# GENERAL

- Working with Armaflex  
- Tools for installing Armaflex  
- The correct use of Armaflex adhesive  
- Wet sealing of butt joints  
- Outdoor Use of Armaflex  
- Advice for insulating in refrigeration and A/C equipment  
- Insulating stainless steel pipes

# PIPES AND FITTINGS

- Insulating pipes using Armaflex tubes  
  - Cutting Armaflex Tubes  
  - Insulating new pipes by Sleeving -On  
  - Insulating existing pipes by Snap -On  
  - Insulating pipes with Armaflex SelfSeal tubes  
  - Multi-layer insulation of pipes  
  - Using the Armaflex template  
  - Detailed drawings for fabrication of
    - Bend with 90° angle  
    - Bend with 45° angle  
    - Segmented bend with 1 middle part  
    - Segmented bend with 2 middle parts  
    - Segmented bend with 3 middle parts  
    - Cross piece joint  
    - Y-tube  
    - Swept T-piece  
    - T-Piece  
    - Insulating coupling pipe joints  
    - Angle T-piece  
    - Pipe reducer

- Insulating pipes & fittings using Armaflex sheet  
  - Insulating pipes with Armaflex sheet  
  - Insulating large pipes with Armaflex sheet  
  - Step-by-step guides for the fabrication of
    - Two part bend  
    - Valve insulation  
    - Neck-T / Pipe-T / Valve Handle  
    - Valve insulation with D-box  
    - Offset angle & pipework bend angle joints  
    - Inclined seat valves  
    - Flange-Box  
    - Concentric Reducers

# DUCTS

- Measure surface dimension for insulating rectangular ducts  
- Insulating ducts with Armaflex tubes  
- Insulating ducts with self-adhesive Armaflex sheet  
- Insulating duct brackets with Armaflex

# VESSELS AND TANKS

- Insulating vessels and tanks using Armaflex sheet  
- Insulating small (Ø < 1.5m) tanks and vessels using Armaflex sheet  
- Insulating big (Ø > 1.5m) tanks and vessels using Armaflex sheet

# ADDITIONAL INFORMATION

- Armaflex with additional metal cladding  
- Installation of Armaflex Insulation on plastic pipes  
- References  
- Calculation Tools
WORKING WITH ARMAFLEX

- Use good quality tools, in particular a sharp knife, fresh Armaflex adhesive, cleaner and a good brush.
- Oval tubes should always be split on the flat side.
- Use clean Armaflex material – with no dust, dirt, oil or water on the surface, if present clean with Armaflex cleaner.
- Use correctly dimensioned material! Never pull glued joints when sealing them, always push them together.
- 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 Armaflex tape is not necessary. Self-adhesive Armaflex 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 Armaflex adhesive and only after 36 hours to allow complete outgasing of the adhesive solvent.
- Armaflex 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 5).

TOOLS FOR INSTALLING ARMAFLEX

- Folding rule / tape measure
- T-Ruler
- Chalk for marking irregular shapes
- Template (printed on every Armaflex carton)
- Silver ink marker pen
- Scissors
- Dividers
- Brushes with short, firm bristles
- Callipers
- Smooth spatula for smoothing down covering
- Knife
- Sharpened pipe ends for the most common pipe diameters
- Safe edge craft knife
- Paint fabric rollers for surface gluing and smoothing down covering
- Sharpening stone
- Gluemaster

* A three knife set plus sharpening stone are available together as a tool kit.

THE CORRECT USE OF ARMAFLEX ADHESIVE

Armaflex Adhesive 520
Armaflex Adhesive 520 has been specially developed to bond Armaflex. It joins the surfaces reliably and safely at medium temperatures of up to +105°C. The bond is resistant to weathering and aging.

Armaflex Adhesive HT625
Armaflex Adhesive HT625 has been specially developed to bond HT Armaflex insulation for medium temperatures of up to +150°C*. When using HT Armaflex only Armaflex Adhesive HT625 should be used, but can also be used for Armacell elastomeric insulation material.

* For temperatures below -50°C or above +150°C, please consult our Customer Services Department.

PREPARING FOR WORK

Check condition of Armaflex Adhesive. Cans of Armaflex 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. Shelf life approx. 1 year.

1. Where installation surfaces are soiled with dust, dirt, oil or water all of these contaminants must be removed and, where applicable, cleaned with Armaflex cleaner before starting work. In addition all surfaces to be joined must be dry before gluing begins.

2. 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.

3. 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.

4. Stir adhesive well after opening. If left to stand for longer periods of time, heavier components in the adhesive may settle in the bottom of the can. These must be periodically mixed thoroughly before use in order to effectively activate the adhesive.
STEEL PIPES WITH CORROSION PROTECTION

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

APPLICATION

1. Use a brush with short, stiff bristles and keep clean. For larger areas a spatula or (non foam type) paint roller or the Armaflex Gluemaster may be used to speed up application.

2. Apply Armaflex adhesive thinly and evenly onto both surfaces to be glued.

3. When adhering Armaflex to other materials (e.g. metal), first apply the adhesive to the Armaflex and then to the other clean surface.

4. 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.

5. 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.

6. When gluing joints under compression, with no gaps present, the wet adhesive method should be applied. Pull the seam apart slightly and apply Armaflex adhesive thinly and evenly with the brush to both surfaces and press together. No open time is needed in this case.

7. Use Armaflex cleaner to clean your tools, contaminated metal surfaces and surfaces which have had talc applied.

8. Curing time for Adhesive 520 / 625: 36 hours.

Note: Do not mix Armaflex cleaner with Armaflex adhesive to thin it out - warm it.

APPLICATION IN HOT AND HUMID ENVIRONMENTS

High atmospheric humidity’s and temperatures lead to faster evaporation of the solvent in Armaflex adhesive. This means that a film of moisture may appear on the surface of the adhesive. Consequently the reliability of the adhesive seam cannot 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:

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

Note: Due to the shorter curing time 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 1m as a reference figure.

