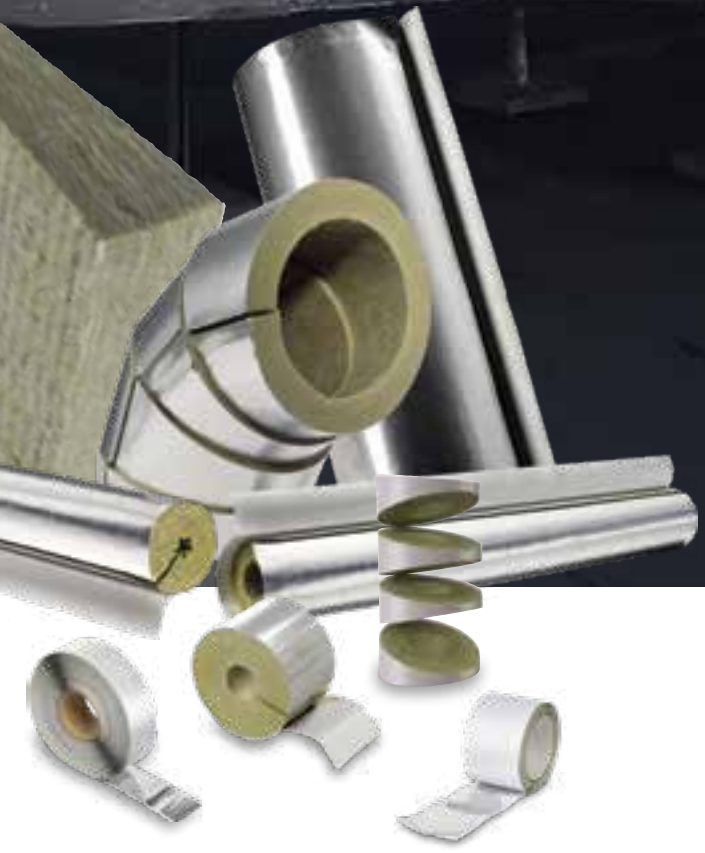
PAROC LAMELLA MAT

INSTALLATION MANUAL FOR ROUND AND RECTANGULAR DUCTS

MINIMUM INSTALLATION TEMPERATURE: 10 °C



OWENS CORNING® PAROC®

TABLE OF CONTENTS

Quick access: Click on the desired product or content page to immediately navigate to it. Clicking on 'Table of Contents' will direct you back to the index page. Hyperlinks will take you to relevant additional pages or research sources.

(WR) = water-repellent version available without surcharge

ROUND DUCTS

Handling and working safely with PAROC stone wool

TOOLS:

- a suitable or recommended knife for cutting stone wool - e. g. PAROC Knife XTK 001 or 003,
- a tape measure or a wooden meter,
- a compass,
- a spatula for smoothing the tape - e. g. PAROC Spatula,
- a routing marker (preferably dry-erased one).

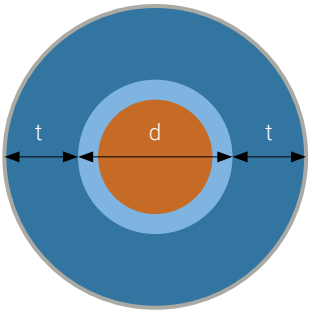
ACCESSORIES:

- see page 23

PREPARATION:

Before the installation, clean the duct surfaces from dust, grease and other contamination,
- the next step is to measure the duct diameter,
- then calculate the insulation circuit ("L") using the following data and formulae:
  - "D" - duct diameter
  - "t" - mat thickness

$$D = d + 2t$$
$$L = \pi D$$



Two methods are used to calculate the length of the mat:

1. Mathematic calculation using the "2r"π formula, where "2r = D" (the diameter), which allows its simplification to L = "π D".

Example:
The Ø100 pipeline is to be insulated with a 50 mm thick lamella mat.

