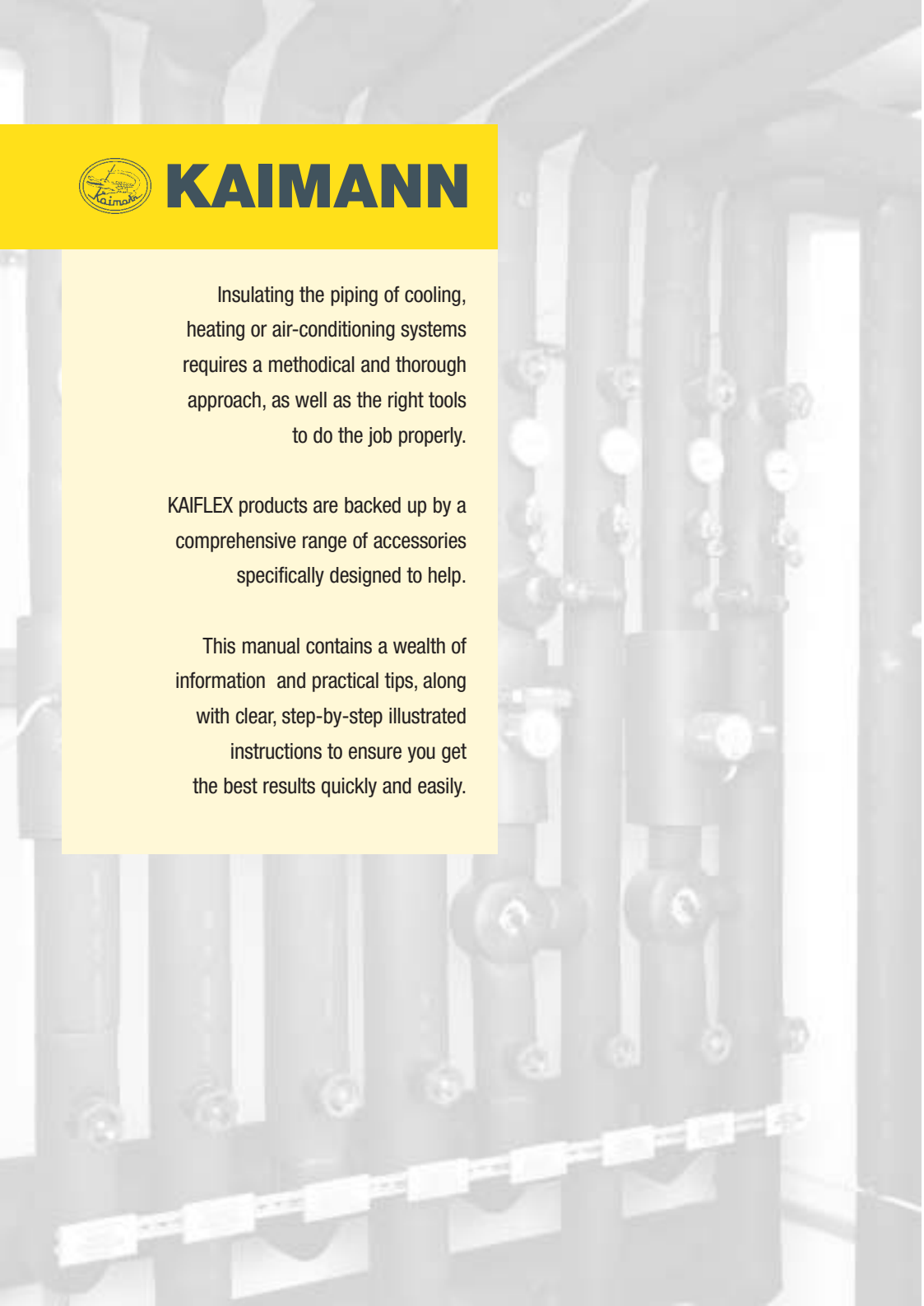


KAIMANN

Insulating the piping of cooling, heating or air-conditioning systems requires a methodical and thorough approach, as well as the right tools to do the job properly.

KAIFLEX products are backed up by a comprehensive range of accessories specifically designed to help.

This manual contains a wealth of information and practical tips, along with clear, step-by-step illustrated instructions to ensure you get the best results quickly and easily.

GENERAL INFORMATION

GUIDE TO SYMBOLS

A red line with an arrow indicates the direction for measuring or fitting.

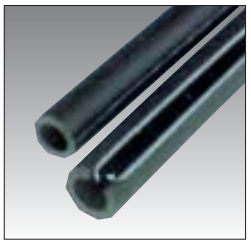
A blue arrow indicates parts or sections to be glued.

Green lines and arrows indicate a dimension to be measured.

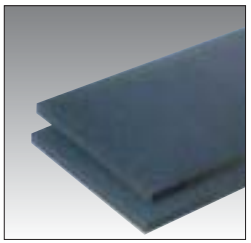
A yellow line represents a measurement and its position on a sheet to be cut to size.

KAIFLEX INSULATING PRODUCTS

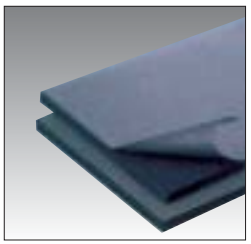
TUBING



SELF-ADHESIVE TUBING

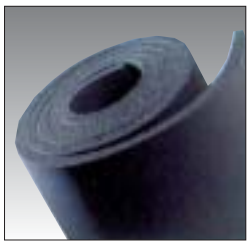


SHEETS

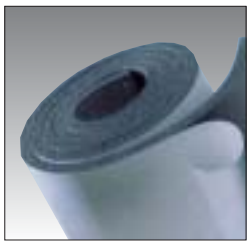


SELF-ADHESIVE SHEETS

KAIMANN produces flexible insulating tubing and sheeting made of black synthetic, vulcanized foam. Self-adhesive versions are also available. A variety of product types, from tubing to flat sheeting, is available with specific technical characteristics for individual applications. Where the tubing has to be cut along its length, the thermal insulating characteristics are maintained using KAIFLEX K 414 glue. With large diameter pipes or conduits, lagging is carried out using elastomeric sheeting which can be cut to size. For technical information on KAIFLEX products and details of size available, please refer to the individual specification sheets which are available from the KAIMANN Technical Office. KAIMANN recommends that fitting should be carried out to the highest standards possible to optimize the effectiveness of the insulation.



ROLLS

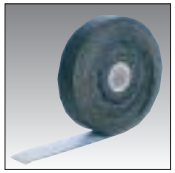


SELF-ADHESIVE ROLLS

KAIFLEX ACCESSORIES

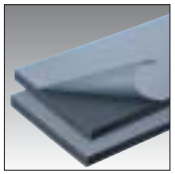
KAIFLEX K 414 GLUE

KAIFLEX K 414 glue is specifically designed for use with KAIFLEX products. Once glued the sections and surfaces are securely attached. The glue hardens on drying and is thus weatherproof and resistant to ageing.



KAIFLEX ADHESIVE INSULATING TAPE

Special, 3 mm-thick, self-adhesive, 5 cm wide insulating tape for covering gaps or sealing insulated sections.



KAIFLEX SELF-ADHESIVE STRIPS

Elastomeric foam strips are available in a selection of lengths, widths and thickness that can be used on surfaces where sheets would normally be cut to measure, thus avoiding the waste of off-cuts from larger sheets.

KAIFLEX CUTTER

It features a special, anatomic grip and makes accurate longitudinal cuts easy in KAIFLEX insulating tubing, so that they can be installed on fitted pipes.

KAIFINISH

KAIFINISH is an acrylic paint that can be diluted in water to protect insulation both indoors and outdoors. The paint is environmentally safe and odourless, making it particularly suitable for use in confined spaces. It gives a professional, durable finish. It dries rapidly and provides excellent coverage.

When used as a primer, subsequent layers of white paint retain their colour even in dark surroundings.
Colours are fade resistant.

KAIFLEX THINNER

It is recommended that surfaces to be lagged should first be cleaned with KAIFLEX thinner, which is suitable for use with KAIFLEX K 414 glue.

The glue will adhere perfectly to surfaces cleaned with the proprietary thinner.

KAIFLEX thinner can also be used to clean tools (brush, spatula, etc.).

Shelf life: sealed unlimited.

USING PRODUCTS AND ACCESSORIES

CLEANING SURFACES

The surfaces to be glued must be perfectly clean and free of grease (use KAIFLEX thinner). Ensure that the surface of the KAIFLEX insulating material is also clean, otherwise it will not stick properly.

COATED SURFACES

Where surfaces have previously been painted, ensure that the glue will adhere to the paint. Do not use the glue on surfaces that have been treated with products containing asphalt, bitumen or linseed oil. Use only chrome-zinc rust inhibitors and removers.

USING THE GLUE

Preparation and storage: Before use, stir the KAIFLEX K 414 glue thoroughly. To store the glue, close the lid tightly to avoid the solvents evaporating. If the glue should become too hard (e.g. when stored in contact with the air or in extreme temperatures), dilute with KAIFLEX thinner.

Method of application: When using a large quantity (e.g. a tin of 2,2 litres), pour a small amount out into a separate container and top up when necessary. When applying KAIFLEX insulation to metallic or other surfaces, the K 414 glue must first be applied to the insulation material, then to the corresponding surface. Conditions for use. Do not apply to systems that are in use. Do not use in sunlight. The insulation should be left to dry for 36 hours before turning the system back on. The ideal working temperature of the glue is +20 °C. Do not use the glue at temperatures below + 5 °C as drying times are excessive. At temperatures above + 30 °C, the glue dries very rapidly.

HARDENING TIME	: 36 hours
STORAGE	: in cool conditions, away from cold and heat
SHELF LIFE	: one year
QUANTITIES USED	: with insulation sheets, from 0,2 to 0,3 litres per m^2

CHOOSING KAIFLEX INSULATING MATERIALS

Before starting, choose the right type of KAIFLEX insulation for the parts to be lagged. Use the thicknesses and sizes which are most suitable for the individual parts of the installation. Do not forget - your KAIFLEX dealer can give expert advice.

USING KAIFLEX INSULATION MATERIALS

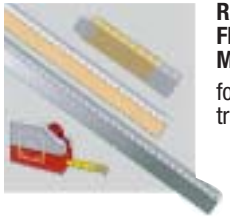
Insulation tubing that is oval or flattened (e.g. the larger cross-section) should be cut along the flattened surface. The pipes which show an oval form, are to be slit always in the flat side.

USING KAIFLEX-FINISH PAINT

The paint can be applied as soon as the KAIFLEX K 414 glue has dried.
Paint within two weeks of fitting.

TOOLS

A selection of good tools is essential for carrying out jobs to the highest standards.



RIGID AND FLEXIBLE TAPE MEASURE

for measuring and tracing lines to cut.

SCISSORS

to facilitate cutting insulating material.

CHALK AND COMPASS

to draw reference lines for measurements and cuts.

METAL BAND

to help cut insulating sheets at the end of large diameter pipes.

STANLEY; OR OTHER KNIFE

use both long and short bladed knives, with spare blades.

BRUSHES (VARIOUS) AND FLEXIBLE SPATULA

for spreading glue and painting.

CALLIPER

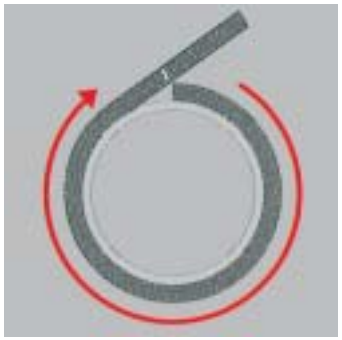
for measuring the external diameter of surfaces to be insulated.

CIRCULAR PUNCHES

in common size, sharp at one end to punch out holes in the insulation in the diameter required.

PRACTICAL TIPS

Many tasks encountered when insulating a system are repetitive. We have attempted to provide examples which can help to bring optimum results straight away, saving time and effort.



MEASURING A CIRCUMFERENCE

The measurement is obtained by using a strip of KAIFLEX of the same thickness to be used as insulation.

This gives you the measurement of the circumference, including the thickness of the insulating material itself.

Do not stretch the strip when encircling the pipe, as this will alter the measurement. Mark the strip with chalk where the two edges overlap.

GLUEING THE EDGES OF A TUBE CUT ALONG ITS LENGTH

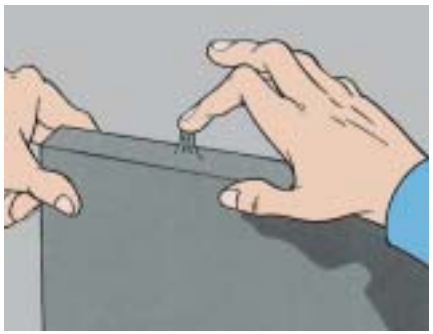
To glue the edges, wrap the tube around a larger diameter pipe so that the edges do not overlap and apply the glue. Then slide the tubing over the pipe to be insulated, taking care to avoid the edges sticking before the tube is in place.

If the tube is not very long, or is not very thick, it can be rolled up and glued. This way, the tube can be quickly and easily applied to the pipe.

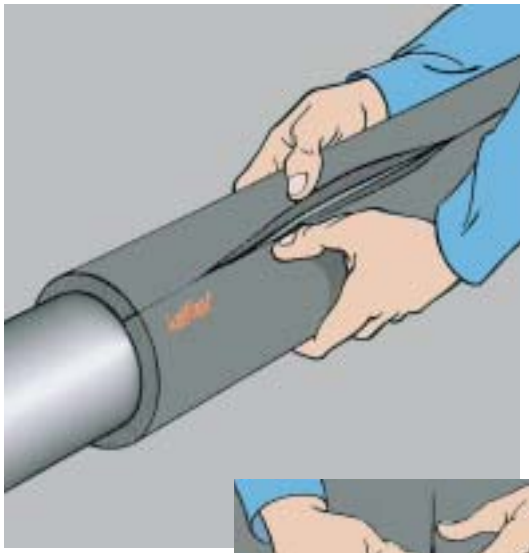
GLUEING THE EDGES OF A KAIFLEX SHEET

When insulating large diameter pipes, sheeting should be cut to fit and both edges glued.
For the best results, a thin, even layer of KAIFLEX K 414 should be applied using a brush with short, hard bristles.

After having spread the glue, ensure that it has dried properly before attempting to stick the edges together.



Test the glued surface by touching it with your finger: if the KAIFLEX K414 no longer sticks to your finger forming threads, it is ready to be positioned.

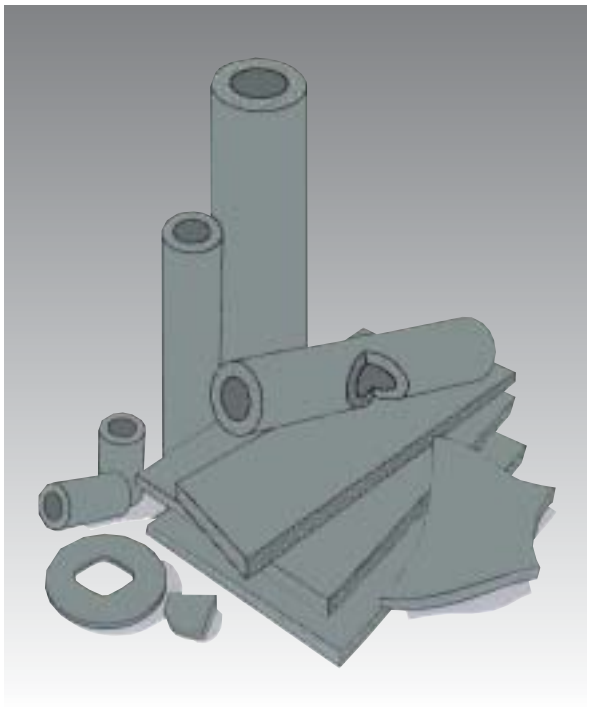


When attaching the two surfaces, press them together firmly with both hands, starting at the far ends, working your way to the centre to avoid an irregular joint.

PAINTING INSULATION FITTED OUTDOORS

We recommend painting insulation outdoors with KAIFINISH to protect it from the weather and from UV rays. To complete the protection, apply two layers of top coat. Allow at least 36 hours (or a maximum of five days) between the first and second coat. An extra layer of paint should be applied every two years.

Use a straight-edged spatula or a roll from lambskin to spread the glue over large areas. If the whole of the surface is to be attached, first apply the glue to the KAIFLEX sheet, then to the surface it is to be stuck to. When the glue has dried sufficiently, attach the sheet to the surface.



USING OFF-CUTS

Off-cuts from KAIFLEX tubes and sheets can be re-used when filling in gaps, or when smaller quantities of material are required.

