

NORTH AMERICA

# Application Manual

ArmaFlex is the original fiber-free, flexible insulation material with a long term performance in energy efficiency and condensation control. Your advantage: the quicker and easier installation saves even more time and money.

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MAKING A DIFFERENCE AROUND THE WORLD

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# General Information

## Working with ArmaFlex

- Use good quality tools: a sharp, non-serrated knife, fresh ArmaFlex adhesive, denatured alcohol and a short, firm bristle 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 denatured alcohol.
- Use correctly dimensioned material! Never pull glued joints when sealing them; always push them together.
- **Turn systems off if running. Never insulate systems in operation! Doing so will risk moisture beneath the insulation and adhesive failure. Wait 36 hours for the adhesive to cure before restarting insulated systems.**
- ArmaFlex tape should not be used as the only connection for butt and longitudinal joints and seams. If required, apply only to joints and seams that have been glued with ArmaFlex adhesive and only after 36 hours to allow complete offgassing of the adhesive solvent.
- WB Finish paint can be applied immediately after the insulation has been installed, with a second coat applied no sooner than 4 hours, to provide UV protection (see Outdoor use of ArmaFlex on page 14). Two coats is the minimum requirement.
- Insulating around bends – Do not slide ArmaFlex insulation around pipe bends when the insulation thickness is 1/2" or greater. A fabricated mitered fitting cover must be used.
- When heat trace cables are used on piping, it is recommended to increase the ArmaFlex tube up to the next ID size for a proper fit.
- For pipe insulation that is not completely round, an attempt should be made to make the pipe insulation round by squeezing with both hands prior to cutting.
- The air gap will not cause any condensation to form on the pipe if the insulation is installed properly, the air gap between the pipe and insulation increases the R-Value of the system as the air is a good insulator. Proper installation means that the entire insulation system must be completely sealed with ArmaFlex 520 adhesive at all seams, joints, fittings, etc. For additional protection, it is permissible to use ArmaFlex Insulation tape over the sealed seams, if desired.

## Tools for installing ArmaFlex

	Folding rule / tape measure		Straight edge
	Chalk for marking irregular shapes		Template (printed on every ArmaFlex carton)
	Silver ink marker pen		Scissors
	Dividers		Brushes with short, firm bristles
	Calipers		Smooth spatula
	Short knife 3 inches		Sharpened pipe ends for the most common pipe diameters
	Long knife 10 inches		Rollers for surface gluing
	Sharpening stone or hand-held sharpener		Gluemaster

## The correct use of ArmaFlex adhesives

### ARMAFLEX 520 ADHESIVES

All ArmaFlex 520 Adhesives were specially developed to bond ArmaFlex foam insulation to itself and to various surfaces including metal, concrete and other insulation. 520 adhesives bond surfaces reliably and safely at medium temperatures of up to +220°F and effectively adheres insulation to surfaces with temperatures up to 180°F. The bond is resistant to weathering and aging.

### ARMAFLEX ADHESIVE HT625

ArmaFlex HT625 Adhesive was specially developed to bond ArmaFlex UT insulation for medium temperatures of up to +350°F. When using

ArmaFlex UT only ArmaFlex HT625 Adhesive should be used, but HT 625 can also be used for other Armacell elastomeric insulation material.

### **LOW VOC SPRAY ADHESIVE**

Low VOC Spray Adhesive was developed to bond ArmaFlex sheet and roll insulation to surfaces such as ducts and tanks. The adhesive should be applied when temperatures are between 60°F and 80°F using the appropriate spray gun and hose. The spray adhesive has a shelf life of one year.

### **PREPARING FOR WORK**

Check the condition of Armaflex 520 adhesives. Cans of Armaflex adhesive should be stored between 60°F and 80°F. Prolonged storage outside of these temperatures will reduce the shelf life and effectiveness of the adhesive. Cans must also have been kept free from freezing.

For detailed information about transport, storage and shelf-life see the product data sheet.

1. Be sure there is proper ventilation.
2. Where installation surfaces are soiled with dust, dirt, oil or water, all of these contaminants must be removed and, where applicable, the surfaces must be cleaned with denatured alcohol before starting work. In addition, all surfaces to be joined must be dry before gluing begins.
3. 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.
4. The ideal installation temperature is 40°F to 100°F. Do not use adhesive under 32°F. If the adhesive is too cold, it can be warmed in a bucket of hot water. Do not use adhesives when the relative humidity is 100% as moisture will form on surfaces reducing the effectiveness of the adhesive.
5. Shake can well before opening, and stir adhesive well after opening. If left to stand for long periods of time, heavier components in the adhesive may settle on the bottom of the can. These must be periodically mixed thoroughly before use in order to effectively activate the adhesive.

### **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 coating systems based on epoxy resin or polyurethane. ArmaFlex adhesive may not adhere to asphalt, bitumen or red lead.

### **APPLICATION OF 520, 520 BLACK, 520 BLV, AND HT625 ADHESIVE**

1. Be sure there is proper ventilation.
2. Do not leave can open during use, fabricate a lid from scrap cardboard, or sheet insulation, and insert brush into lid, this will allow the adhesive to remain liquefied, and prevent fumes into the air or causing adhesive to become viscous.
3. Use a brush with short, stiff bristles and keep clean. For larger areas an adhesive roller may be used to speed up application, and prevent the adhesive from drying too quickly.
4. Always apply material under compression. Avoid tension on the seams.
5. Apply Armaflex adhesive thinly and evenly onto both surfaces to be glued.
6. When adhering ArmaFlex to other materials (e.g. metal), first apply the adhesive to the ArmaFlex and then to the other clean surface.
7. 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 feels tacky, the joint may be closed. The maximum adhesive force will be obtained when two tack-dry surfaces are brought together.
8. The glued surfaces should be pressed together, not stretched. 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.
9. When gluing joints under compression, with no gaps present, the wet adhesive method should be used. 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.
10. Use Goof Off™, Acetone or MEK to remove adhesive from tools and other surfaces. (Do not use on ArmaFlex insulation.)
11. Curing time for 520 / HT625 Adhesive: 36 hours.
12. Note: Do not add anything to thin the adhesives. To make the adhesive easier to apply in cold environments, warm it in a bucket of hot water.

## APPLICATION OF LOW VOC SPRAY ADHESIVE

1. Be sure there is proper ventilation
2. **Surface Preparation:** Surfaces to be bonded should be clean, dry and free of any dust, loose paint, wax, moisture, dirt, grease, oil, rust or other contaminants. Clean the surfaces if necessary with denatured alcohol.
3. **Adhesive Preparation:** The recommended installation temperature should be between 60° to 80°F. Securely attach spray gun (SG200) to hose (MH973) then hose to canister, be certain that all fitting connections are tightened properly. Fully open the valve on the canister, **Do not close until canister is empty.** Remove the dry adhesive from the orifice of the spray gun in between use.
4. **Adhesive Application:** Before operating the spray adhesive, be sure to protect all surrounding areas against overspray of the adhesive, use cardboard, or poly sheeting, and tape off areas to be protected. Hold spray gun approximately 8 to 12 inches from the substrate, allow thin uniform coat of adhesive to both surfaces. Adjust the numerical knob on the spray gun behind the trigger for desired width of spray pattern. Use ArmaFlex 520 adhesive with compression fit method for sealing all seams, and in areas where spraying adhesive is not possible. Do not allow the adhesive to puddle, a thin, uniform coat is required. Do not apply adhesive in direct sunlight. Spray and dry the adhesive in an area with approved and adequate ventilation to exhaust the solvent vapor. Do not breathe dust, vapors or spray mist. See MSDS for further safety information. Prevent static buildup. Properly bond and ground all containers and components. Do not smoke. Extinguish all flames and pilot lights, and turn off stoves, heaters, electric motors and other sources of ignition during use and until all vapors are gone. Use precaution when using adhesive in windy conditions.
5. **Drying:** Both surfaces must be allowed to be tacky to touch prior to bonding; tack is achieved when touched with your fingernails and no adhesive is lifted off the substrate. This will usually take from 2 to 5 minutes under normal conditions. Heat and humidity or cold weather can cause change in tack times. Cold temperature and higher humidity increases tack time, whereas higher temperature and low humidity decreases tack time.
6. **Assembly:** Align one edge of sprayed ArmaFlex insulation onto the other substrate carefully since no shifting is possible once contact is made. Apply even and uniform pressure until the entire section is installed. Apply uniform pressure over 100% of the bonded area.

7. **Handling and Storage:** After initial assembly, leave the hose and spray gun attached to the canister with the **valve open**. Detach spray gun and hose from canister only when transferring to a new canister. Transfer spray gun and hose to a new canister immediately to keep the product from drying in the hose. Store in a cool, well-ventilated area, out of direct sunlight. Avoid storing canister directly on the floor or against an outside wall. Do not store at temperatures above 120° F.
8. **Disposal:** Observe all labeled hazard precautions. After all the material in the canister is used, close valve and remove hose and spray gun. Transfer spray gun and hose to a new canister immediately to keep the product from drying in the hose. Open the valve on the new canister. Open the valve on the old canister and leave the canister for a few hours to make sure residual vapors are dispersed. Remove the valve from the canister. Dispose of according to all federal, state and local regulations.

## APPLICATION IN HOT AND HUMID ENVIRONMENTS

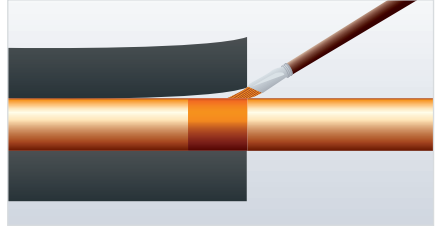
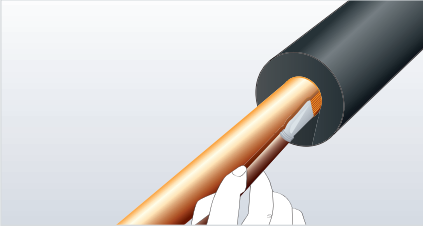
High temperatures lead to faster evaporation of the solvent in ArmaFlex adhesive. Consequently, the tack/working time of the adhesive is greatly reduced.

Under these conditions, the following points may be observed as an alternative to our installation instructions:

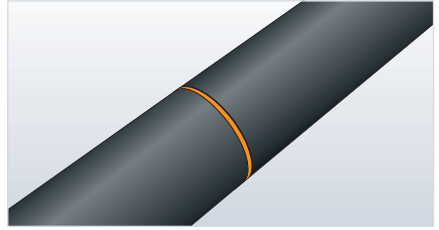
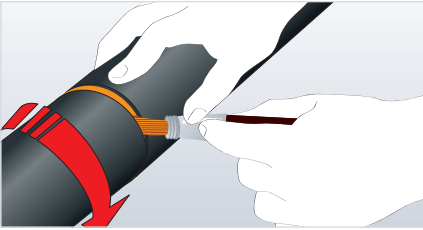
- Apply ArmaFlex adhesive as normal in a thin uniform film on both surfaces.
- Unlike normal bonding, the surfaces to be glued should be held together under pressure while wet.

**Note:** Due to the shorter curing time, adhesive can only be applied to a limited area at a time. Depending on the atmospheric humidity, temperature, material thickness and practical installation conditions, we recommend a maximum tube length of around 3' as a guideline.

## Wet sealing butt joints



1. On all cold lines, use ArmaFlex adhesive to glue the ends of the ArmaFlex sheets/tubes to the pipe surface every 18'.
2. The adhesive should be applied in a width at least equal to the insulation thickness.



3. For the final wet sealing of the tube/sheet, use fingers to pull the joint apart 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 fingers and thumbs to finish.

**Note:** In addition, it is highly recommended that this procedure is followed for all other types of hot pipes located outdoors.

## Outdoor use of ArmaFlex

Whenever used outdoors, ArmaFlex must either be painted, covered or clad.



**ArmaFlex WB Finish** is a water-based protective paint. To provide UV protection, two complete coats must be applied.

The first coat must be applied within three days after insulation is installed. Wait 4 hours before applying second coat.



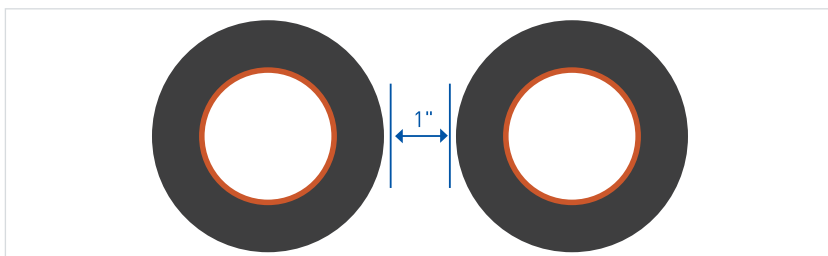
If additional mechanical protection or protection against severe weather conditions is required,

**Arma-Chek covering systems** offer a non-metallic cladding option. For installation details please see the Arma-Chek installation manuals.

## Advice for insulating refrigeration and AC equipment

- Surfaces of pipes and tanks must be sufficiently protected against corrosion before installing ArmaFlex. In general anti-corrosion systems based on epoxy and polyurethane resin are compatible with ArmaFlex adhesives. See the section **Pipes with corrosion protection** on page 8 for more details on compatibility.

- In the case of conventional insulation systems, slight damage to the water vapor barrier can allow moisture to permeate throughout and underneath the insulation material. When using ArmaFlex, this can easily be prevented by attaching each end of the Armaflex tube to the pipe with Armaflex adhesive, and making sure the adhesive joints are completely terminated 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 compartmentalized. Damage will therefore be limited to the specific section and can easily be detected. We recommend a maximum of 18', adhering the insulation to the pipe when practical.
- All connected items of equipment should be insulated with an 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.



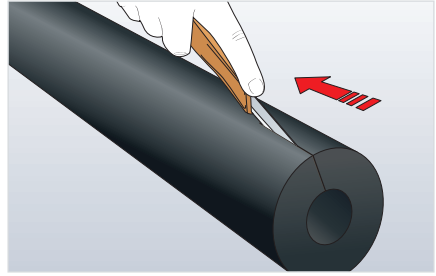
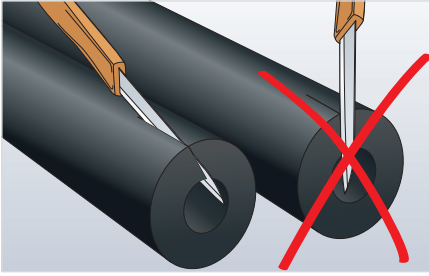
## Insulating stainless steel pipes

When insulating stainless steel with ArmaFlex please consult our Customer Service Department. Do not insulate stainless steel with AP ArmaFlex if the line temperature is over 125°F. See Technical Bulletin #17.

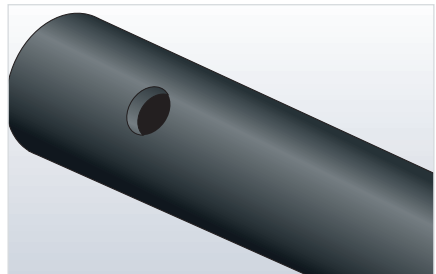
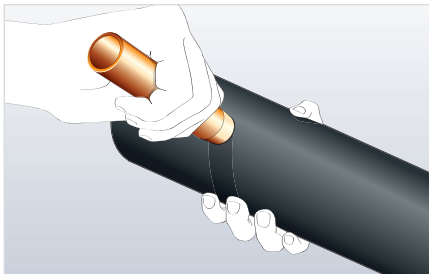
# Pipes and Fittings

## Insulating pipes using ArmaFlex tubes

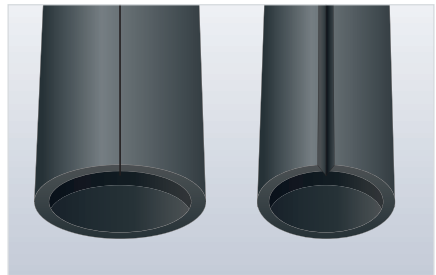
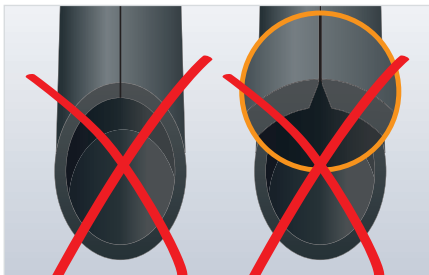
### CUTTING ARMAFLEX TUBES



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



Use sharpened off-cuts of pipes to make holes.



Always cut on the flattest side of tubes.

## INSULATING NEW PIPEWORK USING SLIDE-ON TECHNIQUE

**Note:** Insulating around bends – Armacell’s recommendation is the insulation should not be slid around pipe bends when the insulation thickness is 1/2" or greater. A fabricated mitered fitting cover must be used.

Be aware on 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 if the insulation is slid around the bend, reducing insulation thickness.

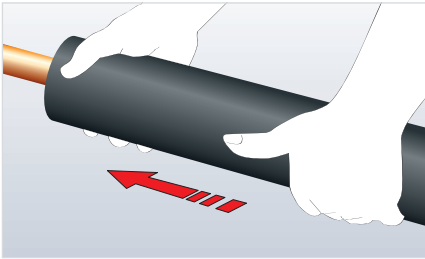
In the refrigeration/air-conditioning sector, the required insulation thickness is then no longer achieved and condensation can occur on the surface of the insulation. When installing tubes with a self-adhesive seal, there is the additional risk of compression of the adhesive lining in the bend area, which can lead to seams coming apart.

The following should be taken into account in these cases:

To avoid insulation kinks, and the adhesive seam from being compressed, the bends should be cut into segments to fit (see **Segment bend with 1 middle part - 2+1 using ArmaFlex tube** on page 26). In such cases we only recommend the use of standard, non self-adhesive, tubes.

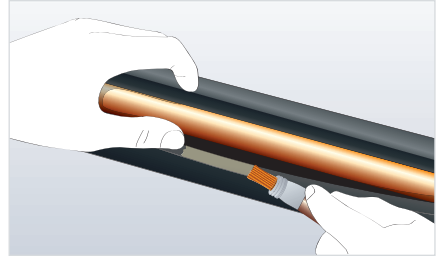
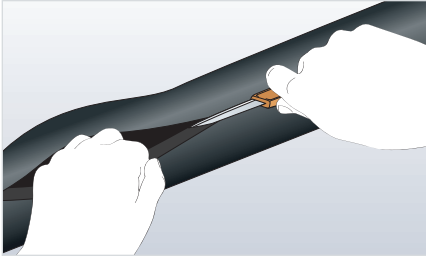
**Note:** Do not attempt to pull the ArmaFlex tube along the pipe as this may cause the insulation to tear.

Always push the ArmaFlex tube over the pipe as shown.

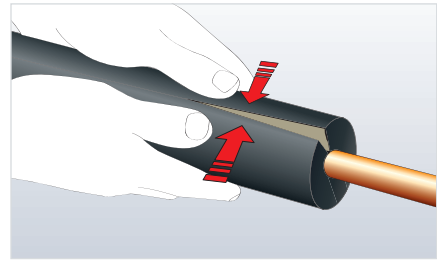
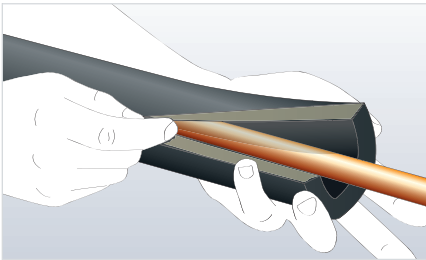




## INSULATING EXISTING PIPEWORK USING SNAP-ON TECHNIQUE

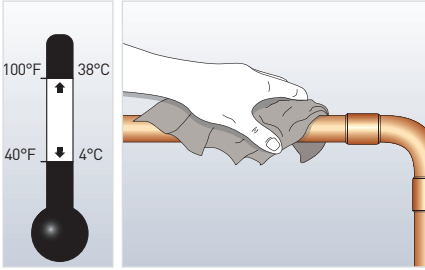


1. With a sharp non-serrated knife, slit the flat part of the unslit tube along the entire length.
2. Place the slit tube onto the clean pipe; apply a thin, even film of ArmaFlex adhesive to the two cut edges using a short bristle brush. Apply the adhesive along the tube length. Alternate 6-8" on both sides to maintain even tackiness.

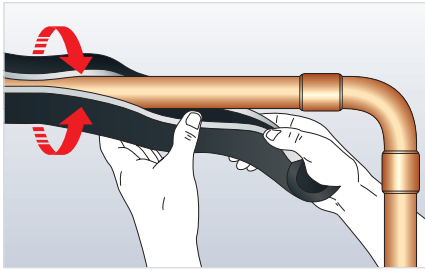


3. Allow the adhesive to be tacky to the touch, not dry or wet. Test with the fingernail.
4. Free the seams from the pipe where applicable, align the edges and press the seam detail with firm, even pressure to finish.
5. For sweated or welded pipes, insulate the fittings first followed by the straight sections.
6. For other pipes with enlarged fittings (PVC, screwed iron, etc.) insulate the straight sections first and then the fittings. (See page 30)

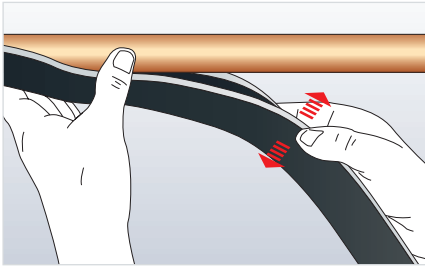
## INSULATING PIPES WITH TUBOLIT, IMCOA, AND TUNDRA POLYETHYLENE (PE) SELF-SEAL TUBES



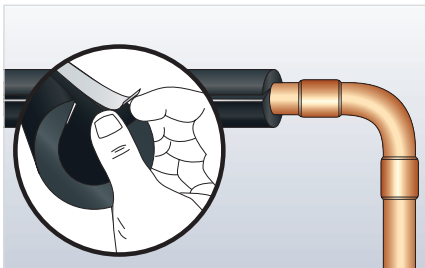
Clean all dust, dirt, oil and water from pipework using denatured alcohol where necessary. Install ArmaFlex when ambient temperature is between 40°F and 100°F.



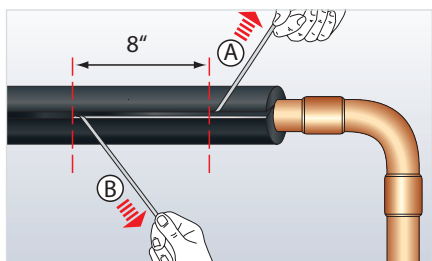
Open pre-slit ArmaFlex and snap onto pipe (the release paper is still protecting the self-adhesive strip).



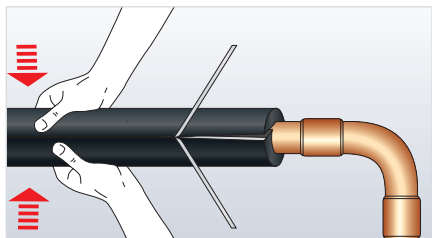
Adjust fitted ArmaFlex to ensure slit is easily accessible.



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

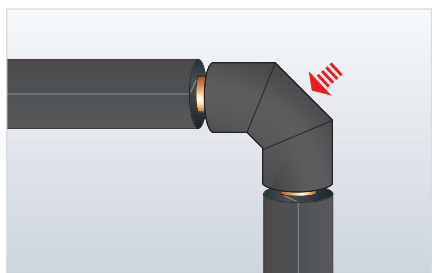


Remove the white release paper strip in 8" increments, by drawing it away from the insulation.

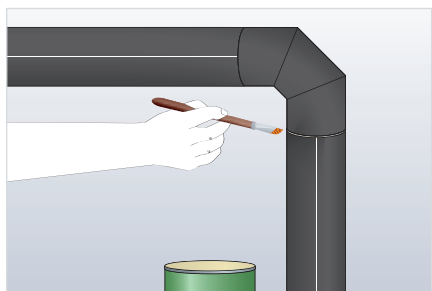


Close the slit seam and press together firmly to ensure a permanent seal.

**Note:** Squeeze 100% of the self seal joint.



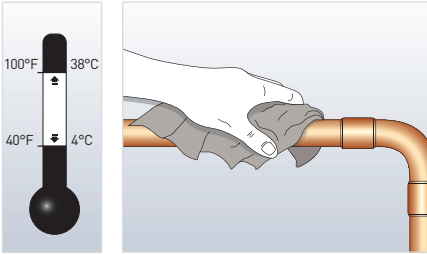
For sweated or welded pipes, insulate the fittings first followed by the straight sections. For other pipes with enlarged fittings (PVC, screwed iron, etc.) insulate the straight sections first and then the fittings. (See page 30)



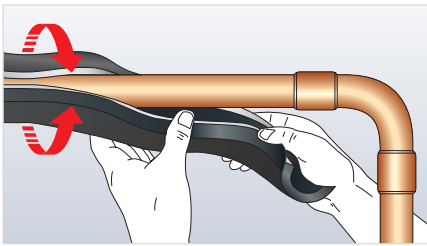
**Note:** With tight bends in pipes (small radius) there is a risk that the insulation will kink in the throat of the bend, reducing insulation thickness. In the refrigeration/air-conditioning sector, the required insulation thickness is then no longer achieved and condensation can occur on the surface of the insulation. When installing ArmaFlex self-seal 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.

