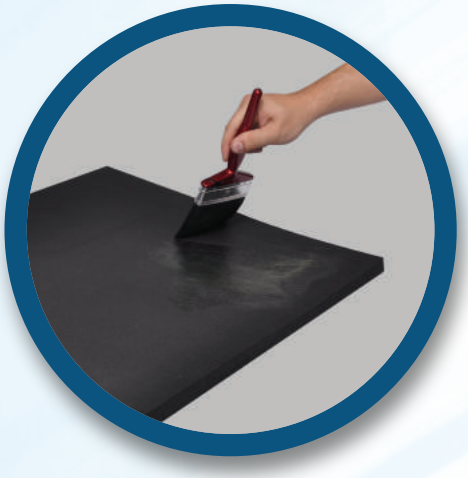
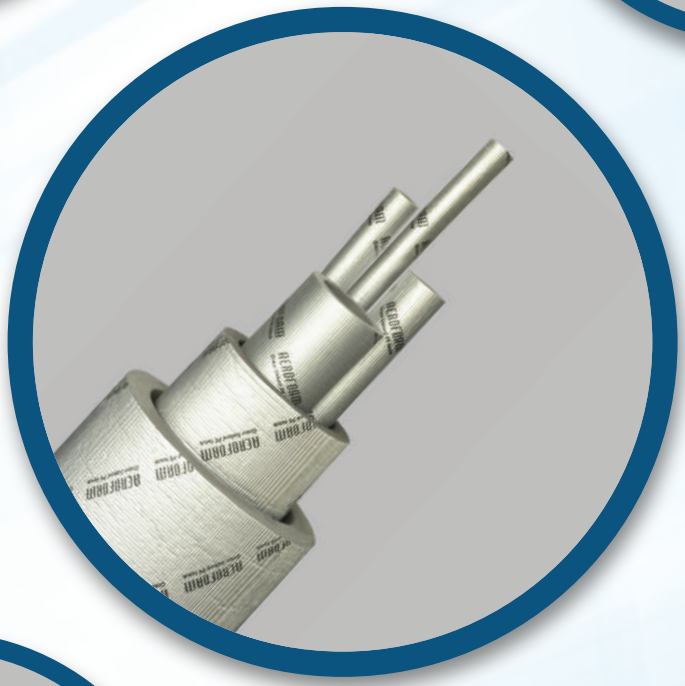
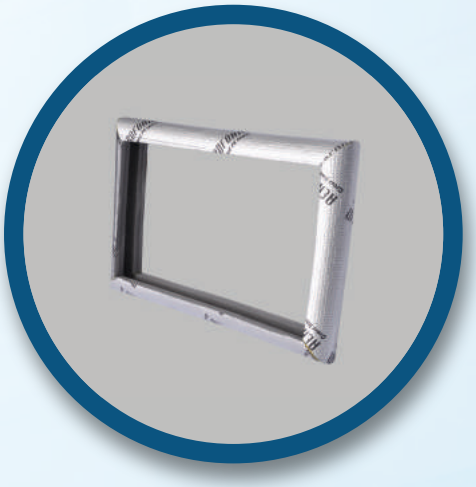
AEROFOAM®







INSTALLATION GUIDE

AEROFOAM®

1. General information

All the information below, where Aerofoam® is referenced (without any clear difference between Aerofoam® NBR and Aerofoam® XLPE), can be applied to both Aerofoam® NBR and Aerofoam® XLPE. Where there are differences in the application procedures between the 2 products, then these will be clearly mentioned.

1.1. Working with Aerofoam®

- Use clean Aerofoam® material – with no dust, dirt,oil or water on the surface; if present, clean with special glue cleaner.
- Use good quality tools, in particular a sharp knife, fresh Aerofoam® adhesive and a good brush.
- Use correctly dimensioned material! Never pull glued joints when sealing them, always push them together.
- Oval tubes should always be split on the flat side (applicable for Aerofoam® NBR).
- Never insulate plants and systems that are in operation. Only start insulated plants after 36 hours - after this time the adhesive is fully cured.
- In general an additional use of Aerofoam® tape is not necessary. Self-adhesive Aerofoam® tape should not be used as the sole fixing for butt and longitudinal joints and seams. If required it should only be applied to joints and seams that have been glued previously with Aerofoam® adhesive and only after 36 hours to allow complete outgasing of the adhesive solvent.
- Aerofinish paint can be applied immediately after the insulation has been installed, with a second coat of paint applied within 3 days, to provide UV protection (**see page no. 4**; applicable only for Aerofoam® NBR).

1.2. Tools for installing Aerofoam®

(i) Folding rule

(ii) Chalk (for marking irregular shapes)

(iii) Silver ink marker pen

(iv) Dividers

(v) Callipers

(vi) Sharp knives (short, medium, long)

(vii) Sharpening stone

(viii) Ruler

(ix) Template (printed on every Aerofoam® NBR carton)

(x) Scissors

(xi) Brushs with short, firm bristles

(xii) Smooth spatula

(xiii) Sharpened pipe ends for the most common pipe diameters

(xiv) Rollers for surface gluing

(xv) Gluemaster

1.3. The correct use of Aerofoam® adhesive

Aerofoam® adhesive has been specially developed to bond Aerofoam®. It joins the surfaces reliably and safely at medium temperatures of up to +105ºC. The bond is resistant to weathering and aging.

i. Preparing for work

Check condition of Aerofoam® adhesive. Cans of Aerofoam® adhesive should have been stored in a cool environment wherever possible. Cans must also have been kept free from frost. Damage due to frost can be reversed by storing in warm conditions, or for immediate use by placing the can into a bucket of hot water. The shelf life is approx. 1 year.

a. Where installation surfaces are soiled with dust, dirt, oil or water, all of these contaminants must be removed and, where applicable, cleaned with special glue cleaner before starting work. In addition all surfaces to be joined must be dry before gluing begins.
b. Pay close attention to the installation instructions on the adhesive can. Use small cans during work so that the adhesive does not thicken too quickly. Refill from larger cans when necessary and keep closed when not in use to avoid thickening.
c. Ideal installation temperature is 15°C to 20°C. Do not use adhesive under 0°C. If the adhesive is too cold it can be warmed in a bucket of hot water. At temperatures below 5°C, condensation can appear on the surfaces to be glued or the adhesive film. If this occurs the materials can be glued only with difficulty.
d. Stir adhesive well after opening. If left to stand, heavier components in the adhesive may settle in the bottom of the can. These must be mixed thoroughly before use in order to effectively activate the adhesive.

ii. Pipes with corrosion protection

Check that the adhesive will adhere to any rust-inhibiting primer that has been used to protect pipes. Standard Aerofoam® adhesives should be compatible with all 2-component coating systems based on epoxy resin or polyurethane. Aerofoam® adhesive may not adhere to asphalt, bitumen or red-lead.

iii. Application

a. Use a brush with short, stiff bristles and keep clean. For larger areas a spatula or (non foam type) paint roller or the Aerofoam® gluemaster may be used to speed up application.
b. Apply Aerofoam® adhesive thinly and evenly onto both surfaces to be glued.
c. When adhering Aerofoam® to other materials (e.g. metal), first apply the adhesive to the Aerofoam® and then to the other clean surface.
d. Allow the adhesive to 'tack-dry'. The time required will vary according to the ambient conditions. The correct initial drying time may be determined by the 'fingernail-test': touch the surface with a fingernail, if the fingernail does not adhere to the surface and the surface itself does not feel tacky the joint may be closed. The maximum adhesive force will be obtained when two tack dry surfaces are brought together.
e. The glued surfaces should be pressed together, do not stretch. Do not leave glued seams on the top of the insulation in external locations. When working outdoors always turn the glued seams away from the sun.
f. When gluing joints under compression, with no gaps present, the wet adhesive method should be applied. Pull the seam apart slightly and apply Aerofoam® adhesive thinly and evenly with the brush to both surfaces and press together. No open time is needed in this case.
g. Use special glue cleaner to clean your tools, contaminated metal surfaces and surfaces which have had talc applied.
h. Curing time for Aerofoam® adhesive: 36 hours.

Note: Do not mix special glue cleaner with Aerofoam® adhesive to thin it out - warm it!

iv. Application in hot and humid environments

High atmospheric humidities and temperatures lead to faster evaporation of the solvent in Aerofoam® adhesive. This means that a film of moisture may appear on the surface of the adhesive. Consequently the reliability of the adhesive seam cannot be assured as the surfaces to be joined may not bond together. Under these conditions, the following points may be observed as an alternative to our installation instructions:

a. Apply Aerofoam® adhesive as normal in a thin uniform-film on both surfaces.
b. Unlike normal bonding, the surfaces to be glued should be held together under pressure whilst wet.

   Note: Due to the shorter curing time the adhesive can only be applied to a limited area at one time. Depending on the atmospheric humidity, temperature, material thickness and practical installation condition we recommend a tube length of around 1 m as a reference figure.
c. To prevent possible tensions within the material and the enclosed solvent opening the seam, seams should be held in place immediately after bonding with self-adhesive Aerofoam® tape crosswise to the glued seam every 20 cm or so.

1.4. Wet sealing of butt joints

a. On all cold lines, fix and secure down to the piping surface Aerofoam® tube/sheet ends with Aerofoam® adhesive.
b. The adhesive bonding will equal the insulation thickness as a minimum.

c. For the final wet sealing of the tube/sheet, pull the compressed butt joint apart with the finger and apply a thin even film of adhesive to the two butt joint edges with a small brush.
d. Apply firm and even pressure to the glued joint using the fingers and thumbs to finish.

Note: In addition all other types of hot piping lines located externally, it is highly recommended to follow the same procedures as with cold lines.

1.5. Outdoor use of Aerofoam®

Whenever used externally Aerofoam® must be either painted, covered or cladded.