- To prevent possible tension within the material and the enclosed solvent opening the seam, seams should be held in place immediately after bonding with Armaflex adhesive tape crosswise to the glued seam every 20cm or so.

WET SEALING OF BUTT JOINTS

1. On all cold lines, fix and secure down to the piping surface, Armaflex tube/sheet ends with Armaflex adhesive.

2. The adhesive bonding will equal the insulation thickness as a minimum.

3. 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.

4. 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.
OUTDOOR USE OF ARMAFLEX

Whenever used externally Armaflex (with the exception of HT Armaflex) must be either painted, covered or clad.

Armafinish 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.

<table>
<thead>
<tr>
<th>Normal consumption</th>
<th>l / m²</th>
<th>m² / l</th>
<th>wet film mm</th>
<th>dry film mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st coat</td>
<td>0,275</td>
<td>3,6</td>
<td>0,275</td>
<td>0,13</td>
</tr>
<tr>
<td>2nd coat</td>
<td>0,275</td>
<td>3,6</td>
<td>0,275</td>
<td>0,13</td>
</tr>
<tr>
<td>Total</td>
<td>0,550</td>
<td>1,8</td>
<td>0,550</td>
<td>0,26</td>
</tr>
</tbody>
</table>

The UV-resistant HT/Armaflex can be used for outdoor applications without any additional UV-protection.

If additional mechanical protection or protection against severe weather conditions is required Arma-Chek covering systems offer a non-metallic cladding option. For installation details please see the Arma-Chek installation manual.

ADVICE FOR INSULATING REFRIGERATION AND A/C EQUIPMENT

- Surfaces of pipes and tanks must be sufficiently protected against corrosion before installing Armaflex. In general two component anti-corrosion systems based an epoxy and polyurethane resin are compatible with Armaflex adhesives. See the section “pipes with corrosion protection” for more details on compatibility.

- 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 Armaflex this can be easily prevented by attaching each end of the Armaflex tube to the pipe with Armaflex adhesive, and making sure the adhesive joints are firm at critical points such as flanges, T-sections, elbows, supports, etc.

- By regularly adhering Armaflex to the pipe in this way the insulation system can be compartmentalised. Damage will therefore be limited to the related sections and can be easily be detected.

- All connected items of equipment shall be insulated with equal thickness where practical.

- 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.

INSULATING STAINLESS STEEL PIPES

When insulating stainless steel with Armaflex please consult our Customer Service Department.

BS 5970 gives a number of specific recommendations when insulating stainless steel pipes. These installation practices greatly reduce the risk of stress corrosion cracking. All Armacell recommendations for installation on stainless steel pipework are intended to be in compliance with the procedure laid out in BS 5970.
CUTTING ARMAFLEX TUBES

Use a sharp knife. Keep knife at a low angle when slitting tube.

Use sharpened off-cuts of pipes to make holes.

Always cut on the flat sides of tubes.

INSULATING NEW PIPEWORK WITH SLEEVE-ON-TECHNIQUE

In principle, tube material can simply be slid 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. When installing tubes with a self-adhesive seal there is the additional risk of compression of the adhesive lining in the bend area, which can lead to seams coming apart.

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 10). For the application of bends we only recommend in this context the use of standard, non self-adhesive, tubes.

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

Always push the Armaflex tube over the pipe as shown.
INSULATING EXISTING PIPEWORK WITH SNAP-ON-TECHNIQUE

1. With a sharp knife, slit the flat part of the unslit tube along the entire length.

2. Place the slit tube onto the clean pipe; apply Armflex adhesive to the two cut edges with a thin even film of adhesive using a short bristle brush. Apply the adhesive at 200mm intervals, along the tube length.

3. Allow the adhesive to touch dry, test with the fingernail.

4. Free the seams from the pipe where applicable, line the edges together and press the seam detail with firm even pressure to finish.
Clean all dust, dirt, oil and water from pipework using Armaflex cleaner where necessary. Install Armaflex when ambient temperature is between +10 and +35°C.

Open pre-slit Armaflex and snap onto pipe (the release paper is still protecting the self-adhesive strip).

Adjust fitted Armaflex to ensure slit is easily accessible.

Locate the end of yellow release paper for the self-seal strip.

Remove the yellow protection paper strip on both sides, by drawing it away from the insulation. Please note: remove protective release paper strip from both sides!

Close the slit seam and squeeze together with firm pressure, to ensure a permanent seal.

Push the Armaflex along the pipe using a circular motion. Do not pull the insulation.

Using a circular motion, push the Armaflex around bends. Do not pull the insulation.

Seal all joints with Armaflex Adhesive. Do not stretch when sealing joints.

Note: In principle, tube material can simply be slid over bends. However, with tight bends in pipes (small radius) 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.

When installing Armaflex SelfSeal tubes there is the additional risk of compression of the adhesive lining in the bend area, which can lead to seams coming apart.

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 10).
MULTI-LAYER INSULATION OF PIPEWORK

Staggering on pipe-work: cross section view

The inside diameter of the second oversize tube (where applicable) should be selected according to the maximum outside diameter of the first layer.

Staggering on pipe-work: longitudinal view

Yellow lines indicate glued seams

Important: Stagger all joints and seams

If the outer diameter of the first insulating layer is above 114mm, we recommend that the second layer be made with sheet, since this can be adapted exactly to the outside diameter of the first layer.

The ends of the tube or sheet of the second layer should be glued to the under layer of Armaflex.

Note: For pipework >500mm O.D. please see page 15 “Armaflex Adhesive and its use on large bore pipework” of this manual.

Multi-layer insulation for pipework > 500mm O.D.

- In the case of double-layer insulation the first and second layers should be glued over the entire surface. DO NOT apply only spots or strips of adhesive.
- The butt and longitudinal seams of the second layer must always be positioned offset to the first layer. The Armaflex surfaces of the first layer should be clean, dry and free from contamination. Armaflex cleaner can be used when oil or grease are present.

Caution: Ensure that the underlying glued seams have cured for 36 hours, before using the Armaflex cleaner.