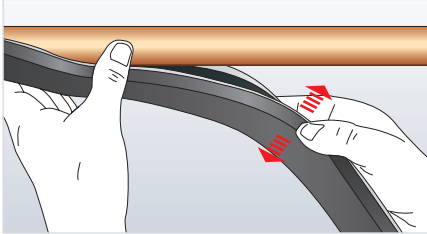
## INSULATING PIPES WITH ARMAFLEX LAPSEAL TUBES



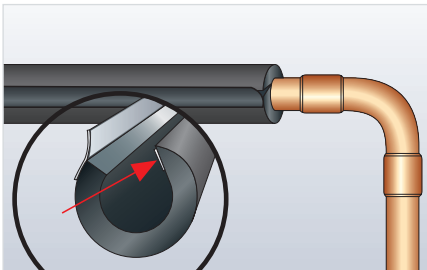
Clean all dust, dirt, oil and water from pipework using denatured alcohol where necessary. Install ArmaFlex when ambient temperature is between 40°F and 100°F.



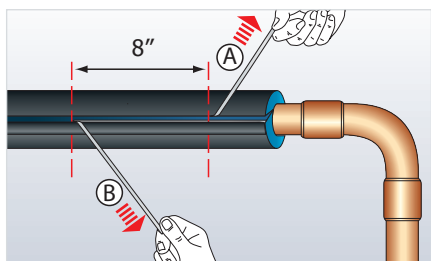
Open pre-slit ArmaFlex and snap onto pipe (the release paper is still protecting the self-adhesive strip).



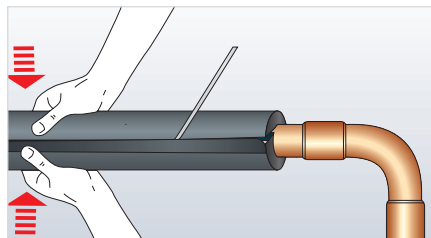
Adjust fitted ArmaFlex to ensure slit is easily accessible.



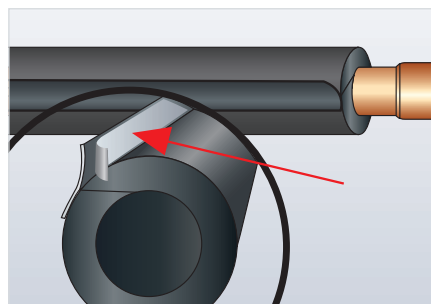
Locate the end of white release paper for the self-seal strip.



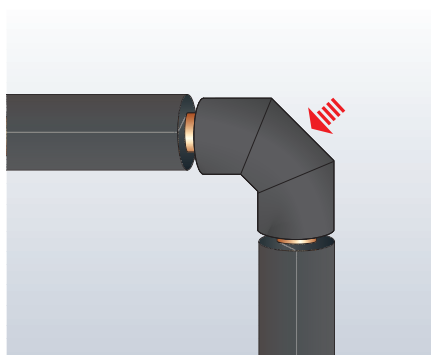
Remove the white release paper strip in 8" increments, by drawing it away from the insulation.



Close the slit seam and press together firmly to ensure a permanent seal.



Remove the release liner on the outer lap, and apply even pressure to completely close the lap onto the ArmaFlex surface.



For sweated or welded pipes, insulate the fittings first followed by the straight sections. For other pipes with enlarged fittings (PVC, screwed iron, etc.) insulate the straight sections first and then the fittings. (See page 30)

Seal all joints with ArmaFlex 520 adhesive. Do not stretch when sealing joints. When gluing joints under compression, with no gaps present, the wet seal method should be applied.

## MULTI-LAYER INSULATION OF PIPEWORK

**Note:** See sleeving chart on page 110.

### Staggering on pipework: cross-section view



### Multi-layer insulation with tubes

The inner diameter of the second oversize tube should be selected according to the maximum outer diameter of the first layer. (See price list for sleeving sizes.)

### Staggering on pipework: longitudinal view



yellow 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 (see **Insulating pipes with ArmaFlex sheet** on page 24), we recommend that the second layer is made with sheet material, since this can be adapted exactly to the outer diameter of the first layer.

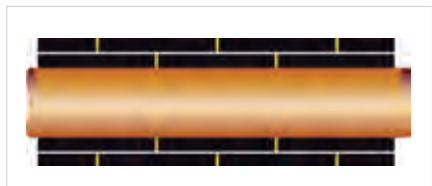
## Multi-layer insulation of pipework with sheets

In general the insulation of pipes with sheet material is possible at an outer diameter of 3-1/2". Select layer insulation thickness combinations as appropriate depending on the outer diameter of the object (see **Insulating pipes with ArmaFlex sheet** on page 36).

**Note:** The ends of the tube or sheet of the second layer should be adhered to the first layer of ArmaFlex. To prevent sagging when the pipe size is 16"-24", the bottom 3rd of the insulation should be adhered to the pipe and/or to the bottom layer of insulation. When the piping diameter is above 24", all-over adhesive coverage is necessary on both surfaces.

Although not required for performance on pipes 24" and smaller, complete adhesive coverage is the best way to prevent corrosion under insulation (CUI).

## Multi-layer insulation of flat surfaces with sheets

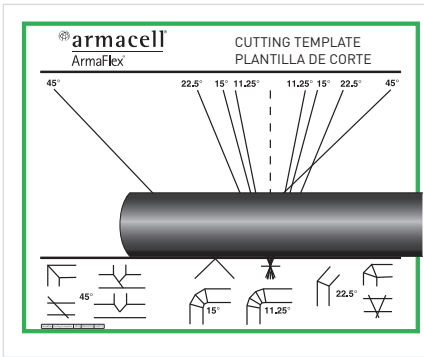
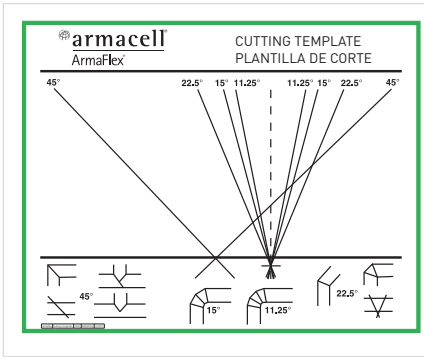


Yellow lines indicate glued seams

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 ArmaFlex. 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.

## USING THE ARMAFLEX TEMPLATE

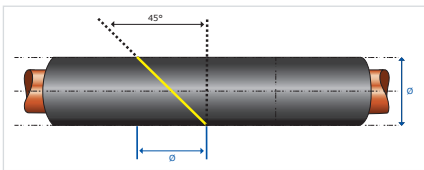


The fabrication of bends and tees using ArmaFlex tube material requires tubes to be cut to different angles. In order to make this process easier and quicker, the ArmaFlex template is provided on every box of AP ArmaFlex.

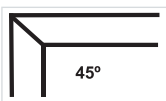
1. Place a copy of the ArmaFlex template face up on a table or worktop.
2. Align an ArmaFlex tube across the template parallel to the horizontal base line.
3. Select the required angle cut from the template and cut along this line.

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

## BEND WITH 90° ANGLE USING ARMAFLEX TUBE

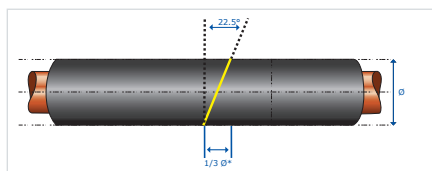


**Note:** Yellow lines indicate where cuts are to be made. For correct angle measurements please use the ArmaFlex template located on each tube box.



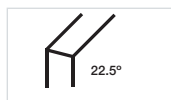


### BEND WITH 45° ANGLE USING ARMAFLEX TUBE

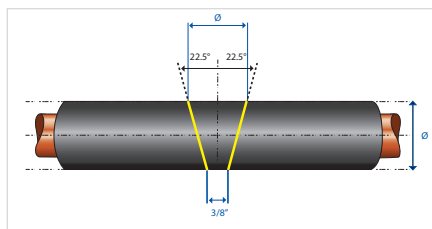


\* The Ø details to achieve the 45° angle are approximate values!

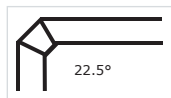
**Note:** Yellow lines indicate where cuts are to be made. For correct angle measurements please use the ArmaFlex template located on each tube box.



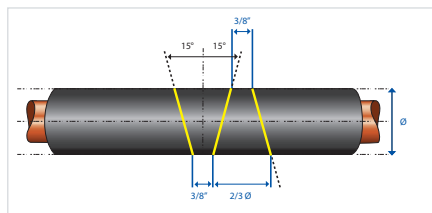
### SEGMENT BEND WITH 1 MIDDLE PART – 2+1 USING ARMAFLEX TUBE



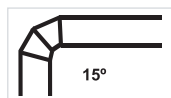
**Note:** Yellow lines indicate where cuts are to be made. For correct angle measurements please use the ArmaFlex template located on each tube box.



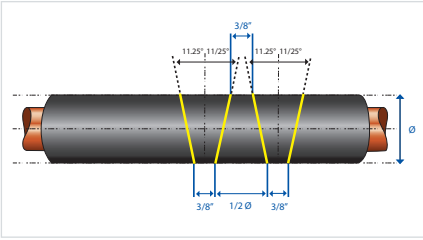
### SEGMENT BEND WITH 2 MIDDLE PARTS – 2+2 USING ARMAFLEX TUBE



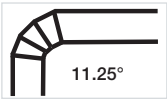
**Note:** Yellow lines indicate where cuts are to be made. For correct angle measurements please use the ArmaFlex template located on each tube box.



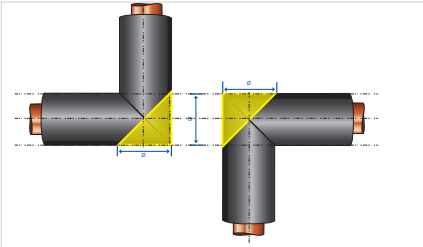
**SEGMENT BEND WITH 3 MIDDLE PARTS – 2+3 USING ARMAFLEX TUBE**



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



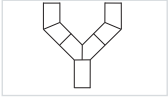
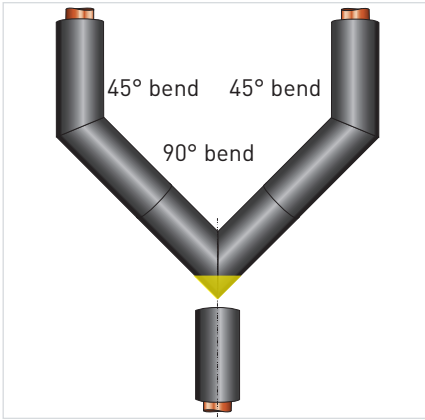
**CROSSPIECE JOINT USING ARMAFLEX TUBE**



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



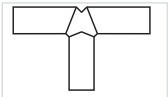
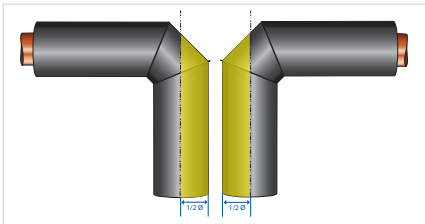
## Y-TUBE USING ARMAFLEX TUBE



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

Further fabrication of the 45° bend (two) and the 90° bend (one).

## SWEPT T-PIECE USING ARMAFLEX TUBE

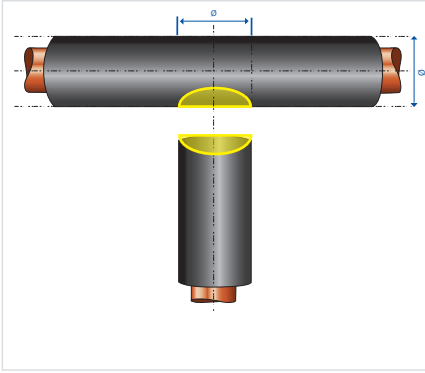


**Note:** Yellow lines indicate where cuts are to be made. For correct angle measurements please use the ArmaFlex template located on each tube box.

## T-PIECE USING ARMAFLEX TUBE

### Method 1: The “Punched Hole” or “Fish Mouth” T-Piece

**Note:** Yellow lines indicate where cuts are to be made.



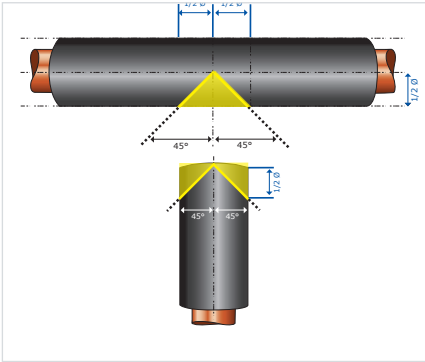
1. Punch a hole in the tube with a sharpened section of a copper pipe of the right diameter, forming the crossbar of the “T”.

**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 slide 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 too deep rather than too shallow.

4. Attach the branch section to the pipe and join the two halves of the “T”. Adhere all seams with ArmaFlex adhesive.



### Method 2: “Miter-Box” T-Piece

**Note:** Yellow lines indicate where cuts are to be made.

1. Cut two 45° angles at the end of the tube section for the branching pipe as shown, using either a miter box 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.

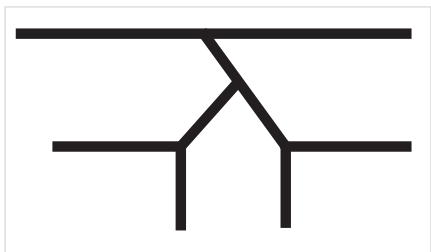


3. Join pre-cut parts with adhesive to form a “T”.

4. Slit the formed piece sideways with a sharpened knife, apply adhesive to seams, fit when tack dry.

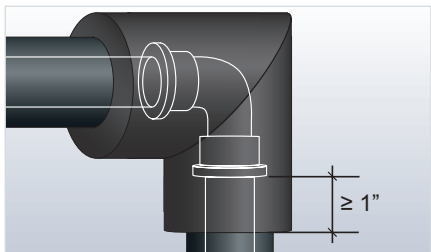
### Method 3: The “3 Piece 45° Segment” T-Piece

1. Place tube on straight line on the carton template. Make one 45° cut. Hold both cut pieces together and make a second 45° cut going the opposite direction of the first cut. Be certain the cut is centered halfway through the first cut for even alignment.
2. Cut the third and final piece at a 45° angle. Measure the length of the cut to be equal to the other pieces.
3. Join each pre-cut piece with 520 adhesive.



## Insulating coupling pipe joints

### OVERSIZED 90° BEND

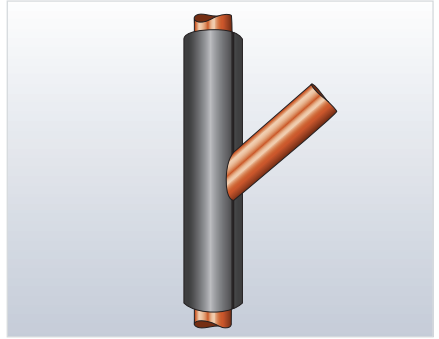
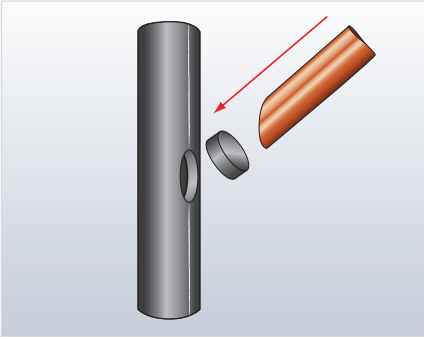


Insulate up to the pipe fitting using ArmaFlex tube and secure to the pipe using adhesive.

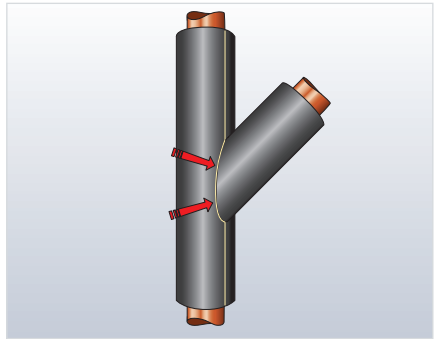
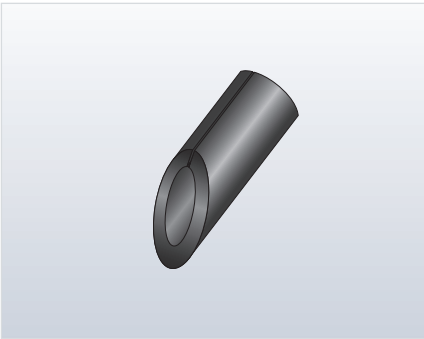
1. The fitting cover is made from tube the bore of which is the O.D. of the incoming tube. Provide a minimum overlap of 1" on each side (increase the distance of the overlap to match the insulation wall thickness if this exceeds 1"). The fitting may be made up using any of the methods described earlier (see **Bend with 90° angle using ArmaFlex tube** on page 30).
2. Slit the throat, apply adhesive to seams, fit when tack dry. Wet seal overlaps.

## Angle T-piece (off-set) using ArmaFlex tube

### METHOD 1



1. Using a sharpened section of copper pipe of the correct diameter, punch a hole in the tube used for the main pipe. Make sure that the angle corresponds to that of the branch pipe.

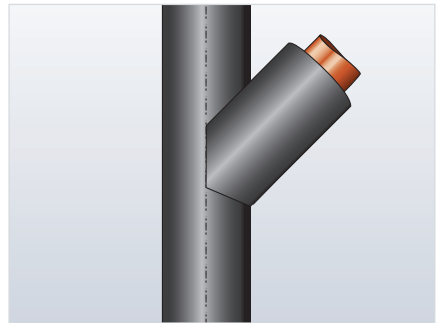
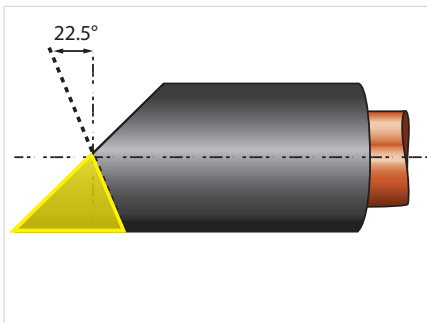
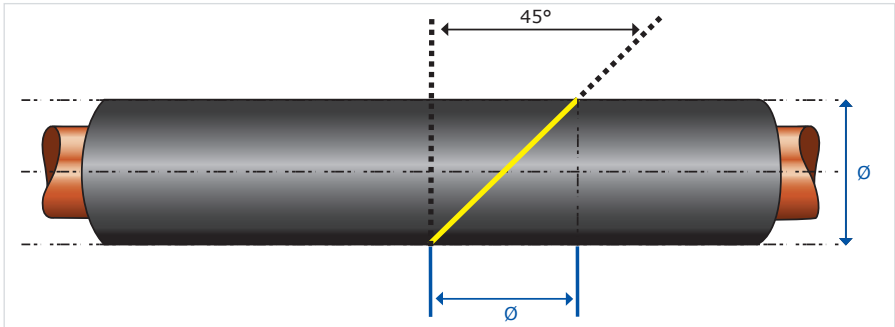


2. Cut a 45° angle at the end of the tube sections for the branch pipe. Parallel to the cut, use a sharpened knife to cut a semi-circular recess in the end of the branch section of tube. It is better to have a cut which is slightly too deep rather than slightly too shallow.
3. Glue both pieces together using ArmaFlex adhesive.
4. Slit the shaped piece, apply adhesive to seams and fit when tack dry.

**METHOD 2**

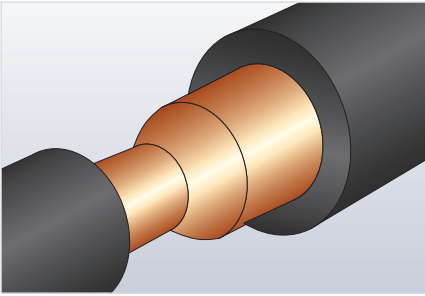
**Note:** Yellow lines indicate where cuts are to be made. For correct angle measurements please use the ArmaFlex template located on each tube box.

1. Make a 45° cut as shown.

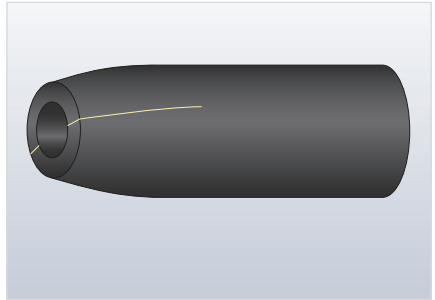
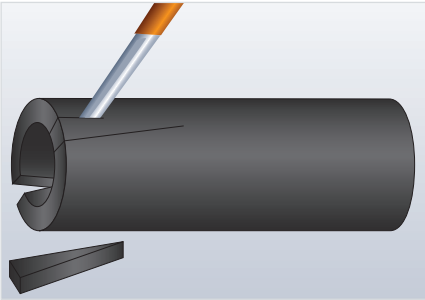


2. Use the piece of the tube with the 45° angle, mark a 22.5° angle and cut off as shown above.
3. Chamfer the inside of the tube where it touches the insulation around the straight pipe.
4. Wet seal all seams.

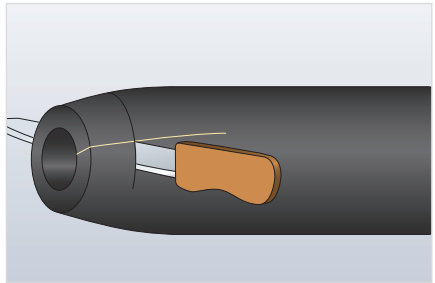
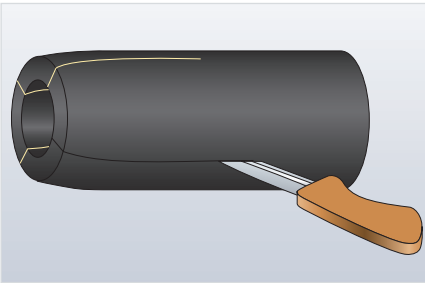
## Pipe reducer using ArmaFlex tube



Pipe reducer to be insulated

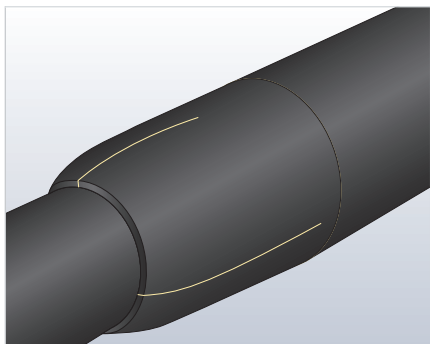


Cut out segments from a tube of the larger diameter and glue seams with ArmaFlex adhesive.



Cut reducer to size – allow compression of 1/4" 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 pipes with outer diameters up to 10", ArmaFlex UT to 2-1/2" and NH ArmaFlex tubes are available for pipe with outer diameters up to 8". Larger pipes and ducts between 16" and 24" should have adhesive coverage on the bottom 1/3 only. Pipes, ducts and tanks 24" and over should be insulated with ArmaFlex sheet/roll and all-over adhesive coverage is required.

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 on the next page to gauge the applicability of different thicknesses of ArmaFlex sheet.

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

For advice on installing ArmaFlex sheet in ambient temperatures  $\geq 40^{\circ}\text{F}$  please see following table.

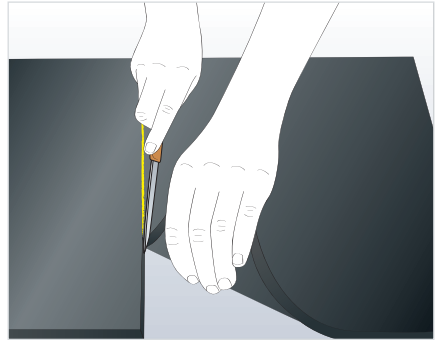
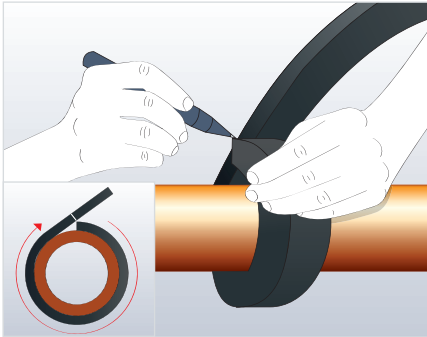
AP ArmaFlex Sheets	Pipe Outer Diameter				
	≥ 3-1/2"	≥ 4"	≥ 5"	≥ 6"	≥ 8"
3/8"	•	•	•	•	•
1/2"	•	•	•	•	•
3/4"	•	•	•	•	•
1"		•	•	•	•
1-1/2"			•	•	•
2"					•

**Note:** ArmaFlex tubes are offered with engineered wall thicknesses. This should be taken into account when selecting ArmaFlex sheet thicknesses.