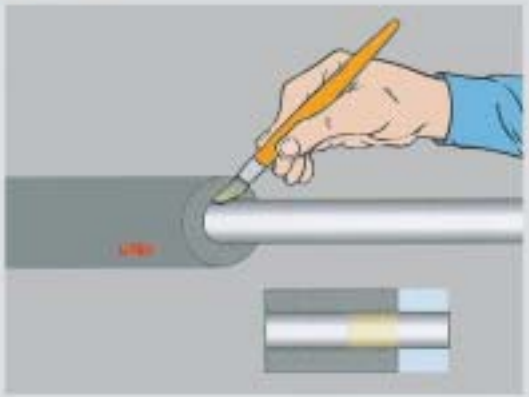
LAGGING PIPES UP TO 160 mm IN DIAMETER WITH KAIFLEX TUBING

Around 80% of piping used in buildings can be insulated before fitting. This simplifies the task and saves time, taking advantage of the wide range of applications offered by an elastomeric produkt like KAIFLEX.

PIPES TO BE FITTED

1 Slide the KAIFLEX tube directly over the pipe from one end.

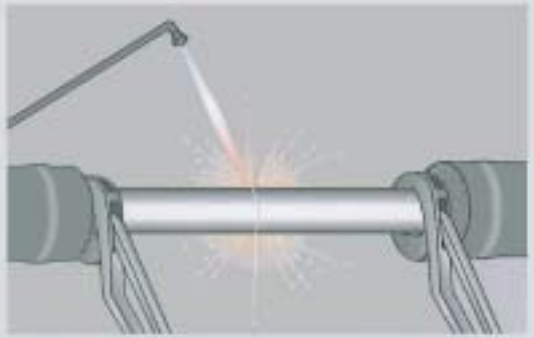
2 Do not force the tube while fitting as this will deform the material. Instead push it smoothly without making unnecessary pressure. This will ensure that it grips to the surface of the pipe naturally, especially around the all-important curved sections.



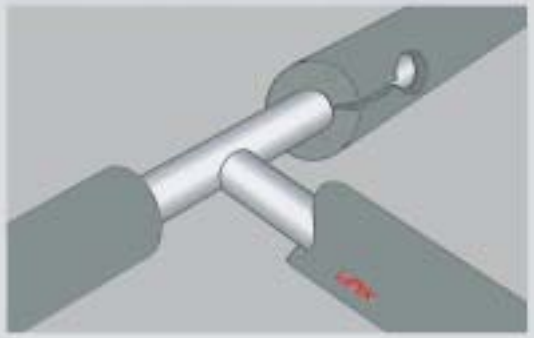
3 When a section of tubing has been positioned satisfactorily, fix at least one end with KAIFLEX K414 to the pipe.

4 Apply glue to the edges of the tubing already in place and the edge of the next section of tubing to be positioned.

5 Bring the edges of the tubing to be glued together and press tightly.



6 If the underlying pipe has to be brazed, free an area 25/30 cm long between the part of the tubing. Once the pipes have cooled, the insulation can be completed.

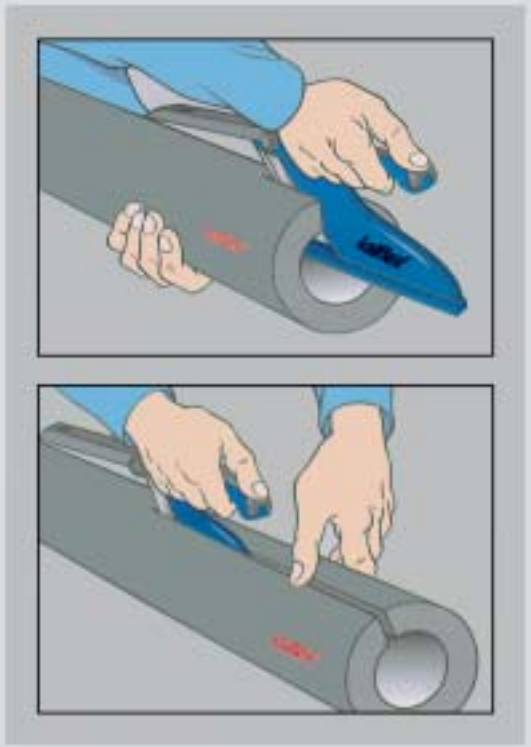


7 Test for strength around critical stress points in the pipes, such as elbow joints, branches or stopcocks, before proceeding to glue the tubing around them.

FITTED PIPES

If the piping has already been installed, the KAIFLEX tubing must be cut along its length to fit in.

1

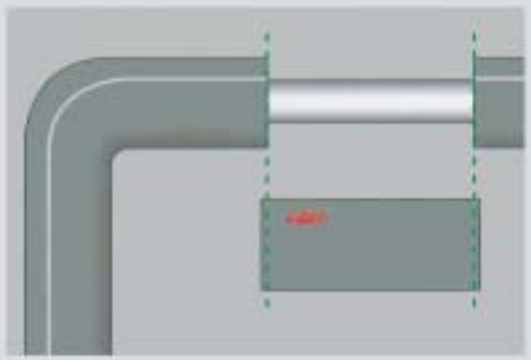


Use only the sharpest knife to effect the cut - this makes the subsequent glueing far easier.

We recommend using the KAIFLEX cutter which is ideal for longitudinal cuts. The use of the cutter is illustrated in these two diagrams. Let the blade run along the tube without the tool's surfaces touching it to avoid fouling the edge.

2 Position the tube so that the edges are separated, and apply an even layer of KAIFLEX K 414 glue.

3 Once the glue has dried, reseal the tube, pressing the edges firmly together.



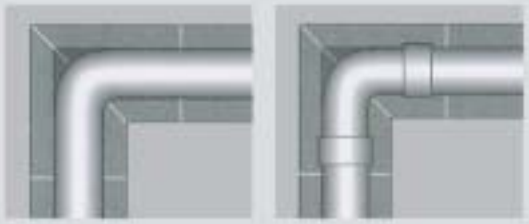
4 When making a joint between two lengths of tubing, cut the insert a little longer than necessary (a couple of millimetres).

If the insert is not long enough, the insulating properties in that area will be reduced.

5 Cut the insert along its length and glue into place.

90° ELBOW FITTINGS

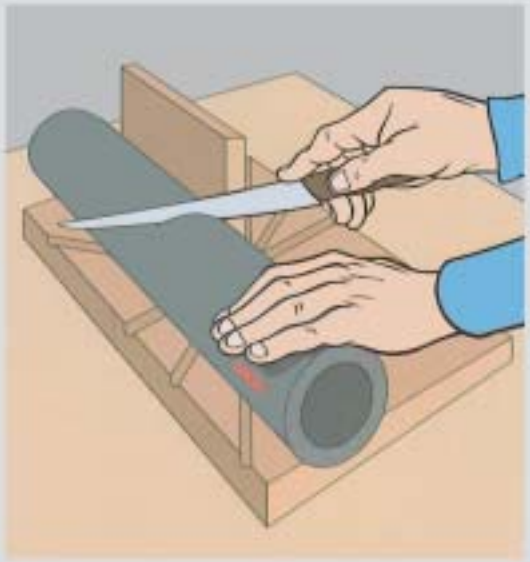
An elbow is a pipe with a 90º bend, either curved or fitted. The attachment points themselves may present a different diameter to the pipes either side. There are thus two solutions to insulating them:
• a right-angled section
• or a segmented section.



INSULATING AN ELBOW FITTING with pipes of the same diameter

1

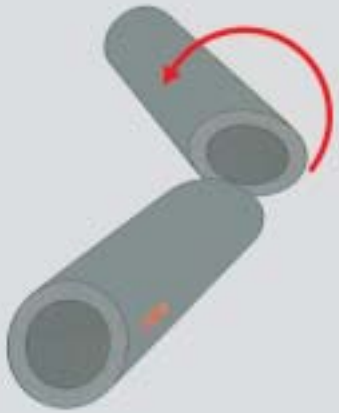
Cut a KAIFLEX tube to the right length to cover the elbow. Cut in the middle at an angle of 45º.



Use a cutting board to form a template for the angle of the cut. A long-bladed knife is required.

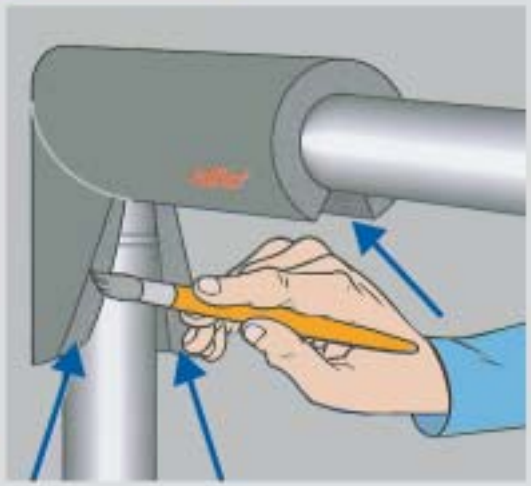
Turn on the pieces of tube until you form a right angle...

2



3 . . . then glue the two sections with KAIFLEX K 414.

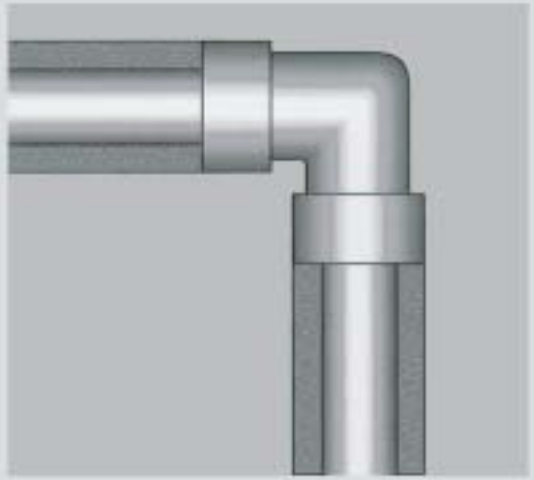
4 After having let the glue dry, cut the right-angled section along its length on the inside.



5 Position it on the pipe and glue the two edges.

Press the edges together to seal.

6

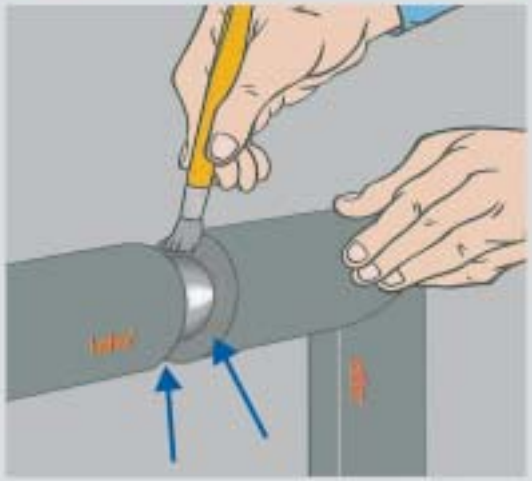


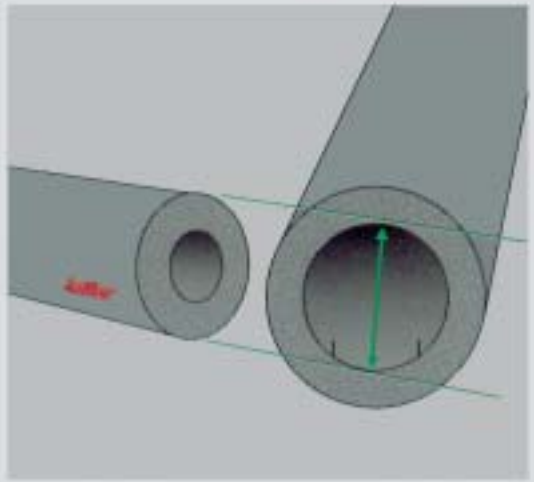
INSULATING AN ELBOW with pipes of different diameters

Should the elbow fitting be substantially different in size to the pipes either side, the latter should be insulated first.

Carefully glue the edges of the elbow section to the straight tubes to be positioned either side.

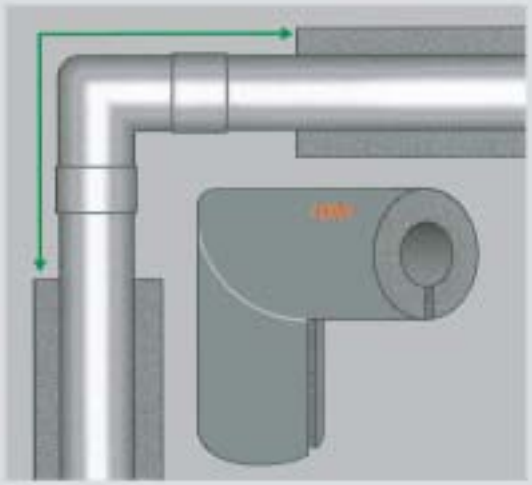
7

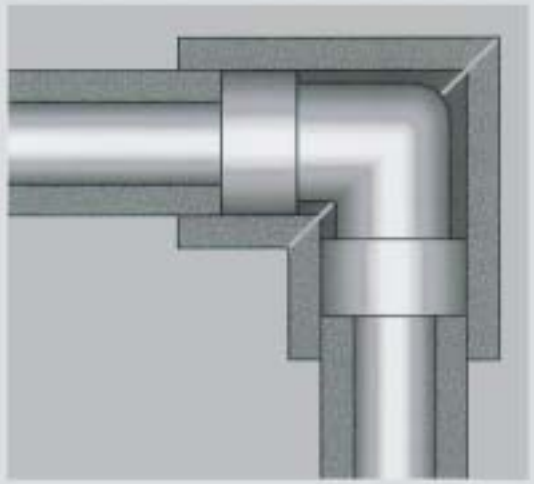




Then find a section of tubing with an internal diameter that is the same as the external diameter of the smaller tubes either side...

If the straight sections have already been glued into place, the right-angled section will have to be accurately measured to fit.

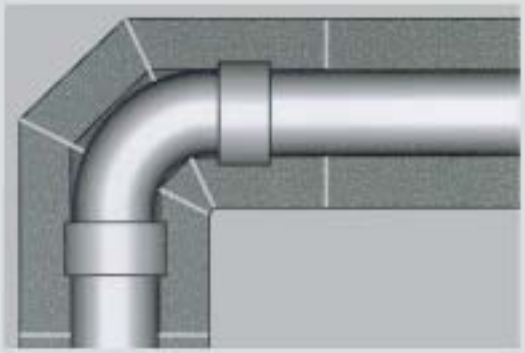


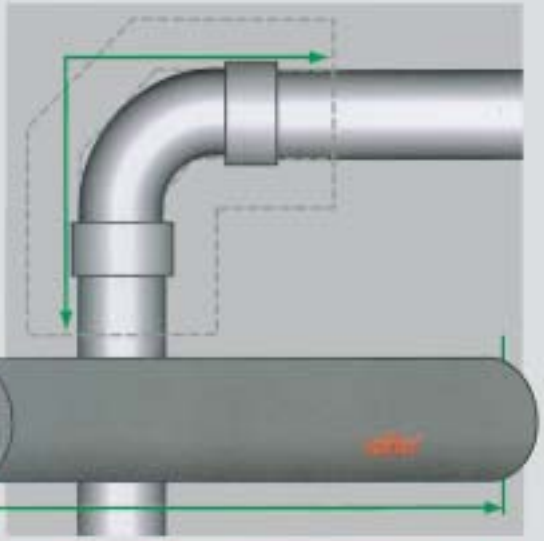


... and cut the right-angled joint so that it overlaps the ends (see illustration).

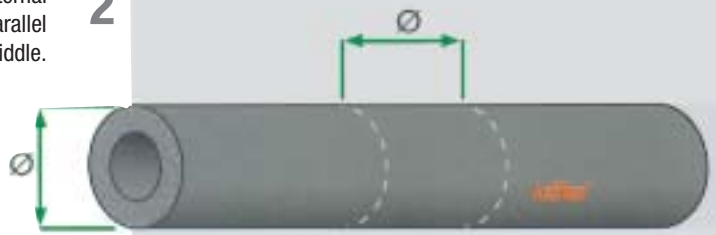
SEGMENTED INSULATION OF AN ELBOW FITTING with pipes of the same diameter

An elbow can also be insulated using jointed sections of tubing. This requires two angled cuts to be made.