Multi-layer insulation for flat surface

- In the case of single and multi-layering applications adhesive is applied with all-over adhesive coverage to all contacting surfaces. DO NOT apply only spots or strips of adhesive.

USING THE ARMAFLEX TEMPLATE

The fabrication of bends and tees using Armaflex tube requires tubes to be cut to different angles. In order to make this process easier and quicker, the Armaflex template is provided on every box of Armaflex.

1. Place a copy of the Armaflex template face up on a table or worktop.
2. Line a tube of Armaflex across the template parallel along the horizontal base line.
3. Select the required angle cut from the template and cut along this line.

Additional copies of the Armaflex template on hard PVC sheet are available on request (contact your local Armacell representative for more information).

Template is printed on every Armaflex tube carton
**BEND WITH 90° ANGLE USING ARMAFLEX TUBE**

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

**BEND WITH 45° ANGLE USING ARMAFLEX TUBE**

**SEGMENT BEND WITH 2 MIDDLE PARTS - 2+2 USING ARMAFLEX TUBE**

**SEGMENT BEND WITH 3 MIDDLE PARTS - 2+3 USING ARMAFLEX TUBE**

**SEGMENT BEND WITH 1 MIDDLE PART - 2+1 USING ARMAFLEX TUBE**

**CROSSPIECE JOINT USING ARMAFLEX TUBE**

**Note:** Yellow lines indicate where cuts are to be made. For correct angle measurements please use the Armaflex template located on each tube box.
**Y-TUBE USING ARMAFLEX TUBE**

- 45° bend
- 45° bend
- 90° bend

**Note:** Yellow lines indicate where cuts are to be made. For correct angle measurements please use the Armaflex template located on each tube box.

1. Cut two 45° angles at the end of the tube section for the branching pipe as shown, using either a mitre block or the Armaflex template.
2. Cut a 90° wedge into the tube section covering the primary pipe. This should correspond to the outer diameter of the branching tube.
3. Join the pre-cut parts with adhesive to form a “T”.
4. Slit the formed piece sideways with a sharpened knife, apply adhesive to seams, fit when tack dry.

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

**SWEPT T-PIECE USING ARMAFLEX TUBE**

- 45° bend
- 45° bend

**Note:** Yellow lines indicate where cuts are to be made. For correct angle measurements please use the Armaflex template located on each tube box.

**Method 1: “Mitre-Block” T-Piece**

- 45°
- 1/2 Ø
- 1/2 Ø
- 45°
- 1/2 Ø
- 1/2 Ø
- 45°

**Note:** Yellow lines indicate where cuts are to be made. For correct angle measurements please use the Armaflex template located on each tube box.

1. Join pre-cuts parts with adhesive to form a “T”.
2. Slit open the “T”, it can then be slid over the pipes.

**Method 2 - The “Punched Hole” T Piece**

- Ø
- Ø

**Note:**

1. Punch a hole in the tube - with a sharpened section of a copper pipe of the right diameter - forming the crossbar of the “T”.
   - **Note:** For larger hole cut-outs use a pair of dividers to “mark out” and cut using a small sharp knife.
2. Slit this section of the tube open (half through the hole) and slid it over the pipe.
3. Cut a semi-circular recess in the end of the branch section of tube. It is better to have a cut which is a little to deep rather than to shallow.
4. Attach the branch section to the pipe and join the two halves of the “T”. Adhere all seams with Armaflex adhesive.
INSULATING COUPLING PIPE JOINTS

Method 1: Oversized 90° bend

Insulate up to the pipe fitting using Armaflex tube and secure to the pipe using adhesive.

1. The fitting cover is made from tube the bore of which is the O.D. of the incoming tube. Provide a minimum overlap of 25mm on each side (increase the distance of the overlap to match the insulation wall thickness if this exceeds 25mm). The fitting may be made up using any of the methods described on page 10.

2. Slit in the throat, apply adhesive to seams, fit when tack dry. Wet seal overlaps.

Method 2: Smooth finish 90° bend

1. The fitting cover is made from tube material, the bore of which corresponds to the maximum outside diameter of the screwed fitting. Provide at least a 38mm overlap beyond the end of the fitting on each side.

2. For pipes up to 35mm, cut two wedge-shaped pieces at 180° to each other, from top and bottom centres, at each end of the fitting. For large bore tubes cut four wedges, one at each 90° around the circumference.

   The wedges should taper back to the points where the fitting would start and be sized so that the bore of the Armaflex reduces to the O.D. of the incoming pipe. Glue the seams on the reducing sections.

3. Slit in the throat, apply adhesive, allow to tack dry, then fit. To complete, wet seal butt joints with Armaflex adhesive.

ANGLE T-PIECE (OFF-SET) USING ARMAFLEX TUBE

Method 1:

1. Punch a hole in the tube for the main pipe - with a sharpened section of a copper pipe of the right diameter according the angle of the branch off pipe-forming the crossbar of the "T".

2. Cut a 45° angle at the end of the tube sections for branch off pipe. Parallel to the cut use a sharpened knife to cut a semi-circular recess in the end of the branch section of tube. It is better to have a cut which is slightly too deep rather than slightly too shallow.

3. Glue both pieces together using Armaflex adhesive.

4. Silt the form piece, apply adhesive to seams and fit when tack dry.
Method 2: Angle T-Piece

1. Make a 45° cut as shown above

2. Use the piece of the tube with the 45° and mark a 22.5° angle and cut off as displayed above.

3. Chamfer the inside of the tube where it touches the insulation around the straight pipe.

4. Wet seal all seams.

Note: Yellow lines indicate where cuts are to be made. For correct angle measurements please use the Armaflex template located on each tube box.

PIPE REDUCER USING ARMAFLEX TUBE

Pipe reducer to be insulated

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

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

Install and glue seam and butt joints
INSULATING PIPES WITH ARMAFLEX SHEET

Armaflex tubes are available for pipe with outer diameters up to 114mm. Larger pipes, ducts and tanks must be insulated using Armaflex sheet.