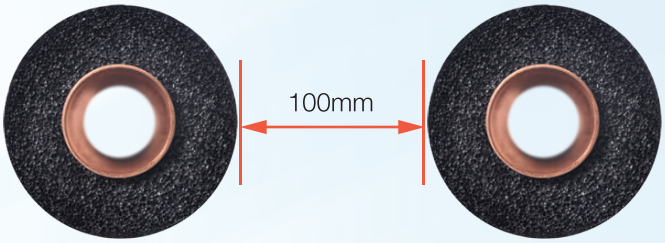
Aerofinish is a water-based protective paint. To provide UV protection two complete coats must be applied.
The first coat can be applied immediately after the insulation has been installed. The second coat should be applied within 7 days.

NORMAL CONSUMPTION				
	l/m²	m²/l	Wet film mm	Dry film mm
1st coat	0.275	3.6	0.275	0.13
2nd coat	0.275	3.6	0.275	0.13
Total	0.550	7.2	0.55	0.26

If additional mechanical protection or protection against severe weather conditions is required Aerofoam® CLAD covering system offers a non-metallic cladding option. For installation details please ask the Technical Service Department.

1.6. Advice for insulating in refrigeration and A/C equipment

a. Surfaces of pipes and tanks must be sufficiently protected against corrosion before installing Aerofoam®.
b. In general two component anti-corrosion system based on epoxy and polyurethane resin are compatible with Aerofoam® adhesives.
c. In the case of conventional insulation systems slight damage to the water vapour barrier can allow moisture to permeate throughout and underneath the insulation material. Using Aerofoam® this can be easily prevented by attaching each end of the Aerofoam® tube to the pipe with Aerofoam® adhesive, and making sure the adhesive joints are firm at critical points such as flanges, T-sections, elbows, supports, etc.
d. By regularly adhering Aerofoam® to the pipe in this way the insulation system can be compartimentalised. Damage will therefore be limited to the related sections and can easily be detected.
e. All connected items of equipment shall be insulated with equal thickness where practical.
f. Never insulate chilled water lines or refrigeration equipment if the sections to be insulated are too close together. Sufficient space should be allowed between insulated objects to ensure free convection as air movement by free convection provides an additional safeguard against condensation on cold pipes (see picture below).



Note: When insulating stainless steel with Aerofoam® please consult our Technical Service Department.

2. Ducts & vessels/tanks

In this chapter the installation procedures for ducts and vessels/tanks will be presented. Please always consider that the adhesive applied on the Aerofoam® rolls is a pressure sensitive adhesive (PSA), so that it is needed that uniform pressure will be applied on the surface of the roll. In order to avoid having surfaces where the roll will not adhere to the duct due to the fact that not enough pressure was applied, it is recommended to use a roller **(see page no. 2, object xiv).**

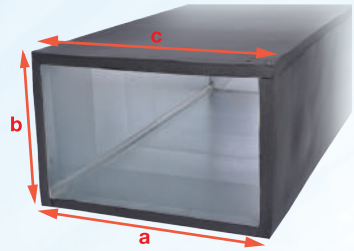
2.1. Insulating ducts with Aerofoam® rolls

All ductwork should be free of dust, grease and oil. To clean the duct, first wipe with a clean cloth to remove dust particles. Then remove grease and oil by applying a methylated spirit or acetone (special glue cleaner) and allow evaporating. Work within a reasonably clean area to avoid too much dust.

a. Measure the sizes of the surface and cut the Aerofoam® roll accordingly.

Note: Add 5 mm so that the material will fit when compressed.

a = duct width + 5 mm
b = duct height + 5 mm + insulation thickness
c = duct width + 5 mm + 2 x insulation thickness



b. Spread a thin film of adhesive onto the Aerofoam® roll and then onto the metal surface. Please clean the metal surface before applying the glue.

c. When the adhesive is tack dry (fingernail test) place Aerofoam® roll in position and press firmly to achieve a good bond. Continue, applying Aerofoam® adhesive to both surfaces, including the Aerofoam® edge, and allow to tack dry before pressing firmly into position.

Note: Remember to roll the sheet down into position along the insulated edges.

d. Insulate according to the drawing below! This is especially important for external duct work.

Note: The cut rolls should be positioned so that there is a 5 mm overlap (for compression). Do not apply adhesive to this area on either the Aerofoam® sheet or the duct surface.

When pressed together the material is under compression and is not stretched. Apply an additional wet seal along the butt joints.

2.2. Insulating ducts with self-adhesive Aerofoam® rolls

2.2.1. 4-piece procedure

All ductwork should be free of dust, grease and oil. To clean the duct, first wipe with a clean cloth to remove dust particles. Then remove grease and oil by applying a methylated spirit or acetone (special glue cleaner) and allow evaporating. Work within a reasonably clean area to avoid too much dust.

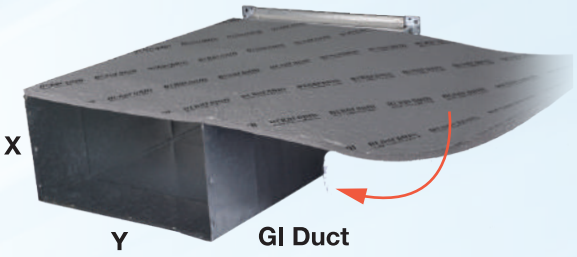
a. Peel off a small section of the adhesive paper. Start off with around 100 mm. Press firmly to activate adhesive (PSA).

b. Align the insulation edge with duct edge and gently lower the sheet exposing only required adhesive and padd firmly the insulation as it lays on the duct from the fixed edge moving to the other edge ensuring air is expelled. At butt joints allow 5 mm overlap for compression. Then apply a wet seal application to the compressed butt joint.

2.2.2. Wrap around application

This procedure is possible only for Aerofoam® thicknesses less than 20 mm (especially in case of Aerofoam® XLPE).

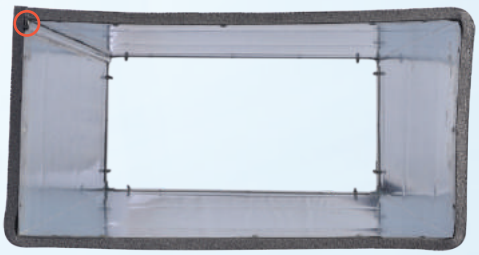
a. Cut Aerofoam® insulation to the required length. Always allow 10 mm excess for final adjustment. Lay the duct on the floor. It is advisable to use a soft sheet, board or any other suitable covering to the floor to avoid damage on the insulation. The required length of the insulation is: **L = 2X + 2Y + 10 mm**

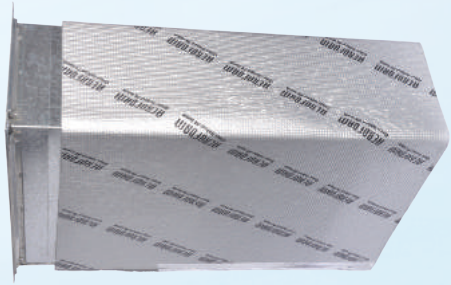


b. Please follow the procedure explained above at 2.2.1.

c. Once one side is fixed, turn the duct to expose bare-side. Repeat until completely covered avoiding pulling of the insulation on edges to ensure the insulation thickness on the corners will be maintained the same.

d. On the final side, ensure the insulation length reaches the same level as the starting edge. Trim off excess length with a sharp knife until it is leveled with adjacent side.





The same procedure is to be followed on a round duct ensuring the edges are butted firmly **(please also see page no. 13).**

However, this procedure is not recommended for Aerofoam® NBR.

2.2.3. Hangers

Disregarding the way it was installed, in case the duct is fixed on a hanger please read below:

Conventional hangers are suitable for the installation of Aerofoam®. If the duct is insulated before it is installed, the hanger base must be lined with foam of the same thickness of Aerofoam® to protect against compression. Aerofoam® can also be used instead of plain PE foam.

2.2.4. Repairing damaged sections

Aerofoam® XLPE is supplied with an alupet foil. This provides mechanical protection to the insulation and prevents the insulation being damaged accidentally during installation or service. However, in the unlikely event the insulation is damaged, repairing is an easy procedure.

- Simple cuts and small holes – as long as there is no visible gap, alupet tape should be used to cover the cuts / slits and holes. This is to ensure that no condensation takes place.
- Large cuts and missing sections – in case the insulation has been damaged and the inner core or the GI sheet is visible, then cut around the damaged section with a sharp knife and remove totally. Cut out the same size section from a fresh roll. Replace the damaged section with new insulation by inserting the new section in the cut out area. Ensure a tight fit with no visible gaps more than 1 mm. Seal with alupet foil tape.

2.3. Insulating duct brackets with Aerofoam®

i. With Aerofoam® tubes

For a cost effective solution with a high-end finish, the Aerofoam® tube can be used to overcover raised ductwork-connecting brackets.

a. Using Aerofoam® tube with equal thickness as the attached main duct branch, split with a sharp knife the tube into two equal halves. If the tube is slit please start with the next step.

b. Measure the four insulated sides of the duct body.
c. Using a mitre box, or the Aerofoam® template, cut the Aerofoam® as shown with a 45 degree angle. From the throat measurement, determine the length of the fitting and cut an opposite 45 angle as shown.

d. Continue to cut the other 3 sides of the tube picture-frame fitting.
e. Using Aerofoam® adhesive, apply a thin even film with a brush to the three sets of 45 degree angles.

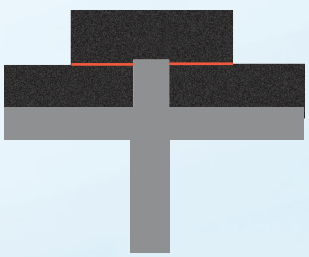
f. Allow the adhesive to touch dry, fix the angles together applying firm even pressure for a good bond.

g. Place the picture frame Aerofoam® tube around the ducting, apply the adhesive to the final angle cuts and bond to complete the fixing of the picture frame.