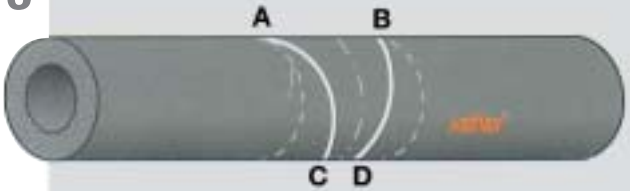




1 Cut a piece of KAIFLEX tubing to the right length to cover the elbow.

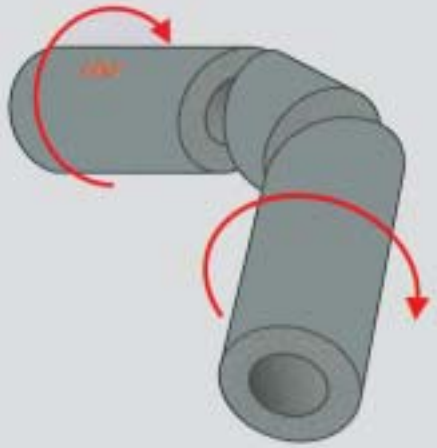


2 Calculate the tube's external diameter and trace two parallel lines this far apart in the middle.



3 Draw a line between the two to mark the centre line. Then make two marks (C and D) on either side of the centre line one centimetre from it and draw two lines running A to C, and B to D (see diagram).

4 Cut along lines AC and BD.



5 Rotate the two ends to obtain a right-angled section.

6 Glue the three sections together.

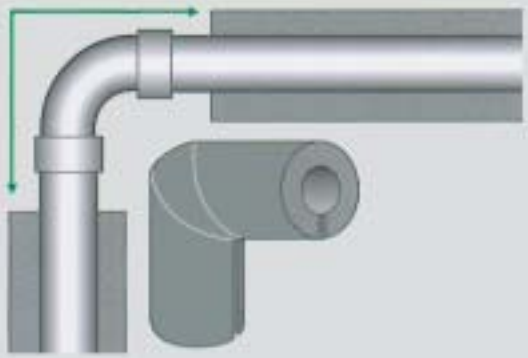
Cut the segmented elbow section along its length on the inside surface only. **8**

Slide the elbow section over the pipe and carefully glue the edges together. **9**

After having completed this stage, fix the elbow section to the tubing either side with KAIFLEX K 414 glue. **10**

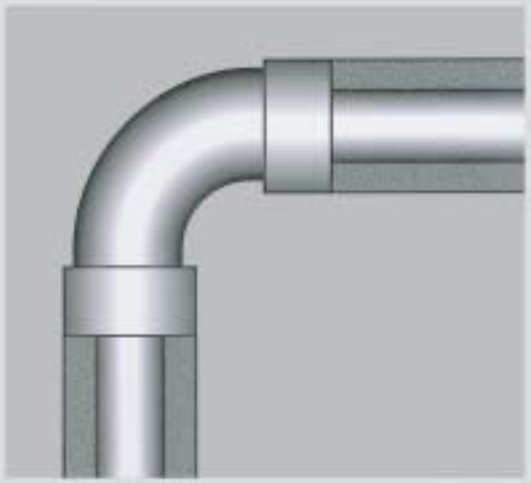
If the adjacent tubes are already in place, the length of the elbow section will have to be accurately measured. **11**

Cut the length of the tube required a little longer than it should be and trim it if necessary.

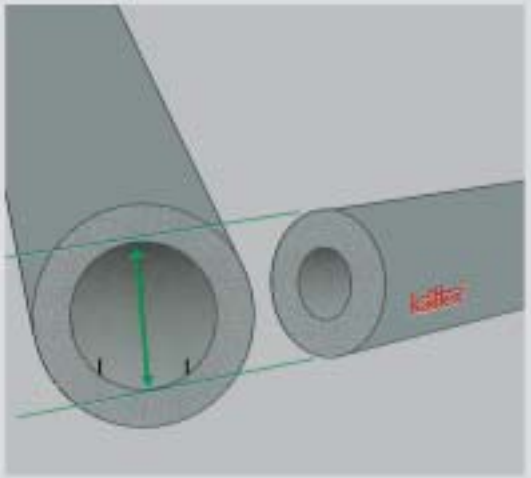


SEGMENTED INSULATION OF AN ELBOW FITTING with pipes of different diameters

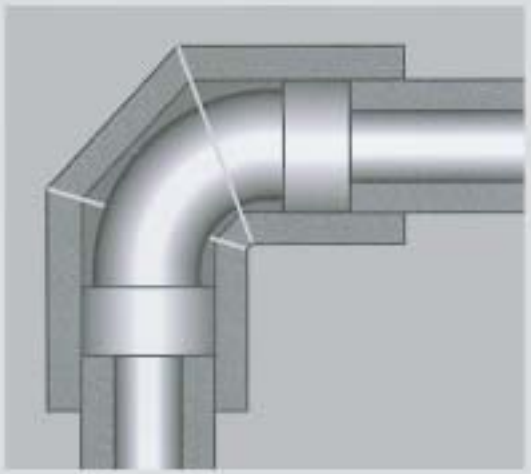
If the pipes either side of the elbow are smaller in diameter, first insulate the straight pipe sections.



Then find a tube with an internal diameter the same as the external diameter of the neighbouring pipes.



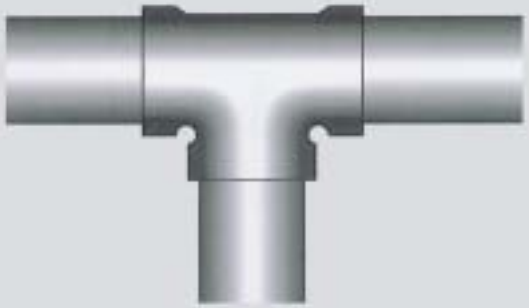
This way, the segmented elbow section will overlap the edges of the insulation either side.



T-FITTINGS

The T-fitting can be lagged with or without the tubing either side having been applied. The latter is the simplest method and thus the one illustrated here.

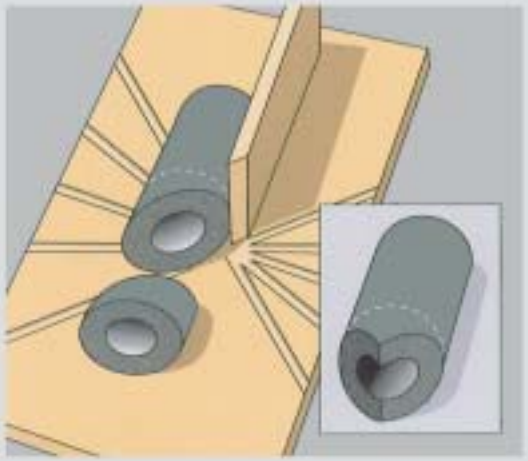
There are two methods of insulating a T-fitting: By dovetailing two tubes with a 90º cut-out or by punching a circular hole.

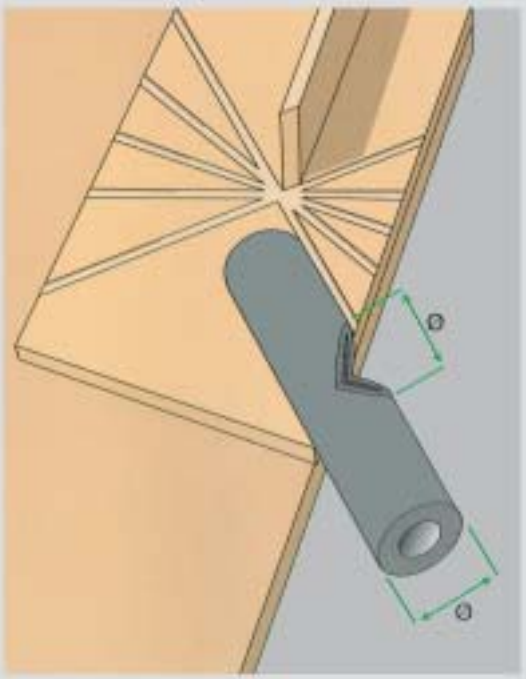


INSULATING A T-FITTING with a 90º cut-out

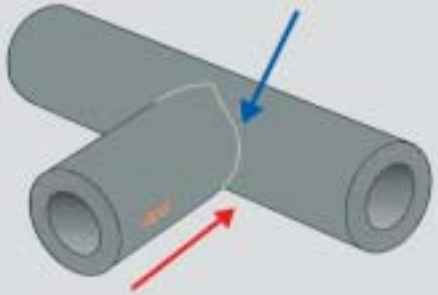
1 Cut a section of KAIFLEX tubing into a third and two-thirds of its original length respectively. The overall length should obviously be sufficient to cover the three pipes leading from the fitting.

2 Using a cutting board, cut the first part of tube twice at an angle of 45º.





3 Taking the second, longer segment, make two 45º cuts in the middle. The cut-away section should have the same cross-section as the outside of the tube so that the two sections (see 2) dovetail perfectly.



4 Glue the cut edges and stick them together in the shape of a „T“.

5 Cut the lower half of the „T“ along its entire length so that it fits snuggly over the T-junction. Then once more apply a layer of KAIFLEX K 414 glue to the edges.

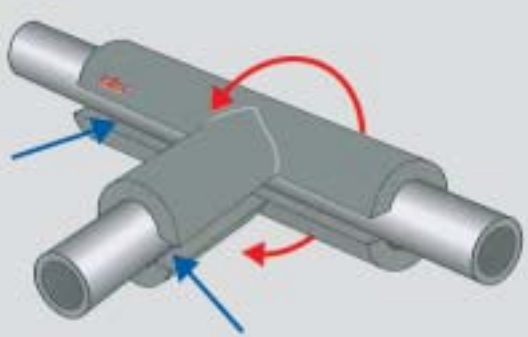
6

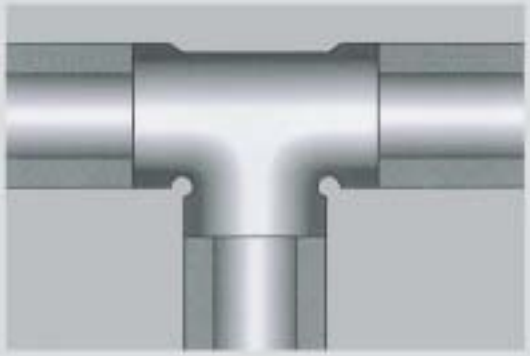
Stick the insulation to the T-junction. Then the three straight tube sections can be attached and glued together.

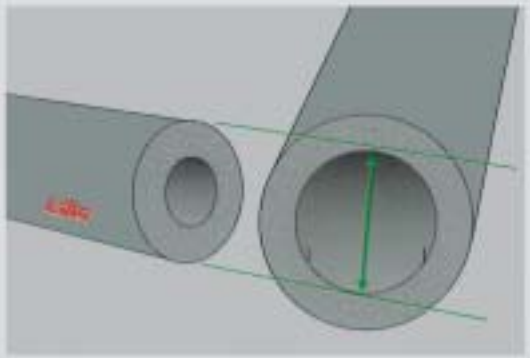
If the adjacent pipes are smaller in diameter than the T-junction, then they need to be insulated before the T-junction itself.

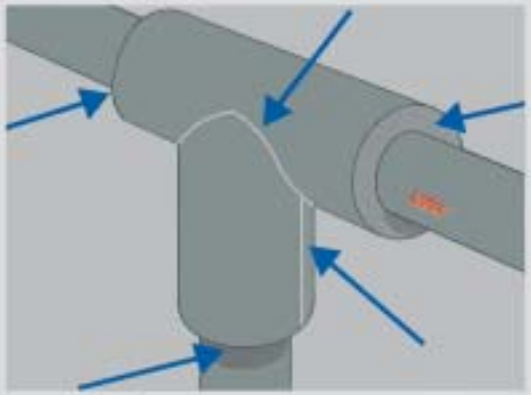
Make a T-section joint as before using, however, a tube with an internal cross-section the same as the external diameter of the neighbouring tubes.

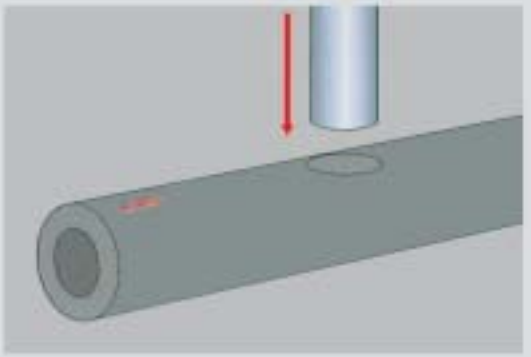
Apply the joint which should overlap the edges of the other insulating tubes. Carefully glue and stick the edges and those surfaces in contact with the other tubes.

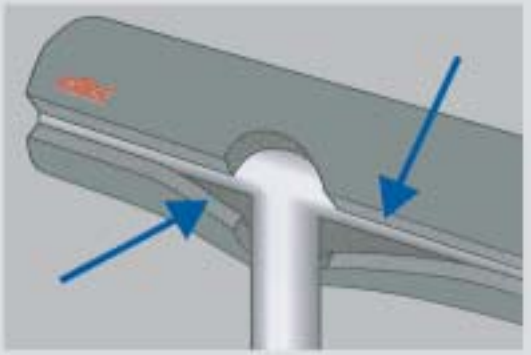












INSULATING A T-FITTING with a round insert

1 Using a punch or metal tube of the same diameter as the tubing, make a hole in the insulating tubing at the point where the „T“ is to be formed.

2 Cut the tube along its length and slide it onto the pipe so that the hole is positioned around the third pipe. Then stick the edges back together.

3 The joint for the lower branch is created by cutting a U-shaped section from a second pipe of tubing.

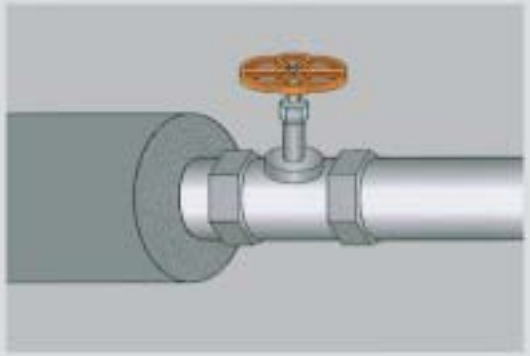
4 Align the lower tube in such a way that it fits perfectly onto the hole in the upper section and glue the section together.

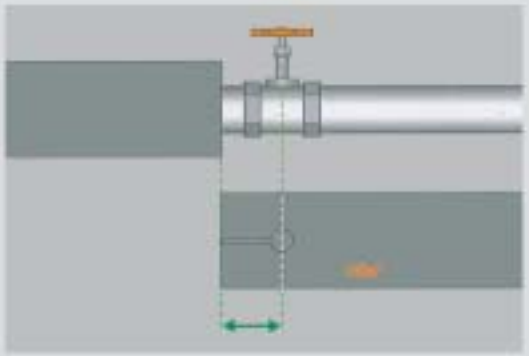
STOPCOCKS

These can be insulated in a number of ways, depending on the type of stopcock.

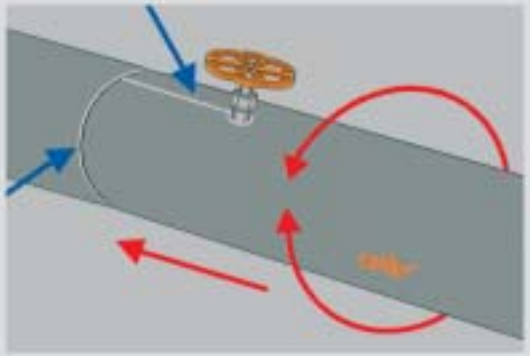
Small valve stem

1 From the edge of the KAIFLEX, make a cut long enough to house the stopcock and punch a hole to fit the stem.



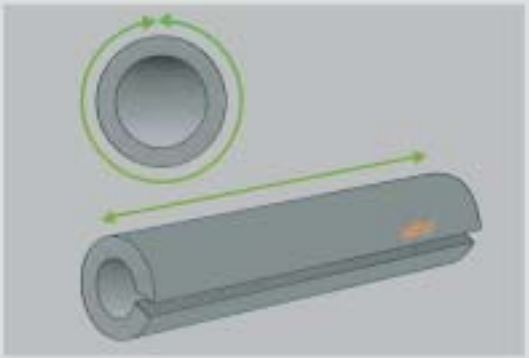


2 Fit the tube snuggly around the stopcock and glue the edges together, then attach it to the adjacent tube.

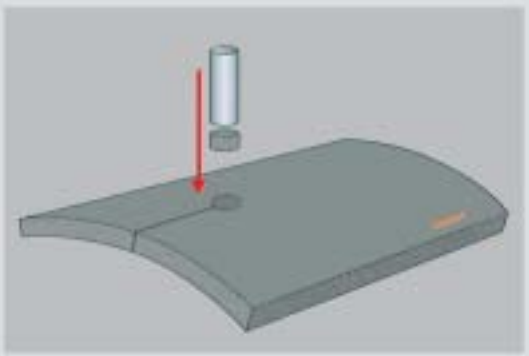


Large diameter valve stem

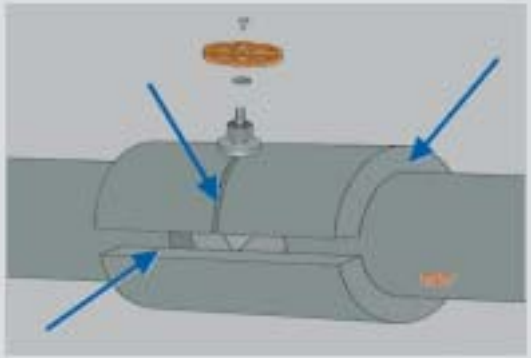
1 Insulate the pipe right up to the stopcock on both sides. Wrap KAIFLEX-self-adhesive insulating tape around the base of the stopcock.