It is often advantageous to insulate smaller pipes using Armaflex 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 Armaflex sheet (recommendations may vary for HT/Armaflex and NH/Armaflex).

The ambient temperature during installation will also impact on the levels of stress likely to be encountered.

For advice on installation Armaflex sheet in ambient temperatures ≥ 5°C, please see the table below.

<table>
<thead>
<tr>
<th>Sheet Thickness</th>
<th>Pipe Outer Diameter / mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≥ 88.9</td>
</tr>
<tr>
<td>9 mm</td>
<td>•</td>
</tr>
<tr>
<td>13 mm</td>
<td>•</td>
</tr>
<tr>
<td>19 mm</td>
<td>•</td>
</tr>
<tr>
<td>25 mm</td>
<td>•</td>
</tr>
<tr>
<td>32 mm</td>
<td>•</td>
</tr>
<tr>
<td>50 mm</td>
<td>•</td>
</tr>
</tbody>
</table>

(Recommendations may vary for HT/Armaflex and NH/Armaflex)

ARMAFLEX ADHESIVE AND ITS USE ON PIPEWORK > 88.9MM O.D.

Armaflex adhesive must be applied to all seams and joints on tube and sheet fabrications up to 500mm O.D pipe size, at each tube and sheet end Armaflex shall be adhered to the pipe.

In addition

- **When insulating horizontal pipework**, an O.D. > 500mm adhesive should also be applied to ¼ of the pipe surface and the facing Armaflex sheet surface in order to prevent “bellowing”. The picture below illustrates the area which should be covered using adhesive.

- **When insulating vertical pipework**, all-over adhesive coverage must be applied to both the pipework and the facing Armaflex sheet regardless of pipe outer diameter.

For temperatures lower than -50°C please refer to special application advice “Insulating low temperature lines”

INSULATING LARGE PIPES WITH ARMAFLEX SHEET

1. Determine the circumference of the pipe.
   **Important:** Always measure with a strip of Armaflex of the thickness to be used for the insulation.
   **Warning:** Do not stretch the strip.

2. Cut Armaflex sheet to the required size - apply Armaflex adhesive to the cut surfaces in a thin layer, allow to touch dry.

3. 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 re-opening 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.
TWO-PART-BEND WITH ARMAFLEX SHEET

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 trimming allowance (determined by the insulation thickness) along both vertical and horizontal edges then transfer to the sheet as indicated.

Determine the circumference of the pipe using a strip of Armaflex of the thickness to be installed.

**Note:** Do not stretch.

Halve the pipe circumference and transfer this dimension to the Armaflex sheet.

Mark out the two arcs from the intersection of the trim lines.

- \( r \) = inside radius of bend
- \( \frac{1}{2} c \) = half of pipe circumference
- \( t' \) = insulation thickness (in mm)
- \( d \) = 1/4 pipe diameter

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.

Place the sections together with the rough surfaces inwards. Apply Armaflex 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.

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

Press the remainder of the joint firmly together.

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 Armaflex adhesive to the inner joint edges.

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.
VALVE INSULATION WITH ARMAFLEX SHEET

Small bore heating and plumbing valves or stopcocks may be insulated using oversized tube sections. The following section gives the general techniques for insulating larger valves and gate valves.

It is recommended that the valve body is packed with strips of Armaflex insulation stuck onto the valve body with Armaflex adhesive.

Insulate the pipe as far as the flange. Where applicable allow for bolt removal.

Determine the:
- \( b = \) circumference of insulated pipe
- \( d = \) depth of flange ring

Mark out and cut a strip. Adhere both ends and apply around the flange ring (skin side of Armaflex should face top).

Measure:
- \( h = \) height between the outer faces of the two rings
- \( a = \) diameter of spindle neck
- \( c = \) circumference of the rings

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

Transfer height (\( h \)), circumference (\( c \)) and diameter of spindle neck (\( a \)) to the Armaflex sheet and mark on the cut outs for the spindle neck.

Apply a thin coat of Armaflex adhesive to all fixing seams of the valve cover. Allow to tack dry (fingernail test), fit, then press together firmly.

Note: The valve body should always be insulated after the insulated pipe has been completed.
Using the difference between the two heights as a radius, mark out 5 arcs round the intersections of the lines, and join the arcs with a continuous line.

Cut out the shaped section of sheet.

Chamfer away the inside surface at the highest point (where the sheet rests against the side of the valve body).

Apply adhesive to the longitudinal seam, allow to tack dry, then seal round the spindle housing.

Note: In external locations, to provide additional protection against water entry, Arma-Chek Mastic Black can be applied around the spindle neck tee covers termination point.

Apply adhesive using the wet seal method to all seams. The valve insulation is now complete.

Note: D-Boxes, using Armaflex sheet, can also be used to insulate valves.
INSULATING VALVES WITH D-BOX MADE OF ARMAFLEX SHEET

Establish the following measurements:
- \( L \) = length of valve + 2 x thickness of insulation
- \( H \) = height of valve + 2 x thickness of insulation
- \( W \) = diameter + 10mm

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

Apply Armaflex adhesive along the edges as indicated. **Note:** The glue line must be as wide as the thickness of the Armaflex in use.

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 edge’s are in-line.

Use a strip of Armaflex (used thickness) to determine the circumference around one end panel (including the top panel).

Mark measurement \( L \) and circumference out and cut the body panel to size. Apply Armaflex Adhesive to the body panel end and the body panel edges as shown.

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. 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.

If required the fitting cover can be slit through three quarters of the way round the fabrication cover and snapped over the fitting – with adhesive applied to all fixing seam details as stated.

To finish, apply Armaflex 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 Armaflex adhesive.

**Note:** For external installations, weather-seal around the valve spindle connection cut using Arma-Chek black mastic.

**Important:** Secure bonding in the area of the spindle neck penetration is essential.
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.

Determine the circumference of the pipe (C).

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

Measure the outer height (B) and the inner height (A) of the mitre joint.