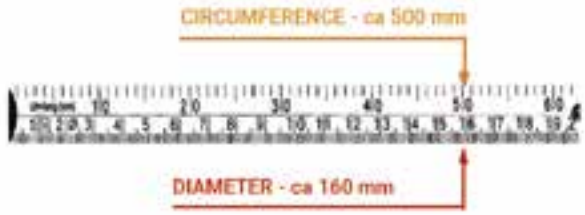
Pipeline diameter including insulation:

D = Ø + 2 x t = 100 + 2 x 50 = 100 + 100 = 200 mm

The length of the lamella mat: L = π D = 3.14 x 200 mm = 628 mm.

This means that the lamella mat is to be cut to the length of ≈ 630 mm

2. Calculation using a meter which has a scale divided into two parts: one with a millimetre graduation, the other (above), with the diameter conversion based on the number π = 3,14.



Example:
The Ø60.3 pipeline is to be insulated with a 50 mm thick lamella mat.

Pipeline diameter including insulation:
D = Ø + 2 x t = 60 + 2 x 50 = 60.3 + 100 = 160.3 mm

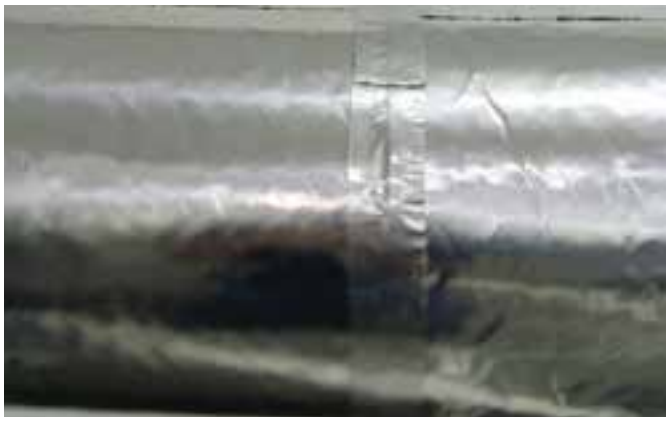
Length of the lamella mat: for a value of 160.3 mm on a millimetre scale, read the circumference conversion value to the specified diameter above.

This means that the lamella mat is to be cut to the length of ≈ 500 mm.

CIRCULAR STRAIGHT DUCTS

The calculated length of the mat should be cut along the folding lines of the lamellas. The folding lines (strips) of the lamellas help us to cut the mat straight to its edge. Cutting in the other direction will make it impossible to wrap the mat around the pipeline;

With small pipeline diameters, high circumferential stresses may occur. To ensure that the mat is tightly pulled together, an PAROC Clad Tape with the sealing and adhesive compound is applied around the circumference (2 times) to secure the mat firmly on the folding. Then the tape is also glued on the longitudinal folding;



The folding lines of the mats are glued in a circumferential manner by connecting individual sections of the mats.

ELBOWS AND FITTINGS

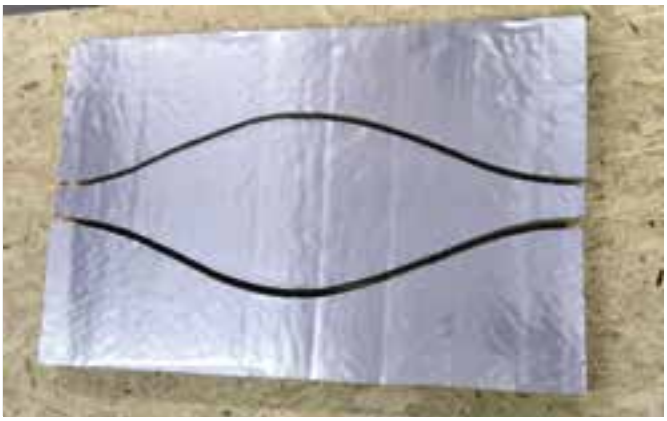
The mineral wool lamella mat with Clad T cladding can be used to insulate straight sections and fittings of the pipelines

Bent elbows
In the case of bent parts, such as bent elbows, the following installation method can be used:
Take the measurement (of the pipeline circumference, chord of the elbow radius measured in the throat);