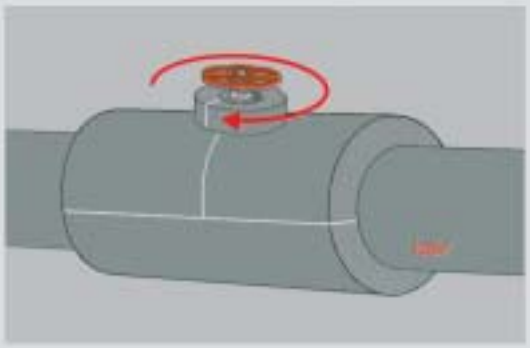
2 Cut a section of KAIFLEX tubing as long as the circumference of the tubing already in place and cut it along its length.



3 Flatten the tube out and make a longitudinal cut with a hole punched at its end to take the stopcock housing.



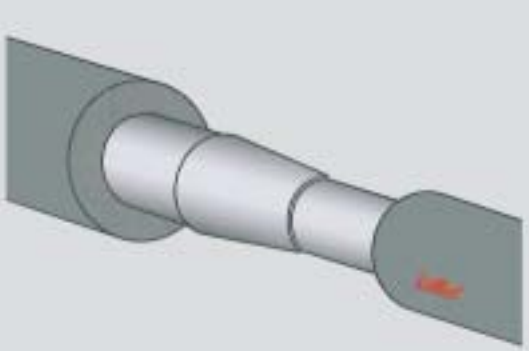
4 Position this around the stopcock so that the sleeve overlaps the ends of the two underlying tubes.
If necessary, remove the stopcock if this gets in the way.



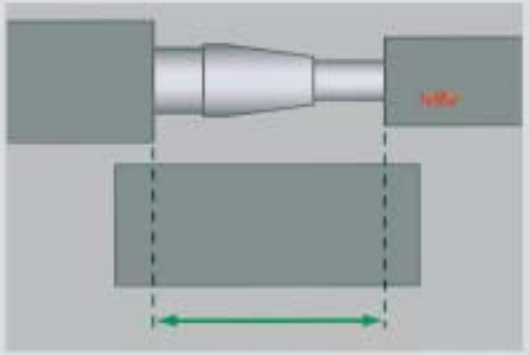
5 Glue and stick the sleeve's edges. If necessary, the stem of the stopcock can also be insulated by applying a ring-shaped section from one of the off-cuts.

INSULATING A COLLAR

1 When insulating a collar that connects two pipes of different diameters, leave sufficient space between the sections of insulating tubing on either side of it.



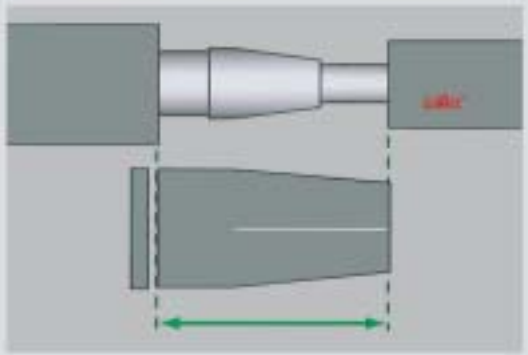
2 Take a piece of KAIFLEX the same diameter as the larger of the two pipes, and cut it a lot longer than the space left between the two sections of tubing already in place.



3 At one end, cut out two equal wedges from either side sufficient to create a reduction in circumference that will fit the smaller tube.

4 Glue the edges of the cut-outs together so that the diameter of the tubing reduces.

5 Trim the smaller end to the length at which its diameter matches that of the smaller tube.



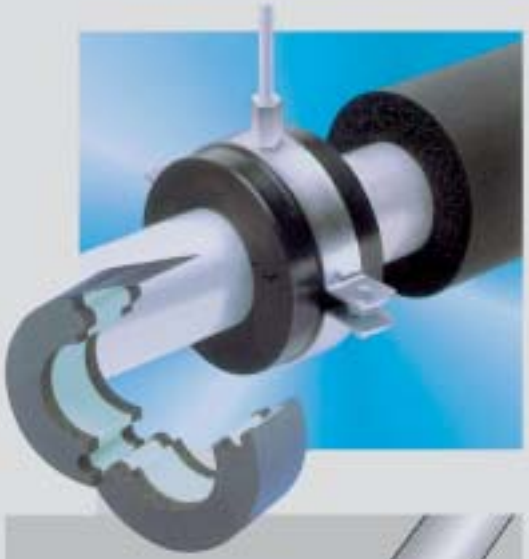
6 Shorten the other end, too, so that the coupling can be inserted neatly into the space left between the two existing sections.

7 Cut the coupling along its length to install it on the pipe.

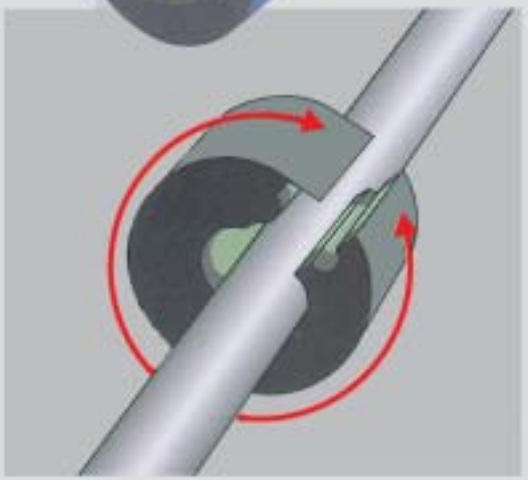
8 After having positioned it on the pipe, stick the edges together, and glue the sleeving to the other two sections of tubing.

INSULATION FOR PIPE SUPPORTS

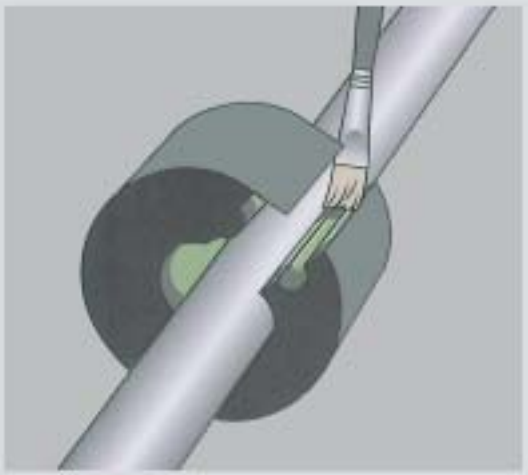
In order to guarantee a constant insulation especially when suspension devices are in use KAIMANN suggests the use of a special support device. A large number of diameters are available to allow easy and efficient insulation.

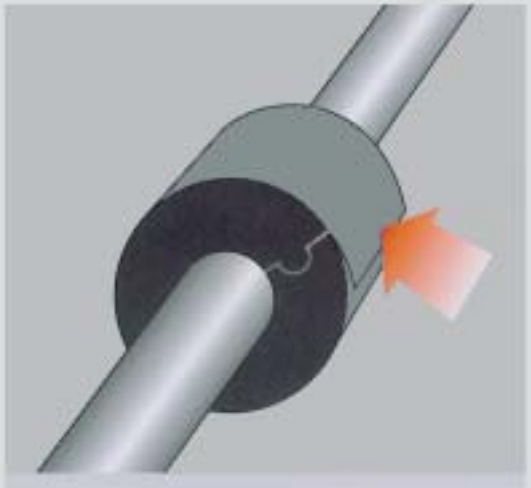


1 Open the two halves of the support and place it around the pipe in correspondence with the suspension point.

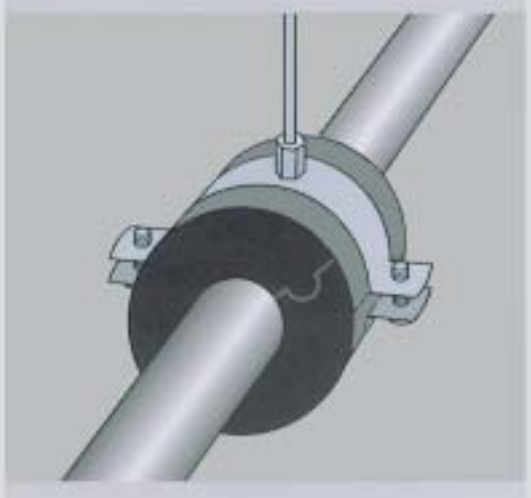


2 Glue support edges with KAIFLEX K 414 glue and join the two halves on the pipe.

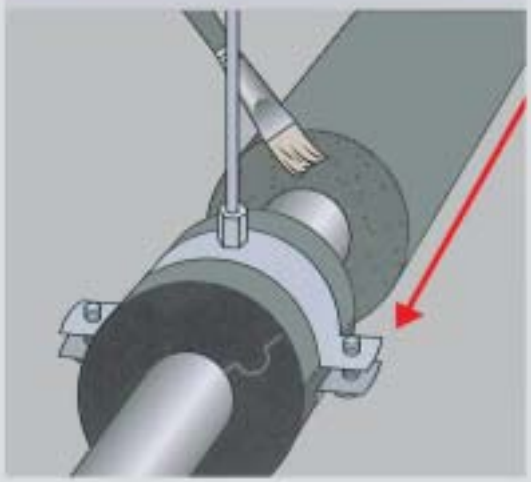




3 Seal the support by overlapping the self - adhesive band.



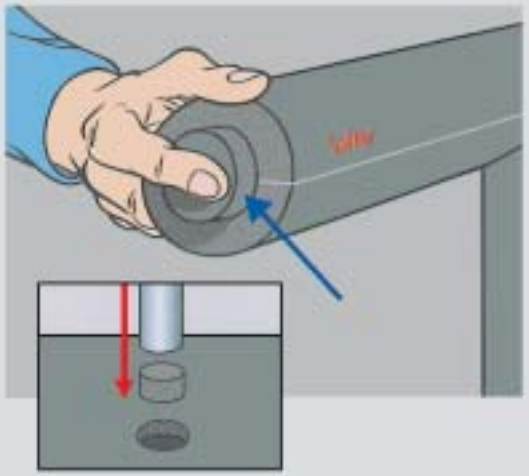
4 Fix clamp to suspension system.



5 After glueing the edges with KAIFLEX 414 join the KAIFLEX pipes with the support.

BLOCKING OFF ENDS OF PIPE

Using the correct size punch, make a plug from a spare piece of KAIFLEX-sheeting. Glue all the facing surfaces and insert in the open end of the insulating tube.



INSULATING „Y“ BRANCHES

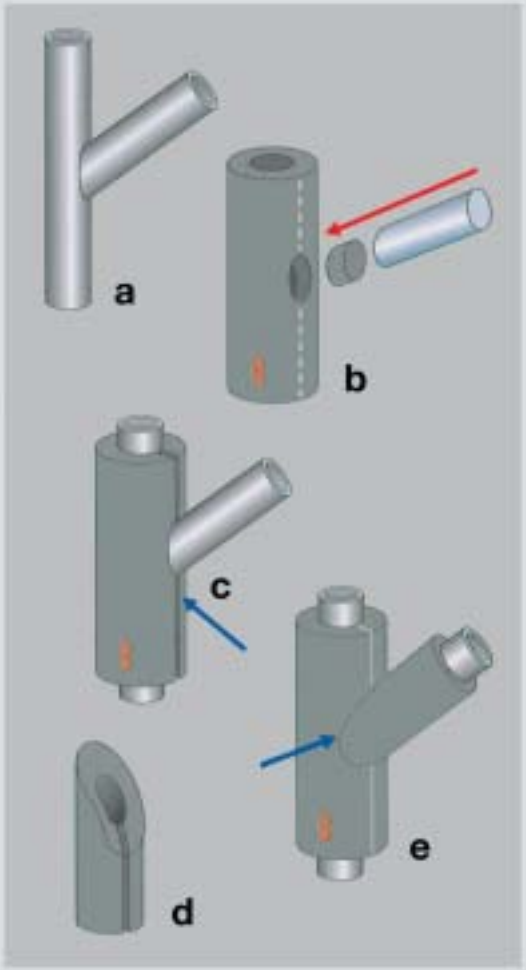
a)
Cut a section of KAIFLEX tubing to the right length.

b)
Use a punch to pierce a hole at the right angle.

c)
Cut the tube along its length, position it on the „Y“ branch and glue the edges together with KAIFLEX K 414.

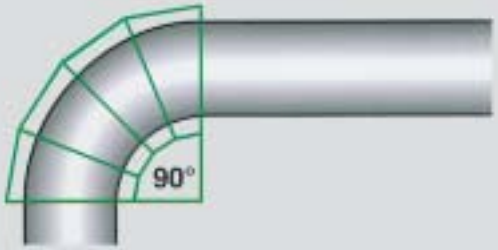
d)
Using a second piece of tubing, cut out a U-shaped indent at the correct angle and cut the tube along one side to attach it to the branch.

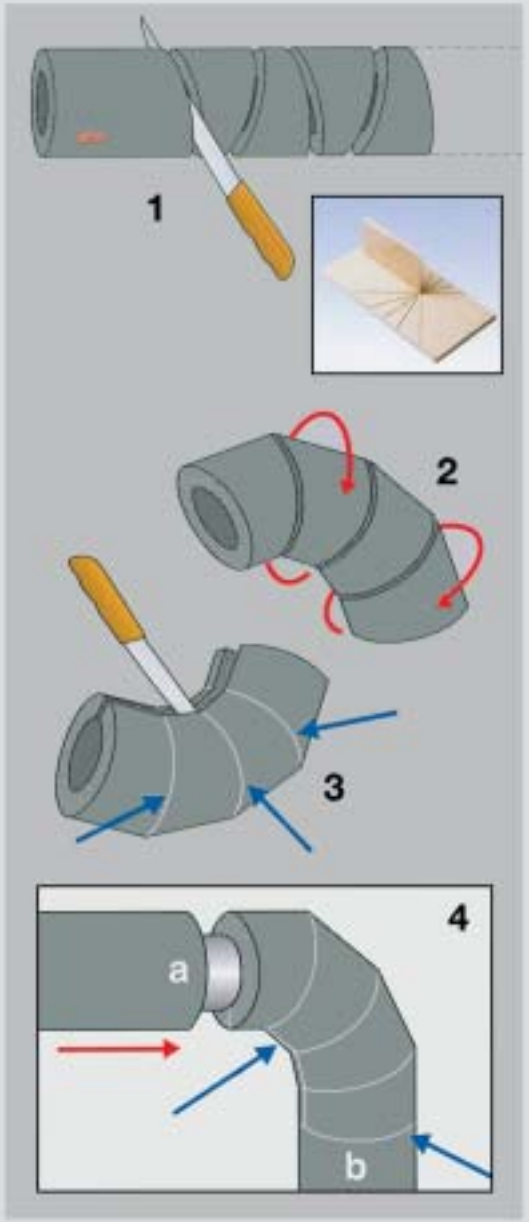
e)
Fit it over the branch and glue it in place.



SEGMENTED CURVES

When it is not possible to slide the tubing around bends in the piping, a segmented curve can be made.





1 Take a section of tubing of the correct diameter and cut it either three or five times at the same angle at 90º to each other.

Use the KAIFLEX cutting board to ensure accurate results.

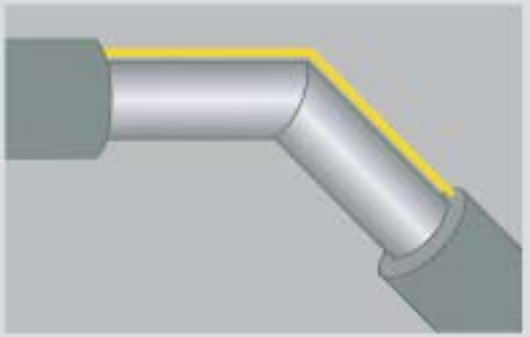
2 Rotate every second segment 180° to get a curved section.