ArmaFlex UT NH ArmaFlex	Pipe Outer Diameter			
	≥ 3-1/2"	≥ 4"	≥ 5"	≥ 6"
1/4" [NH Rolls Only]	•	•	•	•
1/2"	•	•	•	•
3/4"	•	•	•	•
1"			•	•
1-1/2" [NH Rolls Only]				•

## Insulating large pipes with ArmaFlex sheet

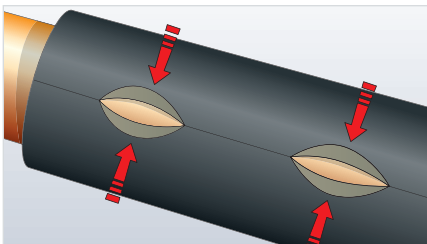
1. Determine the circumference of the pipe.  
**Important:** Always measure with a strip of ArmaFlex of the same thickness to be used for the straight insulation.



**Warning:** Do not stretch the strip.

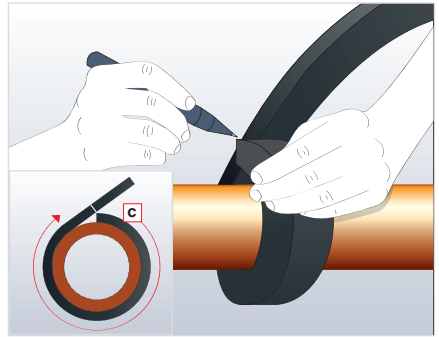
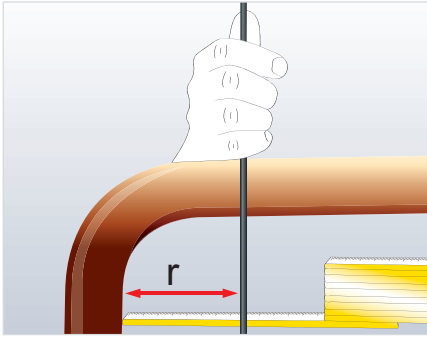
2. Cut ArmaFlex sheet to the required size – apply ArmaFlex adhesive to the cut surfaces along the entire longitudinal seam in a thin layer, allow to tack dry.
3. Press together at the ends and then in the middle. Close the entire seam starting from the middle.

**Note:** In order to prevent the seam re-opening, ensure the adhesive has been fully applied to the edges of the seam and ensure the correct amount of adhesive has been applied.



Check the open time of the adhesive to ensure it is still fit for use.

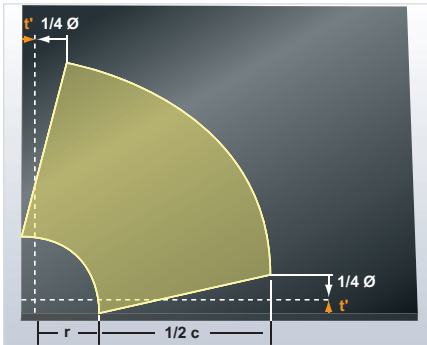
## Two-part bend with ArmaFlex sheet



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.



Divide the pipe circumference in half and transfer this dimension to the ArmaFlex sheet.

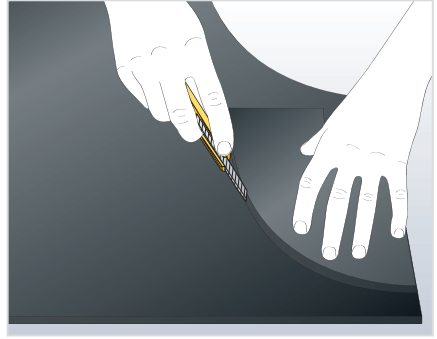
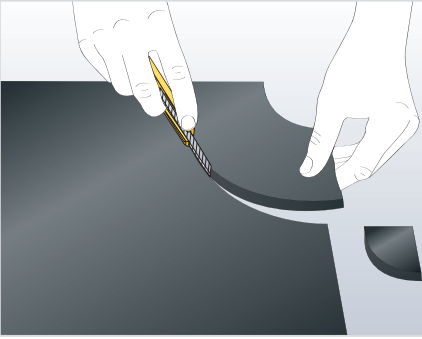
Mark out the two arcs from the intersection of the trim lines.

$r$  = inside radius of bend

$\frac{1}{2} c$  = half of pipe circumference

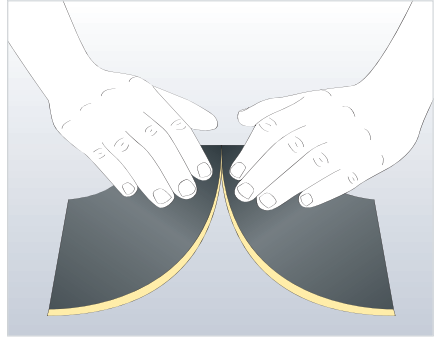
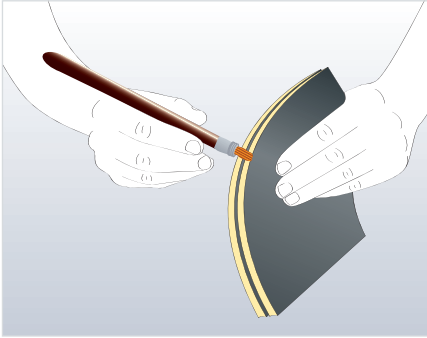
$t'$  = insulation thickness

$\varnothing$  = OD of pipe



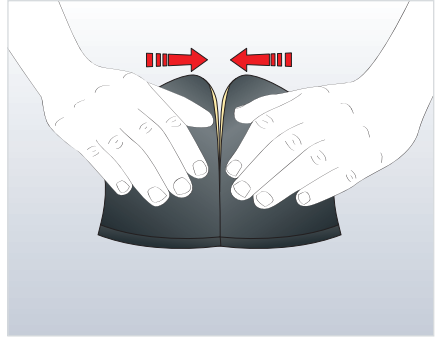
Cut out the first half-section of the elbow.

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



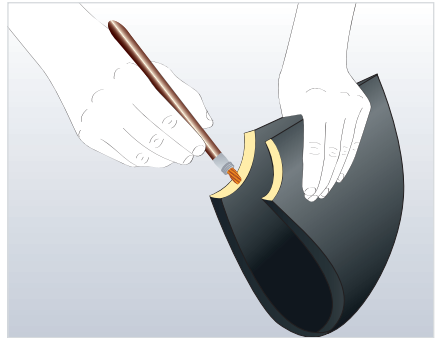
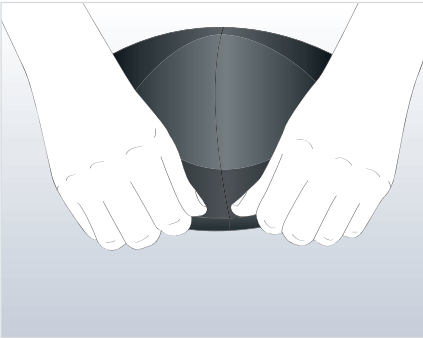
Place the sections together with the rough surfaces inward. Apply ArmaFlex adhesive to the outer edges.

Allow the adhesive to tack dry (fingernail test) then press the two sections together at one side to make a short seam.



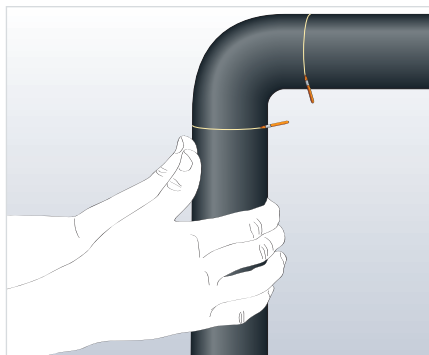
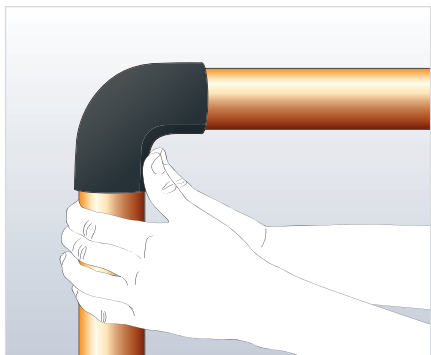
Next, press the opposite sides together, also making a short seam. Working towards the center.

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.

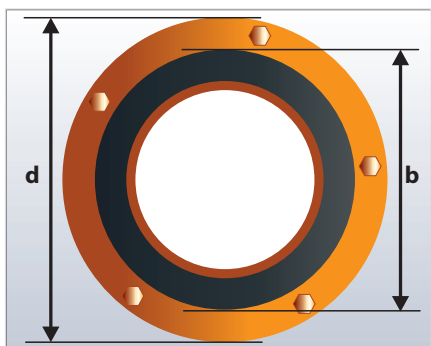
Apply ArmaFlex adhesive to the inner joint edges.



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

Wet seal joints with adhesive, fitted under slight compression, to complete the bend.

## Valve insulation with ArmaFlex sheet



For greater stability, the valve body can be strengthened by building up the body with a layer of ArmaFlex.

Insulate the pipe up to the flange.

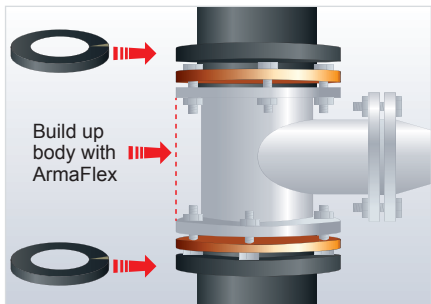
Determine:

**b** = circumference of insulated pipe

**d** = depth of flange ring

Fabricate two end discs:

With the corresponding radius of **d** mark a circle on ArmaFlex sheet material, with the radius **b** mark the cutout. First cut out the whole disc, then the cutout. Cut the discs on one side and glue together again on the insulated pipe.



Fabricate the valve body

Measure:

**h** = height between the outer faces of the two rings.

**a** = diameter of spindle neck

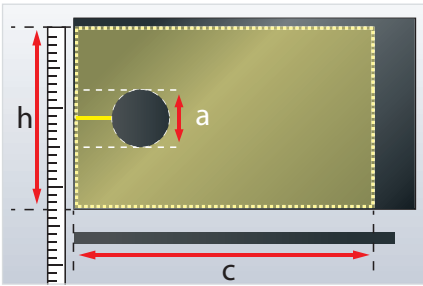
**c** = circumference of the rings

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

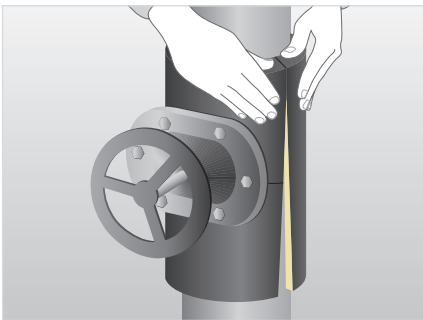
Do not stretch the strip.

Transfer height **h**, circumference **c** and diameter of spindle neck **a** to the ArmaFlex sheet and mark the cutouts for the spindle neck.

**Note:** Cutouts should always be made 1/8" less than measured.



**Note:** For valve spindles without connecting flanges it is recommended that the cutouts are marked in the first quarter of the ArmaFlex sheet.



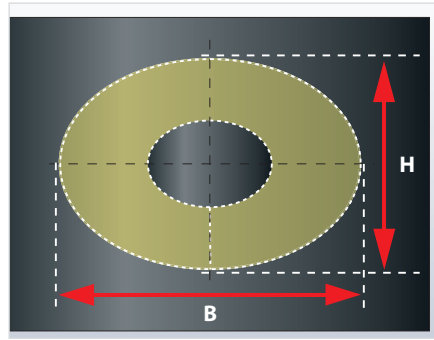
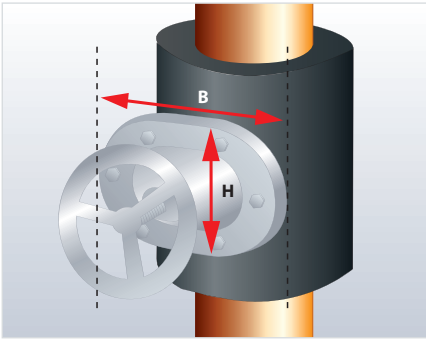
Cut the valve jacket and fit on the valve. Then apply a thin coat of ArmaFlex adhesive to all seams of the valve cover. Allow to tack dry (fingernail test), fit, then press together firmly.

**Note:** The valve body should always be insulated after the pipe.

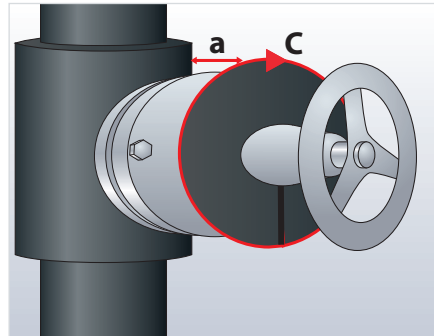
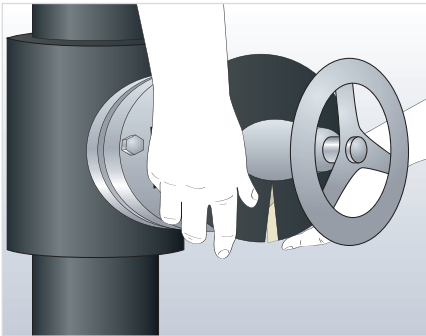
To increase the security of the seams, pre-fabrication of the valve cover on the workbench is recommended based on accurate measurements.



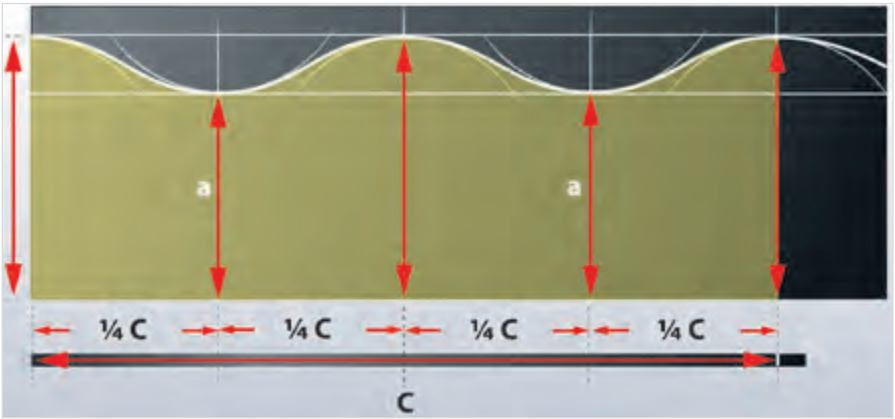
## Insulating neck-T / pipe-T / spindle neck of valve with ArmaFlex sheet



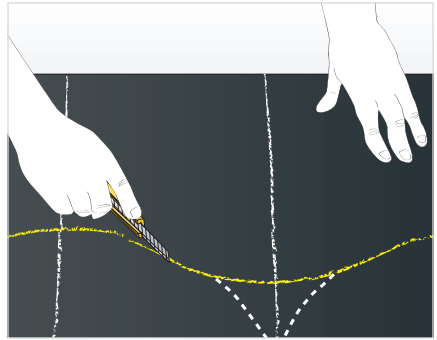
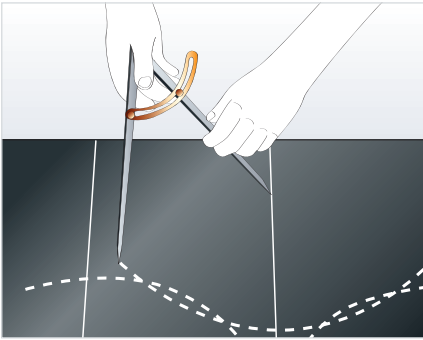
Measure the height of the spindle housing flange and its width, and fabricate an end disc.



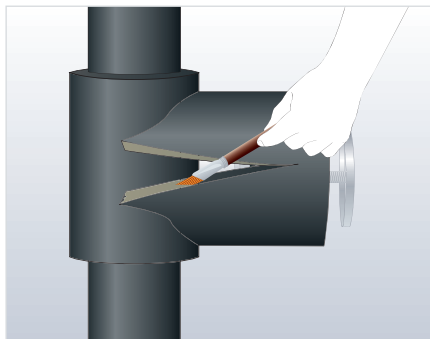
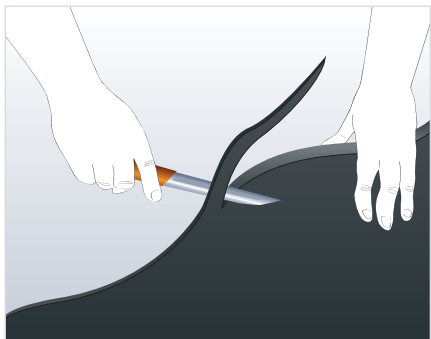
Cut through the disc on one side, apply adhesive to the cut edges, allow to tack dry. Re-join the end disc after placing it over the spindle neck. Measure the circumference of the end disc with a strip of ArmaFlex and transfer the measurement to the sheet material.



Mark off the circumference into 4 equal sections. Measure the minimum depths of the spindle housing including the thickness of the ArmaFlex end disc. Transfer these heights to the ArmaFlex sheet.

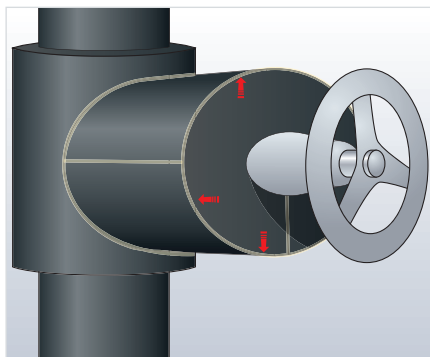
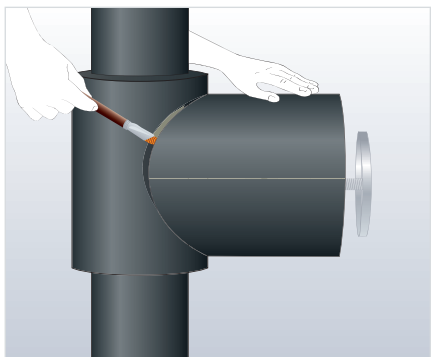


With the radius of the insulated valve body mark out 5 arcs, round the intersections of the lines and join the arcs with a continuous line. Cut out the shaped section of sheet.



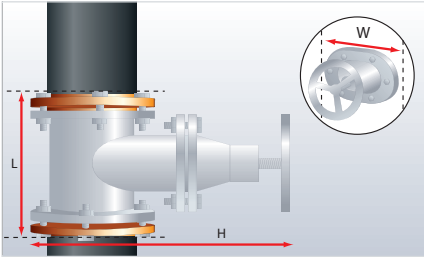
Chamfer away the inside surface at the highest point (where the sheet rests against the side of the valve body).

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



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

## Insulating valves with D-box made of ArmaFlex sheet



Establish the following measurements:

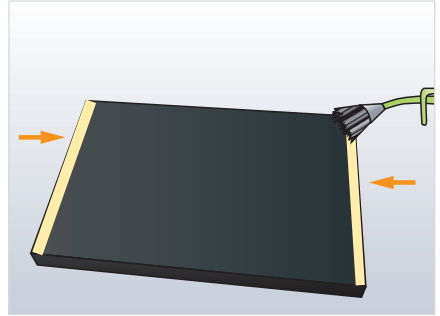
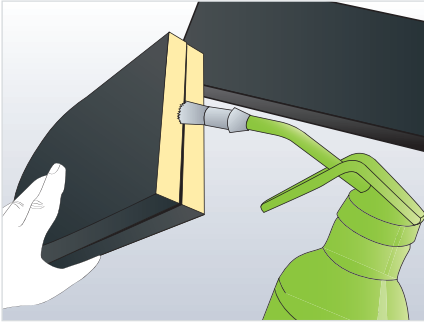
**L** = length of valve + 2 x thickness of insulation

**H** = height of valve + 2 x thickness of insulation

**W** =  $\varnothing$  (diameter) + 3/8"

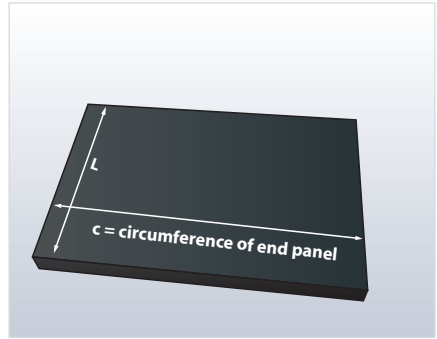
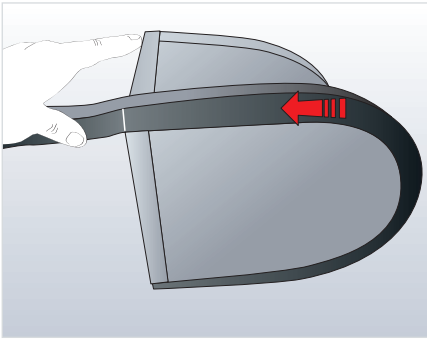
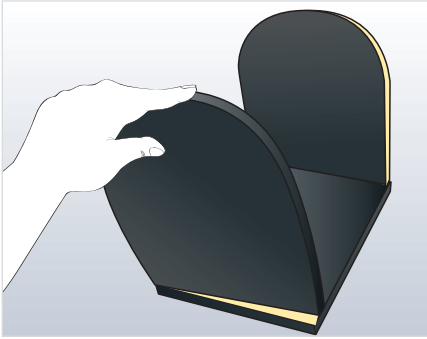
Mark out and fabricate 2 end panels and 1 top panel using the measurements taken in the previous step.

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 used.

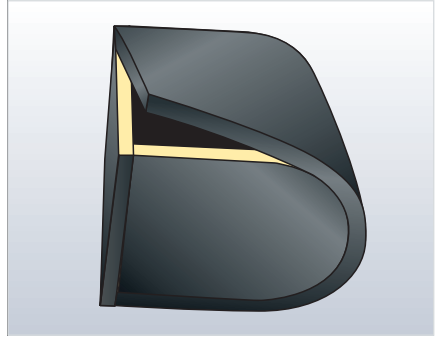
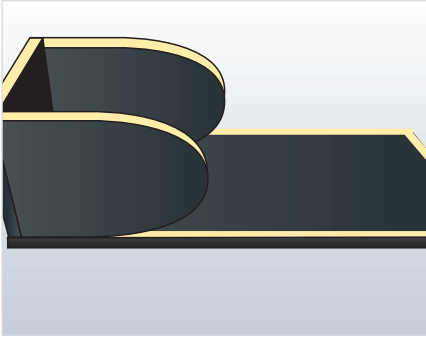


Glue the top edges of the end panels and the top panel edge.

Secure the end panels to the top panel making sure the edges are aligned.

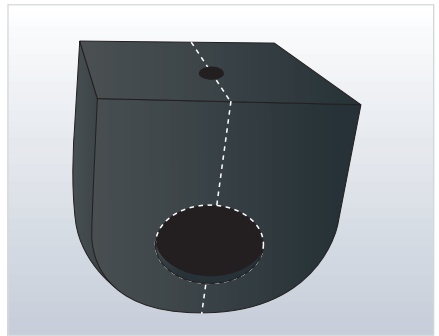
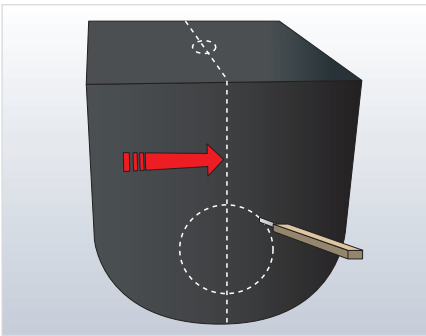
Use a strip of ArmaFlex of the same thickness to determine the circumference around one end panel (including the top panel).

Mark measurement **L** and circumference 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.

Secure the square 90° edge as shown. Ensure the edge is aligned and neat. Continue to secure all edges in this way.



Cut holes for the insulated piping connections on each of the end panels and a final cutout for the valve spindle connection at the top.

Split the box into two halves and fit around the valve.