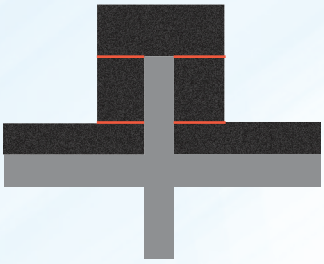
h. To finish, wet seal around the picture frame fitting.

ii. With Aerofoam® rolls

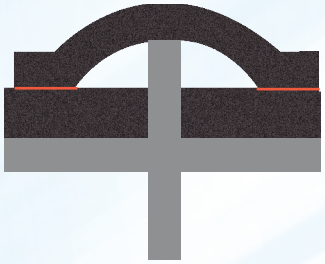
- Single strip method – Four single strips applied to the insulation.



- Three-sided box method – Built up side strips with over-covering body strips.



- Continuous single strip method – Complete single continuous strip.



In all situations the fabricated Aerofoam® insulation bracket covers have the same thickness as the attached ductwork connections. For a continuous vapour sealed system, all insulation covers shall be securely fixed and wet sealed with Aerofoam® adhesive.

2.4. Insulating circular ducts with Aerofoam® rolls

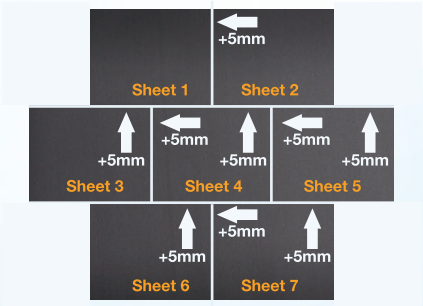
For circular ducts proceed as described in section 3.2.2.

2.5. Insulating vessels and tanks with Aerofoam® rolls

- Draw up a cutting schedule

Work out the most efficient way of covering the surfaces using Aerofoam® sheet (2 x 0.5 m) or continuous roll (1 m width and length 4-30 m dependent upon the thickness). Use Aerofoam® sheets for large vessels and tanks.

Note: Ensure that sheet joints are staggered.



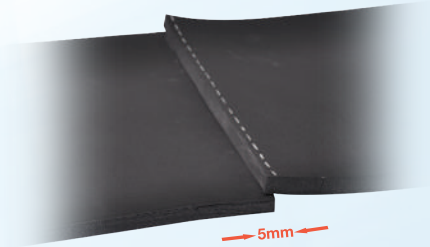
- Compression joints

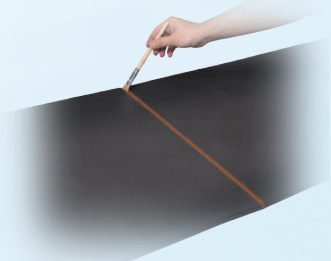
Provide an allowance of an additional 5 mm on all dimensions when cutting from Aerofoam® sheet or roll. Always make compression joints. On curved surfaces, measure the circumference with a strip of Aerofoam® of the same thickness to be used for the insulation, including any surface finish. Do not stretch the strip.

- Adhesion

Apply Aerofoam® adhesive first to the insulation before applying adhesive to the metal surface.
All seams are joined wet. Leave about 30 mm without an adhesive coating on the Aerofoam® surface. Attach the connecting sheet with adhesive and with 5 mm overlap. Then press in the overlapping butt join to give additional compression.

Wet sealing of joints on flat surfaces:





- Multi-layer application

Where multi-layer insulation is installed use special glue cleaner, after 36 hours **(see page no. 10)** to remove any talc, chalk, dirt, grease and moisture from the surfaces to be joined. Stagger all seams and butt joints on the second layer relative to the first layer.

- Complex shapes

Where complex shapes are to be insulated, the shape of the body is outlined with chalk and this may be transferred directly to the Aerofoam® sheet by pressing the flexible material against the metal surface so that the chalk is transferred. Cut along the chalked line with a sharp knife to obtain a good fit for the Aerofoam®.

- Outdoor installations

All naked Aerofoam® materials (without UV resistant foils) used outdoors will require additional protection against UV radiation. We recommend the use of Aerofinish paint or the CLAD system **(see page no. 4)**.

3. Pipes and fittings

3.1. Insulating pipes using Aerofoam® tubes

3.1.1. Cutting Aerofoam® NBR tubes

Use a sharp knife. Keep knife at a low angle when slitting tube to avoid damaging the internal skin of the tube.

Use sharpened off-cuts of pipes to make holes.

Always cut on the flat sides of tubes.

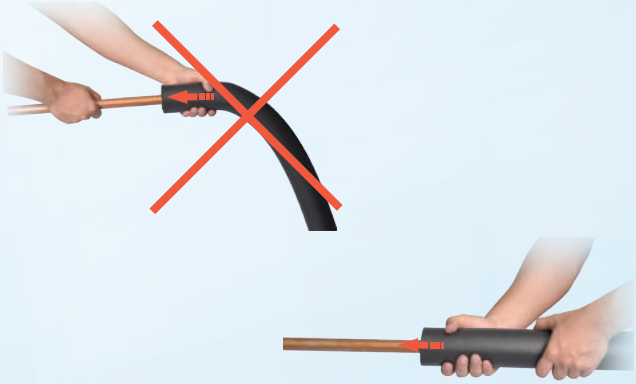
3.1.2. Insulating new pipes by Sleeving–On

In principle, tube material can simply be slid on the round bends.

However, with tight bends (such as those likely to be encountered on small bore pipes) there is a risk that the insulation will kink in the throat of the bend, reducing insulation thickness. In the refrigeration / air-conditioning sector the calculated insulation thickness is then no longer achieved and condensation can occur on the surface of the insulation.
The following should be taken into account in these cases:
If the insulation kinks and the adhesive seam is compressed the bends should be cut into segments to fit **(see page no. 11)**. For the application of bends we only recommend in this context the use of standard tubes.

Note: Do not attempt to pull the Aerofoam® NBR tube along the pipe as this may cause the insulation to tear.

Always push the Aerofoam® tube over the pipe as shown.



3.1.3. Insulating existing pipes by Snap–On

a. With a sharp knife, slit the flat part of the unslit tube along the entire length.
b. Place the slit tube onto the clean pipe; apply Aerofoam® adhesive to the two cut edges with a thin even film of adhesive using a short bristle brush. Apply the adhesive at 200 mm intervals, along the tube length.

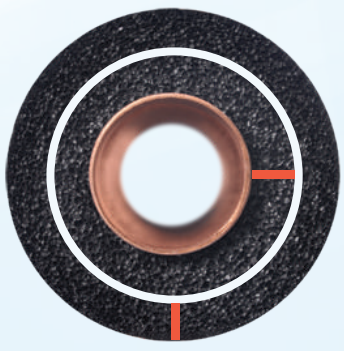
c. Allow the adhesive to touch dry, test with the finger nail.
d. Free the seams from the pipe where applicable, line the edges together and press the seam detail with firm even pressure to finish.

3.1.4. Multi-layer insulation of pipes

Note: Multi-layer insulation of pipes is possible only if insulation without any foil is used. If the inner layer has preapplied foil then multi-layer insulation is not recommended!

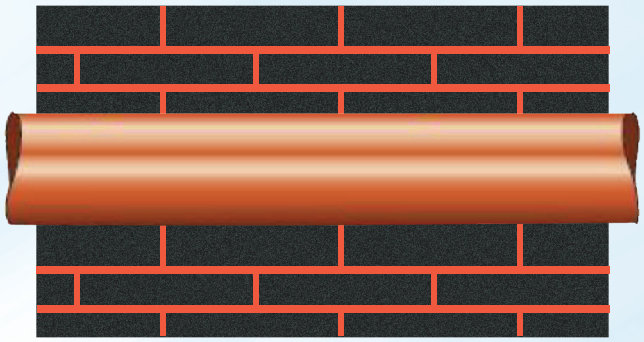
Staggering on pipe-work: cross section view

Multi-layer insulation with tubes: The inside diameter of the second oversize tube should be selected according to the maximum outside diameter of the first layer.



Orange lines indicate glued seams

Staggering on pipe-work: longitudinal view



Orange lines indicate glued seams

- **Multi-layer insulation as a combination of tubes and sheets:**
  If the outer diameter of the first layer is large enough **(please take notice of the table on page 13)**, we recommend that the second layer should be made with sheet, since this can be adapted exactly to the outside diameter of the first layer.

- **Multi-layer insulation of pipework with sheets:**
  In general the insulation of pipes with sheet material is possible at an outer diameter of 89 mm. Select layer insulation thickness combinations as appropriate dependent on the outer diameter of the object **(see table on page 13)**.

  Note: The ends of the tube or sheet of the second layer should be adhered to the first layer of Aerofoam®. If there is a risk that the insulation may sag under the pipe, the insulation should be fully adhered to the underlying layer. When the piping diameter is above 600 mm all-over adhesive coverage should be applied on both surfaces.

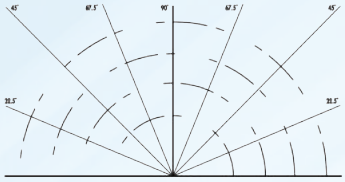
Note: To prevent Under Insulation Corrosion (UIC) all-over adhesive coverage is recommended.

- **Multi-layer insulation of flat surfaces with sheets:**
  In the case of multi-layer insulation the first layer should be applied using all over adhesive coverage. The second layer should be adhered to the previous layer of Aerofoam®. Insulation on the underside of flat objects should be applied using all over adhesive coverage for all layers. In general the butt joints and the longitudinal seams of the second layer should be staggered to those of the first layer.