3 After having glued all the sections together, cut along the resultingsleeve's inner surface.

4 Position the tubing over the bend in the pipe and bond the edges to neighbouring tubes on either side (a-b).

ELBOW FITTINGS (over 90º)

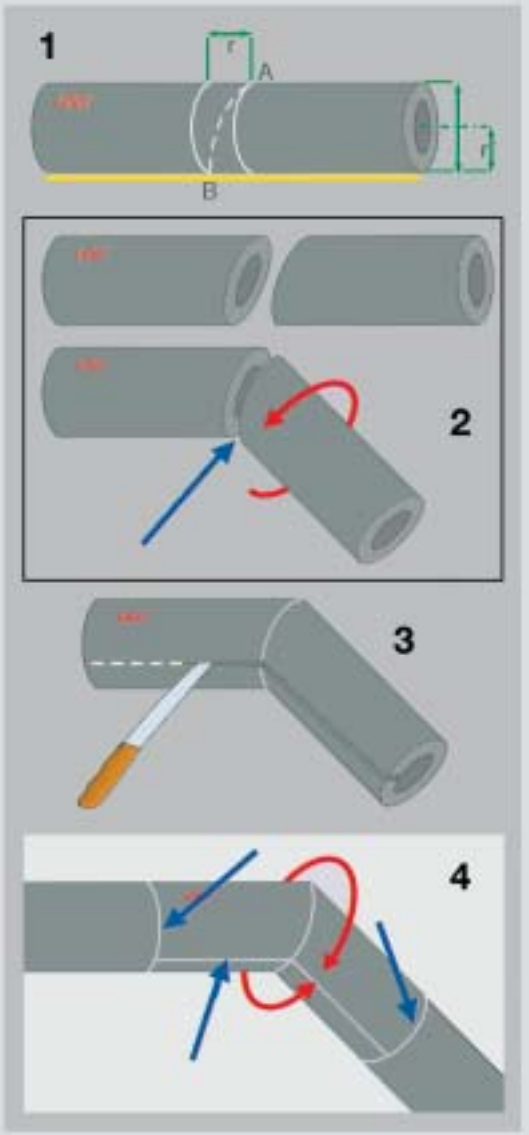
This is a joint created by welding two sections of pipe at an angle of more than 90º.



1)
The adjacent tubes would normally already be in place when calculating the length of tubing necessary to complete the insulation of the joint.

We recommend cutting the central section slightly longer than strictly necessary so that it can be trimmed down to size when fitting.

Measure the radius of the external circumference and draw two parallel lines that far apart in the middle. Draw a line at an angle between points A and B.

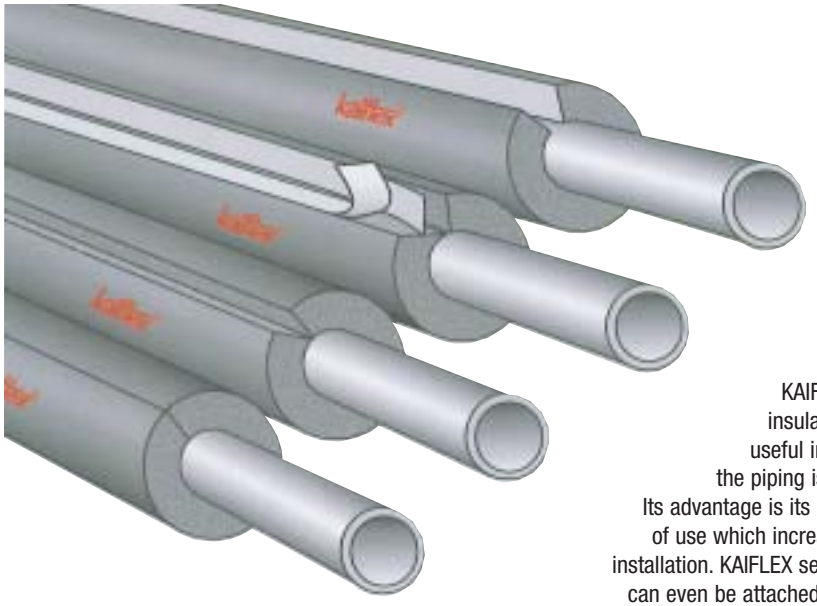


2)
Cut along this line and rotate one of the sections until the required angle is obtained. Glue the two parts together with KAIFLEX K 414.

3)
Cut along the inner surface of the joint.

4)
Trim the joint to fit between the two adjacent tubes and then glue all the edges together.

SELF-ADHESIVE INSULATION TUBING



KAIFLEX self-adhesive insulation is particularly useful in situations where the piping is already in place. Its advantage is its extreme simplicity of use which increases the speed on installation. KAIFLEX self-adhesive tubing can even be attached to bends in pipes with little effort. Carefully read the installation suggestion that follows.

1 Make sure that the surfaces to be insulated are perfectly clean, grease-free and dry. For the best results, we recommend cleaning with KAIFLEX thinner.

The pre-cut tubes allow an easy positioning.

2

Line the edges up and straighten the tubing.

3

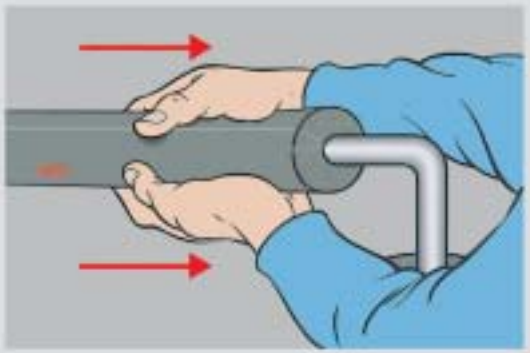
Using both hands, carefully lift the backing strips that cover the self-adhesive edges.

4

Slowly pull the backing strip away from the tubing, ensuring that the two sticky surfaces match up properly.

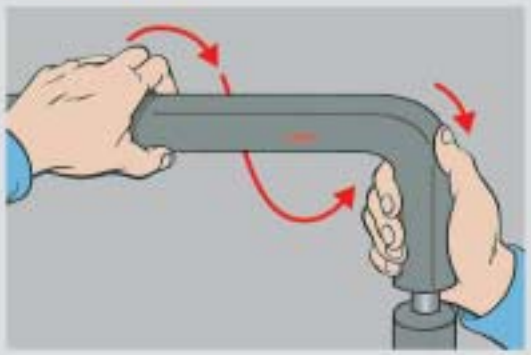
5

6 Lightly press the two edges together, first from the far ends, then at the centre so as to form a neat seal without puckering.



7 To avoid deformation of the insulation tube whilst attaching it use even force on all parts of the piping.

8 Watch out that the seal is under pressure near the curve.



9 Once the tubing is in place, attach it to the neighbouring section of insulation tubing using KAIFLEX K 414 glue.

INSULATING PIPING OVER 160 mm IN DIAMETER WITH KAIFLEX SHEETS

INSULATING A STRAIGHT PIPE

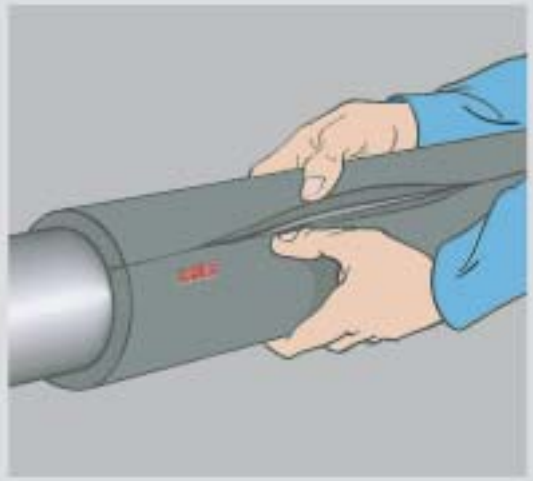
1 Wrap a strip of KAIFLEX, using the thickness you want, round the pipe to measure the exact length required.

2 Mark out the length required on a KAIFLEX sheet.

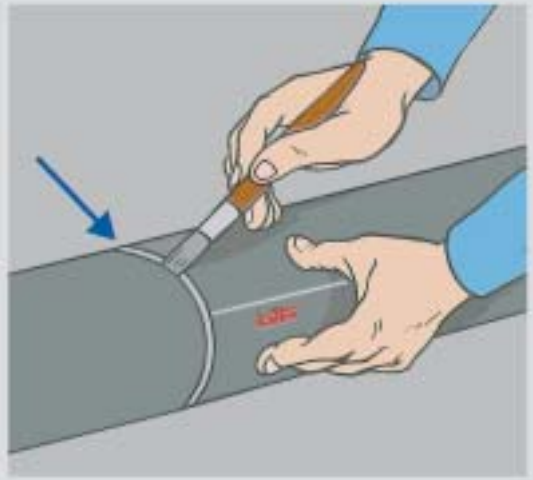
3 Cut carefully along the line.

To ensure accurate results, use a metal ruler.

4 Apply an even layer of KAIFLEX K 414 glue along each edge and allow to dry.



5 Wrap the insulation sheet around the pipe and press the glued edges together starting at the ends, then the centre and then working along the rest of the length.

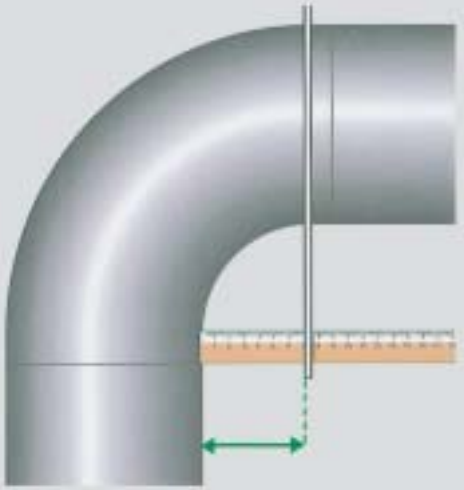


6 Glue the insulating sheeting to the subsequent sections along the length of the pipe.

If the tubing thus created is not correctly lined up, push one against the other slipping the brush in the gap and twist until they are aligned.

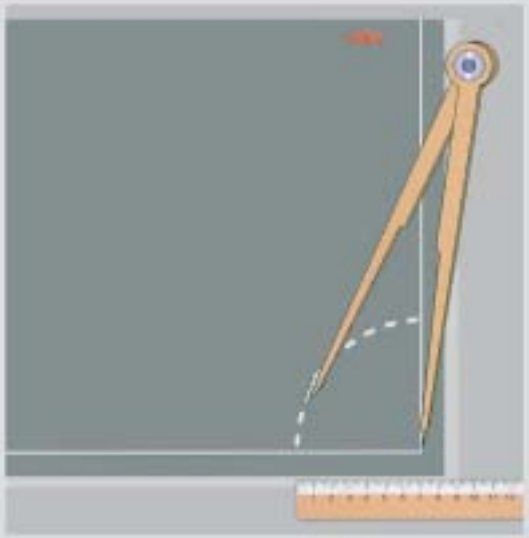
BENDS

To insulate a bend in a large diameter pipe, calculate its radius and mark it out on a sheet of KAIFLEX.



First of all, measure the internal radius of the curve using a ruler and a rule lying perpendicular to it, as shown in the diagram.

1



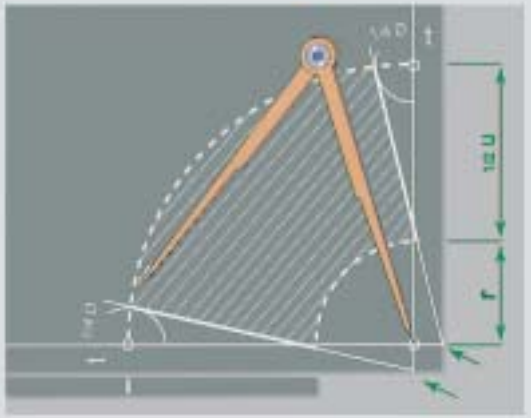
Using a compass, mark the outline of the internal radius on the KAIFLEX sheeting, using the corner of the square marked out on theinsulating material as the axis.

2

Measure the exact circumference of the pipe using a strip of KAIFLEX of the correct thickness (do not stretch the strip).

3

4 Divide the circumference by two, and mark the middle of the strip accordingly.



5 Add the outer radius to the measurement of the inner radius and, using the same axis, draw a semicircle onto the sheet with the compass.

6 Carefully cut around the outline.

7 Place the section obtained on the reverse side of another sheet and use it as a template to cut out a second, mirror image section.

8 Holding the two sections together with the smooth surface on the outside, apply glue to the outer edges.

9 Allow the glue to dry and stick the edges together, starting from the two far ends.

10 Apply pressure in the centre too.

11 Make sure that the two sections have bonded securely on the inside, pressing with your fingers along the joint.

12 Next spread the glue along the inside edges and leave to dry.

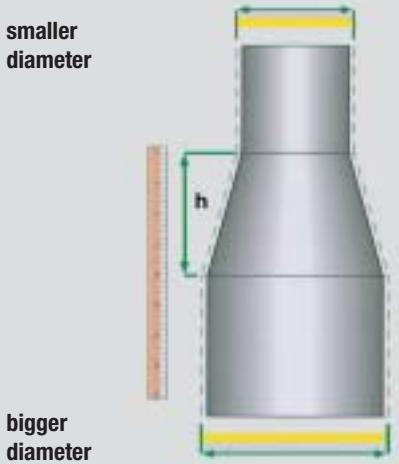
13 Wrap the KAIFLEX insulation around the pipe and press the edges tightly together...

14 ... so that they butt precisely up against the tubing to be fitted either side.

COLLARS

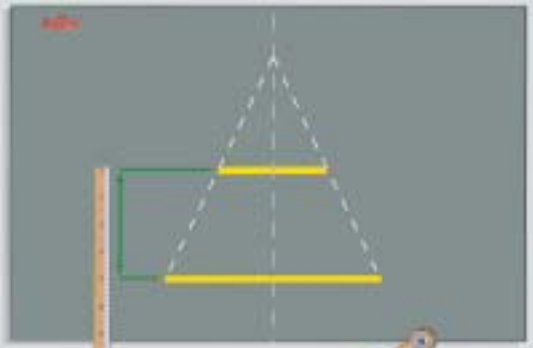
To insulate a collar section that connects pipes of different diameters, take measurements and mark them out on a sheet of KAIFLEX.

1 Measure the height of the collar section, including the welded joints.

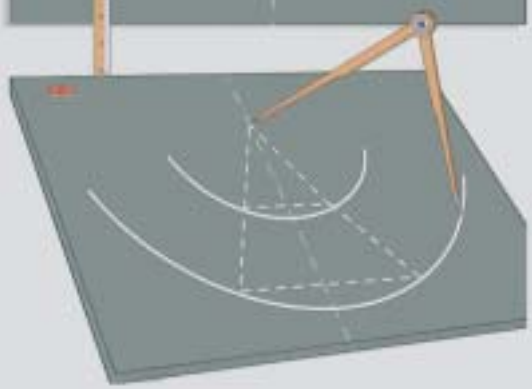


2 Use the calliper to measure the maximum and minimum pipe cross-sections and add twice the thickness of the KAIFLEX to each measurement (see figure 1).

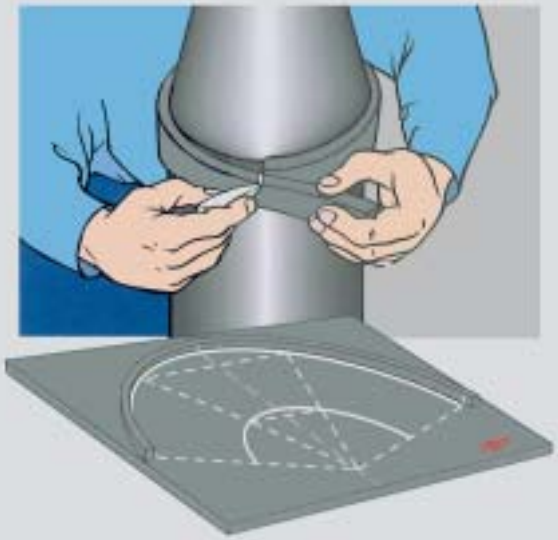
3 Carry over all the measurements (maximum diameter, minimum diameter, height) onto the sheet. Draw two lines from the ends of the measurements until they converge on a centre point.