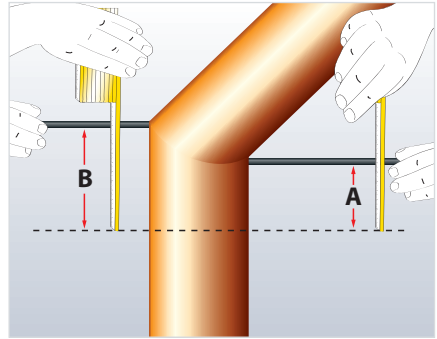
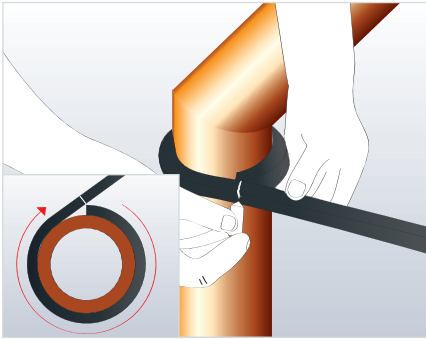
To finish, apply ArmaFlex adhesive to the seams, allow to tack dry and join the seams. Vapor seal the connections (joints) to the linear insulated pipes using ArmaFlex adhesive.

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

**Note:** ArmaFlex tape may be applied to the spindle neck in the area of the penetration to provide additional protection.

## Offset angle and pipework bend angle joints

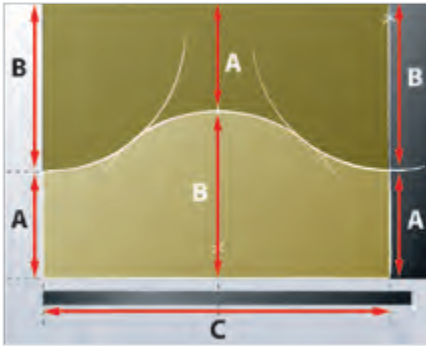
The following illustrations show the various stages of work when insulating a miter angle or bevel joint in a pipe. The procedure when insulating a right angle pipe joint is effectively the same.



Determine the circumference of the pipe **C**

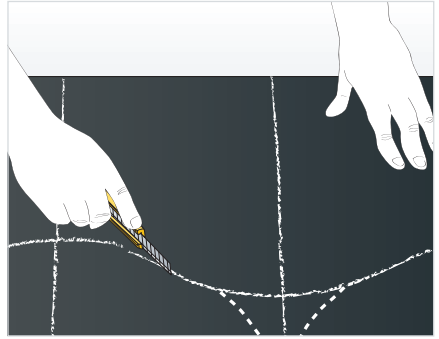
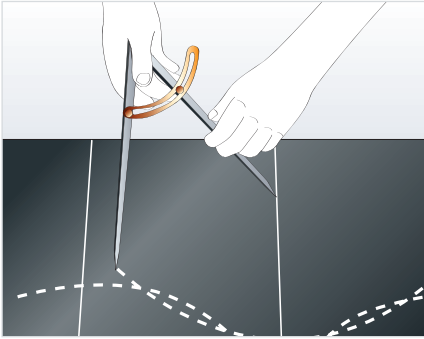
**Important:** Always measure with a strip of ArmaFlex of the same thickness to be used for the insulation. Do not stretch the strip.

Measure the outer height **B** and the inner height **A** of the miter joint.



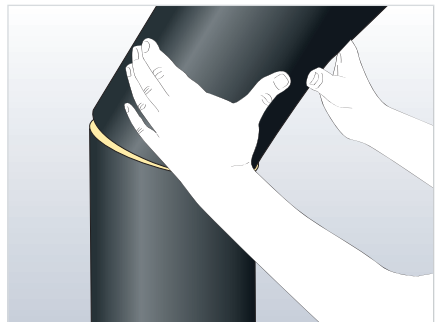
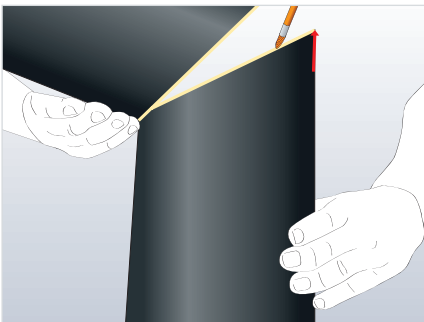
Transfer the circumference to the ArmaFlex sheet and mark the center line.

Transfer the outer and inner height to the ArmaFlex sheet.

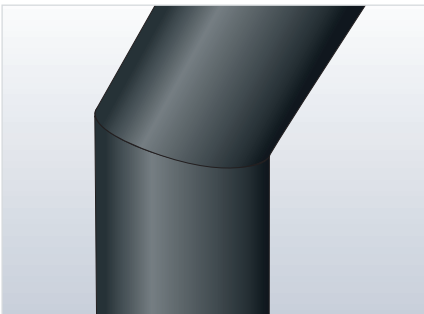


Measure the half-circumference using dividers and mark 3 arcs.

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 miter joint.



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

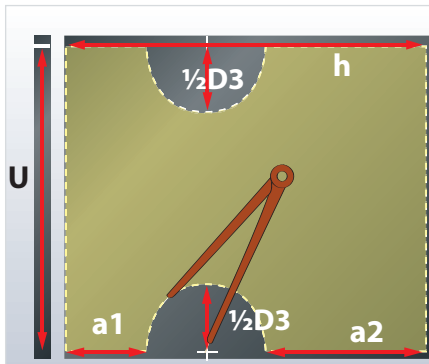
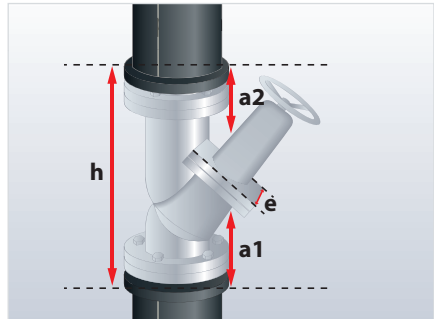
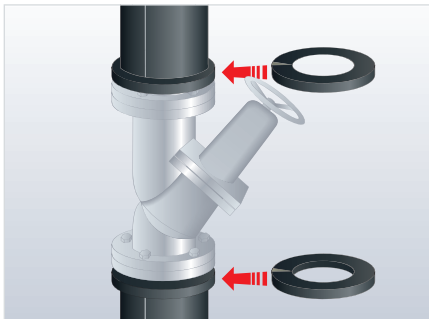
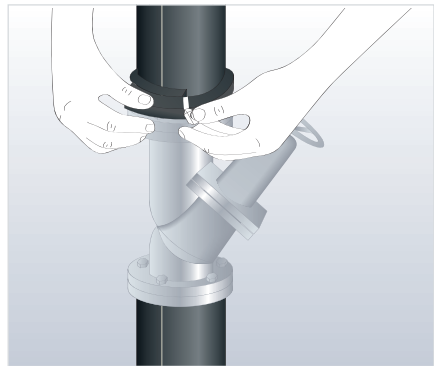
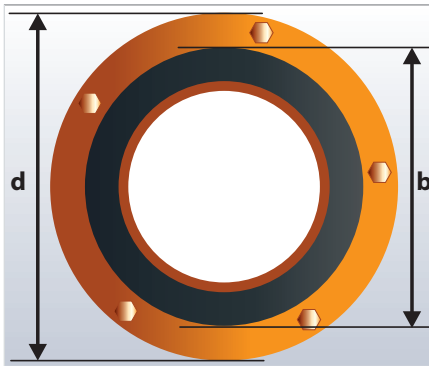


The insulation is now complete.



## Strainers, strainer valves and 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 up to flange.

Determine:

**b** = circumference of insulated pipe

**d** = depth of flange ring

**h** = measure the distance over the outer faces of the two ArmaFlex rings you have positioned next to the flanges

**a1** = measure the distance from the strainer to the outer face of the lower ring

**a2** = measure the distance between the strainer and the outer face of the upper ring

**e** = diameter of strainer

### Fabricate two discs

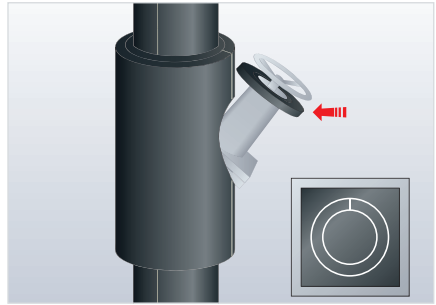
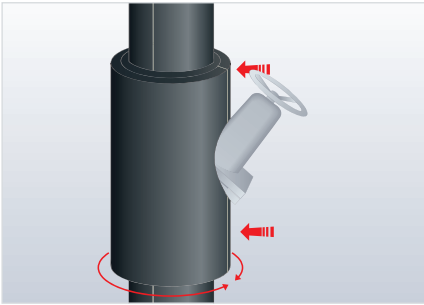
Measure the diameter of the flange and the diameter of the insulated pipe using a pair of calipers. Transfer these measurements to a piece of ArmaFlex sheet. Mark out two concentric circles with dividers. Repeat and cut out two ArmaFlex rings.

**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.

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

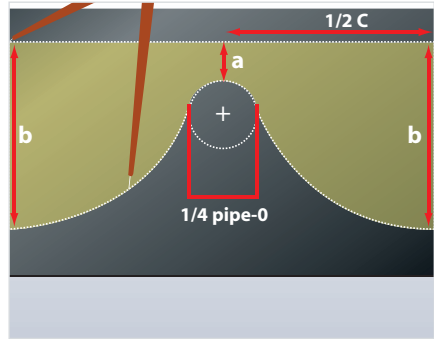
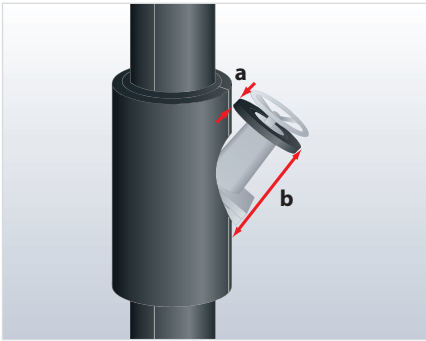
**Warning:** Do not stretch the strip.

Transfer these measurements to the ArmaFlex sheet and mark the cutout 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 to the end of the insulated section as shown using ArmaFlex adhesive.



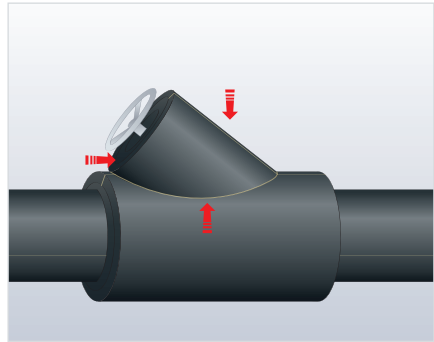
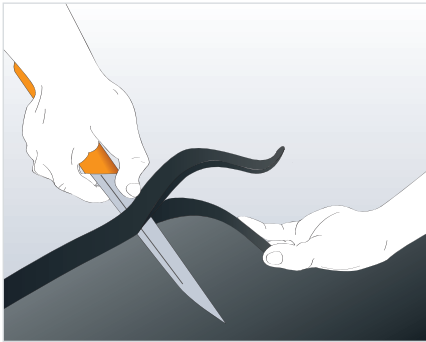
Determine:

**a** = shortest distance from the ring of ArmaFlex to the insulation around the strainer body.

**b** = longest distance from the ring of ArmaFlex to the insulation around the strainer body.

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

Transfer distance **b** on the outer boundary liner and distance **a** on the center line.



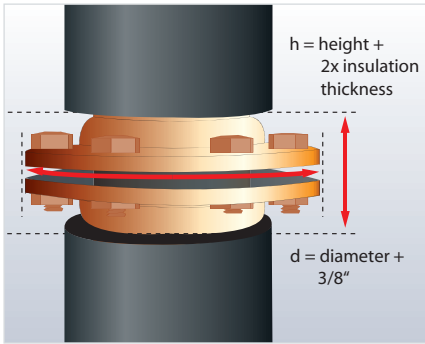
Cut the remaining section of sheet.

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

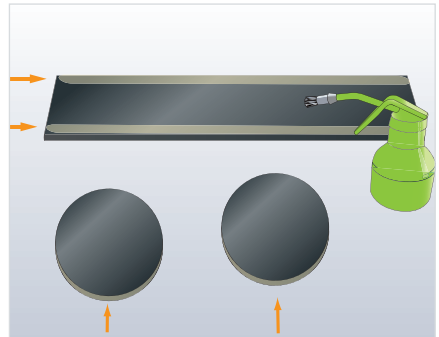
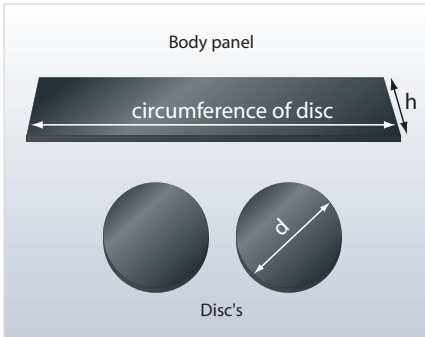
## Flange boxes

The following section shows the installation techniques for insulating flanges.

In chilled-water or refrigeration applications it is advisable to pack the gaps between the nuts with strips of ArmaFlex insulation.

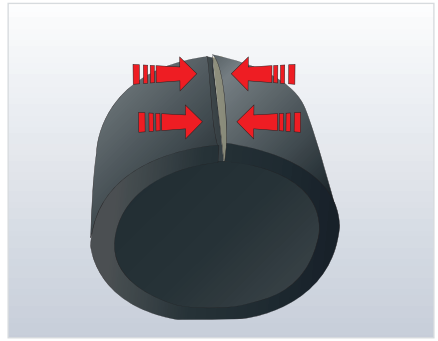
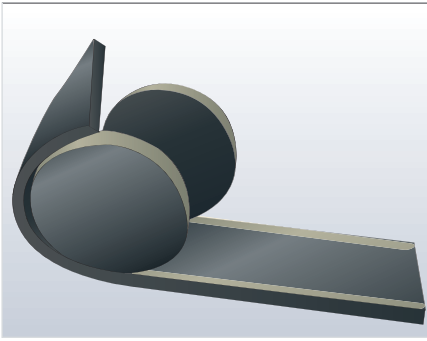


Using a pair of calipers, determine the diameter of the flange face. Add 3/8" to this measurement. Measure the length of the flange (incl. bolts) and add 2x the insulation thickness of the sheet used.



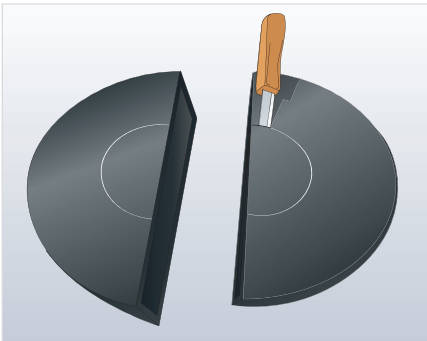
Transfer these measurements to a piece of ArmaFlex sheet. Mark two concentric circles with dividers. Repeat on a second piece of sheet. Cut out two ArmaFlex rings.

Determine the circumference of the disc.



Roll the body panel up and around the end discs, do not stretch during application. Check alignment throughout.

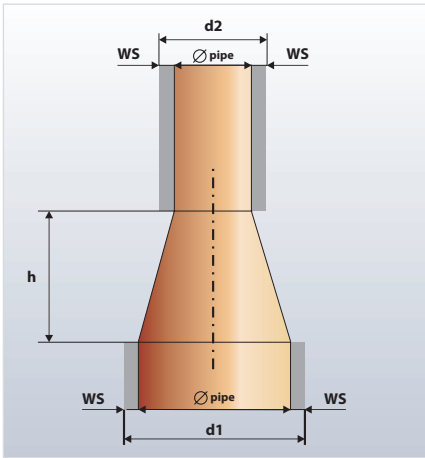
Place the edge to the edge of the adjoining seam opposite.



Using a small sharp knife cut out for the insulated pipe diameter.

To finish fit the two halves of the flange box around the flange and wet seal all seams and joints to the insulated pipe.

## Concentric reducers



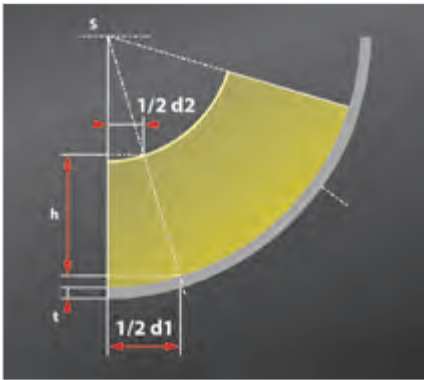
Determine the following measurements

**h** = height of the reducer, including both welds

**d1** = diameter of larger pipe + 2 x insulation thickness

**d2** = diameter of smaller pipe + 2 x insulation thickness

Determine the circumferences by placing a strip of ArmaFlex sheet material of the same thickness to be used around the larger diameter pipe. Do not stretch the strip.

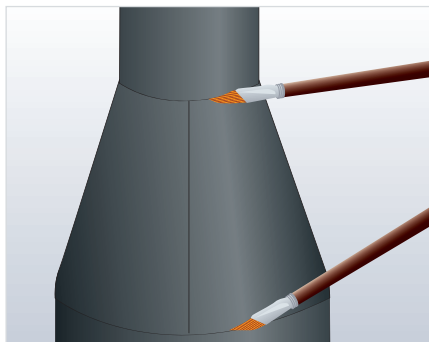
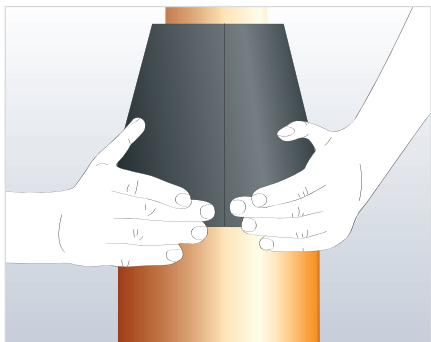


### Thickness of ArmaFlex sheet material

t	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1-1/2"	2"
---	------	------	------	------	------	----	--------	----

Transfer the measurements determined onto the surface of the ArmaFlex sheet marked as shown in the picture. Minimize material waste by drawing the half-elevation on the edge of the ArmaFlex sheet.

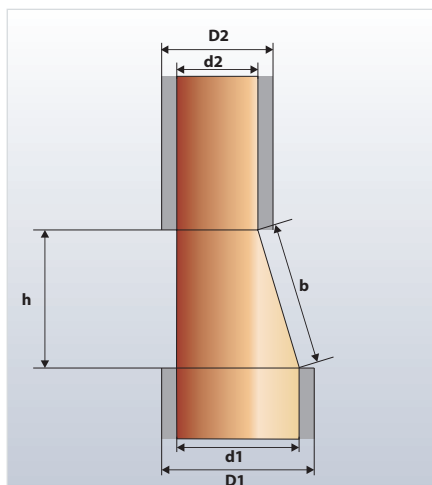
Cut out the reducer piece with a sharp knife (yellow area indicates the cutting lines).



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.

## Eccentric Reducer



Determine the following measurements:

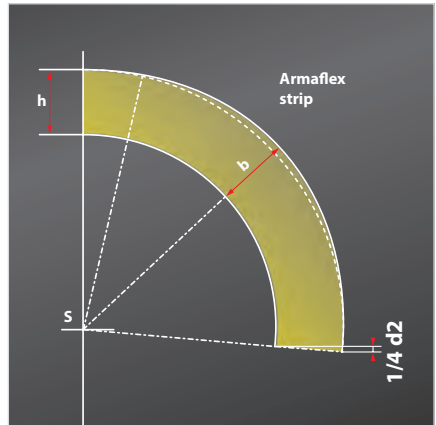
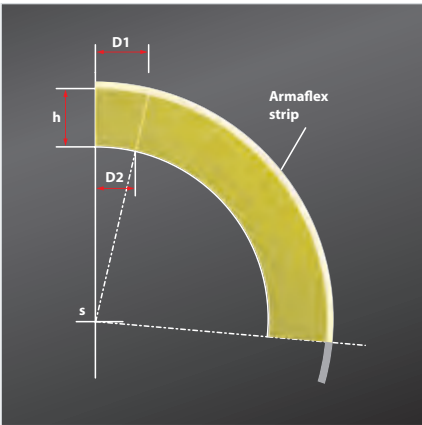
**h** = height of the eccentric reducer including both welds

**D1** = diameter of the larger pipe + 2x insulation thickness

**D2** = diameter of the smaller pipe + 2x insulation thickness

**b** = true length of the reducer

Determine the circumference by placing a strip of ArmaFlex sheet material in the same thickness to be used around the larger diameter pipe.

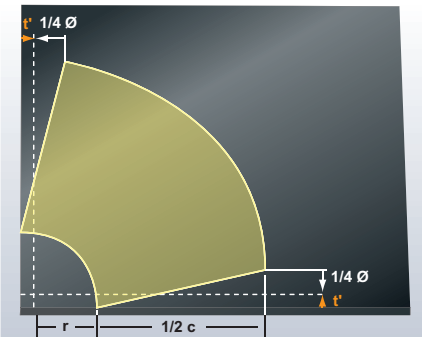


Transfer the measurement determined onto the surface of the ArmaFlex sheet material, as shown in the picture.

Modify the pattern as appropriate.

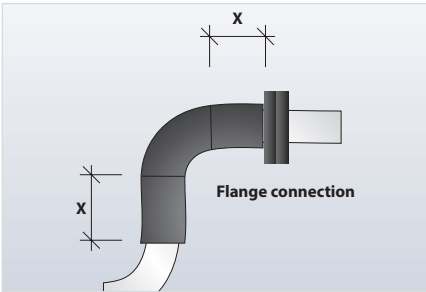
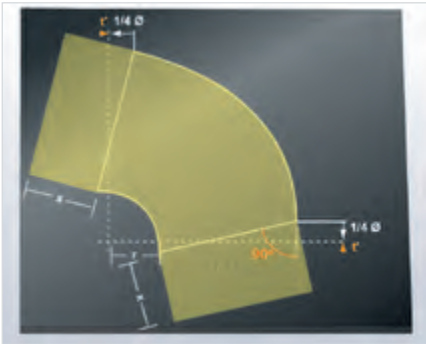
## Two-part bend made of ArmaFlex sheet with extension

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:



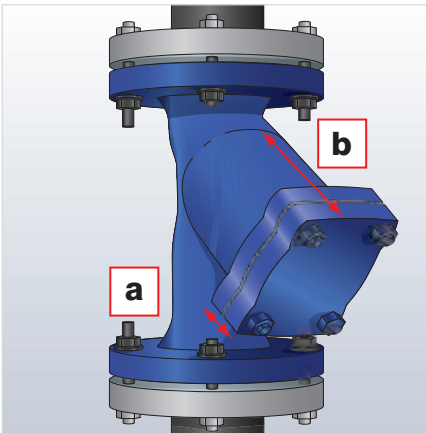
1. Fabricate a two-part bend (see **Two-part bend with ArmaFlex sheet** on page 36)



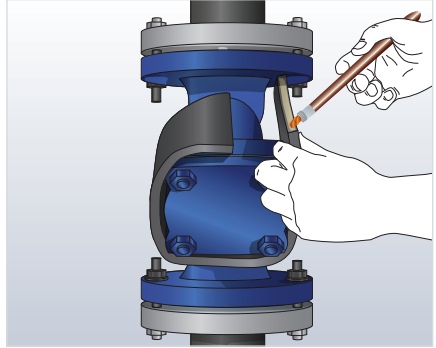
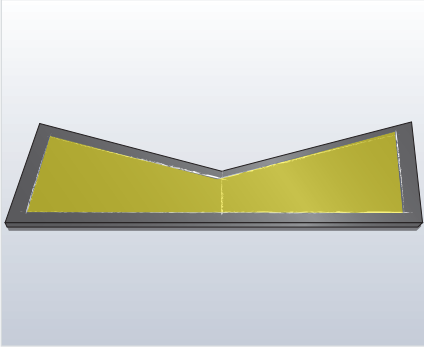


- At both ends of the bend, mark the required extension  $x$  at a  $90^\circ$  angle.
- Cut the first half-section of the extended elbow. Use the first half-section as a template to cut the second half-section of the elbow.
- Place the sections together and apply ArmaFlex adhesive to the outer edges.
- Allow the adhesive to tack dry and glue the pieces together (see **Two-part bend with ArmaFlex sheet** on page 36).
- Place the insulation cover over the pipe bend. Allow the adhesive to tack dry then press the joint faces firmly together.