Transfer the circumference to the Armaflex sheet and mark in the centre line.

Transfer the outer and inner height to the Armaflex sheet.

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.

Apply Armaflex adhesive to the longitudinal seam, then to the connecting seam.

The insulation is now complete.
INCLINED SEAT VALVES

The work involved in insulating a strainer valve or an inclined seat valve is similar (some measurements need to be extended) except that an end disc may be required.

Insulate the pipe as far as the flange.

Determine the

\[ b = \text{circumference of insulated pipe} \]

\[ d = \text{depth of flange ring} \]

Mark out and cut strip. Adhere both ends and apply around the flange ring (skin side of Armaflex should face top).

Alternative: two discs of Armaflex may also be used.

Measure the diameter of the flange and the diameter of the insulated pipe using a pair of callipers. Transfer these measurements to a piece of Armaflex sheet.

Mark out two concentric circles with dividers. Repeat and cut out two Armaflex rings.

Note: It is often desirable to apply strips of Armaflex directly to the strainer at this point. Packing out in this way can add additional strength to the fitting cover and can reduce the impact of shrinkage at low temperatures.

\[ h = \text{Measure the distance over the outer faces of the two Armaflex rings you have positioned next to the flanges.} \]

\[ a_1 = \text{Measure the distance from the strainer to the outer face of the lower ring} \]

\[ a_2 = \text{Measure the distance between the strainer and the outer face of the upper ring} \]

\[ e = \text{depth of strainer} \]

\[ c = \text{Circumference of the rings.} \]

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

Warning: Do not stretch the strip.

Transfer these measurements to the Armaflex sheet and mark the cut-out required for the seat valve body.

Cut the sheet and attach the insulation to the seat valve body using Armaflex Adhesive.

Cut a ring of Armaflex with inner diameter equal to the outer diameter of the insulated offset part of the strainer. Attach this ring at the end of the insulated section as shown using Armaflex Adhesive.

Determine the

\[ a = \text{shortest distance from the ring of Armaflex to the insulation around the strainer body.} \]

\[ b = \text{longest distance from the ring of Armaflex to the insulation around the strainer body.} \]

\[ d = \frac{1}{4} \text{diameter of the insulated valve body} \]

Using the circumference of the offset section of the strainer prepare a sheet of Armaflex.

Cut the remaining section of sheet

Chamfer the sheet away where it is to touch the insulation around the strainer body.
FLANGE BOXES

The following section gives the installation techniques for insulating flanges.
On chilled water or refrigeration applications it is advisable to pack the gaps between the nuts with strips of Armaflex insulation.

Using a pair of callipers, determine the diameter of the flange face. Please add 10mm to this measurement. Measure the length of the flange (incl. Bolts) and add 2x the insulation thickness of the used sheet. Where applicable allow for bolt removal.

Transfer these measurements to a piece of Armaflex sheet. Mark out two concentric circles with dividers. Repeat on a second piece of sheet. Cut out two Armaflex rings.

Determine the circumference of the disc.

Roll the body panel up and around the end disc’s, do not stretch during application. Check alignment throughout.
Place the edge to the joining seam’s edge opposite.

Using a small sharp knife cut out for the insulated pipe diameter.
To finish fit the two half’s of the flange box around the flange and wet seal all seams and joints to the insulated pipe branch.
If required the fitting cover can be snapped over the fitting, by only cutting the insulation cover half way through.
CONCENTRIC REDUCERS

Determine the following measurements

- \( h \) = height of the reducer, incl. both welds
- \( d_1 \) = diameter of larger pipe + 2 x insulation thickness
- \( d_2 \) = diameter of smaller pipe + 2 x insulation thickness

Mark out the Armaflex sheet with a centre line.

- \( d_1 \) and \( d_2 \) are marked off at each end, as shown, to give points a, b, c and d (yellow markings show meeting points).
- Distance between the lines \( d_1 \) and \( d_2 \) is height \( h \).
- Extend the lines \( d-a \) and \( c-b \) to meet at the apex point which is on the extension of the centre line.

From the apex point strike two arches through a-b and d-c.

- Determine the circumference of the \( c_1 \) (large pipe) and \( c_2 \) (small pipe).

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

Warning: Do not stretch the strip.

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 (yellow area indicates the cutting lines).

Apply a thin coat of adhesive to the edges to be joined, allow to tack dry. Press together 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.
**STRAINER VALVE INSULATION WITH ARMAFLEX SHEET**

1. Insulate the incoming pipes as far as the flange.

2. Measure the shortest and the longest distances of the end of the strainer to the uninsulated strainer valve body.

3. Determine the circumference of the removable cover of the strainer.
   **Important:** Always measure with a strip of Armaflex of the thickness to be used for the insulation. Do not stretch the strip.

4. Transfer the circumference to Armaflex sheet and mark out a centre line.

5. Mark at each end the longest distance from the end of the strainer to the uninsulated strainer valve body and at the centre line the shortest distance.
   **Note:** The strainer part may extend into the insulation of the strainer valve body and an additional length may be necessary so that the insulation of the strainer part juts out of the insulation of the strainer valve body.

6. Cut the section of sheet and attach the insulation to the strainer part using Armaflex Adhesive.

7. Using a pair of callipers determine the diameters of the following:
   - insulated incoming pipes
   - flanges of the strainer valve

8. Transfer these measurements to a piece of Armaflex sheet. Mark out two concentric circles with dividers. Repeat on a second piece of sheet. Cut out two Armaflex rings and install to both flanges.

9. Measure the distance between the outer faces of the two Armaflex rings and the circumference of the disc by using a strip of Armaflex with the thickness to be used for the insulation.

10. Transfer the circumference and the height to the Armaflex.

11. Mark a centre line and cut an outline for the strainer part. Cut the sheet and apply adhesive to the longitudinal seam.

12. Attach the insulation to the strainer valve body using Armaflex Adhesive.

13. Measure the height and the width of the strainer part including 2x insulation thickness, transfer to Armaflex sheet and cut out the disc for the end cover.