4 Using the compass, measure the distance between the point of intersection and the two diameters and draw two arcs.



5 Measure the circumference of the widest pipe using a strip of KAIFLEX of the same thickness as the sheet.

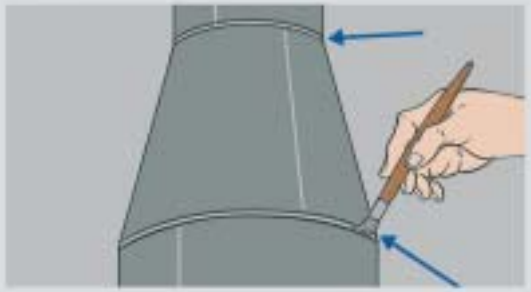


6 Mark the centre of the circumference on the strip, and line it up on the larger of the two arcs. Draw two lines from the ends of the strip to the centre of convergence.

7 Cut out carefully.

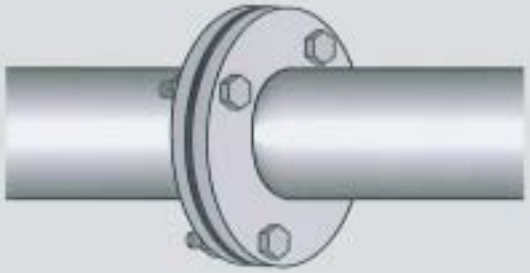
8 Glue the edges and, after they have dried, fit the insulation to the collar. Press the two edges together starting at the far ends.

9 Glue the upper and lower edges and attach the other KAIFLEX sections.

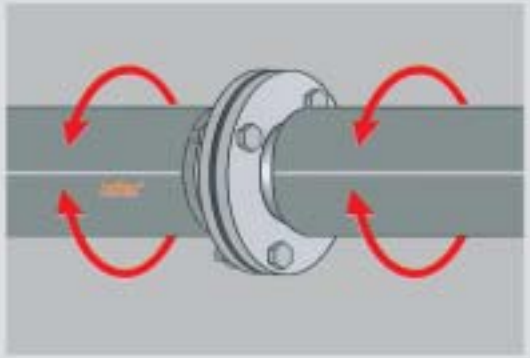


FLANGES

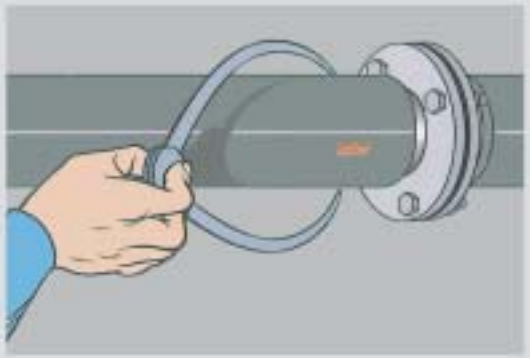
Insulating a flange is reasonably simple, but requires the KAIFLEX sheeting to be accurately cut into two rings.



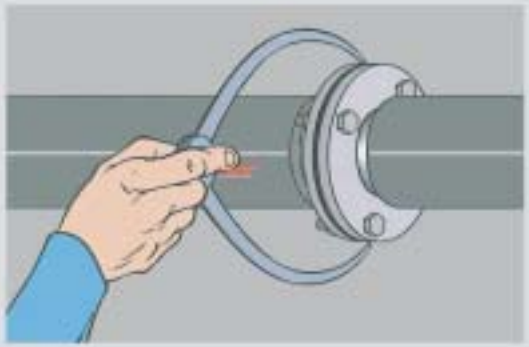
Firstly, insulate the pipes as far as the flange on either side. **1**

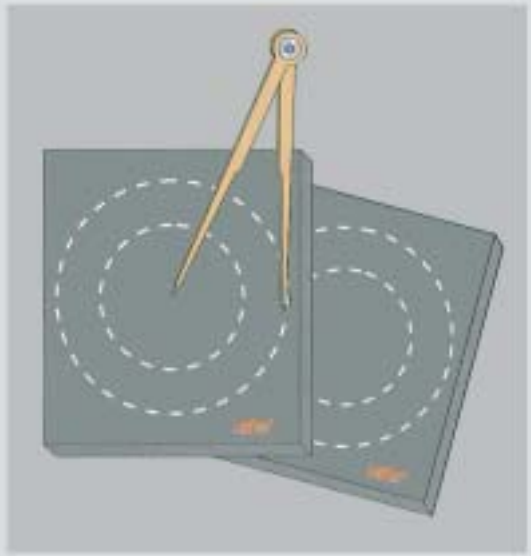


Measure the pipes' circumference with the KAIFLEX around it... **2**

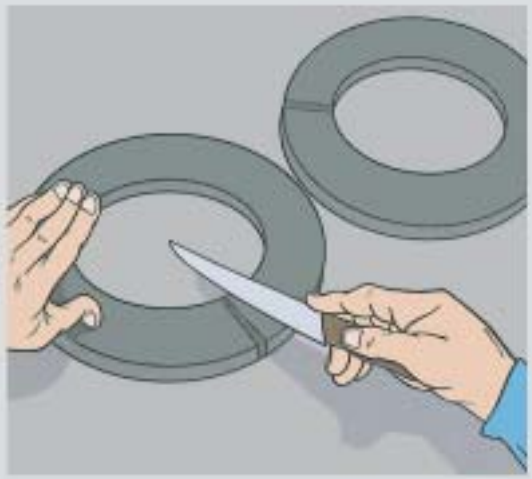


... along with that of the flange. **3**

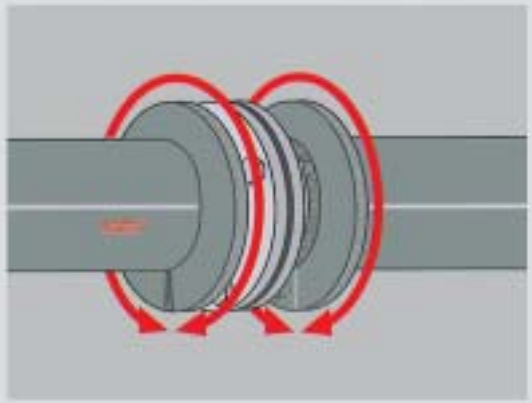




4 After calculating the two radii, draw the inner and outer circumferences of the rings on two separate squares of KAIFLEX.

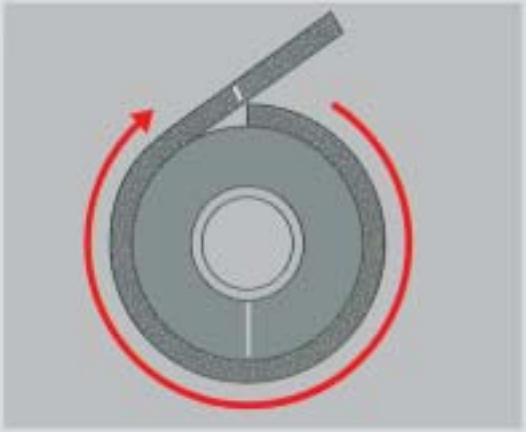


5 Cut the rings out and open on one side to insert them over the pipes.

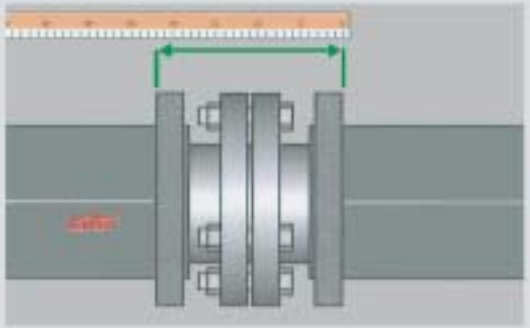


6 Position the rings around the ends of the insulating tube and glue the opening with KAIFLEX K 414.

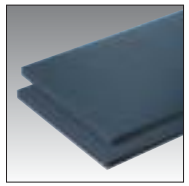
7 Use a strip of KAIFLEX of the same thickness to measure the circumference of the insulating ring.



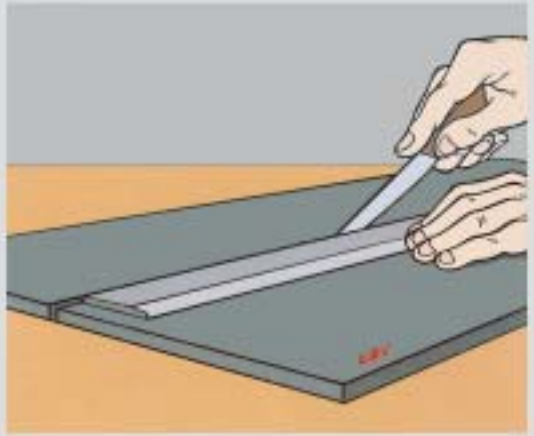
8 Measure the distance between the two rings, including the thickness of the insulating material itself.



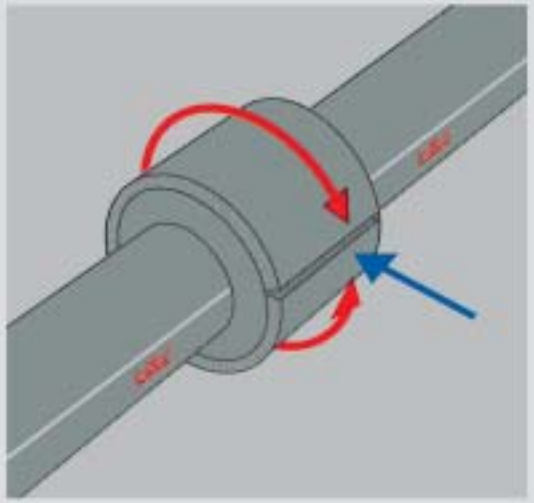
9 Draw the measurements out onto a sheet of KAIFLEX to get the outline of the sleeve that will complete the flange's insulation.



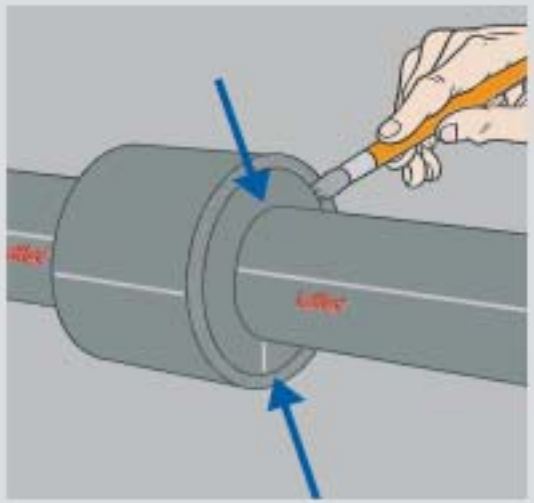
10 Cut the sleeve section out.



11 Mount it around the rings and glue the edges.

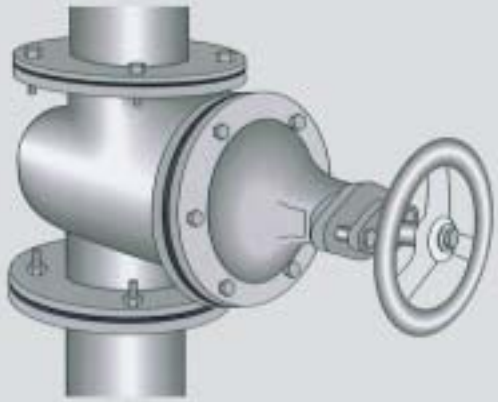


12 Stick the sleeves section to the outer edges of the rings, then stick the inner surface of the rings to the ends of the adjacent tubing.



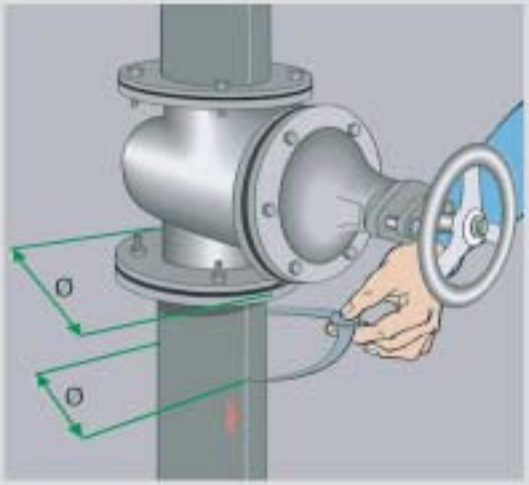
STOPCOCKS

Before starting to insulate the stopcock housing, first fit tubing to the pipes either side of it.

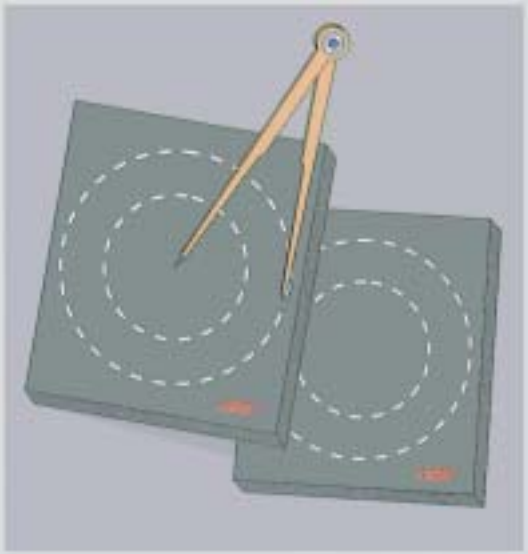


Measure the diameter of the insulated pipes and the flanges. **1**

Use these measurements to calculate the relevant radii.



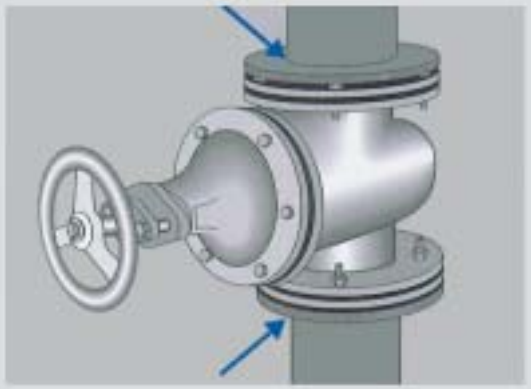
After calculating the radii, mark out the respective inner and outer circumferences on two separate squares of KAIFLEX of the same thickness. **2**



3 Carefully cut out the rings.

4 Make an opening so that they can be fitted over the pipes.

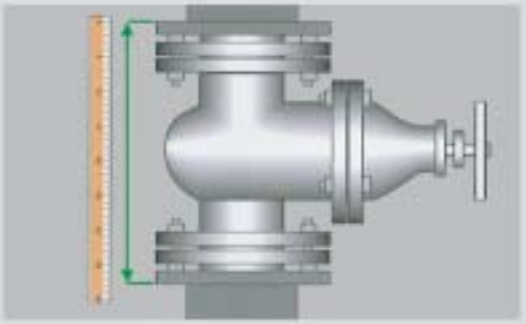
5 Put a ring on the outside of each flange and glue their edges together with KAIFLEX K 414.



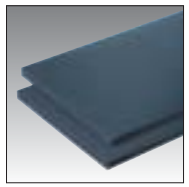
6 Stick the inner surfaces of the rings to the ends of the insulating tubing covering the pipes.

7 Use a strip of insulation of the same thickness, measure the circumferences of the rings.

8 Measure the distance between the rings, including the thickness of the rings themselves.

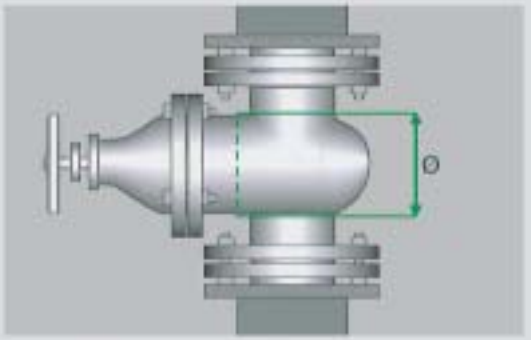


9 Draw the outline of the sleeve section measurements onto a sheet of KAIFLEX and draw a line down the middle.



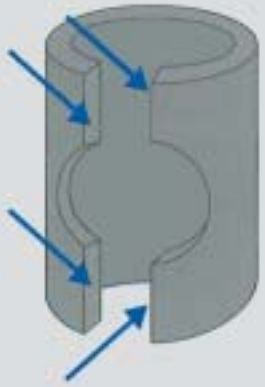
10 Measure the diameter of the stopcock housing.

Continuous cavities making air exchange possible, must be filled out with adhesive, sealing compound or KAIFLEX material.