## Strainer valve insulation with ArmaFlex sheet



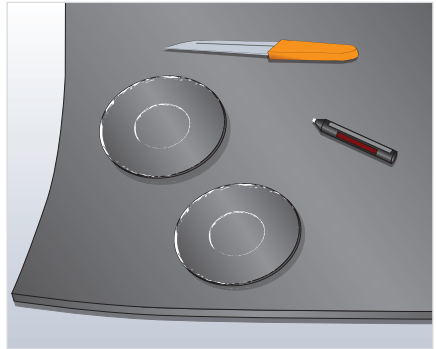
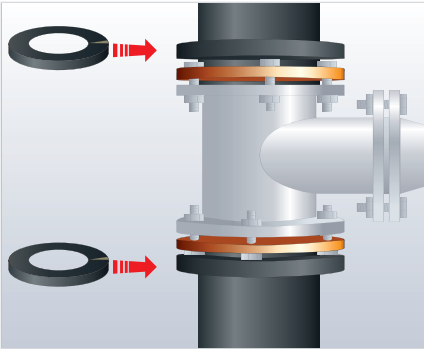
- Insulate the incoming pipes up to the flange.
- Measure the shortest distance **a** and the longest distances **b** of the end of the strainer to the uninsulated strainer valve body.
- Determine the circumference of the removable cover of the strainer. **Important:** Always measure with a strip of ArmaFlex of the thickness to be used for the insulation. Do not stretch the strip.



4. Transfer the circumference to ArmaFlex sheet and mark a center line.
5. At each end mark the longest distance **b** from the end of the strainer to the uninsulated strainer valve body and at the center line mark the shortest distance **a**.

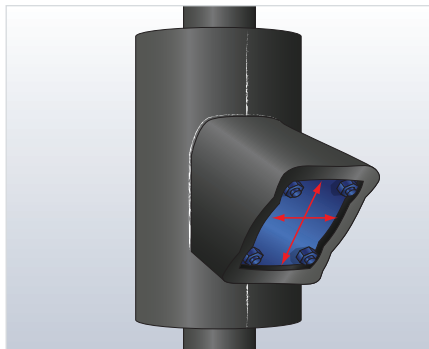
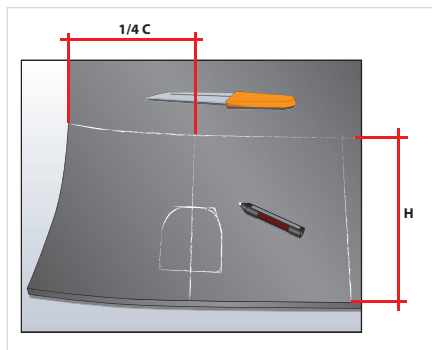
**Note:** The strainer section may extend into the insulation of the strainer valve body and an additional length may be necessary so that the insulation of the strainer section juts out of the insulation of the strainer valve body.

6. Cut the cut the piece out of the sheet material and attach the insulation to the strainer section using ArmaFlex adhesive.

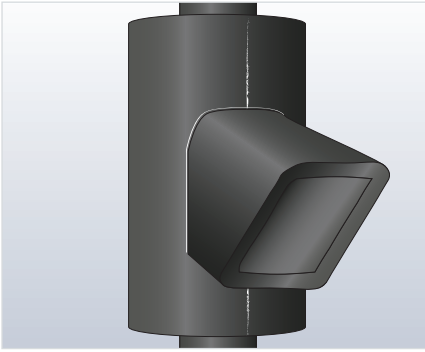


7. Using a pair of calipers determine the diameters of the:
  - insulated incoming pipes
  - flanges of the strainer valve

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



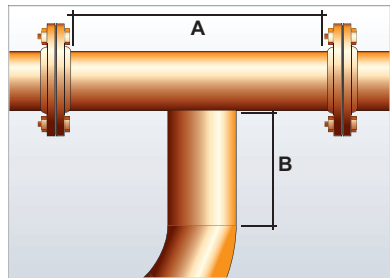
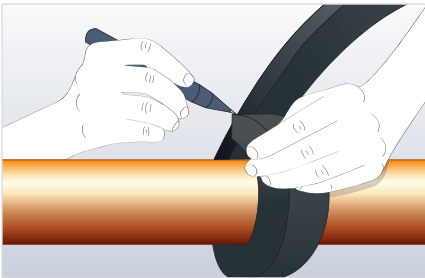
11. Mark a center line and cut an outline for the strainer section. Cut the sheet and apply adhesive to the longitudinal seam. Attach the insulation to the strainer valve body using Armaflex adhesive.
12. Measure the height and the width of the strainer section including 2x insulation thickness, transfer to ArmaFlex sheet and cut out the disc for the end cover.
13. Determine the circumference of the disc. Always measure with a strip of Armaflex of the same 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.
14. Transfer these measurements to ArmaFlex sheet as shown and connect the end-points with a divider.



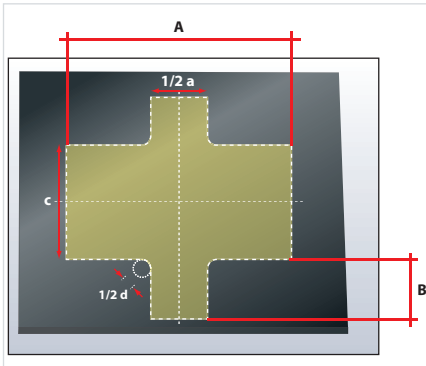
15. Cut the plotted shape and apply adhesive to all seams. Allow the adhesive to tack dry and roll the panel up around the end disc, do not stretch during application. Check alignment throughout.
  16. Install strainer insulation and glue precisely to the strainer valve body.
- Note:** Although the strainer must be cleaned periodically, a removable cap is not recommended on cold applications.

## One-part T-piece with ArmaFlex sheet

1. Measure the circumference of the uninsulated main pipe and branch pipe with a strip of ArmaFlex of the same thickness to be used for the insulation.

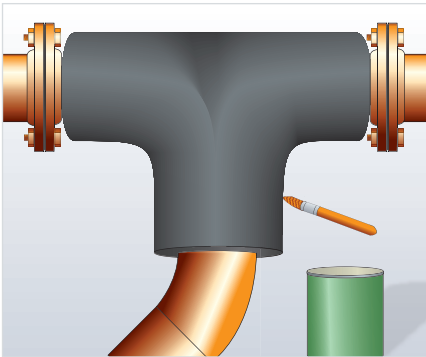


2. Determine length **A** of the main pipe and length **B** of the branch pipe.



- Transfer these measurements to a piece of ArmaFlex sheet and mark vertical and horizontal center lines.

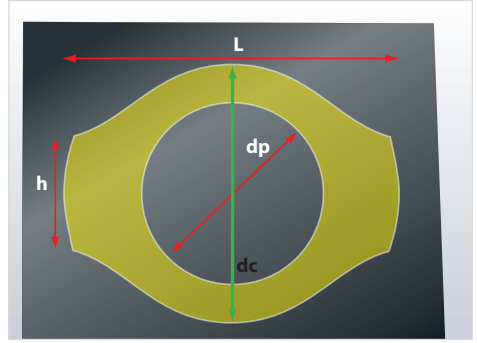
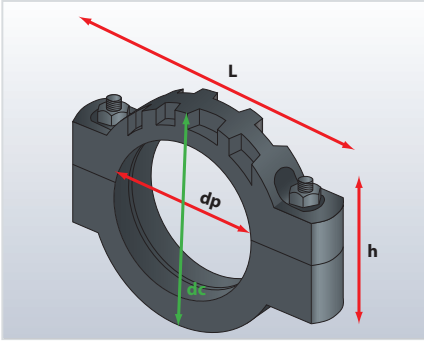
- Determine the length of the branch pipe to be insulated. Mark from the center point to both sides on the vertical center line.
- Mark  $1/2$  diameter of branch pipe and join the points with straight lines.



- With  $1/2$  of the diameter of the branch pipe. Cut out the section.
- Apply adhesive to all seams, allow to tack dry, then seal around the T-piece.

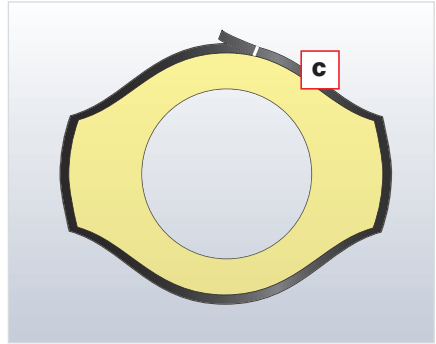
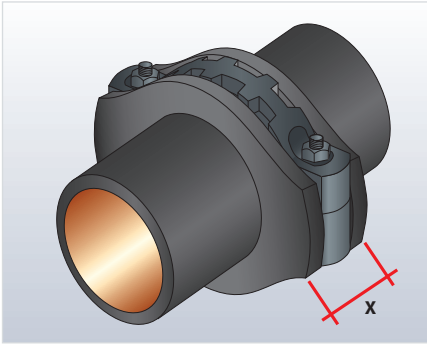
## Insulating victaulic couplings with ArmaFlex sheet

1. Insulate pipes up to the coupling.

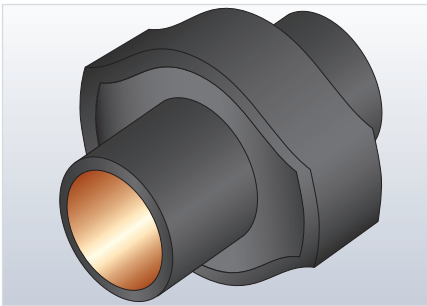


2. Determine
  - dc** = diameter of coupling + 2 x insulation thickness
  - h** = height of screws + 2 x insulation thickness
  - L** = length of coupling
3. Using 1/2 of **dc** (diameter coupling + 2 x insulation thickness) as a radius, transfer a circular arc to the ArmaFlex sheet and mark a horizontal center line.
4. From the center of the line, mark the width of the coupling.
5. At both ends, mark the height of the screws plus 2x insulation thickness at a 90° angle to the center line.
6. Connect the four end-points and the circular arc with a tangent so that an oval-like disc is formed.
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.

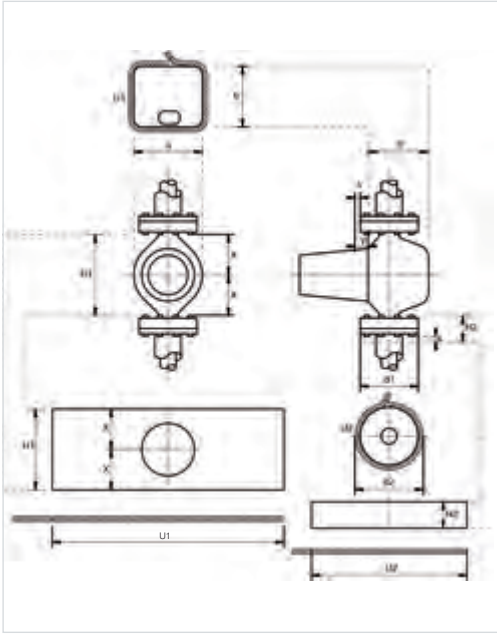


9. Glue both discs directly next to the coupling as shown.
10. Determine the circumference of the disc and measure the distance over the outer faces of the two discs.  
Transfer these measurements to a sheet of ArmaFlex.  
**Important:** Always measure with a strip of ArmaFlex of the same thickness to be used for the insulation. Do not stretch the strip.
11. Cut this section and glue over the ArmaFlex discs around the coupling.



## Insulating pumps with ArmaFlex sheet

Various types of pumps are available. The following section offers general advice and procedures which can be applied and modified as required to insulate most pump configurations.



1. Insulate the incoming pipes up to the flange.
2. Cut to size two ArmaFlex discs including the cutouts according to the dimension of the pump body (**a x b**).
3. Determine the circumference of the disc **U1**.

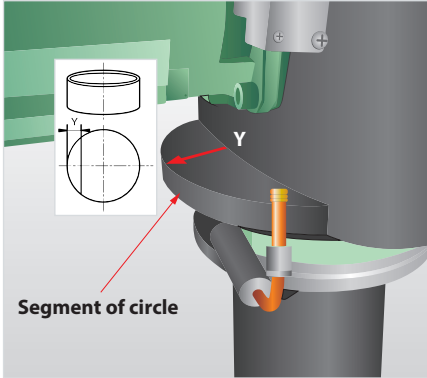
**Important:** Always measure with a strip of ArmaFlex of the same thickness to be used for the insulation. Do not stretch the strip.

4. Cut out the section for the insulation of the pump body from an ArmaFlex sheet (**U1 x H1**).
5. Create the cutout for the motor pump. To provide a close-fitting cutout in the penetration area of the pump motor, it should be  $3/16$ " smaller than measured.
6. Glue 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 firmly together.

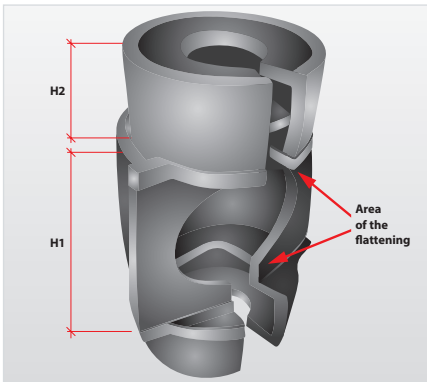
**Note:** In the area of the pump motor, apply self-adhesive ArmaFlex tape to the pump to ensure the insulation is attached securely.



7. For the flattening, fabricate two circular sections. Cut out discs with the dimension of flange diameter + 2 x insulation thickness. Mark the **Y**-dimension, cut the two circular sections and glue at the top and bottom of the pump cap.



8. Fabricate the flange boxes: determine the diameter of the flanges **d1**, circumference **U2**, the height **H2** and the cutouts for the insulated piping connections.
9. Fit the flange boxes around the flange and wet seal all seams and joints.



The picture shows a pump box with a straight front cover and a semi-circular shell.

## Installing ArmaFix insulated pipe supports

### Pipe hanger locations

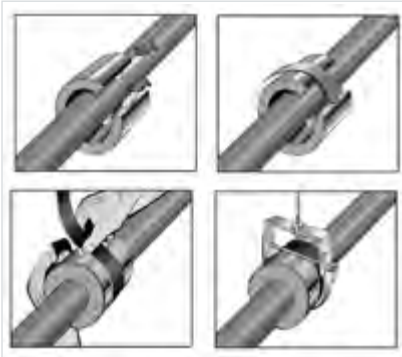
At pipe hanger locations where the insulation must resist compression, a supporting device must be used. With ArmaFlex insulation this will be ArmaFix EcoLight in combination with Insuguard Pipe Shields/Saddles.

### ArmaFix EcoLight Pipe Supports

ArmaFix EcoLight pipe supports provide fast, reliable support for insulated pipes, an innovative alternative to traditional block and dowel methods. The pre-insulated hangers ensure optimum load bearing, protect against thickness compression and prevent condensation gaps that could otherwise compromise system integrity. To minimize the movement of ArmaFlex, it is recommended that ArmaFlex Insulation Tape be wrapped around the outside of the ArmaFix EcoLight supports if needed.

ArmaFix EcoLight features a self-adhesive closure and an exclusive foam-to-foam bond. The insulated pipe support is adhered to ArmaFlex insulations using ArmaFlex 520 or 520 BLV Adhesive.

If the application is for clevis or saddle type of pipe hangers it is recommended that ArmaFlex Insulation Tape be wrapped around the ArmaFix EcoLight prior to placing in the clevis or Insuguard Pipe Shields/Saddles if needed.



**Easy Application**

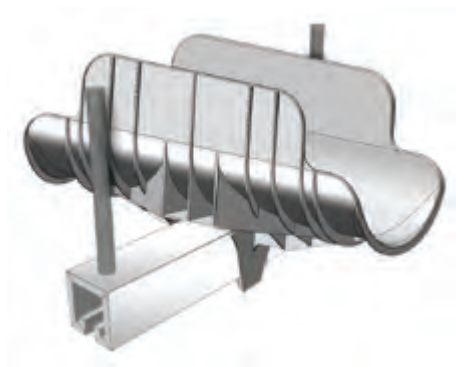


**Application with insulation**

## Insuguard pipe saddles and accessories

**Insuguard®** is the original pipe saddle for tool-free installation on strut support systems. It is designed to accommodate movement of the pipes generated by thermal expansion and vibration.

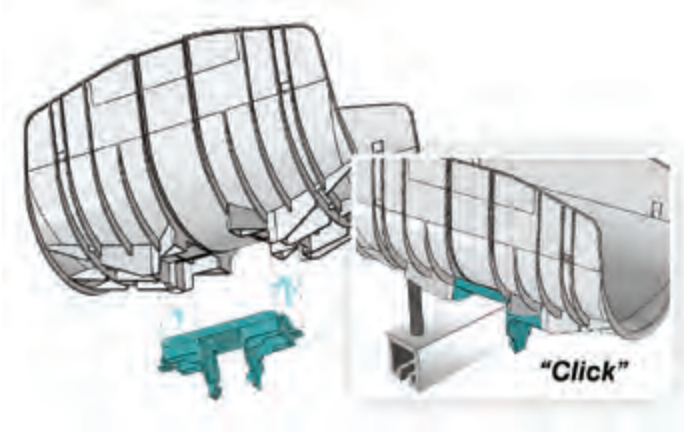
Simply click the saddle onto the strut at the fixing points. Insuguard should be used in conjunction with ArmaFix EcoLight pipe supports.



**Insuguard Multi** is made to adapt any pipe saddle size on various sizes of struts, H-Beam, floor-mount, Clevis hangers and Steel angles. Using the interchangeable adapters simply click into place to secure to the support system.

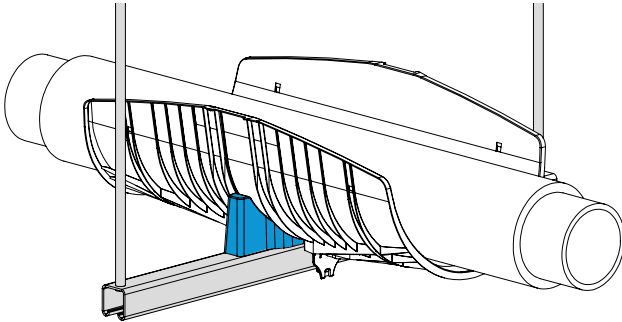
## Strut Adapter

Clip the adapter into the saddle, then clip the assembly onto the strut support.



## Strut Stabilizer

The Strut Stabilizer part is used to prevent rocking of the saddle from side to side on the strut beam. It is used with the strut adapter.



1. Slide the stabilizer part in the space between the grooves on the bottom of the saddle.
2. Then click the Strut Adapter over the narrow part of the stabilizer. This locks both parts into place.
3. Then clip the entire assembly onto the strut.

Slide the saddle into the Clevis hanger, then clip the adapter into place over the metal stirrup to hold it securely.



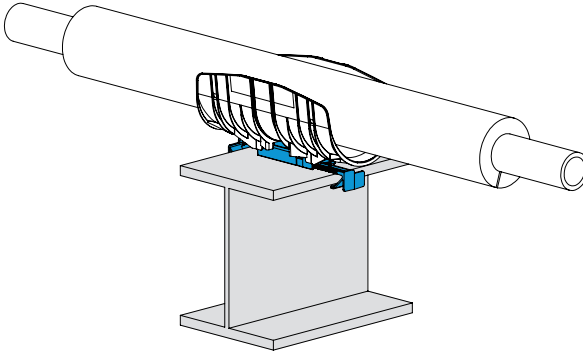
### Steel Angle

Clip the adapter into the saddle, slide in at an angle on the steel angle support, then push the ratchet clip to secure the saddle into place.



### H-Beam / I-Beam Adapter

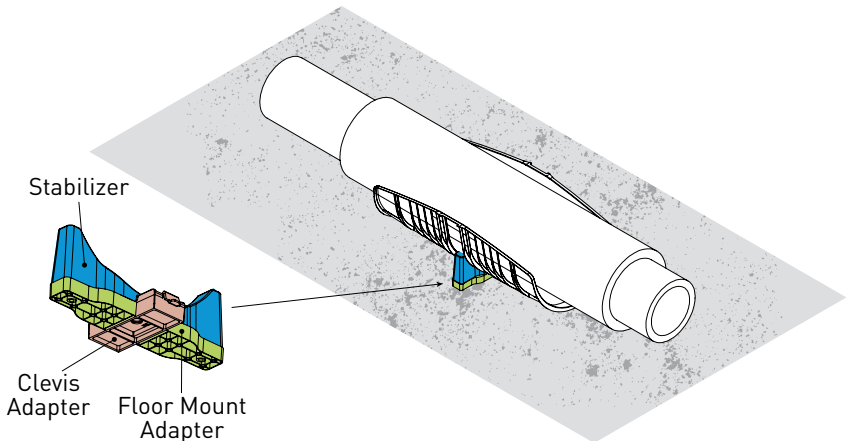
Clip the H-Beam adapter onto the bottom of the saddle and squeeze the ratchet bracket together to tighten onto the beam.



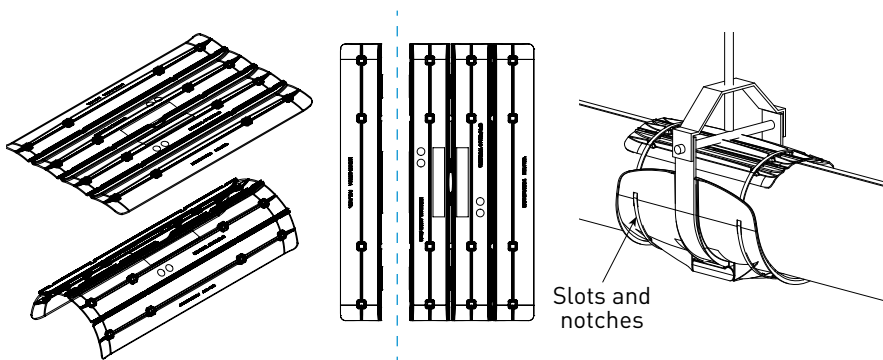
### Floor Mount

The floor adapter keeps the saddle up off the floor surface and stabilizes the saddle and piping preventing rolling from side to side. You'll need 3 parts to achieve the floor mount.

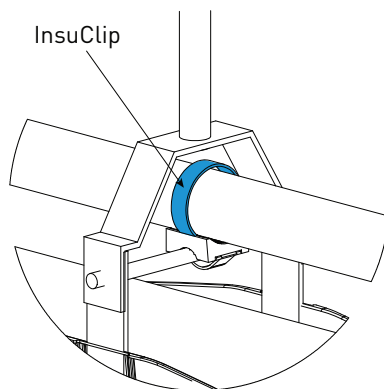
1. Place 1 stabilizer part into the grooves at the bottom of the saddle.
2. Apply the Floor mount adapter to the stabilizer to give it a higher profile.
3. Click the Clevis adapter across both parts to secure into place.



**InsuCover®** is designed to be used on top of the pipe in the saddle. The cover is adjustable by simply cutting to the appropriate width. Use zip ties to secure using the slots and notches that match up to Insuguard and Insuguard Multi as a guide. Do not over tighten.



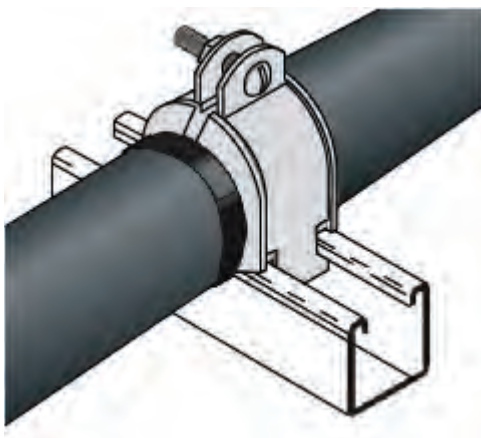
**InsuClip®** allows you to take advantage of the extra space above the cross-bolt of a clevis hanger. Simply attach the 2-way fastener to the cross-bolt, then run the pipe (or cables) through the space and attach the last two ends of the fastener to the pipe.



The **ShockTech**<sup>®</sup> shock detector indicates water hammer problems before pipe damage can occur. Three interchangeable color-coded flags are included to help maintenance spot trouble areas right away. Simply click the adapter onto the Insuguard Multi and attach the appropriate flag for the level of water hammer you are trying to detect. Push the flag up into position.







### Clamp (Friction Fit)

Install ArmaFlex insulation on either side of the ArmaFix EcoLight pipe support.

Wet seal the butt joints with the ArmaFix EcoLight pipe support using ArmaFlex 520 or ArmaFlex 520 BLV adhesive.

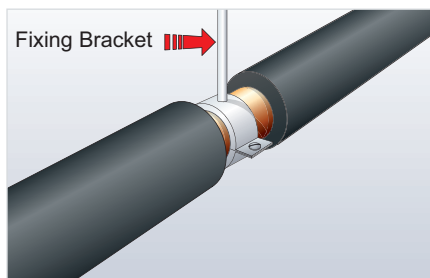
**Note:** Ensure that the pipe insulation is installed under slight compression.



## Insulating over pipe supports (encapsulating)

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

**Note:** When installing on cold lines, it is essential to raise concerns about the suitability of such systems before beginning work.