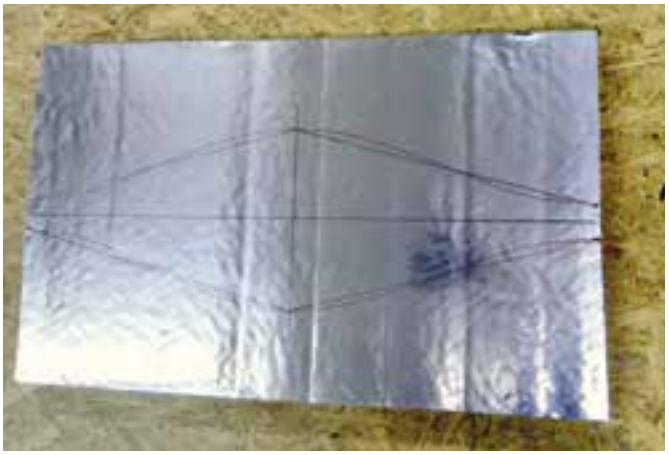
Take the measurement (of the pipeline circumference, chord of the elbow radius measured in the throat);

Cut out the circumference of the insulation (mat) of the appropriate length;
In the selected location, mark an auxiliary line (the symmetry of the middle element of elbow insulation);
On the auxiliary line, mark the point corresponding to the half the length (circumference) of the mat;
At a point on both sides, mark half the diameter of the pipeline with the insulation, e.g. if a Ø250 pipe is insulated with a 50 mm thick mat, the diameter of the insulated pipeline is 350 mm and its half is 175 mm;

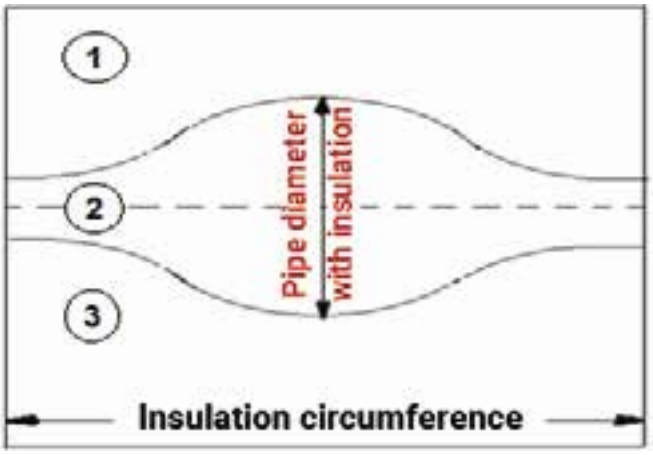
On both edges of the perimeter, on the auxiliary line, mark about 1/5 of the length of the elbow measured at the throat, diagonally, e.g. if the length is 210 mm, the dimension to be applied on both sides should be about 40 mm;
Connect the points from the edge of the circumference with the points in the middle;



Cut out the resulting figure and place the following element of the elbow in the order listed below:
1 - the front of the elbow insulation,
2 - the middle of the elbow insulation,
3 - the end of the elbow insulation.



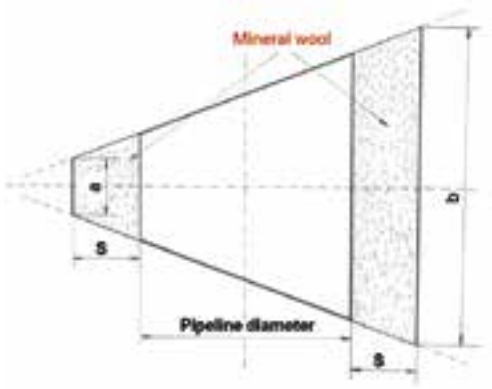
Draw a curve from points on the edge on one side through the point in the middle of the circumference, linking it to the point at the end of the circumference;



Seal the transverse joints with PAROC Clad Tape with the sealing compound.