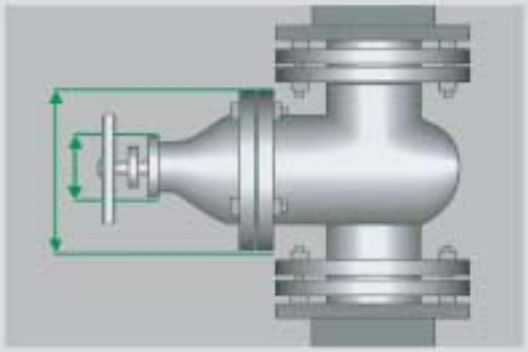
11 Divide the diameter by two to get the radius. Place the compass at the end of the sleeve's centre line and draw a semi-circle at each end.

12 After cutting around the outline, put glue on the joining edges.

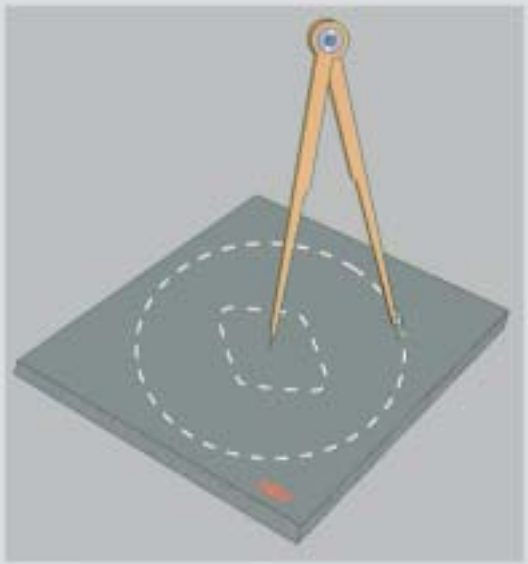


13 Once the glue is dry, fit the sheeting around the rings and stick the edges together.

14 Next, calculate the shape of the disc for the front flange. Measure the circumference of the supporting flange and the form of the face plate around which the disc must fit.



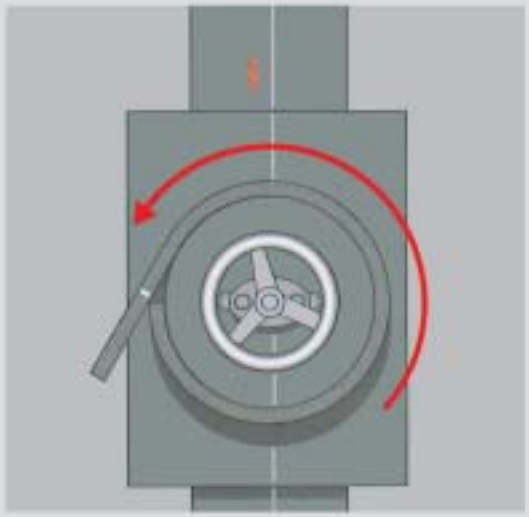
15 Mark out the measurements on a piece of KAIFLEX and cut the disc out.



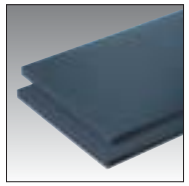
16 Make an opening so that the disc can be fitted over the face plate.

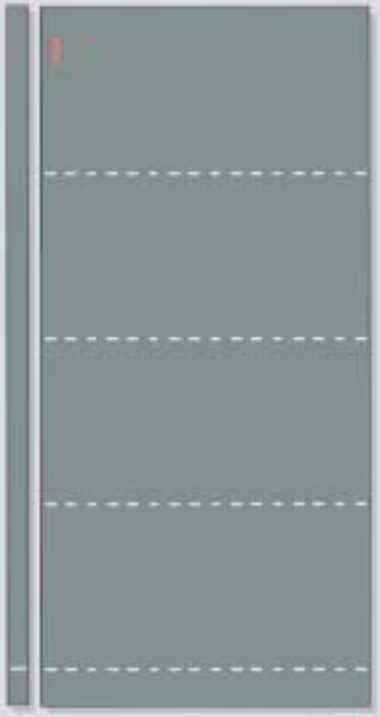
17 Position the disc and stick the edges together with KAIFLEX K 414. Make sure to stick the inside edges to the face plate, too.

18 Once it is in position, measure the circumference of the disc.

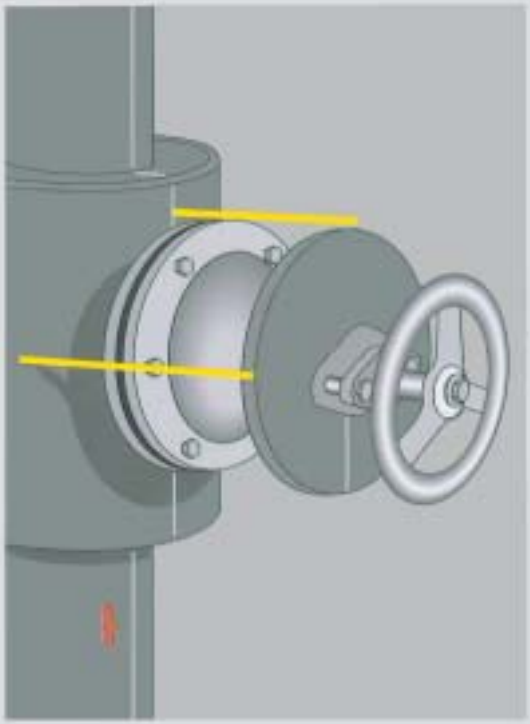


19 Mark the measurement out on a piece of KAIFLEX of the same thickness and divide its length into four equal parts.

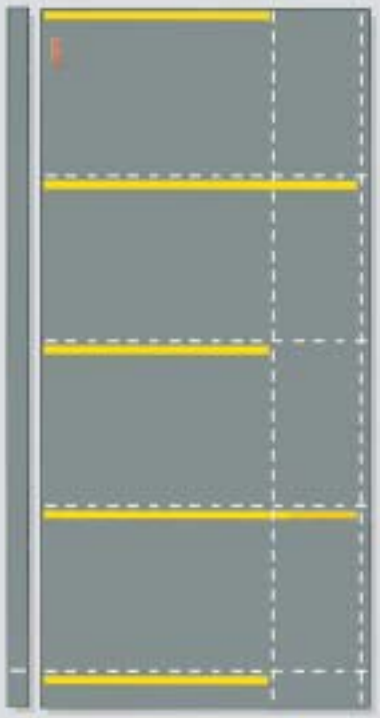




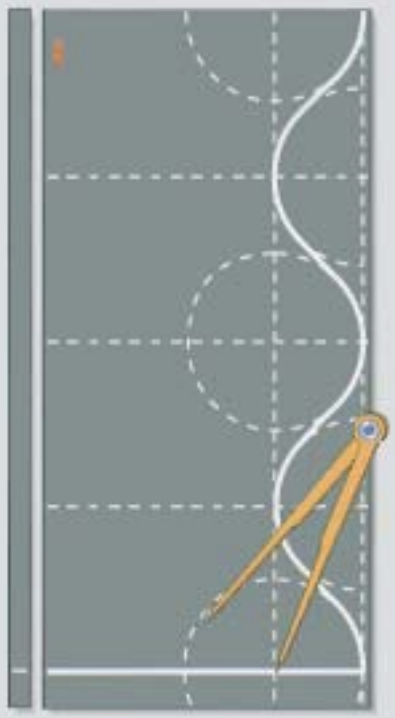
20 Measure the distance between the disc and the existing lagging at its nearest and furthest points.



21 Mark these measurement on the existing lines as shown in the figures.



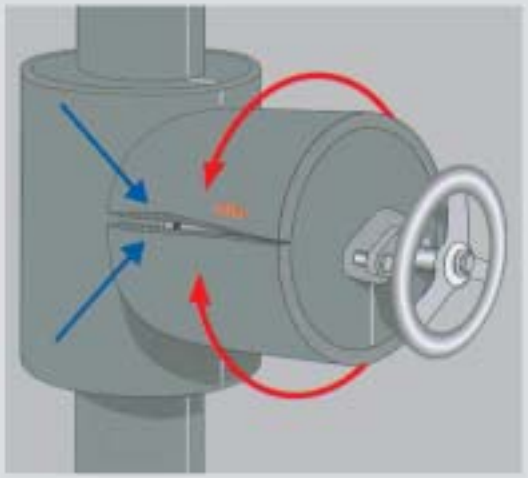
22 Use the difference in the two lengths as a radius, draw circles around the ends of the lines. Use the arcs of the circles, draw a continuous line to link them up, as illustrated.



Carefully cut along the line. **23**

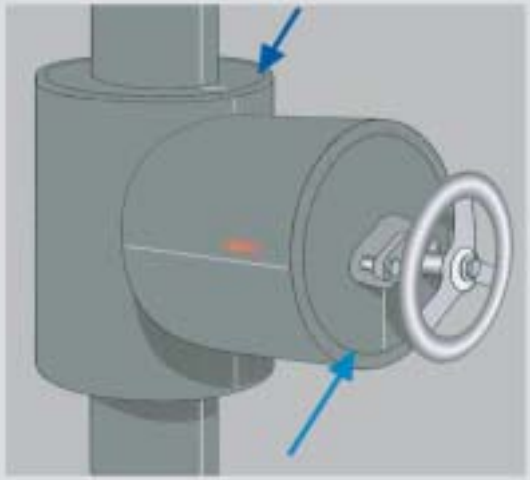
To assure a tight glue seal cut the edges of the upper, convex curves towards the KAIFLEX's inner surface. **24**

Glue the leading, straight edges, let them dry, then fit the resulting sleeve around the disc. **25**

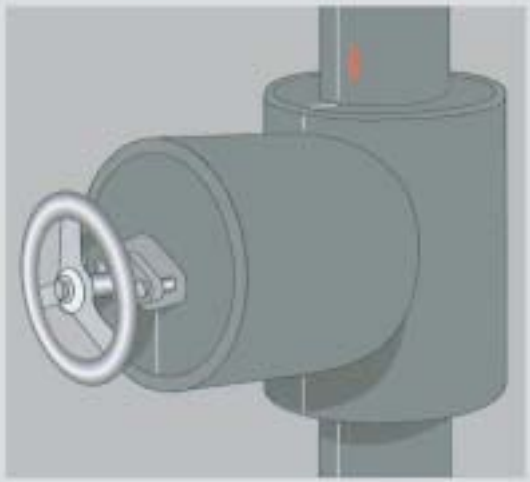


26 Connect the sleeve with the insulation around the main stopcock housing using KAIFLEX K 414.

27 Check if all parts have been glued together accordingly.

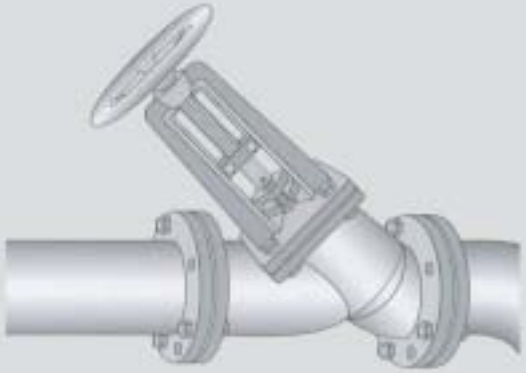


28 The stopcock is now completely sealed.



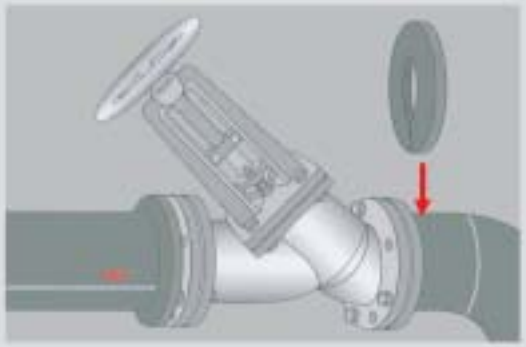
ANGLED STOPCOCKS

Before insulating an angled stopcock, first lag the pipes either side of the flanges.



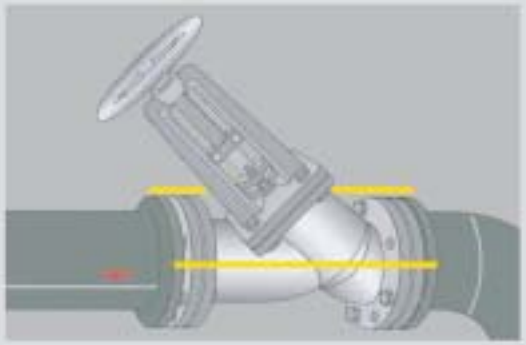
Following the same procedure as on page 49 (insulating flanges), cut out two rings of KAIFLEX and fit them over the tubing next to the flanges.

1



Measure the distance between the two KAIFLEX rings, including the material itself, and the distance between each ring and the stopcock housing.

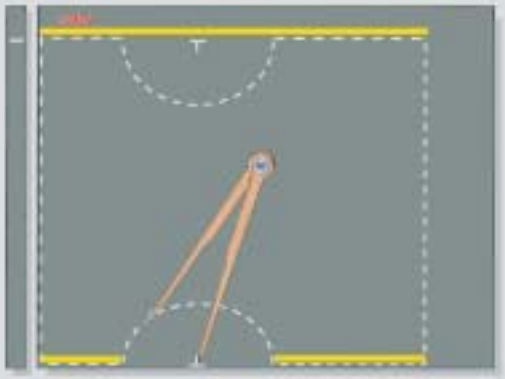
2



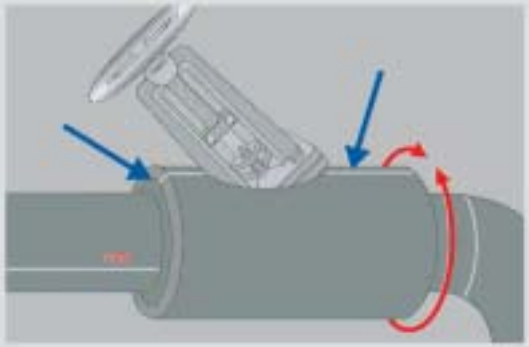
Measure the diameter of the base of the stopcock housing. Use this to calculate the radius needed to draw the circumference at point 5.

3

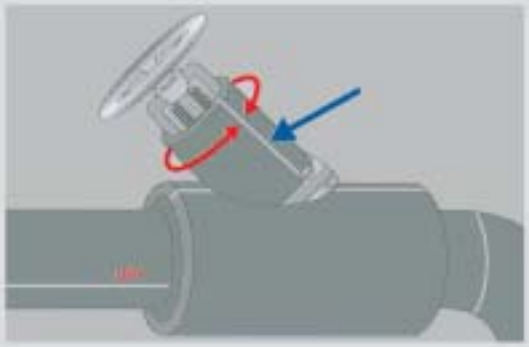
4 Measure the circumference of the rings.



5 Mark the measurements of the rings' circumference out on a sheet of KAIFLEX (figure 4), along with the semi-circles for the base of the houses (figure 3) positioned along the length of the sleeve according to the measurements taken in figure 2.

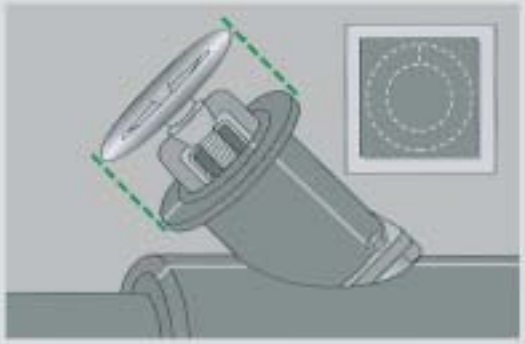


6 Cut out the piece, wrap it around the rings to seal the central stopcock housing, then stick the edges together using KAIFLEX K 414.

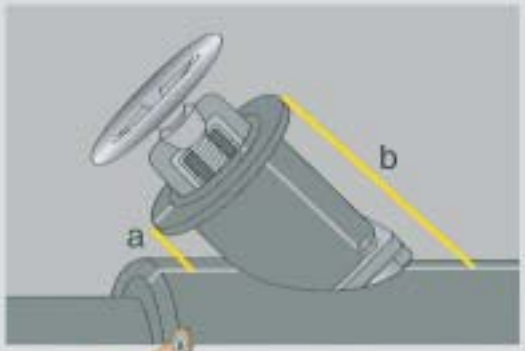


7 Cut out a second sleeve section to fit around the stopcock mechanism.

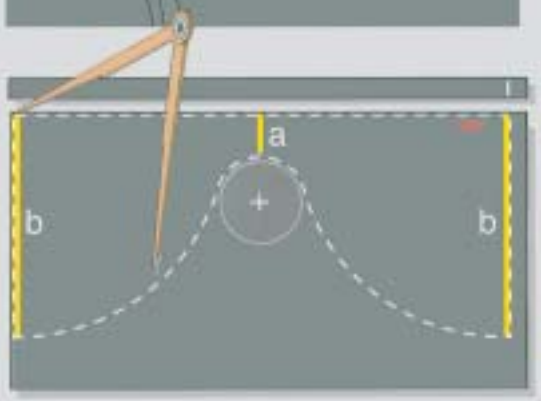
8 Cut out a ring of KAIFLEX in the size of the stopcock wheel. The inner diameter should be the same as the outer circumference of the sleeve already attached.