3.1.5. Using the Aerofoam® template

The fabrication of bends and tees using Aerofoam® tube requires tubes to be cut to different angles. In order to make this process easier and quicker, the Aerofoam® template is provided on every box of Aerofoam® (available on Aerofoam® NBR boxes).

a. Place a copy of the Aerofoam® template face up on a table or worktop.
b. Line a tube of Aerofoam® across the template parallel along the horizontal base line.
c. Select the required angle cut from the template and cut along this line.

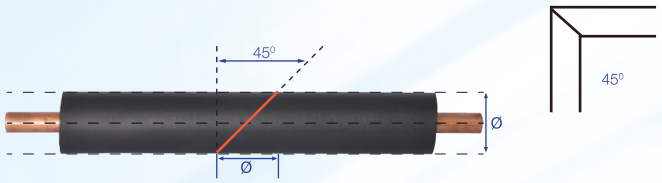


Additional copies of the Aerofoam® template on hard PVC sheet are available on request (contact your local Sales Representative). Template is printed on every Aerofoam® NBR tube carton.

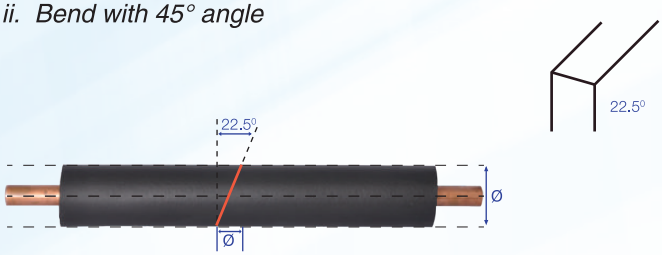
3.1.6. Detailed drawings for fabrication of shapes

Below you will find the drawings needed to obtain different shapes made from insulation tubes. The orange lines indicate where cuts are to be made. For correct angle measurements please use the Aerofoam® template located on each tube box.
Also a miter box can be used for the same purpose.

i. Bend with 90° angle



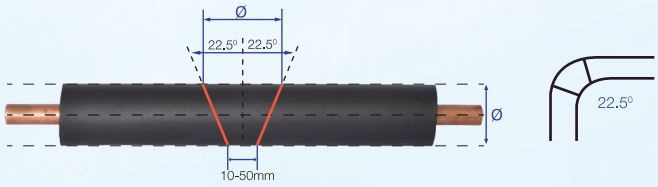
ii. Bend with 45° angle



*The Ø details to achieve the 45° angle are approximate values!

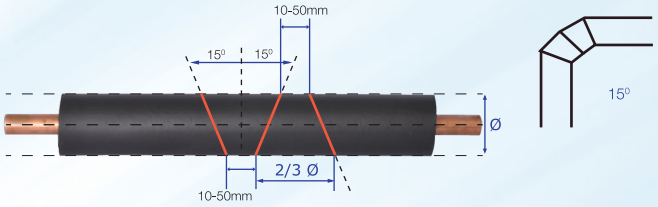
a. To obtain the 22.5°, use miter box or cut the tube in an angle to achieve one third of the outer diameter of the insulation.
b. Apply Aerofoam® adhesive on both surfaces of the angle ends.
c. Join both ends firmly.
d. If the tubes have preapplied foil on them, it is recommended to use foil tape on the joint.

iii. Segmented bend with 1 middle part



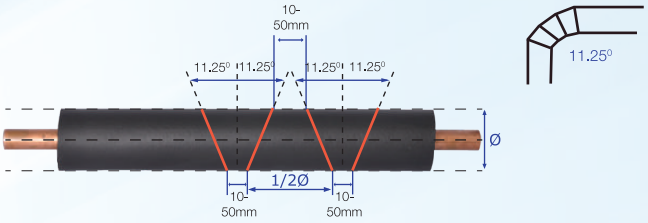
a. To obtain the 22.5°, use miter box or cut the tube in an angle with a spacing of 10-15 mm for the middle piece.
b. Apply Aerofoam® adhesive on both surfaces of the angle ends.
c. Join both ends firmly.
d. If the tubes have preapplied foil on them, it is recommended to use foil tape on the joint.

iv. Segmented bend with 2 middle parts



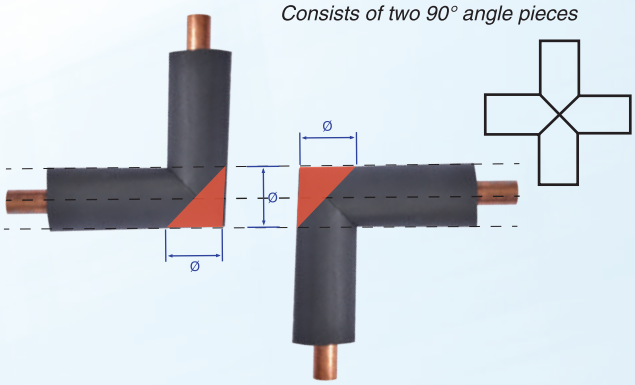
a. To obtain the 15°, use miter box or cut the tube in an angle with a spacing of 10-15 mm for the middle pieces.
b. Apply Aerofoam® adhesive on both surfaces of the angle ends.
c. Join both ends firmly.
d. If the tubes have preapplied foil on them, it is recommended to use foil tape on the joint.

v. Segmented bend with 3 middle parts



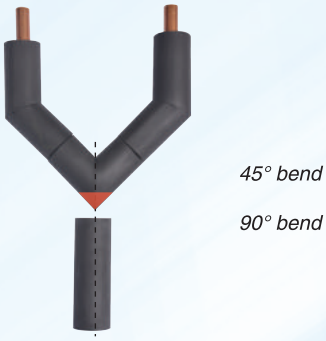
a. To obtain the 11.25°, use miter box or cut the tube in pieces.
b. Apply Aerofoam® adhesive on both surfaces of the angle ends.
c. Join both ends firmly.
d. If the tubes have preapplied foil on them, it is recommended to use foil tape on the joint.

vi. Cross piece joint



a. Follow the steps described at “Bend with 90° angle” to create 2 elbows of 90°.
b. Cut both elbows as indicated in the drawing, after measuring them.
c. Apply Aerofoam® adhesive on both surfaces of cut areas. Join both ends firmly.
d. If the tubes have preapplied foil on them, it is recommended to use foil tape on the joint.

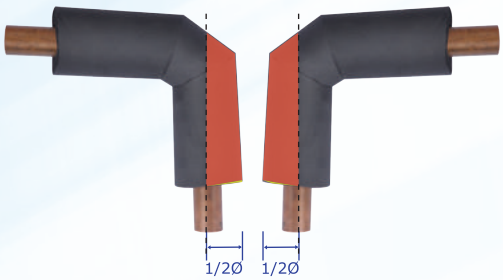
vii. Y-tube



Further fabrication of the 45° bend (2 times) and the 90° bend (once).

a. Follow the steps described at “Bend with 45° angle” to create 2 elbows of 45°.
b. Follow the steps described at “Bend with 90° angle” to create one elbows of 90° from the 2 elbows of 45°.
c. Cut the 90° elbow as indicated in the drawing, after measuring it.
d. Apply Aerofoam® adhesive on the surfaces of the cut areas and on the tube end. Join both ends firmly.
e. If the tubes have pre applied foil on them, it is recommended to use foil tape on the joint.

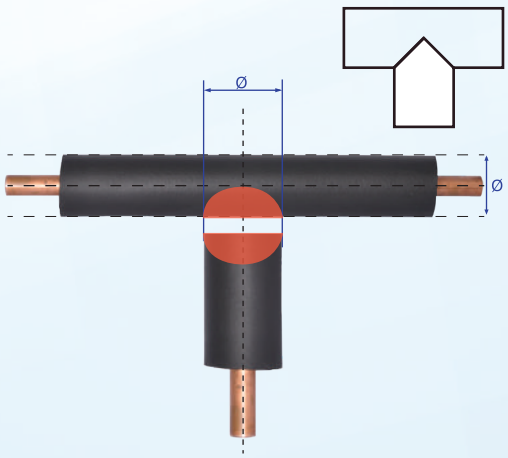
viii. Swept T-piece



a. Follow the steps described at „Segmented bend with 1 middle part” to create 2 elbows of 90°.
b. Cut both elbows as indicated in the drawing, after measuring them.
c. Apply Aerofoam® adhesive on both surfaces of cut areas. Join both ends firmly.
d. If the tubes have pre applied foil on them, it is recommended to use foil tape on the joint.

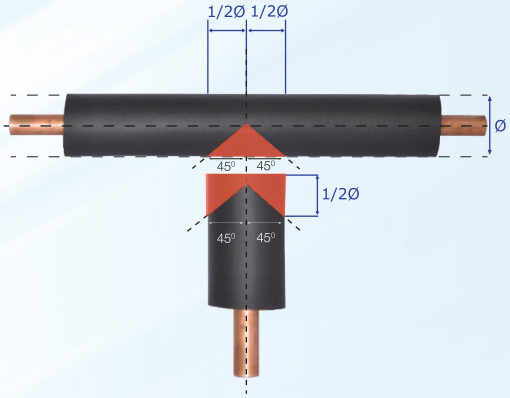
ix. Angle T-piece

Method 1 - The “Punched Hole” T Piece



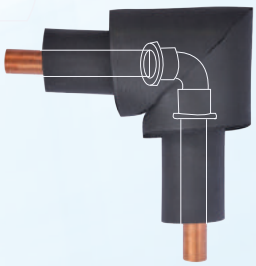
a. With a sharp pipe end make a hole in the tube which will be used as the superior part.
b. Cut a semicircular shape at the end of the tube which will be the leg of the “T”. The maximum depth of the cut shouldn’t be bigger than one third of the exterior diameter of the tube used for the superior part.
c. Join pre-cut parts with Aerofoam® adhesive to form a “T”.
d. Slit open the “T”, it can then be slid over the pipes.
e. If the tubes have preapplied foil on them, it is recommended to use foil tape on the joint.