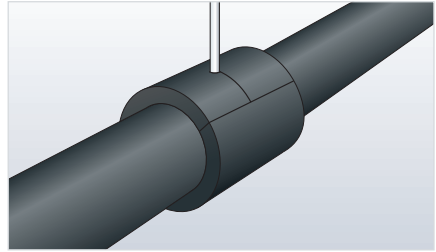
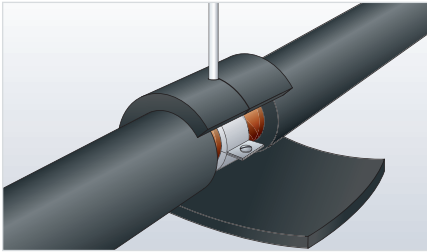
1. Install the ArmaFlex as close to the fixing bracket as possible. Seal the ends of the tube to the pipe with ArmaFlex adhesive.

**Note:** On cold lines, insulate the fixing bracket with a suitable ArmaFlex tube or with ArmaFlex self-adhesive tape 2-4" upward.



2. With a large off-cut of ArmaFlex tube, punch 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 recommended.



3. Place the ArmaFlex cover over the support area, mark and cut the true circumference of the cover.  
Fix and vapor seal all seams and joints in and around the attached insulation using ArmaFlex adhesive.

### Insulation of other pipe supports

ArmaFix pipe supports represent the best option to create a fully water-vapor-tight system and prevent condensation on cold applications.

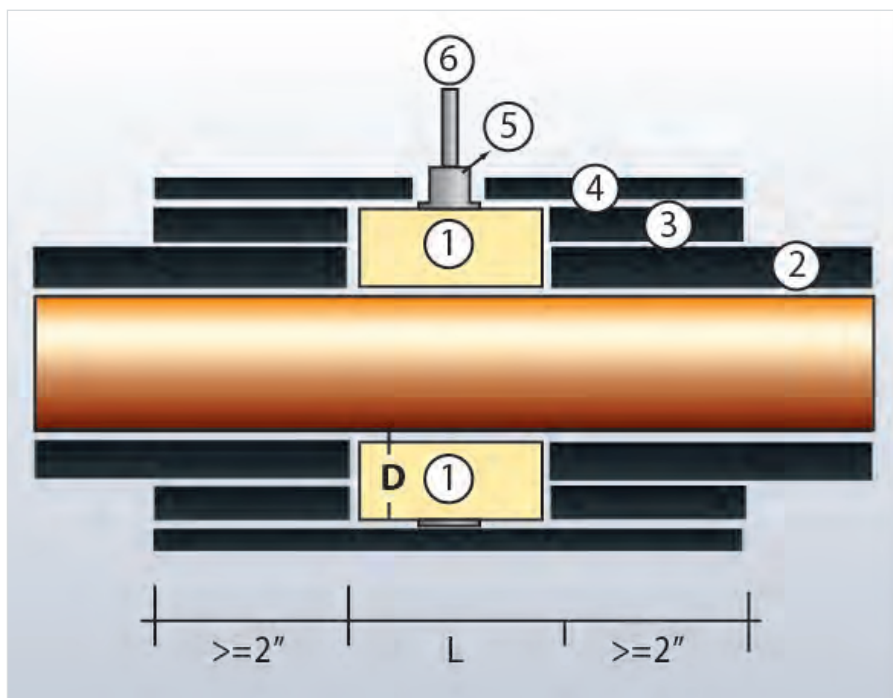
Often, cold clamps made of PUR/PIR complete the pipe hanging systems.

In these cases it is important that a vapor-tight bond between the cold clamps and the ArmaFlex insulation is achieved.

This interface represents a thermal bridge where condensation may occur and adhesion at these points requires special attention:

1. Clean the surface of the clamp using denatured alcohol.
2. Apply ArmaFlex adhesive on the surfaces which are to be glued. Allow this first layer of ArmaFlex adhesive to dry.
3. Apply a second thin coat of adhesive evenly on both the surface of the clamp and the ArmaFlex adhesive joints. After the adhesive has cured, the joints should be pressed together briefly, but firmly.
4. When gluing both butt joints under pressure, wet seal around the joint, when the clamps have been glued in advance.
5. If necessary double the ArmaFlex thickness to the diameter of the PUR-support.
6. To secure the butt joints, apply an overlapping strip of ArmaFlex using all-over adhesive coverage.

## SCHEMATIC CROSS-SECTION OF A CONNECTION OF ARMAFLEX TUBES WITH A CLAMP MADE OF PU RIGID FOAM



1. Clamp made of PU rigid foam
2. ArmaFlex tube
3. ArmaFlex double layer
4. ArmaFlex overlap (thickness  $\geq 3/8''$ )
5. Connecting thread
6. Threaded bar

## Ducts – Duct Wrap

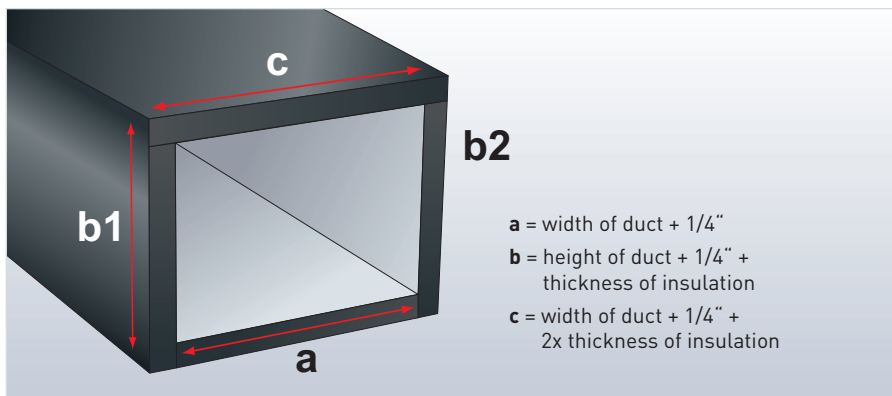
### Insulating rectangular ducts with ArmaFlex sheet

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

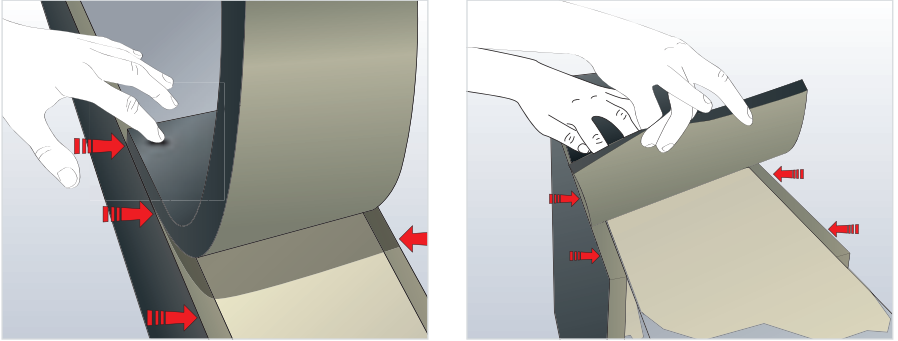
Measure surface dimensions and cut ArmaFlex sheet to size using the picture below as a guide.

**Note:** Add 1/4" so that the material is oversized to provide a tight, compression fit.

Insulate the bottom of the duct (a) 1st followed by the sides (b1 and b2) and the top (c) last.

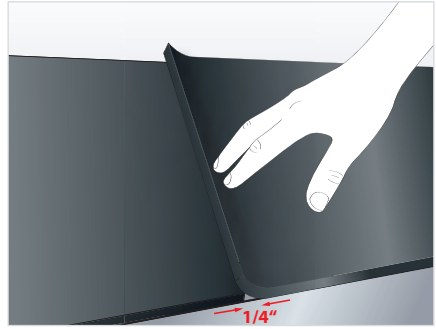
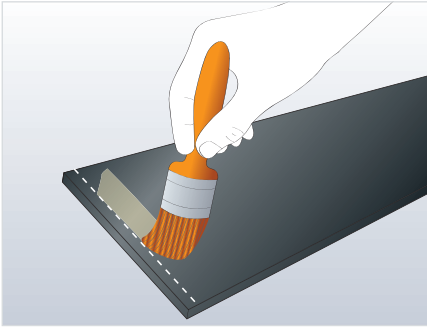


Spread a thin film (100% coverage) of adhesive onto the entire metal surface and then onto the entire ArmaFlex sheet.

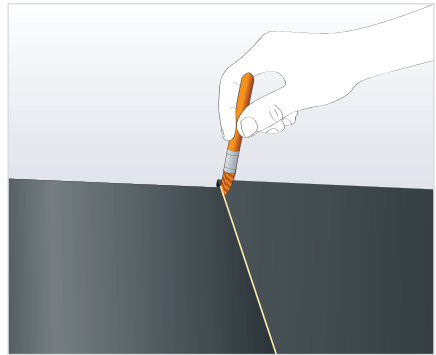
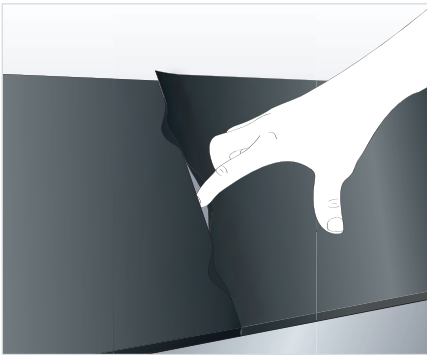


When the adhesive is tack dry (fingernail test) place the ArmaFlex sheet in position and press firmly to achieve a good bond. Continue applying ArmaFlex adhesive to both surfaces including the ArmaFlex edge, and allow to tack dry before pressing firmly into position.

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



When butting sheets together, the cut sheets should be positioned so that there is a 1/4" overlap (for compression). Do not apply adhesive to this area on either the ArmaFlex sheet or the duct surface. Where two sheets join, leave a 1/4" strip of both the sheet and the duct surface free of adhesive.

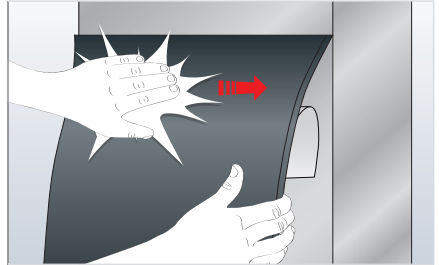
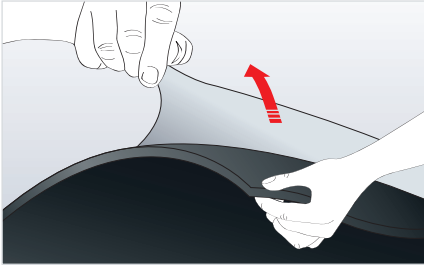


When pressed together, the material is under compression and not stretched.

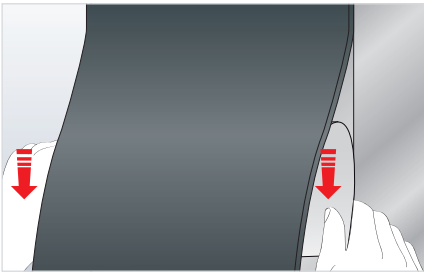
Apply an additional wet seal along the butt joints.

## Insulating rectangular ducts with ArmaFlex self-adhesive sheet

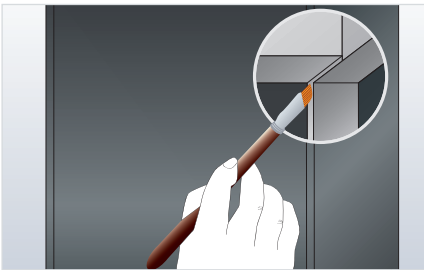
Clean all surfaces using or denatured alcohol to remove grease, oil, dirt, etc. and cut sheets to size.



Peel back release paper in 6-8" increments and line up sheet. Press firmly to activate adhesive.



Align material and continue to line up correctly, pressing firmly while slowly removing release paper. At butt joints allow 1/4" overlap for compression



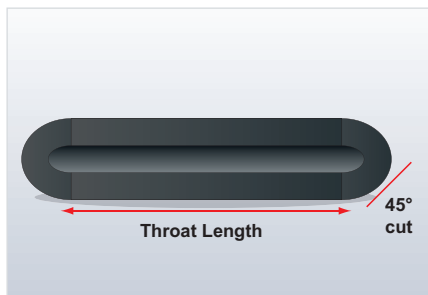
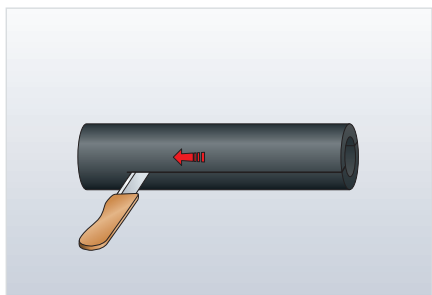
Wet seal the compressed butt joint.



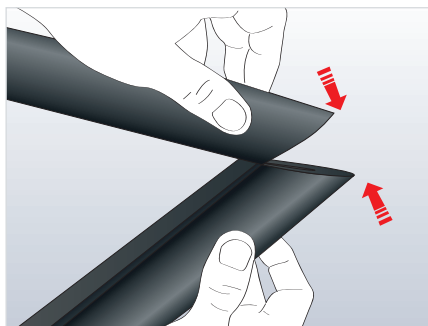
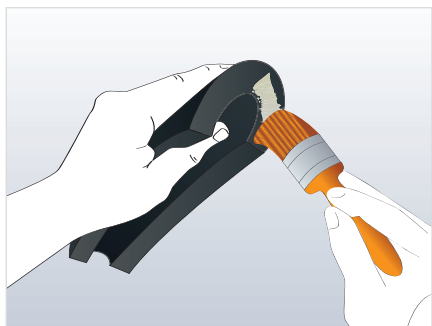
## Insulating duct brackets with ArmaFlex

### INSULATING DUCT BRACKETS USING ARMAFLEX TUBES

For a cost-effective solution with a high-end finish, ArmaFlex tube can be used to cover duct brackets.

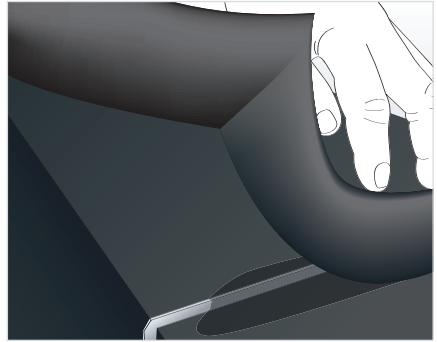
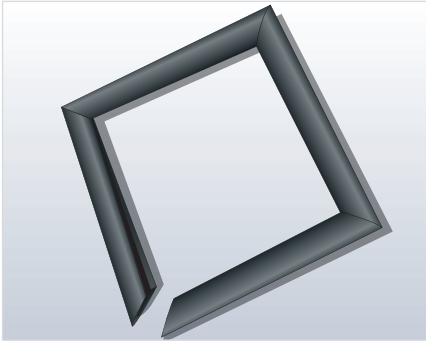


1. Use unslit ArmaFlex tube in a thickness equal to the duct insulation. Split the tube into two equal halves using a sharp knife.
2. Measure the four insulated sides of the duct body.
3. Using a miter box, or the ArmaFlex template, cut the ArmaFlex as shown with a 45° angle. From the throat measurement, 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 using 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 tack dry and press the angles together, applying firm even pressure for a good bond.



7. Place the picture frame of ArmaFlex tube material around the ducting, apply the adhesive to the final angle cuts and bond to complete.
8. To finish, wet seal around the picture frame fitting cover.

### INSULATING DUCT BRACKETS 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 these cases the fabricated ArmaFlex insulation bracket covers have the same thickness as the attached ductwork connections. For a continuous vapor-tight system, all insulation covers should be securely fixed and wet sealed with ArmaFlex adhesive.

## Insulating circular ducts with ArmaFlex sheet

For circular ducts proceed as described in the sections **Insulating large pipes with ArmaFlex sheets** (See page 36) and **Use of adhesive on pipes with outer diameter > 24"**. (See page 24)

## Ducts – Duct Liner

### Lining rectangular ducts with ArmaFlex Duct Liner using ArmaFlex 520 Adhesive

The temperature of the air, duct surfaces to be insulated, and of the insulation should be between 40°F and 100°F at the time of the installation.



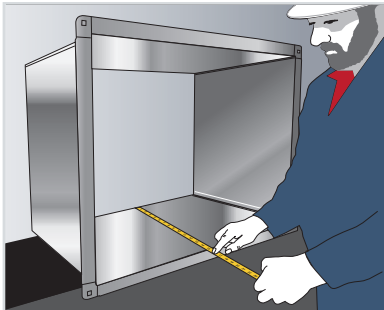
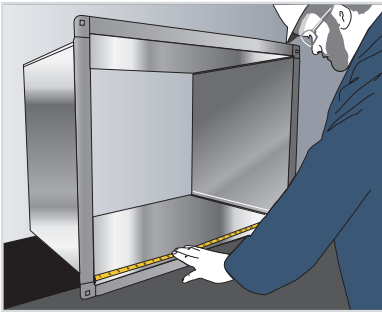
Surface to be insulated must be clean, and free of any loose particles, or other debris such as rust.

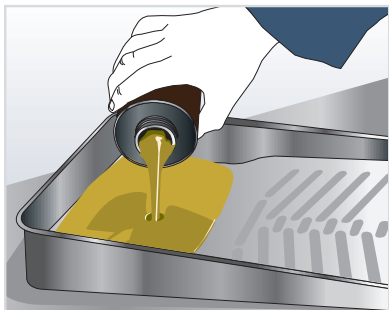
Thoroughly clean the entire surface with denatured alcohol. This must be done even for new sheet metal in order to remove the oil residue off the entire surface.

#### Application of ArmaFlex to the Sheet Metal

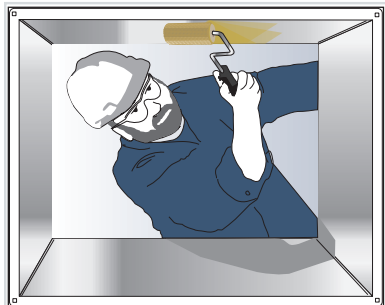
The use of retaining pins is not required when using ArmaFlex 520 Adhesive.

Start by measuring the top of the duct, from side to side, then adding approximately 1/4" to the measurement to ensure a compression fit. Transfer this measurement to the ArmaFlex. Use a straightedge to make the cut.





Pour the ArmaFlex 520 Adhesive into a standard paint roller tray. Cover with aluminum foil or scrap of ArmaFlex sheet when not in use to prevent solvent loss.



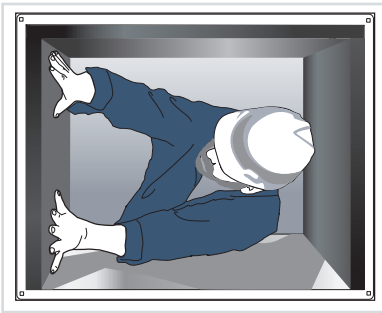
Using an adhesive roller or a short, stiff bristle brush, apply a thin, uniform coat of ArmaFlex 520 Adhesive to both the ArmaFlex surface as well as to the metal duct surface. Be certain there is 100% coverage on both surfaces.



Once the adhesive is tacky (fingernail test) the top piece is ready to be adhered. Start at one edge of the duct and align the outside edge of the ArmaFlex down onto the duct. Continue along, applying pressure to the entire length and press firmly. When it is approximately 90% adhered, align the opposite edge tightly against the duct and press firmly, then press balance of insulation flat. This will ensure a tight, compressed fit at the edges.



When all the ArmaFlex has been applied, be certain to apply full, even pressure along the entire surface with your hands or a weighted roller for best adhesion. Follow this method for all surfaces during the installation.



Measure and install each side of the duct next. The sides will support the top insulation. Start by taking the measurement from the underside of the top piece of ArmaFlex previously installed to the bottom of the duct. Be certain to add approximately 1/4" for compression fit.



The final piece to be installed is the bottom section. Start by taking the measurement from one side up against the side piece previously installed, to the opposite side piece. Add approximately 1/4" length for a tightly compressed fit to complete the installation.

Fabricate templates for all the fittings, and transition pieces by tracing the metal fitting onto a piece of cardboard

and then transferring the pattern to the ArmaFlex sheet. Cut out with a sharp, non-serrated knife, and adhere the ArmaFlex onto the fitting piece with ArmaFlex 520 Adhesive.

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

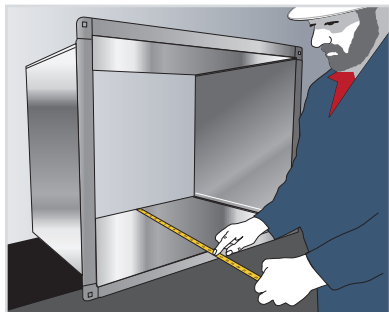
## Lining rectangular ducts with ArmaFlex Duct Liner using ArmaFlex Low VOC Spray Adhesive

The temperature of the air, duct surfaces to be insulated, and of the insulation should be between 40°F and 100°F at the time of the installation.

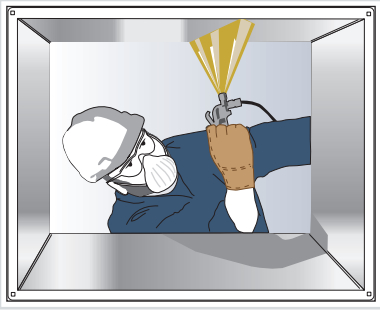


Surface to be insulated must be clean, and free of any loose particles, or other debris such as rust. Prepare the surface by thoroughly cleaning the surface with denatured alcohol. This must be done even for new sheet metal in order to remove the oil residue off the entire surface.

The use of retaining pins is not required when using ArmaFlex Low VOC Spray Adhesive.



Start by measuring the top of the duct, from side to side, then adding approximately 1/4" to the measurement to ensure a compression fit. Transfer this measurement to the ArmaFlex sheet. Use a straightedge to make the cut.



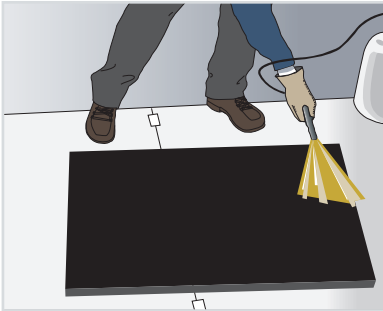
### Spraying the Adhesive

Be certain that all the connections to the spray apparatus are secured, in order to prevent leakage.

Protect all surrounding areas from Adhesive overspray.

Apply a thin, uniform coat. Do not apply an excessive amount of adhesive as this will affect the tack time.

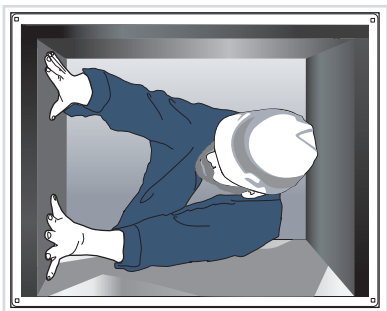
Overlap each sprayed area by approximately 1" in order to achieve complete coverage.



Once the adhesive is tacky and ready to be adhered, start at one edge of the duct and align the outside edge of the ArmaFlex onto the duct. Continue along, applying pressure to the entire length as it is being pressed down. When the ArmaFlex is approximately 90% adhered, align the opposite edge tightly against the duct and press firmly, then press the balance of the insulation flat. This will ensure a tight, compressed fit at the edges.







Measure, and install each side of the duct next. The sides will support the top insulation. Start by taking the measurement from the underside of the top piece of ArmaFlex previously installed, to the bottom of the duct. Be certain to add approximately 1/4" for compression fit.



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 1/4" length for a tightly compressed fit to complete the installation.

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 ArmaFlex sheet. Cut out with a sharp, non-serrated knife and adhere the ArmaFlex onto the fitting piece with ArmaFlex 520 Adhesive.

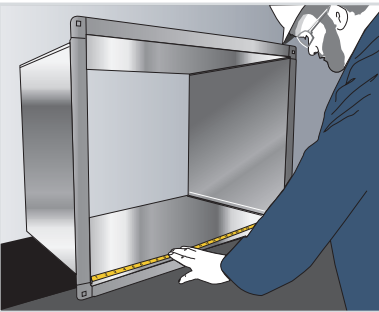
When the installation is complete, all adjoining edges must be installed under compression fit, no visible signs of gaps, or voids should be present.

## Lining rectangular ducts with ArmaFlex Self Adhering Duct Liner

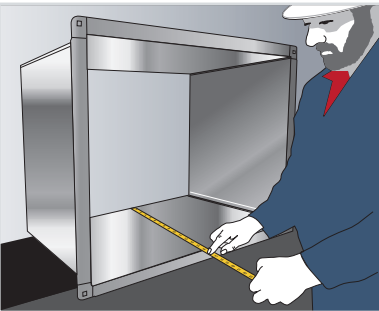
The temperature of the air, duct surfaces to be insulated, and of the insulation should be between 40°F and 100°F at the time of the installation.