14. Determine the circumference of the disc. Always measure with a strip of Armaflex of the thickness to be used for the insulation. Measure the shortest and the longest distances from the end of the strainer to the insulated strainer valve body.

15. Transfer these measurements to Armaflex sheet as shown and connect the endpoints with a divider.

16. Cut the plotted shape and apply adhesive to all seams. Allow the adhesive to “tack dry” and roll the panel up around the end disc, do not stretch during application. Check alignment throughout.

17. Install strainer section and glue accurate to the strainer valve body.
   **Note:** Although the strainer must be cleaned periodically, a removable cap is not recommended on cold applications.
ONE-PART T-PIECE WITH ARMAFLEX SHEET

1. Measure with a strip of Armaflex of the thickness to be used for the insulation the circumference of the uninsulated main pipe and the branched pipe.

2. Determine the length of the main pipe to be insulated.

3. Transfer these measurements to a piece of Armaflex sheet and mark out vertical horizontal centre lines.

4. Determine the length of the branched pipe to be insulated. Mark out from the centre point to both sides on the vertical centre line.

5. Mark ½ diameter of branched pipe and join the points with straight lines.

6. With ½ of the diameter of the branched pipe. Cut the section of the sheet.

7. Apply adhesive to all seams, allow to tack try, then seal around the T-piece.
INSULATING VICTAULIC COUPLINGS WITH ARMAFLEX SHEET

1. Insulate pipes up to the coupling.

2. Determine
   dc = diameter of coupling + 2 x insulation thickness
   h = height of screws + 2 x insulation thickness
   L = length of coupling

3. Using ½ of dc (diameter coupling + 2 x insulation thickness) as a radius transfer a circular arc to the Armaflex sheet and mark a horizontal centre line.

4. From the centre of the line mark the width of the coupling.

5. At both ends mark out the height of the screws plus 2x insulation thickness at a 90º angle to the centre line.

6. Connect the four endpoints and the circular arc with a tangent so that a oval like disc is built.

7. Determine the diameter of the insulated pipe and mark it on the Armaflex sheet.

8. Cut out this disc and use as a template to create a second identical disc.

9. Adhere both discs immediately next to the coupling as shown.

10. Determine the circumference of the disc and measure the distance over the outer faces of the two disc’s.
    Transfer these measurements to a sheet of Armaflex.

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

11. Cut this section and adhere over the Armaflex discs around the coupling.
INSULATING PUMPS WITH ARMAFLEX SHEET

Pumps are offered in various constructions. The following section offers general advice and procedures which can be applied and modified as required to insulate most pump configurations.

1. Cut to size two Armaflex discs according to the dimension to the pump body.

2. Determine the circumference of the disc.
   **Important**: Always measure with a strip of Armaflex of the thickness to be used for the insulation. Do not stretch the strip.

3. Cut out the section for the insulation of the pump body from an Armaflex sheet.

4. Using Armaflex sheet, plot a section dimensioned to cover the pump motor. Reduce edges as shown in the picture at the inner side (y).

5. Adhere both discs to the section for the pump body. Place the insulation cover over the pump body and apply adhesive. Allow to tack dry then press the surfaces to dry and press firmly together.
   **Note**: In the area of the pump motor apply self-adhesive Armaflex tape to the pump in order to get a better fixing with the insulation of the pump body.

6. Flanges should be insulated using flange boxes as described on page 21.
INSTALLING ARMAFIX INSULATED PIPE SUPPORTS

Where Armaflex is installed, the use of Armafix or Armaload pipe supports are the preferred solution for the prevention of ice and condensation on cold installations. However, when Armaflex pipe supports are not selected, the following instructions are imperative:

- Ensure that the Armaflex is fitted tight to the support, with no air gaps present and vapour sealed with Armaflex adhesive.
- Install Armaflex self adhesive tape to the butt joint where the Armaflex and the support meet. Ensure the surface of the butt joint is free from dust before installing the Armaflex tape.

Armafix pipe supports are sections of Armaflex with load bearing PUR/PIR inserts and an aluminium outer shell cladding.

Install Armafix pipe support to the pipe, remove the yellow protective paper strip on both side. Close the seam applying firm pressure.

**Note:** Select the correctly dimensioned Armafix pipe support (min. insulation thickness of tube).

Install the brackets.

**Important:** Use only the PUR/PIR segments as load bearing.

Install the Armaflex insulation on either side of the Armafix pipe support. Wet seal the butt joints with the Armaflex pipe support using Armaflex adhesive.

**Note:** Ensure that the pipe insulation is installed under slight compression.

INSULATING “OVER” (ENCAPSULATING) PIPE SUPPORTS

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

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

1. Install the Armaflex as close to the fixing bracket as possible. Seal the ends of the tube to the pipe with Armaflex adhesive.

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

2. With a large off-cut of Armaflex 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 Armaflex sheet is recommend.

3. Place the Armaflex 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 Armaflex adhesive.
MEASURE SURFACE DIMENSIONS FOR INSULATING RECTANGULAR DUCTS

Measure surface dimensions and cut Armaflex sheet to size. **Note:** Add 5mm so that material is fitted under compression.

\[
a = \text{width of duct} + 5\text{mm} \\
b = \text{Height of duct} + 5\text{mm} + \text{thickness of insulation} \\
c = \text{width of duct} + 5\text{mm} + 2\times \text{thickness of insulation}
\]

INSULATING RECTANGULAR DUCTS WITH ARMAFLEX SHEET

Clean all surfaces using Armaflex cleaner to remove grease, oil, dirt etc. and cut sheets to size.

Spread a thin film of adhesive onto the metal surface and then onto the Armaflex sheet.

When the adhesive is tack dry (fingernail test) place Armaflex sheet in position and press firmly to achieve a good bond. Continue, applying Armaflex adhesive to both surfaces, including the Armaflex edge, and allow to tack dry before pressing firmly into position. **Note:** Remember to roll the sheet down into position along the insulated edge's.