Method 2 - The “Mitre Block” T-Piece



a. Cut two 45° angles at the end of the tube section for the branching pipe as shown, using either a mitre bock or the Aerofoam® template.
b. Cut a 90° wedge into the tube section covering the primary pipe. This should correspond to the outer diameter of the branching tube.
c. Join the pre-cut parts with adhesive to form a “T”.
d. Slit the formed piece sideways with a sharpened knife, apply adhesive to seams, fit when tack dry.
e. If the tubes have preapplied foil on them, it is recommended to use foil tape on the joint.

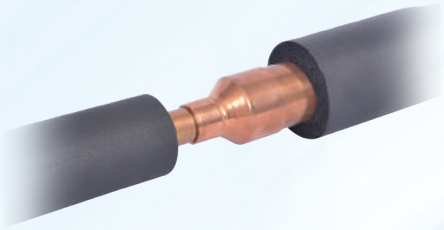
x. Insulating coupling pipe joints



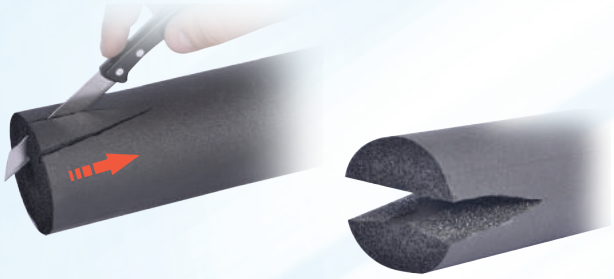
a. Insulate up to the pipe fitting using Aerofoam® tube and secure to the pipe using adhesive.
b. The fitting cover is made from tube the bore of which is the outer diameter of the incoming tube. Provide a minimum overlap of 25 mm on each side (increase the distance of the overlap to match the insulation wall thickness if this exceeds 25 mm). The fitting may be made up using any of the methods described on **page 11**.
c. Slit in the throat, apply adhesive to seams, fit when tack dry. Wet seal overlaps.

xi. Pipe reducer

Pipe reducer that has to be insulated is shown below:



a. Cut out segments from a tube of the larger diameter and glue seams with Aerofoam® adhesive.



b. Cut reducer to size - allow compression of 5 mm at each end. Slit fitting on the flat side.

c. Install and glue seam and butt joints.

d. If the tubes have preapplied foil on them, it is recommended to use foil tape on the joint.

3.2. Insulating pipes & fittings using Aerofoam® rolls

In this chapter you will learn how you can insulate big diameter pipes and fittings with Aerofoam® rolls.

3.2.1. Insulating pipes with Aerofoam® rolls

Aerofoam® tubes are available for pipes with outer diameters up to 3 ½" (Aerofoam® NBR) and up to 40" (Aerofoam® XLPE). Larger pipes and ducts as well as tanks should be insulated with Aerofoam® roll or sheet, and all over adhesive surface coverage is required for pipes with an outer diameter above 24".
It is often advantageous to insulate smaller pipes using Aerofoam® sheet, even when correctly dimensioned tubes are available. Care should be taken to ensure that the stresses in the seams, caused by the bending in the sheet, do not become too great.

These stresses rise as the insulation thickness increases and as the pipe diameter decreases. Please consult the table below to gauge the applicability of different thicknesses of Aerofoam® sheet (valid only for Aerofoam® NBR; for Aerofoam® XLPE higher stresses should be considered and that is why it is recommended that only rolls with a maximum thickness of 20 mm should be used to insulate pipes – please use the precut Aerofoam® XLPE pipe sections as much as possible).
The ambient temperature during installation will also impact on the levels of stress likely to be encountered.

Aerofoam® NBR sheets	**External diameter of the pipe (mm)**				
	> 89	> 114	> 139	> 159	> 408
9 mm	√	√	√	√	√
13 mm	√	√	√	√	√
19 mm	√	√	√	√	√
25 mm		√	√	√	√
32 mm			√	√	√
40 mm				√	√
50 mm					√

3.2.2. Insulating large pipes with Aerofoam® rolls

a. Determine the circumference of the pipe.

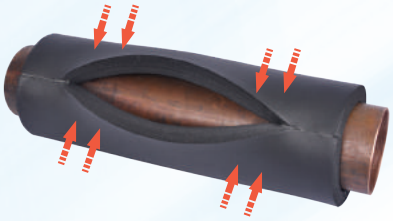
Important: Always measure with a strip of Aerofoam® of the thickness to be used for the insulation.

Warning: Do not stretch the strip!

b. Cut Aerofoam® sheet to the required size – apply Aerofoam® adhesive to the cut surfaces in a thin layer and allow to touch dry.

c. Press together at the ends and then in the middle. Close the entire seam starting from the middle.

Note: In order to prevent the seam reopening ensure the adhesive has been fully applied to the edges of the fixing seam and ensure the correct amount of adhesive has been applied. Check the open time of adhesive to ensure it is still fit for use.

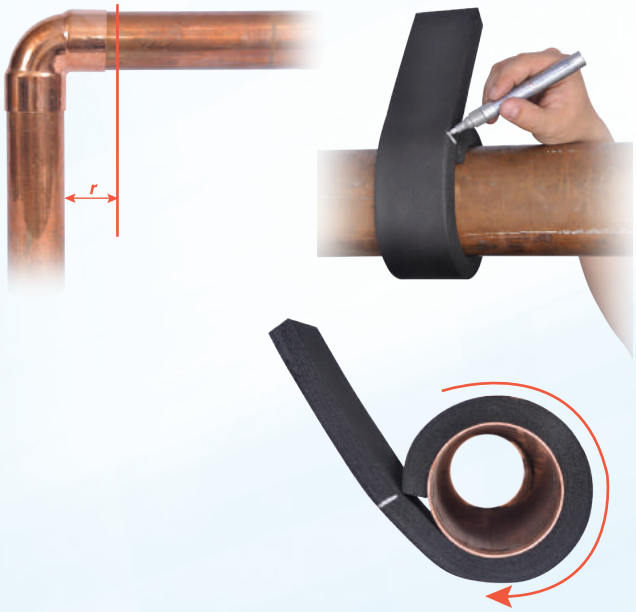


3.2.3. Step-by-step guides for the fabrication of shapes

Below you will find the drawings needed to obtain different shapes made from insulation rolls or sheets. For correct angle measurements please use the tools indicated at **page no. 2.**

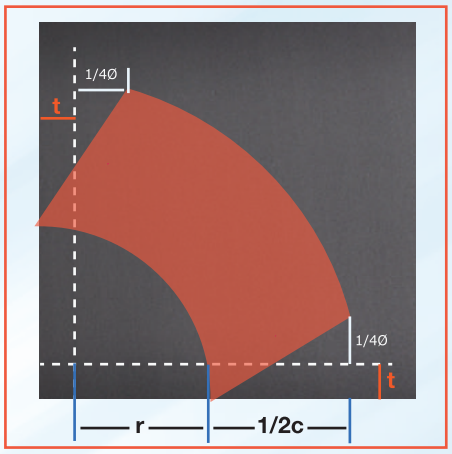
i. Two part bend

a. Establish the inside radius, *r*, by dropping a perpendicular line to meet a horizontal line from the outside of the two welds. The point where these two lines intersect gives the origin for the radius, *r*. This is the throat radius.
Measure in a 12 mm trimming allowance along both vertical and horizontal edges then transfer *r* to the sheet as indicated. Determine the circumference of the pipe using a strip of Aerofoam® of the thickness to be installed.

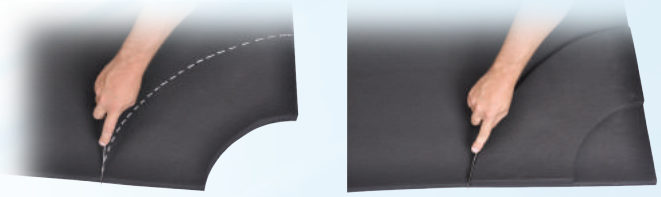


b. Halve the pipe circumference and transfer this dimension to the Aerofoam® sheet. Mark out the two arcs from the intersection of the trim lines.

r - inside radius of bend
½ c - half of pipe circumference
t - insulation thickness (in mm)



c. Cut out the first half-section of the elbow. Use the first half-section as a template to cut out the second half-section of the elbow.



d. Place the sections together with the rough surfaces inwards. Apply Aerofoam® adhesive to the outer edges. Allow the adhesive to tack dry (fingernail test) then press the two sections together at one side to make a short seam.

e. Next, press the opposite sides together, also making a short seam. Repeat alternately closing 50-75 mm at a time on each side, working towards the centre. Press the remainder of the joint firmly together.

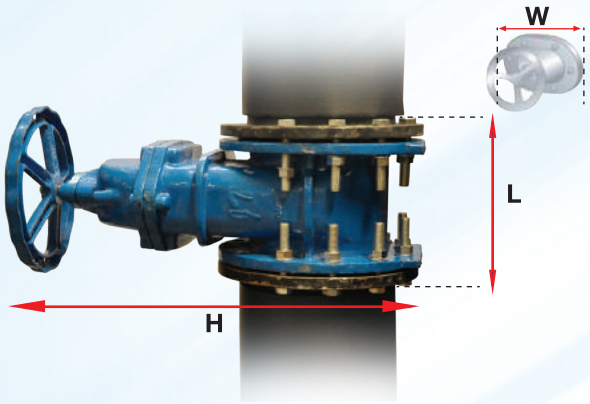
f. Turn the assembly over and press the seam firmly together from the inside, so that a good adhesive joint is achieved across the entire wall thickness. Apply Aerofoam® adhesive to the inner joint edges.

g. Place the insulation cover over the pipe bend. Allow the adhesive to tack dry then press the joint faces firmly together. Wet seal jointing details with adhesive, fitted under slight compression, to complete the bend.