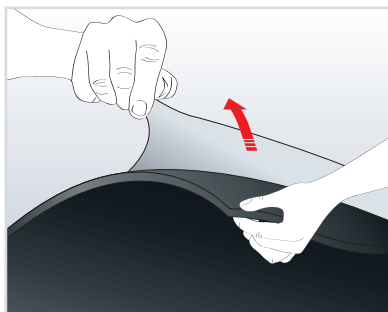
Surface to be insulated must be clean, and free of any loose particles, or other debris such as rust. Prepare the surface by thoroughly cleaning the surface with denatured alcohol. This must be done even for new sheet metal in order to remove the oil residue off the entire surface.



Start by measuring the top of the duct, from side to side, then adding approximately 1/4" to the measurement to ensure a compression fit.



Transfer this measurement to the ArmaFlex sheet. Use a straightedge to make the cut.



Peel back enough release liner to start.

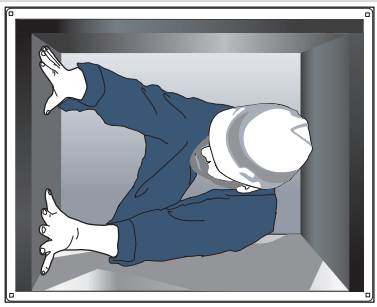


Square off sheet along an edge or corner. Press the sheet to the surface taking care not to trap any air.

Reach behind the ArmaFlex sheet and peel liner back while pressing the sheet to the surface.

Follow this method for all surfaces during the installation.





Measure, and install each side of the duct next. The sides will support the top insulation. Start by taking the measurement from the underside of the top piece of ArmaFlex previously installed, to the bottom of the duct. Be certain to add approximately 1/4" for compression fit.



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 1/4" length for a tightly compressed fit to complete the installation.

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 ArmaFlex sheet. Cut out with a sharp, non-serrated knife and adhere the ArmaFlex onto the fitting piece with ArmaFlex 520 Adhesive.

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

## AP SpiralFlex™ Duct Liner Installation Instructions

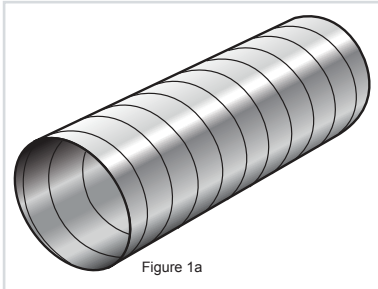


Figure 1a

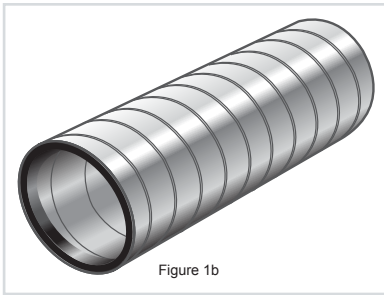


Figure 1b

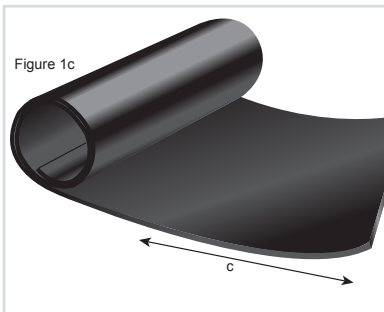


Figure 1c

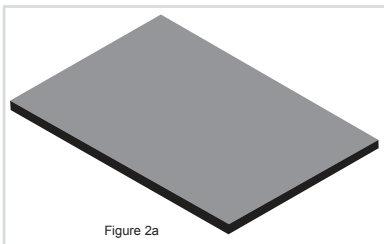


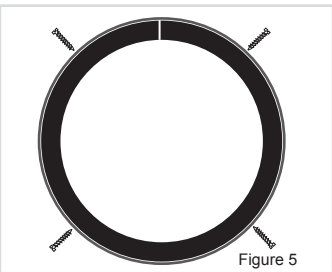
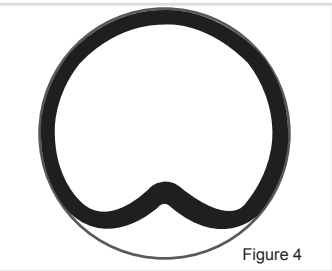
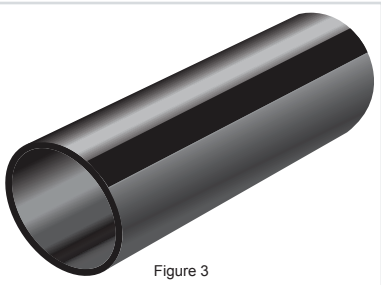
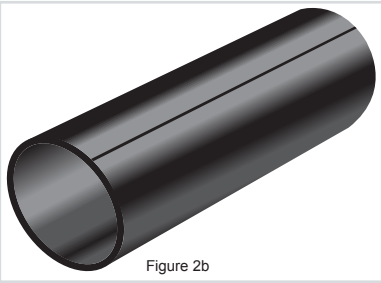
Figure 2a

The ideal installation temperature is 40°F to 100°F.

Prepare the duct surface (Figure 1a) by thoroughly cleaning the entire inner surface with or denatured alcohol. This must be done even for new sheet metal to remove any oil residue or debris from the surface.

1. Start by measuring the inner circumference **c** of the spiral duct using a 2" wide strip of the same thickness AP SpiralFlex duct liner being used. Place the strip around the inside of the duct. Be certain that the strip is making good contact with the duct and no gaps are present between the insulation and the wall of the duct. Transfer the **c** measurement along the **long edge** of the AP SpiralFlex roll for each piece (Figure 1c). This allows the cut liner material to follow the natural curvature of the roll and ensuring a tight fit against the inner wall.
2. Keep the AP SpiralFlex roll clean and dry when laying out to measure, then cut for installation into the duct (Figure 2a). After the measurement has been transferred to each long edge of the roll, use a straightedge and a sharp, non-serrated knife to make the cut.

This measurement can now be used for all identical straight pieces. Apply 520 adhesive or 520 BLV to each edge of the longitudinal seam. Be sure to allow the adhesive to reach correct tack. See **Application of 520 Adhesive** page 09.



Roll the material with the stiff backer side out. Start at one end of the pre-cut section, making sure to evenly align the outside edges when joining together, and apply pressure to the entire joint (Figure 2b) to make a tube shape.

3. Measure 2" on each side of the longitudinal seam just joined and transfer a mark. Center a 4" wide piece of tape along the outside of the seam on the poly side (Figure 3) prior to installing into the duct.
4. Each piece of SpiralFlex should be slightly bent inward (Figure 4) on the side **opposite** the taped seam to allow the compressed tube to fit inside the duct.
5. Once the piece is inside the duct, reshape the liner to make a tight compression fit against the duct wall. When the installation is complete there should be no visible gaps or voids.
6. Finally, install 4 sheet metal screws to the leading and trailing edge of each duct section from the outside of the duct into the liner (Figure 5). Use a length of screw that does not protrude through the entire thickness of the liner product.

### Fittings and Bends:

When insulating odd shapes, fittings, transitions, etc., outline the outside of the shape and fabricate templates from cardboard then trace and cut the pattern from standard ArmaFlex duct liner product. Ensure all edges are completely sealed.

## Ducts – Exterior Ducts

### Armacell ArmaTuff® Installation Instructions

A sharp, non-serrated knife should be used when making cuts on the ArmaTuff products. Use a straight edge to ensure an accurate cut. It is recommended to wear gloves to protect your hands when making cuts, and handling ArmaTuff.

This product is semi-flexible, but excessive bending may create deep surface wrinkles that will be difficult to eliminate, make every effort to keep the material as flat as possible during installation.

The recommended temperature of the air, duct surfaces to be insulated, and the insulation at the time of installation is 40°F - 100°F.



It is important that all surfaces are dry and clean, free from dirt, dust, oil and debris of any kind. All new duct work has a thin coat of oil residue – this must be wiped down with denatured alcohol to ensure that the surface is clean; this will allow good adhesion for the ArmaTuff. Uncleaned surfaces may prevent the adhesive from creating a solid bond onto the substrate.

#### Installation of ArmaTuff on Rectangular Ductwork

On all ductwork, it is required that the ductwork has a natural pitch of at least 2° on the top, to allow water runoff, prevent ice buildup, and the pooling of water on the ArmaTuff surface. This is extremely important to prevent the insulation joints from opening. **This pitch or watershed must be created prior to the installation of the ArmaTuff insulation.**

ArmaTuff should be measured, cut, and applied to each of the 4 sides of the duct separately, starting with the bottom, **do not** bend the material around the edges of the duct.



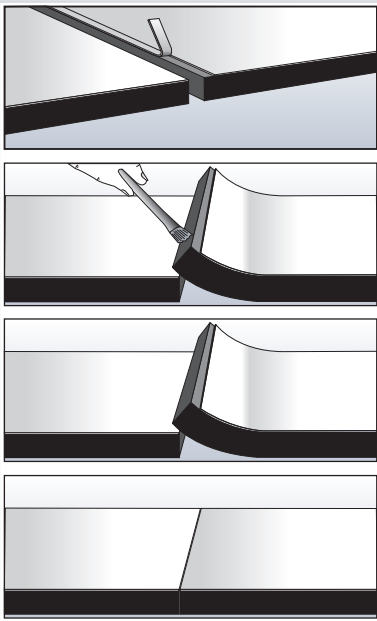
#### Installation of ArmaTuff non-self-adhering product with 520 Adhesives

Apply ArmaTuff to the bottom surface first followed by the two sides and the top last. Measure and cut the insulation to the correct width.

Using an adhesive roller, apply one of the ArmaFlex Adhesive products to the ArmaTuff foam, as well as to the duct with



100% coverage on both. Allow the adhesive to tack up as per instructions. If using ArmaFlex Low VOC Spray Adhesive, apply as per instructions. See **Correct Use of ArmaFlex Adhesives**, page 07.



When installing the ArmaTuff edges together as a butt joint, be certain that the pieces create a compression fit. To ensure a proper compressed fit, cut and peel off a 1/4" strip of laminate from the surface, to allow compression of the joining pieces.

520 Adhesive **must** be applied to both mating surfaces to complete the compression butt joint. This method would also apply at the termination ends of the ArmaTuff. Follow the same procedure to ensure a tight fit up against connections, brackets, etc.

Apply a bead of exterior grade, silicone caulk to all irregular areas of the ArmaTuff seams that are difficult to completely seal with the seam tape alone, apply the caulk to prevent any moisture intrusion from occurring.

**FOR ARMATUFF SA SHEETS**

At all butt joint locations, leave approximately 1/4" of release paper on matching piece, to allow for a compression fit.

Peel back approximately 10 -12" of release liner at a time. Properly align one edge, and adhere to duct. Reach under and continue to peel back the balance of the release liner in workable amounts at a time.

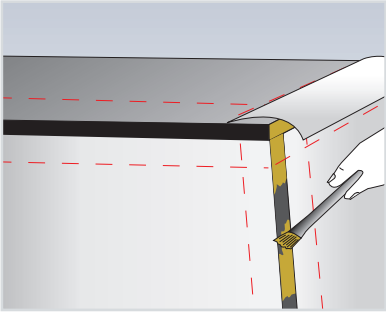
Apply a wet seal with the 520 Adhesive along the entire butt joint.



## INSTALLATION OF ARMATUFF SEAM TAPE

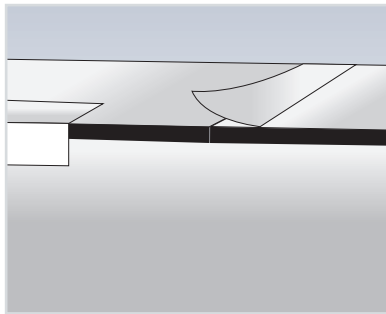
Be sure all surfaces are wiped down with denatured alcohol and dry prior to applying the tape. This will ensure proper bonding.

Before installing the seam tape, apply 520 Adhesive to all exposed cut cell edges of the ArmaTuff foam in order to provide a good surface bond for the seam tape.

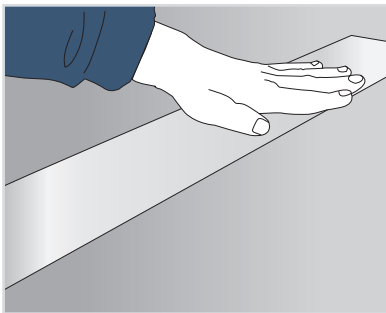


Be certain that 520 Adhesive has been applied to all butt joints prior to applying the ArmaTuff seam tape. ArmaTuff seam tape should be applied across the top of the laminate completely covering the seams, ensuring that the system has been completely sealed.

Using a tape measure, measure the length of seam tape required, including the overlap of a minimum of 4", and cut to length using a pair of sharp scissors, or non-serrated knife. Do not stretch the tape.



Apply the ArmaTuff 6" wide seam tape to all exposed seams and joints immediately after installing the ArmaTuff insulation. Allow the tape to overlap onto itself by 4". Be certain to properly measure on both sides of the seam to properly align the tape. **Do not** leave the seams open or exposed. This is very important to ensure efficient joint closure. When applying the seam tape, be certain to use a roller, or plastic squeegee to prevent any air pockets, and to ensure full adhesion of the tape onto the laminate. Allow the seam tape to conform to the surface of the ArmaTuff, do not stretch it across any uneven surface areas.



When the ArmaTuff thickness is 1-1/2" or 2", align 2" of seam tape across the top edge of the duct, and 4" down the sides of the duct, going over the exposed cells of the foam. When the ArmaTuff thickness is 1" or below, apply 3" of seam

tape across the top section, and 3" down the sides of the duct (or center across the corner of the duct).

**Note:** If the required insulation thickness exceeds 2", contact Armacell for assistance with the proper ArmaTuff installation technique.

### Insulating the standing rib brackets:

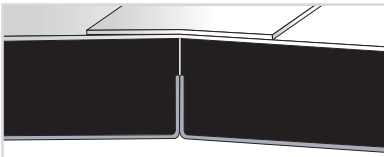
The ArmaTuff must be measured to fit as close to both sides of the rib bracket as possible in order to minimize any gaps or voids in the insulation.

Apply ArmaFlex 520 Adhesive to the area where the ArmaTuff butts up against the side of the rib. Remove 1/4" of laminate from the ArmaTuff surface that butts up against the rib, and install under compression.

Allow the adhesive to get tacky and then apply pressure to the area, maintaining a tight seal at the rib area. If the insulation thickness is the same height of the rib, or higher, install 6" ArmaTuff seam tape across the entire area around the duct, with a minimum 4" tape overlap onto itself. To effectively enclose the balance of the metal rib, be sure to measure, and install the seam tape with even surface coverage on both sides, use a roller to ensure full adhesion of the tape.

When the ArmaTuff insulation thickness is less than the height of the standing rib, it is important to completely insulate the balance of the metal rib. Be certain that the ArmaTuff is adhered to the sides of the rib under compression, using ArmaFlex 520 Adhesive.

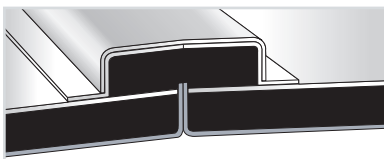
Using the same ArmaTuff thickness, cut a 4" wide strip, and notch out the center the depth of the exposed rib metal, and adhere it with 520 Adhesive directly to the ArmaTuff below it, and up against the rib tightly, applying it around the entire duct.



Apply 6" ArmaTuff seam tape along the top of the rib cap on both sides, measuring properly to allow 2" on the top, and the balance down the side, making sure the exposed foam cells are fully covered with tape. After the seam tape is completely

applied to both sides, finish the rib area by providing a water shed across the top. Apply a 6" strip of seam tape across the entire top section, measuring evenly so that 4" is on top, and approximately 1" down each side, completely covering the 4" tape that was previously installed. This will prevent water from penetrating into the rib area. The standing rib must be completely sealed in order to prevent moisture intrusion.

### Installation at roof support brackets



Be certain that the duct support brackets that extend up from the roof, are completely sealed at each corner where the ArmaTuff terminates. The ArmaTuff should be fit up against the support brackets as tightly as possible

on all sides, preventing any gaps or voids. This should be done, by adhering the ArmaTuff with 520 Adhesive at all corners directly to the duct support, or penetration areas, as to effectively create a vapor retarder. After the 520 Adhesive has been allowed to tack, and has been adhered, apply a bead of exterior silicone caulk around all edges of the support bracket to completely seal it.

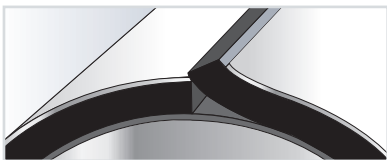
### Installation on Round Duct (Use Non Self Adhering ArmaTuff Only)

Measure the circumference of the duct by using a piece of ArmaTuff of the same thickness being installed and wrap loosely around the duct, adding 1/4" to the measurement for a compression fit. **Do not use a tape measure to measure the circumference.**

Using the circumference length from above, cut the piece of ArmaTuff to be wrapped around the duct, using a straightedge for accuracy.

If possible, the seam should be on the bottom of a horizontal run. Apply a 3" strip of ArmaFlex 520 Adhesive on one side of the seam, and also on the duct, and adhere the insulation to the duct.

Wrap the ArmaTuff around the duct, without stretching, and apply another 3" strip of Adhesive, to the matching piece, and on the butt joint. **Do not glue 100% of the ArmaTuff to the duct.** There must be room for expansion of the insulation.



Subsequent sections should be installed the same way, and all butt joints must be made under compression fit, by removing approximately 1/4" of the top laminate from the ArmaTuff, and peeling it off, this will allow a true compression at the joint

and adhered completely with ArmaFlex 520 adhesive. Wet seal the joint.

Finish by applying a 6" strip of ArmaTuff seam tape along the entire longitudinal seam, and butt joints, allowing a 4" tape overlap onto itself on all seams and butt joints. It may be necessary to measure and mark the location of the seam tape to ensure equal coverage on each side of the seam. Be certain that the seam tape is applied to all exposed seams and joints immediately after installing the ArmaTuff.

Allow the seam tape to always conform with the surface of the ArmaTuff. **Never stretch it across uneven surfaces.**

It is extremely important that when the installation is complete, the entire system is completely sealed, and no gaps or voids are present.

# Vessels and Tanks

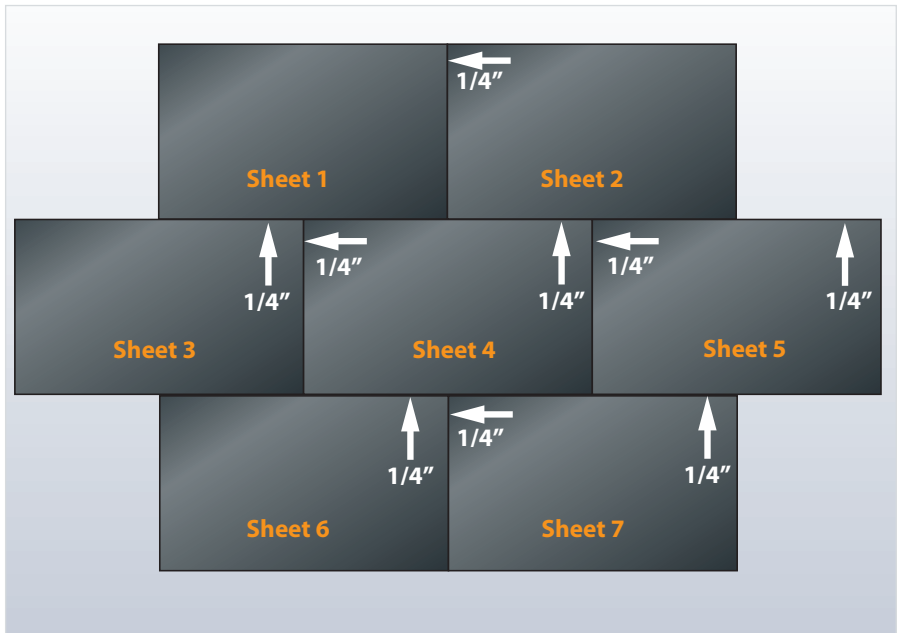
## Insulating vessels and tanks with ArmaFlex sheet

### DRAW UP A CUTTING SCHEDULE

Work out the most efficient way of covering the surfaces using ArmaFlex sheet (36" x 48") or continuous roll (48" wide and length depending on 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 1/4" on all dimensions when cutting from ArmaFlex sheet or roll.

**Important:** 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. **Warning:** Do not stretch the strip.

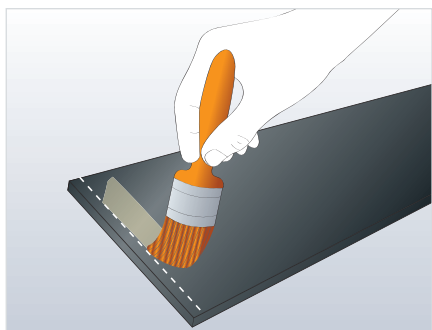


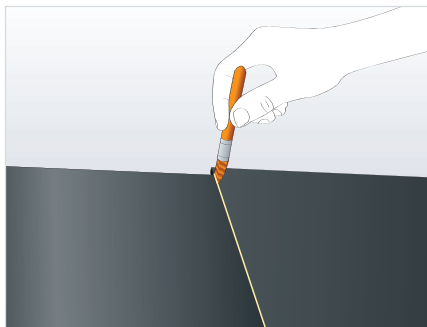
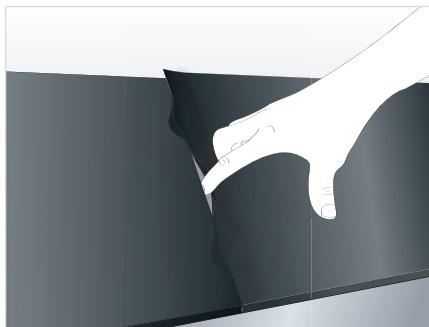
## ADHESION

Apply ArmaFlex adhesive first to the insulation, before applying adhesive to the metal surface.

All seams are joined wet. Leave about 1" without an adhesive coating on the ArmaFlex surface. Attach the connecting sheet with adhesive and with 1/4" overlap. Then press in the overlapping butt joint to give additional compression.

Wet sealing of joints on flat surfaces:





### MULTI-LAYER APPLICATION

Where multi-layer insulation is installed use denatured alcohol after 36 hours (**see Multi-layer insulation of pipework** on page 24) 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.

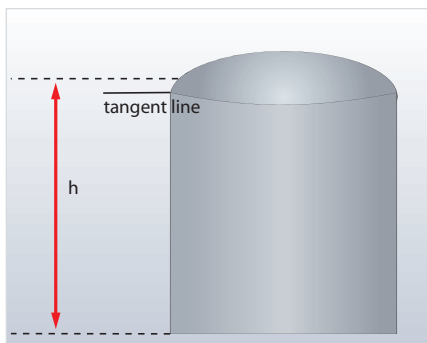
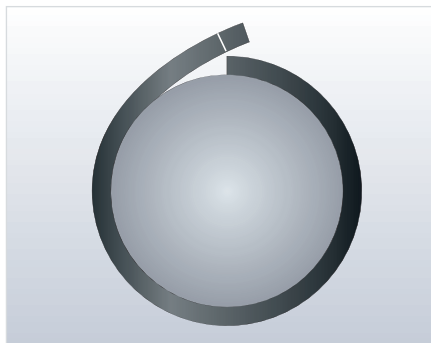
### COMPLEX SHAPES

Where complex shapes are to be insulated, the shape of the body is outlined with chalk and these chalk markings can be transferred directly to the ArmaFlex sheet by pressing the flexible material against the metal surface. Cut along the chalked line with a sharp knife to obtain a good fit for the ArmaFlex.

### OUTDOOR INSTALLATIONS

All ArmaFlex materials used outdoors will require additional protection against UV radiation. We recommend the use of ArmaFlex WB Finish paint or one of the Arma-Chek Systems (see **Outdoor use of ArmaFlex** on page 14).