The cut sheets should be positioned so that there is a 5-10mm overlap (for compression). Do not apply adhesive to this area on either the Armaflex 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.

INSULATING RECTANGULAR DUCTS WITH ARMAFLEX SELF-ADHESIVE SHEET

Clean all surfaces using Armaflex cleaner to remove grease, oil, dirt etc. and cut sheets to size.

Peel back release paper & line up sheet. Press firmly to activate adhesive.

Align material and continue to correctly line up, pressing firmly whilst slowly removing release paper. At butt joints allow 5mm overlap for compression.

Apply a wet seal application to the compressed butt joint.
INSULATING DUCT BRACKETS WITH ARMA-FLEX

Insulating duct brackets by using Armaflex tubes

For a cost effective solution with a high-end finish, Armaflex tube can be used to over-cover raised ductwork-connecting brackets.

1. Using unslit Armaflex tube with equal thickness as the attached main duct branch; split with a sharp knife the tube into two equal halves.
2. Measure the four insulated sides of the duct body.
3. Using a mitre box, or the Armaflex template, cut the Armaflex 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.
4. Continue to cut the other 3 sides of the tube picture frame fitting.
5. Using Armaflex adhesive, apply a thin even film with a brush to the three sets of 45 angles.
6. Allow the adhesive to touch dry, fix the angles together, applying firm even pressure for a good bond.
7. Place the picture frame Armaflex tube around the ducting, apply the adhesive to the final angle cuts and bond to complete the fixing of the picture frame.
8. To finish, wet seal around the picture frame fitting cover.

Insulating duct brackets by using Armaflex sheet

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 Armaflex 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 Armaflex adhesive.

INSULATING CIRCULAR DUCTS WITH ARMA-FLEX SHEET

For circular ducts proceed as described in section “Insulating large pipes with Armaflex sheets” & “Use of Adhesive on pipes OD > 600mm”.

APPLICATION MANUAL

3 - Ducts >> Insulating Ducts with Armaflex Sheet
**INSULATING VESSELS AND TANKS WITH ARMAFLEX SHEET**

**Draw up a cutting schedule**
Work out the most efficient way of covering the surfaces using Armaflex sheet (2 x 0.5 metre) or continuous roll (1m width and length 4-15m dependent upon the thickness).

Armaflex sheet layout for large vessels and tanks

*Note:* ensure that sheet joints are staggered.

**Compression joints**
Provide an allowance of an additional 5mm on all dimensions when cutting from Armaflex sheet or roll.

Always make compression joints. On curved surfaces, measure the circumference with a strip of Armaflex of the same thickness to be used for the insulation, including any surface finish. Do not stretch the strip.

**Adhesion**
Apply Armaflex adhesive first to the insulation before applying adhesive to the metal surface.

All seams are joined wet. Leave about 30mm without an adhesive coating on the Armaflex surface. Attach the connecting sheet with adhesive and with 5mm 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 Armaflex cleaner, after 36 hours (see page 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 Armaflex 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 Armaflex.

**Outdoor installations**
All Armaflex materials (excl. HT/Armaflex) used outdoors will require additional protection against UV radiation. We recommend the use of Armafinish paint or one of the Arma-Chek Systems (see page 5).

HT/Armaflex insulation does not require painting when used outdoors.
INSULATING SMALL (Ø < 1.5m) TANKS AND VESSELS USING ARMAFLEX SHEET

1. Determine the circumference of the tank.  
   **Important:** Always measure with a strip of Armaflex of the thickness to be used for the insulation.  
   **Warning:** Do not stretch the strip.

2. Transfer the circumference to the Armaflex sheet and cut to the required size. Spread a thin film of adhesive onto the Armaflex sheet... and then onto the metal surface. When the adhesive is tack dry (fingernail test) place Armaflex sheet in position and press firmly to achieve a good bond.

3. Determine the curve length of the domed surface.  
   **Important:** Always measure with a strip of Armaflex of the thickness to be used for the insulation.  
   **Warning:** Do not stretch the strip.

4. Using the curve length as the diameter mark out a complete disc on a piece of Armaflex sheet. If this disc is too large to fit on a single sheet of Armaflex first adhere multiple sheets together.

5. Cut around the disc.

6. Spread a thin film of adhesive onto the back of the Armaflex sheet and then onto the metal surface.

7. When the adhesive is tack dry (fingernail test) place Armaflex sheet in position onto the top of the tank and press firmly down from the centre, avoiding any slipping of the material, to achieve a good bond.

8. Apply an additional wet seal along the edges at the top of the tank.

9. After the adhesive has been given time to tack dry press the edges of the seam firmly together.
Install the Armaflex sheet panels from the domed end section of the vessel as shown. Use all-over adhesive coverage to both surfaces.

Continue to install the panels of Armaflex around this domed end section. Ensure the Armaflex sheet is fitted under compression. After the first ring of panels are installed, continue to apply other panels of Armaflex sheet around the body of the vessel as shown.

When the entire surface area of the vessel body is completed, to finish, insulate the dome ends as shown by installing vertical Armaflex panels.

To determine the circular edge cut profile, which is located around the completed body section of dome end – mark the Armaflex circular edge with White marking chalk.

With the first pre-cut Armaflex sheet panel as required, place with a 50mm overrun, the sheet over the profile edge, apply firm pressure and remove. The underside of the Armaflex sheet will show the impression of the required profile.

Cut the marked profile with a shape knife and install directly to the section required with all over adhesive coverage. Note: Do not apply adhesive to the circular profile edges of the domed end. This is done last by wet sealing the “jointing details as described below.

Continue to install the required insulation panels as required to complete the domed section.

To finish, wet seal the domed panels to the main insulated body sections as shown within the section relating to vessels below 1.5 mts.

If required the dome end profile sections can be chamfered, to fit the body panel edge perfectly.
ADDITIONAL APPLICATION ADVICE

The following sections contain further detailed information for specific applications.