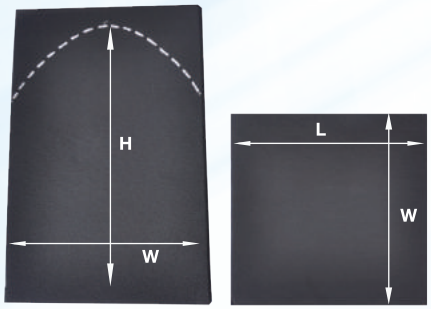
ii. Valve insulation with D-Box

a. Establish the following measurements:

L - length of valve + 2 x thickness of insulation
H - height of valve + 2 x thickness of insulation
W - Ø (diameter) + 10 mm



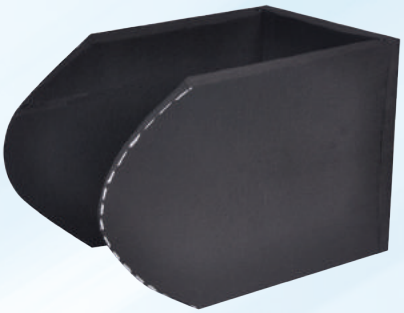
b. Mark out and fabricate 2 x end panels and 1x top panel using the measurements made in the previous step. Cut cleanly using a small sharp knife.



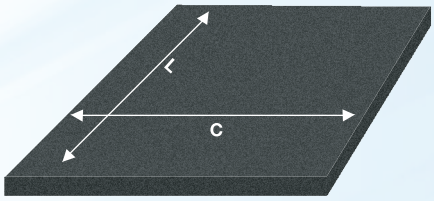
c. Apply Aerofoam® adhesive along the edges as indicated.

Note: The glue line must be as wide as the thickness of the Aerofoam® in use.

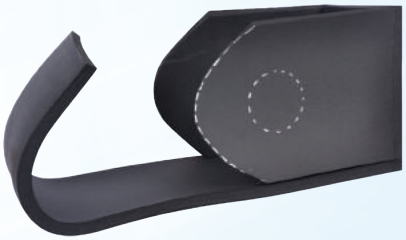
d. Glue the top edges of the end panels and the top panel edge. Fix down the end panels to the top panel making sure the edges are in-line.



e. Use a strip of Aerofoam® (used thickness) to determine the circumference around one end panel (including the top panel). Mark measurement *L* and circumference *c* out and cut the body panel to size. Apply Aerofoam® adhesive to the body panel end and the body panel edges as shown.



f. Gently roll the body panel edges around the end panels until the cover panel resembles a box. Fix down the square 90° edge as shown. Ensure the edge is in-line and neat.



g. Continue to fix all edges in this way. Cut holes for the insulated piping connections on each of the end panels and a final cut-out for the valve spindle connection at the top. Split the box into two halves and fit around the valve. To finish, apply Aerofoam® adhesive to the fixing seams, allow to touch dry and fix the seams together. Vapour seal the connections (joints) to the linear insulated pipes using Aerofoam® adhesive.

Important: Secure bonding in the area of the spindle neck penetration is essential.
Note: Tape may be applied to the spindle neck in the area of the penetration to provide additional protection.

iii. Offset angle & pipework bend angle joints

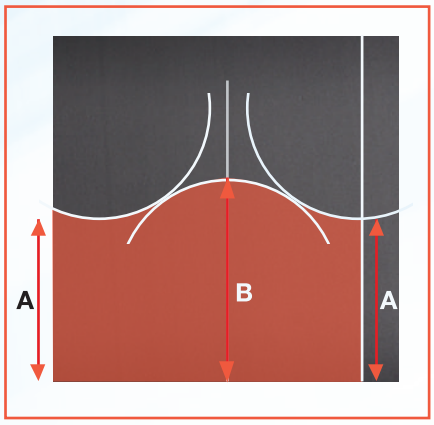
The following illustrations show the various stages of work when insulating a mitre angle or bevel joint in a pipe. The procedure when insulating a right angle pipe joint is effectively the same.

a. Determine the following:

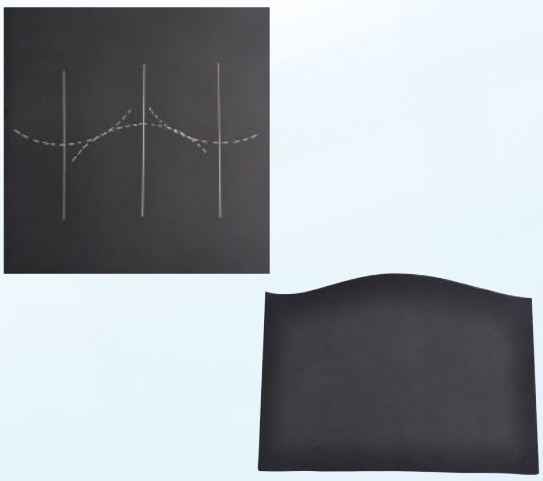
C - circumference of the pipe
B – outer height of the mitre joint
A – inner height of the mitre joint

Important: Always measure with a strip of Aerofoam® of the thickness to be used for the insulation. Do not stretch the strip.

b. Transfer the circumference to the Aerofoam® sheet and mark in the centre line. Transfer the outer and inner height to the Aerofoam® sheet.



c. Measure the half-circumference using dividers and mark out 3 arcs. Join the arcs with a continuous line.Cut along the line. When repositioned by 180°, the upper and lower sections produce the two parts of the mitre joint.

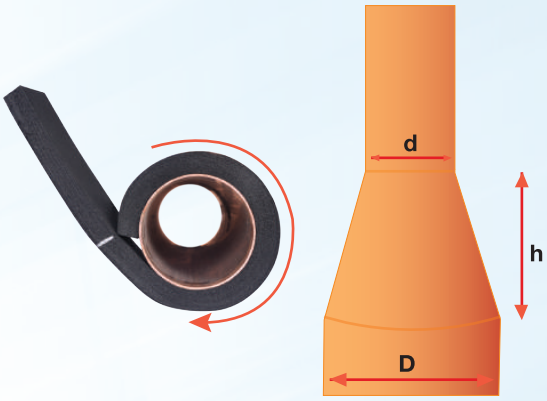


d. Apply Aerofoam® adhesive to the longitudinal seam, then to the connecting seam. The insulation is now complete.

iv. Concentric Reducers

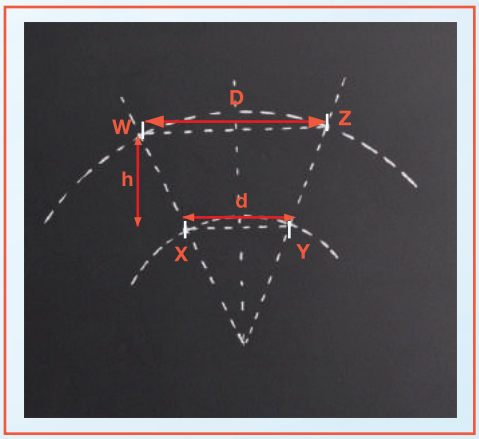
a. Determine the following measurements:

h - height of the reducer, incl. both welds
D - diameter of larger pipe + 2 x insulation thickness
d - diameter of smaller pipe + 2 x insulation thickness



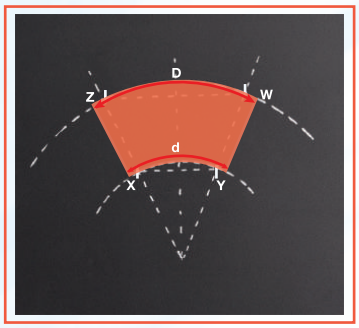
b. Mark out the Aerofoam® sheet with a centre line. *D* and *d* are marked off at each end, as shown, to give points X,Y, Z and W (orange markings show meeting points). The distance between the lines *d* and *D* is height *h*.

c. Extend the lines W-X and Z-Y to meet at the apex point which is on the extension of the centre line.



d. From the apex point strike two arches through X-Y and W-Z. Determine the circumference *C* (of the large pipe) and *c* (of the small pipe) .
Important: Always measure with a strip of Aerofoam® of the thickness to be used for the insulation.
Warning: Do not stretch the strip.

e. Transfer the two circumferences by using the two strips used to measure the circumferences and mark the final dimension of the insulation of the reducer. Cut out the reducer piece with a sharp knife (orange area indicates the cutting lines).

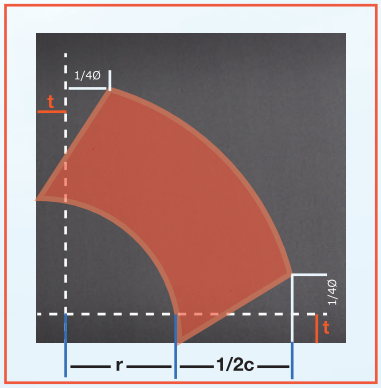


f. Apply a thin coat of adhesive to the edges to be joined, allow to tack dry. Press togehter firmly at one end, then at the other end and complete the joint. Complete insulation by insulating the pipes on either side of the reducer and wet seal both butt joints.

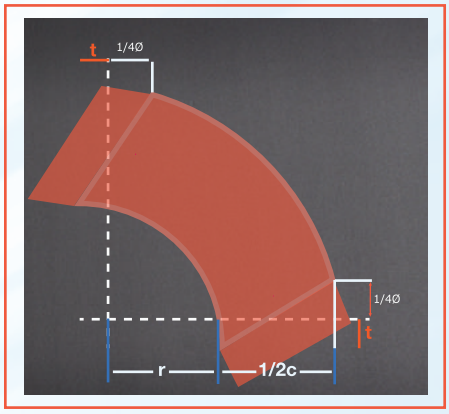
v. Two-part bend with extension

In some cases flanges, valves etc. are located in close proximity to bends. In such situations it is practical to insulate this area as a single operation:

a. Fabricate a two-part-bend as shown on **page no. 14** of this manual.