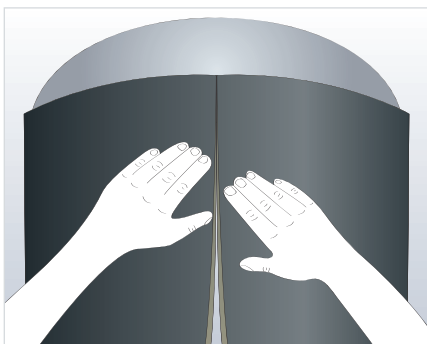
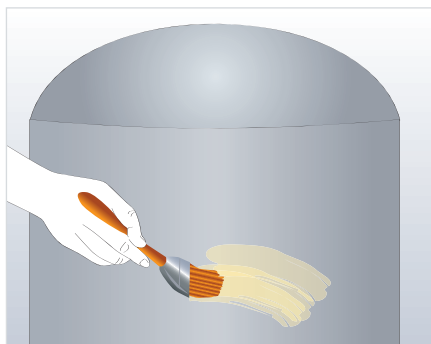
## Insulating small ( $\phi < 5'$ ) tanks and vessels using ArmaFlex sheet



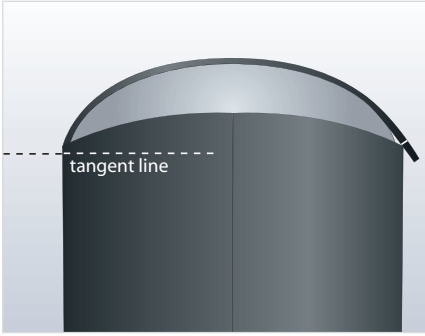
1. Determine the circumference of the tank.

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

**Warning:** Do not stretch the strip.



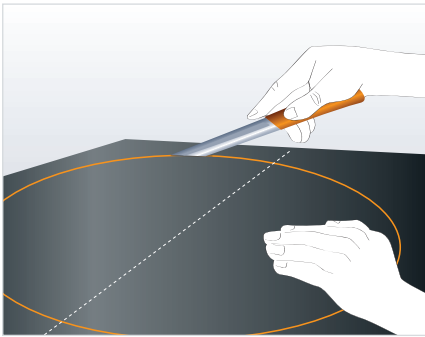
2. Transfer the circumference to the ArmaFlex sheet and cut to the required size. Spread a thin film of adhesive onto the ArmaFlex sheet and then onto the metal surface. When the adhesive is tack dry (fingernail test) place ArmaFlex sheet in position and press firmly to achieve a good bond. Apply the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



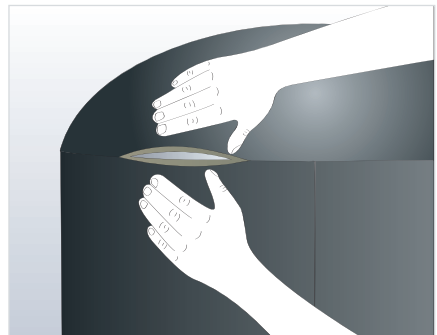
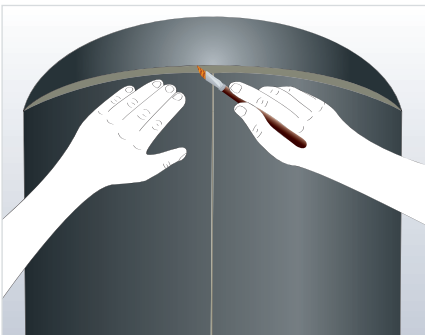
3. Determine the curve length of the domed surface.

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

**Warning:** Do not stretch the strip



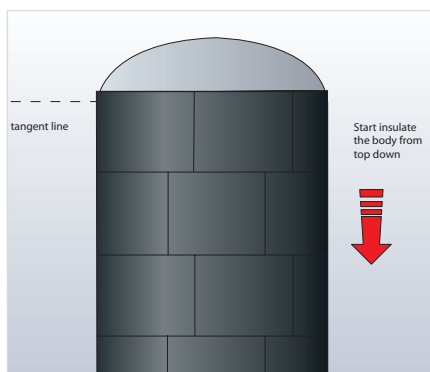
4. Using the curve length as the diameter, mark a complete disc on a piece of ArmaFlex sheet. If this disc is too large to fit on a single sheet of ArmaFlex, first glue multiple sheets together.
5. Cut around the disc.
6. Spread a thin film of adhesive onto the back of the ArmaFlex sheet and then onto the metal surface.





- 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 center, avoiding any slipping of the material, to achieve a good bond.
- Apply an additional wet seal along the edges at the top of the tank.
- After the adhesive has been given time to tack dry, press the edges of the seam firmly together.

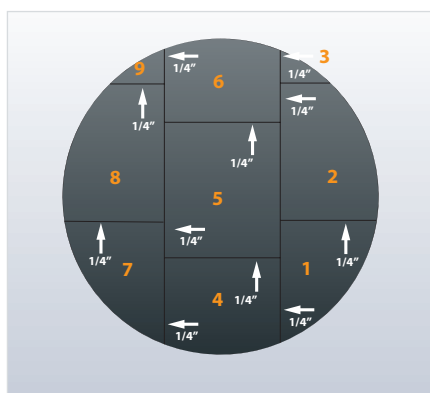
## Key basic application procedures for large vessels $\varnothing > 5'$



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, insulate the dome ends as shown.



To determine the exact shape of the edge sheets, mark the edges of the ArmaFlex used to insulate the vessel body with white chalk.

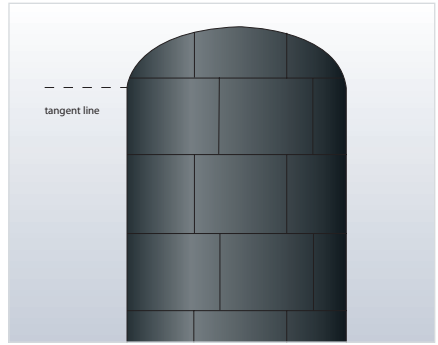
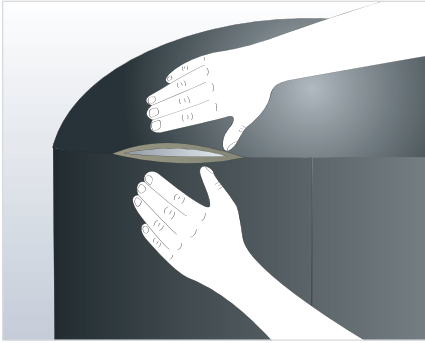
For the edges of the domed end section, cut sheets roughly to size with an overlap of approx. 2". Place sheets over the chalked edges and apply firm pressure and remove.

The underside of the ArmaFlex sheet will show the impression of the required profile.

Cut the marked outline with a shape knife and install directly to the appropriate section 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 in the section relating to vessels with diameters smaller than 5'.

## Additional Application Advice

The following sections contain further detailed information for specific applications.

### ArmaFlex with additional metal cladding

Sometimes an additional metal cladding is needed to protect ArmaFlex against mechanical damage and, in outdoor applications, UV radiation.

If such cladding is used, it is necessary to bear in mind that the metal cladding may influence the insulation thickness required. In particular the altered surface emissivity will have an 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.

Alternatively, the cladding can also be installed with an air gap (minimum 1/2") by using strips of ArmaFlex as spacers. In addition, holes with a diameter of 3/8" should be drilled in the underside of the cladding at least every 12".

**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, which will have an impact on the insulation wall thickness.

It is recommended that ArmaFlex is protected against 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 which is sufficiently larger than the outer diameter of the insulated pipe assembly to be inserted.
2. Ensure the outer protective pipe is fully supported, by having full contact with the surrounding soil, to prevent the drainpipe breaking. Joints and connections are particularly vulnerable. Refer to Info Service Bulletin #7

## Yield of AP ArmaFlex® Sheet

PIPE SIZE	INSULATION THICKNESS (in.)	INSULATION WIDTH* (Pipe Circum., in.)	SHEET LENGTH	LF/SHEET	DROP-OFF
5" IPS	1/2	20	36	6	8
	3/4	21-1/8	36	6	5-3/4
	1	22-1/8	36	6	3-3/4
	1-1/2	23-7/8	36	6	1/4
6" IPS	1/2	23-3/8	36	6	1-1/4
	3/4	24-1/2	48	4	11-1/2
	1	25-3/8	48	4	10-5/8
	1-1/2	27	48	4	9
8" IPS	1/2	29-5/8	48	4	6-3/8
	3/4	30-3/4	48	4	5-1/4
	1	31-3/4	48	4	4-1/4
	1-1/2	33	48	4	3
	2	34-1/4	48	4	1-3/4
10" IPS	1/2	36-1/4	36	3	11-3/4
	3/4	37-3/8	36	3	10-5/8
	1	38-3/8	36	3	9-5/8
	1-1/2	40-1/4	36	3	7-3/4
	2	41-1/2	36	3	6-1/2
12" IPS	1/2	42-5/8	36	3	5-3/8
	3/4	43-5/8	36	3	4-3/8
	1	43-1/2	36	3	4-1/2
	1-1/2	47	36	3	1
14" IPS	1/2	46-1/2	36	3	1-1/2
	3/4	47-5/8	36	3	3/8
	1	48	36	3	0

Yield of AP ArmaFlex Sheet (36" x 48") When used on various Pipe Sizes

\*For jobsite application sizing.

All dimensions are in inches

## Yield of AP ArmaFlex® Sheet/Rolls

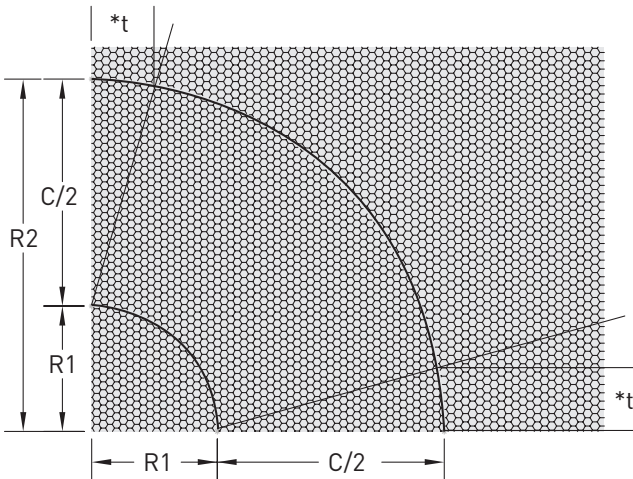
PIPE SIZE	INSULATION THICKNESS (in.)	INSULATION WIDTH* (Pipe Circum., in.)	APPROX. ROLL LENGTH (LF)	PCS/ROLL (4 ft. Lengths)	LF/ROLL (ft.)
5" IPS	1/2	20	70	42	168
	3/4	21-1/8	50	28	112
	1	22-1/8	35	18	72
	1-1/2	23-7/8	25	12	48
6" IPS	1/2	23-3/8	70	35	140
	3/4	24-1/2	50	24	96
	1	25-3/8	35	16	64
	1-1/2	27	25	11	44
8" IPS	1/2	29-5/8	70	28	112
	3/4	30-3/4	50	19	76
	1	31-3/4	35	13	52
	1-1/2	33	25	9	36
	2	34-1/4	18	6	24
10"	1/2	36-1/4	70	23	92
	3/4	37-3/8	50	16	64
	1	38-3/8	35	10	40
	1-1/2	40-1/4	25	7	28
	2	41-1/2	18	5	20
12" IPS	1/2	42-5/8	70	19	76
	3/4	43-5/8	50	13	52
	1	43-1/2	35	9	36
	1-1/2	47	25	6	24
	2	48-1/2	18	4	16
14" IPS	1/2	46-1/2	70	18	72
	3/4	47-5/8	50	12	48
	1	48	35	8	32
	1-1/2	50-1/2	25	5	20
	2	52-1/2	18	4	16
16" IPS	1/2	52-3/4	70	15	60
	3/4	53-3/4	50	11	44
	1	54	35	7	28
	1-1/2	57	25	5	20
	2	59	18	3	12
18" IPS	1/2	59-1/8	70	14	56
	3/4	60	50	10	40
	1	60-1/2	35	6	24
	1-1/2	63-1/4	25	4	16
	2	65	18	3	12
20" IPS	1/2	65-3/8	70	12	48
	3/4	66-3/8	50	9	36
	1	67	35	6	24
	1-1/2	68-3/4	25	4	16
	2	70-1/2	18	3	12
24" IPS	1/2	77-7/8	70	10	40
	3/4	78-7/8	50	7	28
	1	79	35	5	20
	1-1/2	82-1/2	25	3	12
	2	83-1/2	18	2	8

Yield of 48-inch-wide AP ArmaFlex Sheet/Rolls when used on various Pipe Sizes

\*For jobsite application sizing.

## How to Apply ArmaFlex Sheet Insulation on Welded 90° Elbow Fittings

1. Check the type ell (long or short radius) and size.
2. Take throat measurement from chart (R1). Swing an arc from one corner of the Armaflex sheet, using this measurement.
3. Take half circumference plus throat measurement from chart (R2). Using the same corner of the sheet from which the arc R1 was drawn, now swing an arc, using the measurement R2.
4. Cut out on arcs R1 and R2, and use as a pattern for the second half of the elbow cover.
5. Adhere outer arcs of the two halves with Armaflex 520 or 520 BLV Adhesive.
6. Put cover around elbow fitting, and adhere inner arcs.
7. Trim ends of fitting cover square to meet adjacent pipe insulation.



\*t = trimming allowance for a flush edge.

$$*t = \frac{OD}{4} + \text{Insulation Thickness}$$

## How to Apply ArmaFlex Insulation

Long Pipe Size	Pipe OD	Sheet Thickness	Throat Measurement		Half Circumference Plus Throat Meas. R2	
			Short Radius R1	Long Radius R1	Short Radius	Long Radius
3	3-1/2	1/2	1-1/4	2-3/4	8	9-1/2
3	3-1/2	3/4	1-1/4	2-3/4	8-1/2	10
3	3-1/2	1	1-1/4	2-3/4	9	10-1/2
3-1/2	4	1/2	1-1/2	3-1/4	9	10-3/4
3-1/2	4	3/4	1-1/2	3-1/4	9-1/2	11-1/4
3-1/2	4	1	1-1/2	3-1/4	10	11-3/4
4	4-1/2	1/2	1-3/4	4	10-1/8	12-1/8
4	4-1/2	3/4	1-3/4	4	10-5/8	12-5/8
4	4-1/2	1	1-3/4	4	11-1/8	13-1/8
5	5-9/16	1/2	2-1/4	4-3/4	12-1/4	14-3/4
5	5-9/16	3/4	2-1/4	4-3/4	12-3/4	15-1/4
5	5-9/16	1	2-1/4	4-3/4	13-1/4	15-3/4
5	5-9/16	1-1/2	2-1/4	5-1/8	14-1/8	17-1/8
6	6-5/8	1/2	2-3/4	5-5/8	14-1/2	17-1/4
6	6-5/8	3/4	2-3/4	5-5/8	15	17-3/4
6	6-5/8	1	2-3/4	5-5/8	15-1/2	18-1/4
6	6-5/8	1-1/2	2-3/4	6	16-1/4	19-1/2
8	8-5/8	1/2	3-3/4	7-5/8	18-1/2	22-3/8
8	8-5/8	3/4	3-3/4	7-5/8	19-1/8	23
8	8-5/8	1	3-3/4	7-5/8	19-5/8	23-1/2
8	8-5/8	1-1/2	3-3/4	8	20-1/4	24-1/2
8	8-5/8	2	3-3/4	8	20-7/8	25-1/8
10	10-3/4	1/2	4-5/8	9-5/8	22-3/4	27-3/4
10	10-3/4	3/4	4-5/8	9-5/8	23-1/4	28-1/4
10	10-3/4	1	4-5/8	9-5/8	23-3/4	28-3/4
10	10-3/4	1-1/2	4-5/8	10	24-3/4	30-1/8
10	10-3/4	2	4-5/8	10	25-3/8	30-3/4
12	12-3/4	1/2	5/5/8	11-5/8	26-7/8	32-7/8
12	12-3/4	3/4	5/5/8	11-5/8	27-3/8	33-3/8
12	12-3/4	1	5/5/8	11-5/8	27-3/8	33-3/8
12	12-3/4	1-1/2	5/5/8	12	29-1/8	35-1/2
12	12-3/4	2	5/5/8	12	29-7/8	36-1/4
14	14	1/2	7	14	30-1/4	37-1/4
14	14	3/4	7	14	30-3/4	37-3/4
14	14	1	7	14	31	38
14	14	1-1/2	7	14-3/8	32-1/4	39-5/8
14	14	2	7	14-3/8	33-1/4	40-5/8
16	16	1/2	8	16	34-3/8	42-3/8
16	16	3/4	8	16	34-7/8	42-7/8
16	16	1	8	16	35	43
16	16	1-1/2	8	16-3/8	36-1/2	44-7/8
16	16	2	8	16-3/8	37-1/2	45-7/8
18	18	1/2	9	18	38-1/2	47-1/2
18	18	3/4	9	18	39	48
18	18	1	9	18	39-1/4	48-1/4
18	18	1-1/2	9	18-3/8	40-5/8	50
18	18	2	9	18-3/8	41-1/2	50-7/8
20	20	1/2	10	20	42-5/8	52-5/8
20	20	3/4	10	20	43-1/8	53-1/8
20	20	1	10	20	43-1/2	53-1/2
20	20	1-1/2	10	20-3/8	44-3/8	54-3/4
20	20	2	10	20-3/8	45-1/4	55-5/8
24	24	1/2	12	24	51	63
24	24	3/4	12	24	51-1/2	63-1/2
24	24	1	12	24	51-1/2	63-1/2
24	24	1-1/2	12	24-3/8	53-1/4	65-5/8
24	24	2	12	24-3/8	53-3/4	66-1/8

## Family of Products

**ARMAFLEX ULTRA:** ArmaFlex Ultra is the first elastomeric insulation to be UL Classified as to UL 723 at 25/50. Patented FlameDefense™ Technology means the insulation resists burning and has reduced smoke development. ArmaFlex Ultra is plenum-rated and listed and labeled by a third-party certification body, UL.

**AP ARMAFLEX:** AP ArmaFlex is the original fiber-free, flexible insulation material with a long term performance in energy efficiency and condensation control. Due to the unique closed cell structure, AP ArmaFlex has more stability, making it even easier to install. Your advantage: the quicker and easier installation saves even more time and money.

**AP COILFLEX:** Highly conformable, fiber-free, acoustical insulation duct liner that is engineered for factory application by sheet-metal fabricators using automated coil lines.

**AP SPIRALFLEX:** The first fiber-free, lightweight and conformable elastomeric duct liner specifically designed for spiral ducts. It's made with an easy-to-cut, flexible backing which is pre-laminated to fiber-free elastomeric foam.

**ARMAFIX PIPE SUPPORTS:** ArmaFix EcoLight pipe hanger sections with load bearing PET core to prevent excessive material compression.

**ARMAFLEX ACCESSORIES:** ArmaFlex Adhesive 520, 520 Black, 520 BLV and ArmaFlex Low VOC Spray Adhesive for adhering nitrile rubber-based ArmaFlex materials and ArmaFlex Adhesive 625 for adhering EPDM-based ArmaFlex materials.

ArmaFlex WB Finish paint for visual impact and to prevent damage from UV exposure when ArmaFlex is used outside.

ArmaFlex Insulation Tapes specifically designed to use with ArmaFlex insulation tubes, sheets and rolls.

**ARMAFLEX PRE-FABRICATED FITTINGS:** Prefabricated fittings for ArmaFlex pipe insulation systems developed to reduce complex cutting and assembly of insulation for 45°, 90°, Tee, P-Trap, Grooved Fittings and Couplings.



**ARMATUFF:** ArmaTuff is the one-step installation solution for thermal mechanical insulation and UV protection of exterior ducts, tanks, vessels, and large pipes. The combination of a tough metal cladding laminated to closed-cell foam insulation provides durable, year-round weather protection. Also available in a self-adhering option.

**ARMAFLEX UT:** EPDM-based, closed-cell flexible insulation that remains flexible up to 300°F and is designed for use on VRF, HVAC, chilled water, refrigeration, solar, hot gas, dual temperature, low-pressure steam, and stainless steel over 125°F. Low-VOC, non-halogen and PVC-free.

**NH ARMAFLEX:** Halogen-free, closed-cell, nitrile rubber-based ArmaFlex foam insulation material with a low smoke toxicity rating.

**ARMALIGHT TUBOLIT, IMCOA, AND TUNDRA:** Tubolit, Imcoa, and Tundra pipe insulation are an economical thermal solution which reduces heat loss on hot water plumbing and heat gain on cold water plumbing systems. It is a semi-slit, 25/50-rated, closed-cell polyolefin/polyethylene thermal insulation. Also available in a self-seal closure.

### ArmaFlex Sleeving Sizes

ArmaFlex Insulation Sizes (in.)	Copper Tubing		Nom. Iron Pipe Size (in.)	Nom. 3/8" Wall (in.)	
	Nom. Size (in.)	OD Size (in.)			
3/8" ID	1/4	3/8		1-1/8"	
1/2" ID	3/8	1/2	1/4	1-3/8"	
5/8" ID	1/2	5/8	3/8	1-3/8"	
3/4" ID	5/8	3/4		1-5/8"	
7/8" ID	3/4	7/8	1/2	1-5/8"	
1-1/8" ID	1	1-1/8		1-1/2" IPS	
1-3/8" ID	1-1/4	1-3/8	1	2-1/8"	
1-5/8" ID	1-1/2	1-5/8	1 1/4	2 IPS	
1-1/2 IPS			1 1/2	2-1/2" IPS	
2-1/8" ID	2	2-1/8		2-1/2" IPS	
2 IPS			2	3 IPS #	
2-5/8" ID	2-1/2	2-5/8		3 IPS	
2-1/2" IPS			2 1/2	4-1/8" #	
3-1/8" ID	3	3-1/8		4-1/8"	
3 IPS			3	4 IPS	
3-5/8" ID	3-1/2	3-5/8			
4-1/8" ID	4	4-1/8	3 1/2		
4 IPS			4		
5 IPS			5		
6 IPS			6		
8 IPS			8		

† Based on average wall thicknesses developed from factory tolerances

# May require cutting

\*Note: Some IDs will not be available in all wall thicknesses

**Sleeving Sizes**

	<b>Nom. 1/2" Wall (in.)</b>	<b>Nom. 3/4" Wall (in.)</b>	<b>Nom. 1" Wall (in.)</b>	<b>Nom. 1 1/2" Wall (in.)</b>	<b>Nom. 2" Wall (in.)</b>
	1-3/8"	-	2-1/8"	3-1/8"	4" IPS
	1-3/8"	1-1/2" IPS	2" IPS	3" IPS #	4" IPS
	1-5/8"	2-1/8"	2-5/8"	3" IPS	5" IPS #
	1-1/2" IPS	2" IPS	2-5/8"	4-1/8" #	5" IPS #
	1-1/2" IPS	2" IPS #	2-1/2" IPS	4-1/8"	5" IPS #
	2-1/8"	2-1/2" IPS	3" IPS	4-1/8"	5" IPS #
	2" IPS	3-1/8"	3-5/8"	4" IPS	5" IPS
	2-1/2" IPS	3" IPS	4-1/8" #	5" IPS #	6" IPS #
	3-1/8"	3-5/8"	4" IPS #	5" IPS #	6" IPS #
	3" IPS #	4-1/8" #	4" IPS	5" IPS	6" IPS #
	3" IPS	4-1/8"	5" IPS #	5" IPS	6" IPS
	4-1/8" #	4" IPS #	5" IPS #	6" IPS #	8" IPS #
	4-1/8"	4" IPS	5" IPS #	6" IPS #	8" IPS #
	4" IPS	5" IPS #	5" IPS	6" IPS	8" IPS #
	5" IPS #	5" IPS #	6" IPS #	6" IPS	8" IPS #
	5" IPS #	5" IPS #	6" IPS #	8" IPS #	8" IPS #
	5" IPS	6" IPS #	6" IPS	8" IPS #	8" IPS #
	6" IPS #	6" IPS #	8" IPS #	8" IPS #	8" IPS
	8" IPS #	8" IPS #	8" IPS #	Sheet	Sheet
	8" IPS #	8" IPS	Sheet	Sheet	Sheet
	Sheet	Sheet	Sheet	Sheet	Sheet

## Calculation tools

**Armacell's new ArmaWin™ Professional Insulation Thickness Calculator has a new and improved interface that offers a variety of new functions. It takes just a few clicks to find the optimal insulation thickness.**

With our new ArmaWin software, you can now plan your technical insulation project even more quickly and in more detail. This powerful expert tool enables you to carry out all common technical insulation calculations for refrigeration, HVAC, and plumbing applications. Visit [www.armacell.com](http://www.armacell.com) today or download the app for iPhones and Android phones.



**ARMAWIN**  
Professional Insulation  
Thickness Calculator

[www.ArmaWin.com](http://www.ArmaWin.com)



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## ABOUT ARMACELL

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As the inventor of flexible foam for equipment insulation and a leading provider of engineered foams, Armacell develops innovative and safe thermal and mechanical solutions that create sustainable value for its customers. Armacell's products significantly contribute to global energy efficiency making a difference around the world every day. With more than 3,300 employees and 27 production plants in 19 countries, the company operates two main businesses, Advanced Insulation and Engineered Foams. Armacell focuses on insulation materials for technical equipment, high-performance foams for acoustic and lightweight applications, recycled PET products, next-generation aerogel technology and passive fire protection systems.

For more information, please visit:  
[www.armacell.us](http://www.armacell.us)