ARMAFLEX WITH ADDITIONAL METAL CLADDING

Sometimes it is necessary to protect Armaflex 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 Armaflex leaving no air gap. Since fixing screws will be directly inserted into the Armaflex 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 15mm) by using strips of Armaflex as a distance holder. In addition a 10mm drilling with differences of 300mm 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.

ARMAFLEX INSTALLED IN THE SOIL

Pressure of soil backfilled on top of the Armaflex will cause compression of the material impacting on the insulation wall thickness.

It is recommended that Armaflex be shielded from compression by sleeving the insulated pipe into a rigid soil or waste water drainage pipe.

1. Prevent compression of flexible cellular material due to contact with the outer protective pipe by selecting a drainpipe whose bore is sufficiently larger than the outer diameter of the insulated pipe assembly which is to be inserted.

2. Ensure the outer protective pipe is fully supported e.g. by having full, intimate, contact with the surrounding soil to prevent breaks occurring in the drainpipe joints and connections are particularly vulnerable to these kind of events.

3. Ensure outer protective pipe protects Armaflex from water that accumulates in the soil.

INSTALLATION OF ARMAFLEX INSULATION ON PLASTIC PIPES

Armaflex insulation materials and Armaflex Adhesive 520 and HT 625 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, Armaflex can simply be installed in the same way as on metal pipes.

However, when bonding Armaflex 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, Armacell recommends first roughening the plastic where the partition bonding is to be carried out.

For ABS plastic pipes only HT/Armaflex should be used. In addition, the insulation should not be glued to the pipework. Adhesive should only be used to bond adjacent edges of insulation together. These measures are necessary because some types of foam insulation and adhesives can be detrimental to ABS.

<table>
<thead>
<tr>
<th>Compatibility of Armaflex and Armaflex Adhesive with plastic pipes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic pipe</td>
</tr>
<tr>
<td>PVC-C</td>
</tr>
<tr>
<td>PE-Xa</td>
</tr>
<tr>
<td>PE-HD</td>
</tr>
<tr>
<td>PP</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>ABS</td>
</tr>
</tbody>
</table>
REFERENCES

In addition to this manual Armacell provides the following documents, free available. Please ask our Customer Service Center.

INSULATION OF STAINLESS STEEL WITH ARMAFLEX

CORROSION PROTECTION IN THERMAL AND REFRIGERATION INSULATION ON TECHNICAL OPERATING SYSTEMS

INSULATING OF LOW TEMPERATURE LINES WITH ARMAFLEX
Installation advice on issues arising when insulating low temperature lines below -50°C.

INSULATING LIQUID NITROGEN LINES WITH ARMAFLEX
Installation advice on issues arising when insulating low temperature lines below -200°C.

GLUING ARMAFLEX ONTO CELLULAR GLASS
Installation advice when installing Armaflex directly onto a cellular glass surface.

INSTALLATION OF ARMAFLEX INSULATION ON PLASTIC PIPES

OTHER APPLICATION GUIDES
» Application Guide for Arma-Chek Systems
» Special Application Advice for NH/Armaflex
» Special Application Advice for HT/Armaflex
» Application of Armaflex DuoSolar VA
» Application guide for ArmaSound Industrial Systems
» Armaflex & Arma-Chek application videos

CALCULATION TOOLS

» ArmWin AS
Armwin AS is the technical calculation program to determine insulation thicknesses required to prevent surface condensation and limit energy losses. It also allows users to calculate heat flows and temperature changes for pipes, ducts and tanks.

» keytec. ISO 15665
Determine the right ArmaSound Industrial Systems...
Combining an excellent thermal conductivity with closed cell structure, Armaflex features an in built water vapour barrier and a high resistance to water ingress. Unlike other insulation materials, Armaflex requires no external vapour barrier and will maintain its thermal properties over a long period of time.

It's the inherent attributes of Armaflex which make it the choice for cold systems around the globe:

**Closed cell protection**
Closed cell insulation materials possess a built-in resistance to the passage of water vapour. As a result, closed cell materials do not rely on an easily pierced external water vapour barrier to prevent condensation on refrigeration and air conditioning systems.

**In-built water vapour barrier**
Closed cell Armaflex material has such a high built-in resistance to water vapour that the insulation itself effectively acts as a water vapour barrier. No easily compromised external foil barrier is required.

**Non-wicking**
Since the insulation itself acts as a vapour barrier, the "wicking" effect is not possible. This means that a small puncture in the insulation surface results only in localised damage and not system wide failure, reducing the risk of condensation, mould growth and under insulation corrosion.

---

**Seamless Installation**
Armaflex Adhesive is a full contact adhesive which fully fuses the Armaflex insulation together. This means that glued seams and butt joints form a secure bond to prevent entry of water vapour bridges.

**Dust & fibre free**
Dusty and fibre-based materials are both difficult to work with and create an additional workplace hazard that aggravates respiratory conditions. As a nitrile rubber material, Armaflex is entirely dust free and fibre free, making it suitable for use in schools, offices and hospitals.

**Easy to cut**
Armaflex sheet insulation is easily cut and shaped on-site to ensure the best fit for any area. Cutting of Armaflex does not release particulate matter that can affect installers and the building's environment.

**Excellent acoustic performance**
Armaflex offers impressive airborne noise absorption at problem frequencies and excellent decoupling and isolation performance on pipes and ducts in contact with other structural and service elements.

---

Armacell provides this information as a technical service. To the extent the information is derived from sources other than Armacell, Armacell is substantially, if not wholly, relying upon the other source(s) to provide accurate information. Information provided as a result of Armacell’s own technical analysis and testing is accurate to the extent of our knowledge and ability, as of date of printing, using effective standardized methods and procedures. Each user of these products, or information, should perform their own tests to determine the safety, fitness and suitability of the products, or combination of products, for any foreseeable purposes, applications and uses by the user and by any third party to which the user may convey the products. Since Armacell cannot control the end use of this product, Armacell does not guarantee that the user will obtain the same results as published in this document. The data and information are provided as a technical service and are subject to change without notice.

© Armacell Asia Limited · Subject to alterations · 000-005-0211-EN (HK)