9 Measure the distance between the ring and main housing insulation at the two points a and b.



10 Draw the shape of the sleeve on a sheet of KAIFLEX, using a compass and the measurements taken. The reference circle in the middle has a radius equivalent to a quarter of the diameter of the stopcock housing already insulated (see point 6).

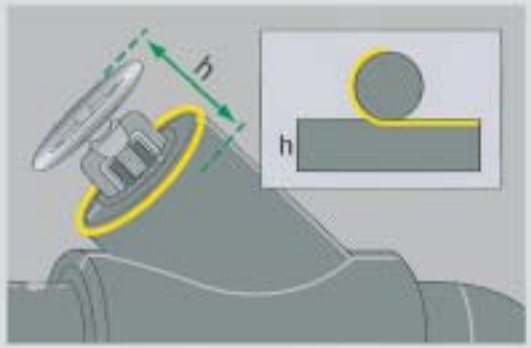


11 Join the two semicircles and cut along the line.

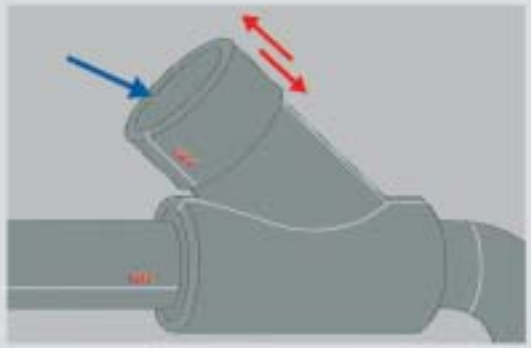
12 Bevel the curved edges towards the inner surface.

13 Attach the insulation material around the ring and glue the connecting surfaces together.

14 Make a cylindrical, removable cap with a strip ot KAIFLEX. The dimension to use is shown in the figure.



15 The cap should slide on and off easily. Once this is ensured, stick the edges together with KAIFLEX K 414 glue.



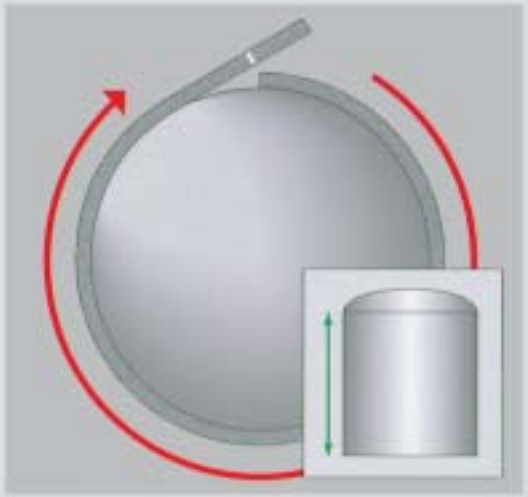
TANKS

There are two possibilities to insulate the tank. Either insulate the domed surface and the subsoil or the walls. We will show the second possibility exemplary.

Before insulating, clean the whole surface carefully with KAIFLEX thinner.

First of all, lag the tank walls. Use the same method as with piping. Measure the circumference of the tank with a strip of KAIFLEX, and measure the height.

1

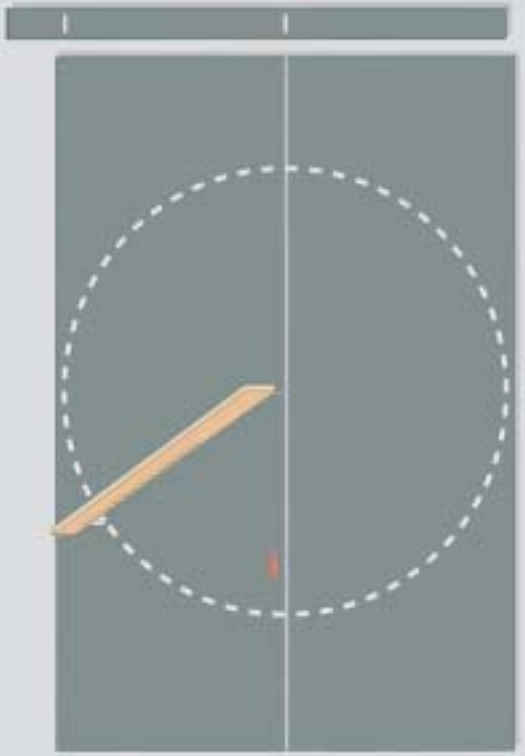


Mark the dimensions out on a sheet of KAIFLEX and cut out. Spread KAIFLEX K 414 glue over the entire surface of the sheeting with a flexible spatula and, with a brush, over the walls of the tank. Glue the edges of the sheet, then stick the insulation to the tank, joining the edges together.

2

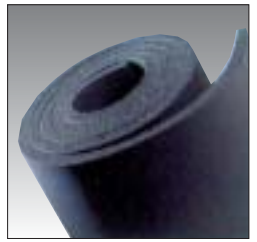
To insulate the domed surface, first measure its overall diameter with a strip of the same KAIFLEX.

3



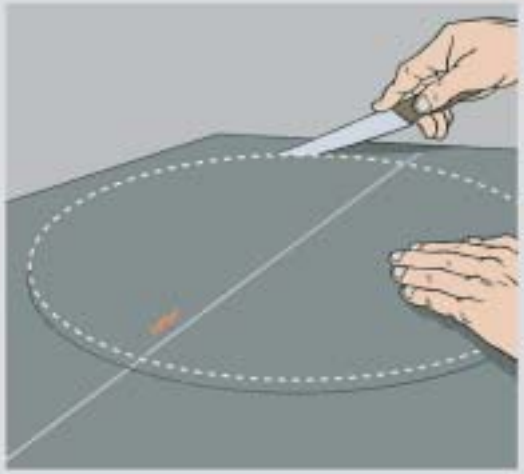
Use the diameter to calculate the radius and draw the complete circumference.

4



Cut the circle out accurately.

5

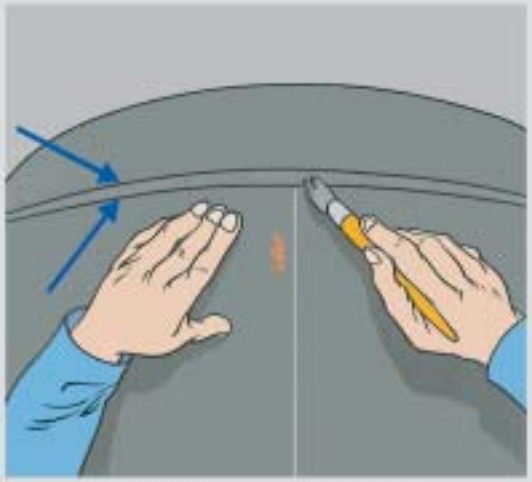


8 Place the KAIFLEX disc on the top of the tank and press it down firmly from the centre outwards to avoid it moving.

Coat the disc ...

6

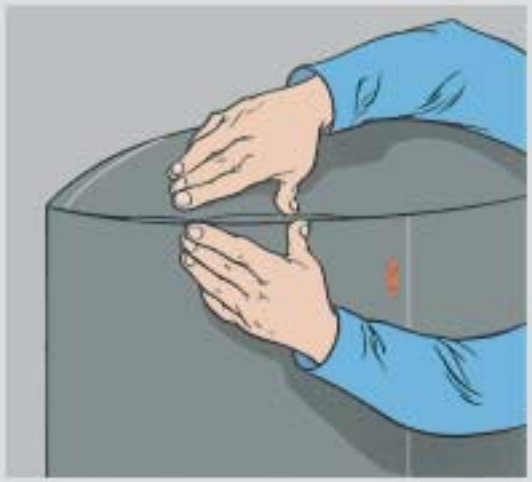
9 When the sheet is firmly attached, glue the edges all the way round.



... and the top of the tank with KAIFLEX K 414 glue.

7

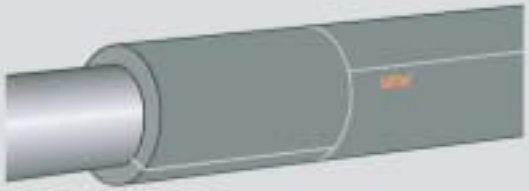
10 Leave to dry, then press firmly together.



MULTI-LAYER INSULATION

If it is necessary to apply more than one layer of KAIFLEX, one sheet can be stuck on top of another. To install the first refer to page 40.

Contact Office if you have to insulate piping transporting fluids below -40 °C.



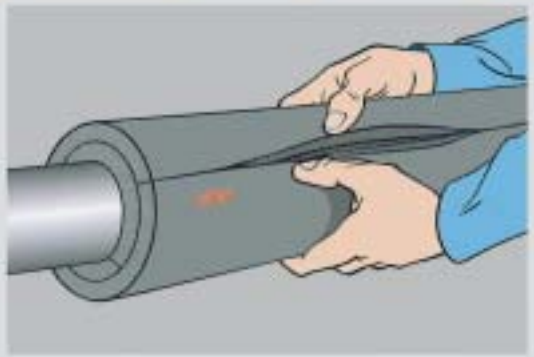
Clean the surface of the first layer insulation. **1**

Measure the overall diameter with the first sheet in place. **2**

Cut out the second sheet to the size required. **3**

4 Glue the edges of the sheet to be fitted.

Do not stick the two layers together, as the individual sheets may be subject to different degrees of expansion or contraction when the plant is operational.



5 Wrap the insulation sheet around the tubing, ensuring that the seam does not overlap that of the underlying insulation.

6 Adjacent section of insulation should be glued at their respective ends.

CROSS-SECTION

LONGITUDINAL-SECTION

7 When installing the second layer, make sure that the seams do not overlap those underneath (sea diagram). This insures that, when the plant is operational, maximum insulating properties are maintained as the materials expand or contract.

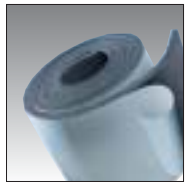
SELF-ADHESIVE ROLLS

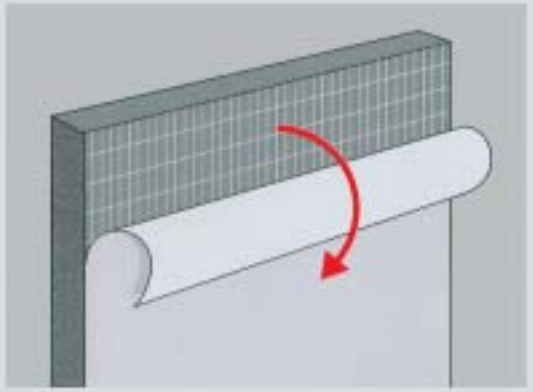
Sheet insulation in roll form with self-adhesive backing for quick and simple installation. Remove the backing paper prior to positioning the insulation. The rolls of material are particularly suitable for extra-large surfaces, for example ducting or tanks, where installation is relatively straightforward.

1 When, for example, insulating ducting, make sure all the surfaces are clean and grease-free using KAIFLEX thinner. Do not apply insulation over rust or corrosion as the adhesive backing may not stick.

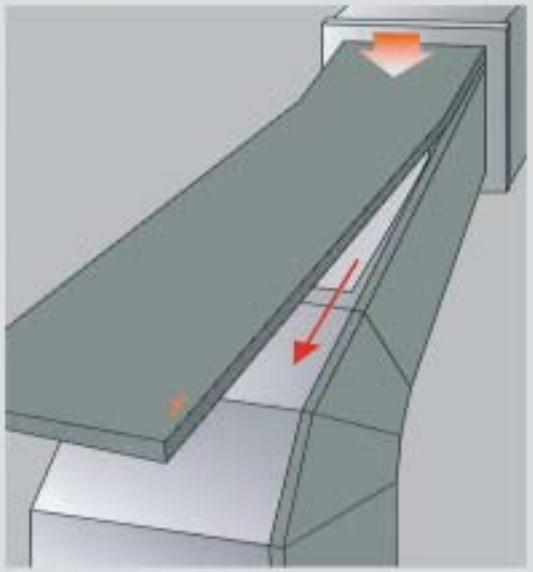
Do not process KAIFLEX at a surrounding temperatur less + 10 °C and above + 35 °C.

2 Cut the size required out of the roll.





3 Lift the leading edge of the backing paper.



4 Line the edge up and stick it down. Pull the backing paper off gradually, pressing the material down as you go. *In the example given, for the best results we recommend first lagging the lower surface of the conduit, then the side walls and lastly the top. This will prevent the penetration of humidity.*

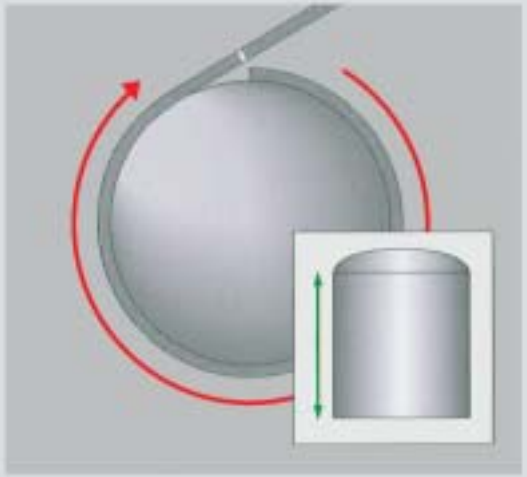
Attention: Before glueing the SK-sheet onto an open cellular edge, glue the open cellular material with KAIFLEX K 414!

5 Glue the edges of each length of KAIFLEX to the successive one.

With multi-layer insulation of SK-sheets, the joints should be removed.

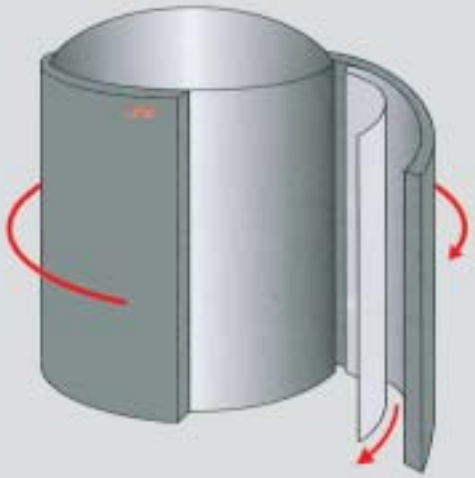
6

Similarly, to insulate the walls of round tanks, measure the height and circumference. Carry the measurements over onto a roll of sheeting and cut out the size required.



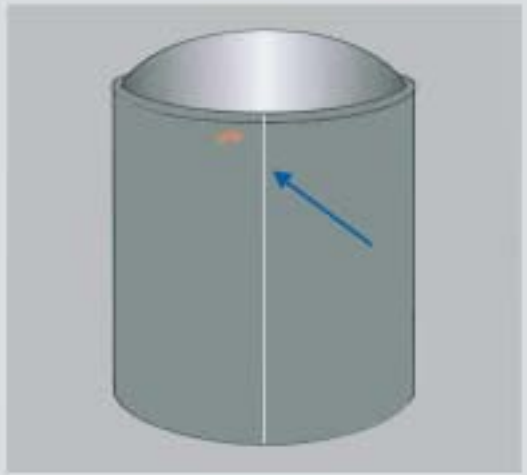
7

Stick one end carefully to the tank wall. Pull the backing paper off gradually while smoothing the sheeting onto the underlying surface.



8

When the sheeting is firmly attached to the tank, stick the leading edges together with KAIFLEX K 414. The top of the tank should than be insulated following visually the same instructions as for non-adhesive sheets, execpt that the backing paper should be removed before applying.



KAIMANN produced this manual as a practical guide dealing with the most common types of insulating situations.

Clearly, not all types of applications are covered due to the sheer number and complexity of installations found. It is thus up to experienced fitters to choose the most appropriate solutions.

KAIMANN guarantees that the quality of all products conforms to the technical specifications supplied in compliance with legal requirements.

KAIMANN can not be held responsible for any defects occurring as a result of the incorrect or improper use of the materials or tools, or as a result of incorrect fitting.