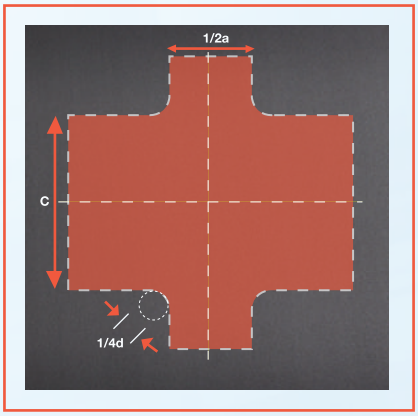
b. Mark at both ends of the bend the required extension at a 90° angle.
c. Cut the first half-section of the extended elbow. Use the first half-section as a template to cut the second half section of the elbow.
d. Place the sections together and apply Aerofoam® adhesive to the outer edges.
e. Allow the adhesive to tack dry and adhere the pieces together as shown on **page no 16**.



f. Place the insulation cover over the pipe bend. Allow the adhesive to tack dry then press the joint faces firmly together.

vi. One-part T-piece

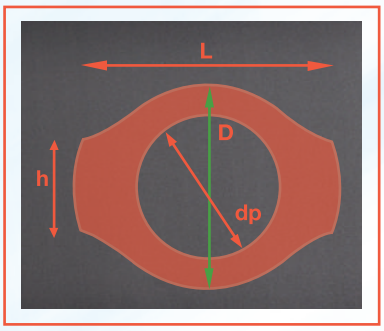
a. Measure with a strip of Aerofoam® of the thickness to be used for the insulation the circumference of the uninsulated main pipe (*c*) and the branched pipe (*a*).
b. Determine the length of the main pipe to be insulated.
c. Transfer these measurements to a piece of Aerofoam® sheet and mark out vertical horizontal centre lines.
d. Determine the length of the branched pipe to be insulated. Mark out from the centre point to both sides on the vertical centre line.
e. Mark ½ diameter of branched pipe and join the points with straight lines.
f. With ½ of the diameter of the branched pipe cut the section of the sheet.



g. Apply adhesive to all seams, allow to tack dry, then seal round the T-piece.

vii. Victaulic couplings

a. Insulate pipes up to the coupling.
b. Determine the following:
D - diameter of coupling + 2 x insulation thickness
h - height of screws + 2 x insulation thickness
L - length of coupling



c. Using ½ of *D* (diameter coupling + 2 x insulation thickness) as a radius transfer a circular arc to the Aerofoam® sheet and mark a horizontal centre line.
d. From the centre of the line mark the width of the coupling.
e. At both ends mark out the height of the screws plus 2x insulation thickness at an 90° angle to the centre line.
f. Connect the four endpoints and the circular arc with a tangent so that an oval like disc is built.
g. Determine the diameter of the insulated pipe (*d*) and mark it on the Aerofoam® sheet.
h. Cut out this disc and use as a template to create a second identical disc.
i. Adhere both discs immediately next to the coupling.
j. Determine the circumference of the disc and measure the distance over the outer faces of the two discs. Transfer these measurements to a sheet of Aerofoam®.

Important: Always measure with a strip of Aerofoam® of the thickness to be used for the insulation. Do not stretch the strip.
i. Cut this section and adhere over the Aerofoam® discs around the coupling.

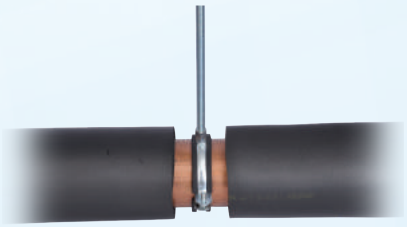
3.2.4. Insulating pipe Supports

i. Insulating "over" pipe brackets

The insulation of standard brackets can be carried out using the procedure as follows:

a. Install the Aerofoam® as close to the fixing bracket as possible. Seal the ends of the tube to the pipe with Aerofoam® adhesive.

Note: On cold lines insulate the fixing bracket with a relevant Aerofoam® tube or with self-adhesive tape.



b. With a large off-cut of Aerofoam® tube, core out a small hole to allow for the oil thread support of the bracket and slit with a small sharp knife along the flat face of the tube.

Note: For large pipe diameters the use of Aerofoam® sheet is recommended.

c. Place the Aerofoam® cover over the support area, mark and cut the true circumference of the cover. Fix and vapour seal all seams and joints in and around the attached insulation using Aerofoam® adhesive.

Note: If installed on cold lines a declaration of scrupulosity should be made.

ii. Insulation of pipe supports

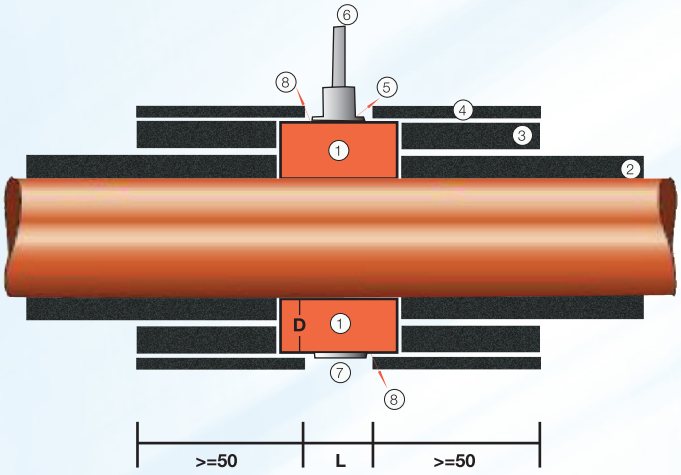
Often, cold clamps made of PUR/PIR are the chosen pipe hanging systems. In these cases it is important, that a vapour tight bonding between the cold clamps and the Aerofoam® insulation is achieved.

This interface represents a thermal bridge where condensation may occur and adhesion at these points requires special attention:
a. Clean the surface of the clamp, using special glue cleaner.
b. Apply Aerofoam® adhesive on the surfaces which are to be adhered. Allow this first layer of Aerofoam® adhesive to dry.
c. Apply a second thin coat of adhesive evenly on both the surface of the clamp and the Aerofoam® adhesive joints. After the adhesive has cured, the joints should be pressed together in a brief but firm action.
d. When adhering both butt joints under pressure perform a "wet-seal" around the joint, when the clamps have been adhered in advance (please see above).

If necessary double the Aerofoam® thickness to the diameter of the PUR-support. To secure the butt joints apply an overlapping strip of Aerofoam® using all over adhesive.

Schematic cross section of a connection of Aerofoam® tubes with a clamp made of PU ridgid foam:

1. Clamp made of PU ridgid foam:
2. Insulation thickness
3. Aerofoam® tube
4. Aerofoam® double layer
5. Aerofoam® overlap (thickness ≥ 9 mm)
6. Connecting thread M10
7. Threaded bar M10
8. Two-part screw pipe clamp, zinc coated aluminium facing



4. Additional information

The following sections contain further detailed information for specific applications.

4.1. Aerofoam® with additional metal cladding

Sometimes it is necessary to protect Aerofoam® with an additional layer of metal cladding from mechanical damage and also, for outdoor applications, from UV-radiation.
If such cladding is used it must be taken into account that the metal cladding may influence the insulation thickness requirement. In particular the altered surface emissivity will impact on the surface coefficient of heat transfer to be used in calculations.
It is considered best practice to install the metal cladding directly onto the Aerofoam® leaving no air gap. Since fixing screws will be directly inserted into the Aerofoam®, thermal bridges will be created and the insulation wall thickness may need to be increased to compensate for this.
Alternative the cladding can also be installed with an air gap (minimum 15 mm) by using strips of Aerofoam® as a distance holder. In addition a 10 mm drilling with differences of 300 mm at a maximum on the underside of the cladding should be carried out.

Note: It is important to ensure that condensation does not occur within this air layer or on the surface of the aluminium cladding. Always pay careful attention to the changing surface coefficient of heat transfer as this can seriously impact upon the insulation thickness requirement.

4.2. Installation of Aerofoam® insulation in the soil

Pressure of soil backfilled on top of the Aerofoam® will cause compression of the material impacting on the insulation wall thickness. It is recommended that Aerofoam® be shielded from compression by sleeving the insulated pipe into a rigid soil or waste water drainage pipe.
Prevent compression of flexible cellular material due to contact with the outer protective pipe by selecting a drain-pipe whose bore is sufficiently larger than the outer diameter of the insulated pipe assembly which is to be inserted.
Ensure the outer protective pipe is fully supported e. g. by having full, intimate, contact with the surrounding soil to prevent breaks occuring in the drainpipe joints and connections are particularly vulnerable to these kind of events.

4.3. Installation of Aerofoam® insulation on plastic pipes

Aerofoam® insulation materials and Aerofoam® adhesive are compatible with most plastic pipe materials which are used for industrial and building service equipment. On pipes made of PVC-C, PE-Xa and PE-HD plastics, Aerofoam® can simply be installed in the same way as on metal pipes.
However, when bonding Aerofoam® to polypropylene (PP) pipes, it is necessary to bear in mind that the adhesion of the material is not optimal. Therefore, to improve the bond, it is recommended to perform a roughening of the plastic where the partition bonding is to be carried out.
When Aerofoam® is glued to ABS pipes, solvent from the Aerofoam® adhesive may be trapped. During the aging process of the ABS plastic, this can lead to hair cracks in the pipes. Direct partition bonds should therefore not be used on ABS pipes. However, it is possible to first apply self-adhesive rubber foam tape where the partition is to be created and then carry out partition bonding. In contrast, this is not necessary when the longitudinal seams are glued. Here it can be assumed that if the work is carried out correctly, the solvent present in the applied adhesive will have evaporated before the insulation is glued together.

Compatibility of Aerofoam® and Aerofoam® adhesive with plastic pipes

Plastic pipe	Compatibility	Comments
PVC-C	yes	-
PE-Xa	yes	-
PE-HD	yes	-
PP	yes	To improve bonding - e.g. where partition bonds are to be carried out - first roughen the plastic
ABS	yes	In the case of partition bonding, first apply self-adhesive rubber foam tape where the partition is to be created, then carry out partition bonding.

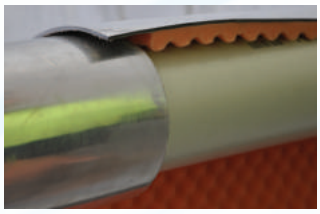
AEROSOUND SL+ / SLM INSTALLATION METHODOLOGY

Step 1 : Preparation

1. Measure the length and diameter of the pipe requiring lagging.
2. To calculate the required width of AeroSound Acoustic Lagging apply the formula below.

WIDTH = π x (OD + (2 x T)) + OL Where:
OD = outside diameter of the pipe π = 3.14
T = thickness of SL+ (13mm nom.)
OL = Overlap (40mm)



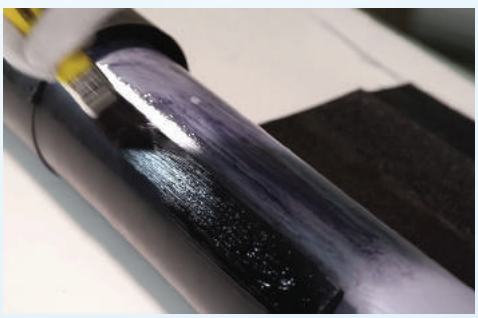
Example
For 110 mm pipe + AeroSound SL+
W = 3.14 x (110 + (2 x 13)) + 40 = 467mm

Step 2: Installation

1. Remove all the dirt, dust, grease and water from the pipe surface.

2. With sharp knife cut the material for the pieces where width is about 40mm longer than circumference of the pipe. Additional width is needed for the overlap.

3. Using standard brush apply glue on the top of the pipe (5-8 cm stripe only) and soft side of the sound insulation (5-8 cm from the edge) Wait a while to dry of the glue - finger shouldn't stick!



4. Tighten together both surfaces and press hard to remove the air.

5. Apply the glue using brush on the other side of pipe and soft side of insulation. Area where the overlap is covering first layer has to be glued as well.

6. After short drying (finger test) wrap around the pipe this pre-cut material and press hard.

7. All joints has to be covered with high mass rubber stripes or duct tape to avoid noise leakage

8. In certain cases, we suggesting additional mechanical fastening (two wraps each section).

9. Ensure to make all the joints and gaps has to be closed properly and well sealed.


10. Accessories

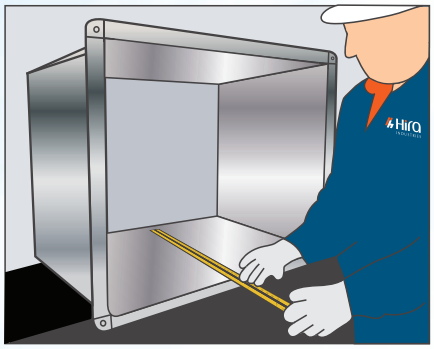
- Knifes
- Brush
- Glue
- Meter
- Gloves

AEROSOUND ACOUSTIC DUCT LINER INSTALLATION METHODOLOGY

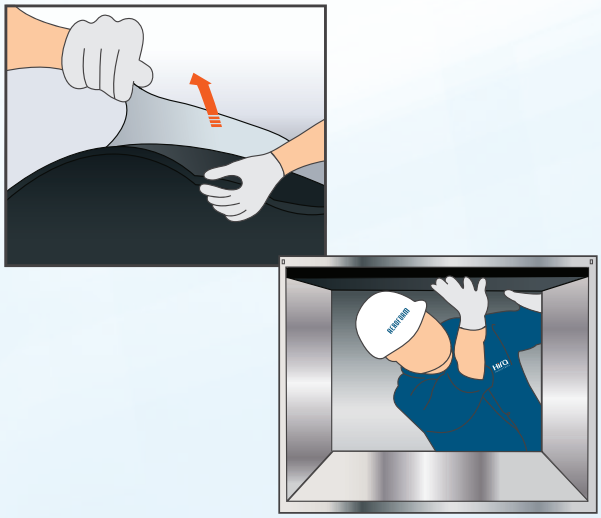
Self- Adhesive type AeroSound Acoustic Duct liner (Model LN and LX) installation methodology:

1. Surface of ducts must be clean and free of any loose particles and any other debris such as rust. Prepare the surface by thoroughly cleaning the surface.

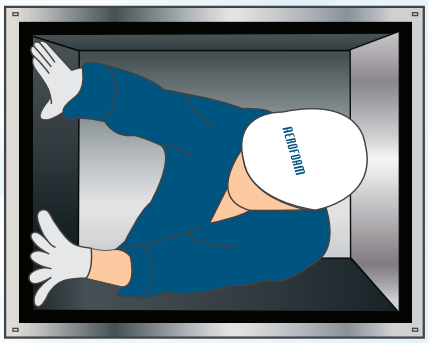
2. Start by measuring from the top of the duct, from side to side then adding approximately 5mm to the measurement to ensure a compression fit.



3. Peel the liner and apply liner sheet along an edge or corner. Press the liner sheet to the surface taking care not to trap any air. Follow this method for all the surfaces during the installation.



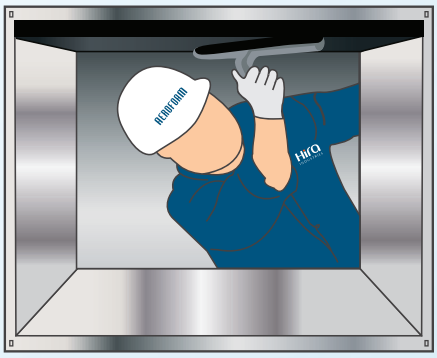
4. Measure and install each side of the duct. The sides will support the top insulation. Start by taking the measurement from the underside of the top piece of AeroSound Acoustic Duct Liner previously installed, to the bottom of the duct. Ensure to add approximately 5mm for compression fit.



5. The final piece to be installed is the bottom section. Start by taking the measurement from the side piece previously installed, to the opposite side piece, again, adding approximately 5mm length for a tightly compressed fit to complete the installation.

6. Fabricate templates for all the fittings and transition pieces by tracing the metal fitting onto a piece of cardboard, then transfer the pattern to the AeroSound Acoustic Duct Liner sheet. Cut out with a sharp knife and adhere the AeroSound Acoustic Duct Liner onto the fitting piece.

7. When the installation is complete, all the adjoining edges must be installed under compression fit, no visible signs of gaps, or voids should be present.



4.4. Calculation tool

AeroCalc Thermal Calculation is the technical calculation program to determine insulation thicknesses required to prevent surface condensation and limit energy losses. It also allows users to calculate U-values, heat flows and surface temperature for pipes, ducts and tanks.

Aerofoam® products

Aerofoam® NBR is a reliable flexible elastomeric insulation with a long term performance in condensation control – which is achieved thanks to the unique combination of its extremely low thermal conductivity and a high water vapour diffusion resistance. The additional advantages are a longer life-time expectancy and a higher energy efficiency of the insulated installation. This results in additional energy cost savings during the service life of the equipment.

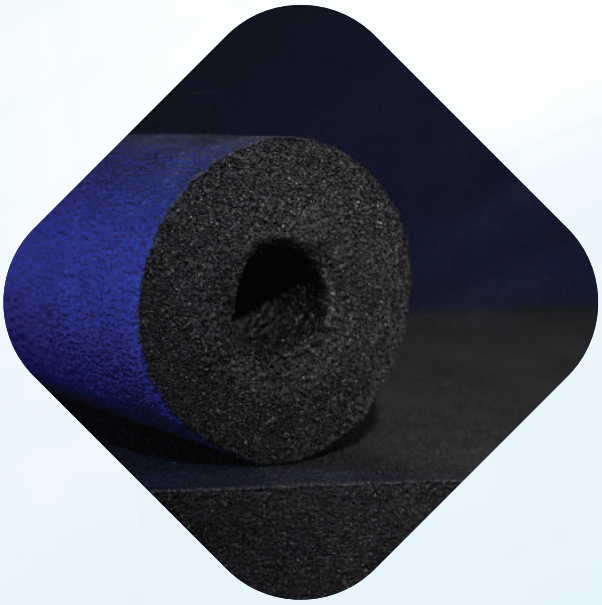
Aerofoam® XLPE is a cross linked closed cell polyolefin foam suitable for condensation control, thermal insulation and sound absorbtion. Due to its excellent water vapor transmission resistance, low water absorbtion and very good thermal performance, it can be used succesfully for chilled water pipes, ventilation ducts, roofing applications and inside clean rooms.

Aerofoam® CLAD is a product that incorporates either Aerofoam® NBR or Aerofoam® XLPE as foam and a flexible trilaminate non-metallic cladding. The preapplied cladding saves the installation time and has excellent mechanical resistance, UV resistance and salt-water/chemicals resistance. Its silver look makes it also a viable solution for clean rooms or places where aestethics play an important role.

Aerofoam® Accessories
Aerofoam® adhesive - for adhering nitrile rubber based Aerofoam® materials
Aerofinish paint - for visual impact and to prevent damage from UV exposure when Aerofoam® is used outside
Aerofoam® tape – for securing the joints (only for Aerofoam® XLPE)

AEROFOAM®

INSULATION SOLUTIONS



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