Segmented elbows
In the case of bent parts, such as segmented elbows, the following installation method can be used:

Take the measurements (of the pipeline circumference and the distance on the outside and the inside of the elbow segment);



Prepare an appendant drawing:
- draw a projection of the segment with its axis of symmetry,
- mark the insulation thickness on the inside and outside of the segment,
- extend the lines of the sides of the segment at intersections with the marked insulation thickness,
- read the value inside "a" and outside "b";

Cut out the circumference of the insulation (mat) of the appropriate length;

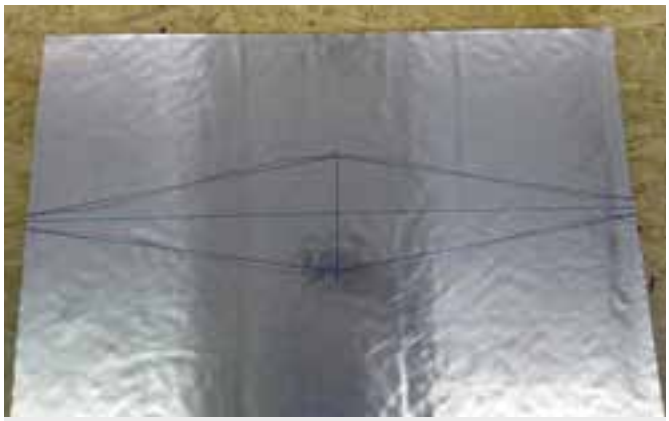
In the selected location, mark an auxiliary line (the symmetry of the middle element of elbow insulation);

On the auxiliary line, mark the point corresponding to the half the length (circumference) of the mat;

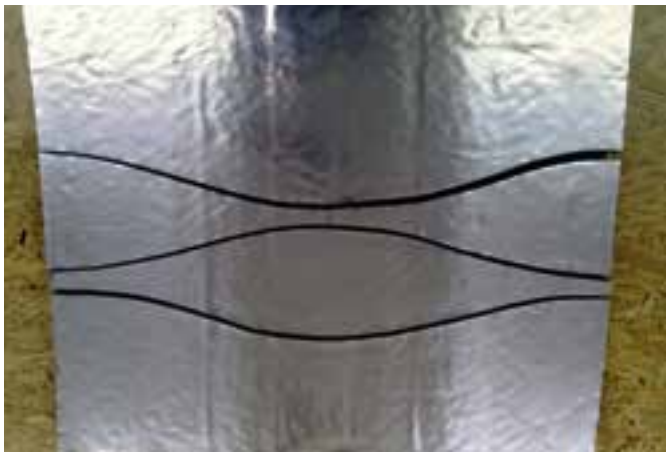
At the point on both sides, mark half of the dimension "b";

On both edges of the circumference, on the auxiliary line on both sides, mark half of the dimension "a";

Connect the points from the edge of the circumference with the points in the middle;



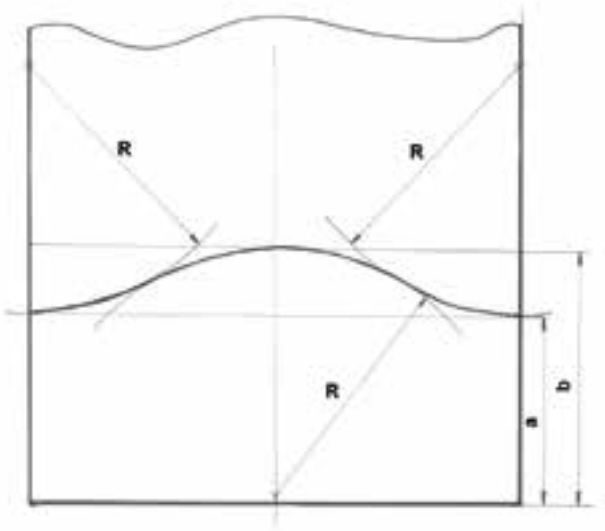
Draw a curve from points on the edge on one side through the point in the middle of the circumference, linking it to the point at the end of the circumference;



Cut out the resulting figure by duplicating, it depending on the number of segments in the elbow. To prevent waste, you can use the element cut out from the wool as a template by moving it halfway around the circumference. Then the folding will be alternately - once in the throat of the elbow, then on the outside of the elbow;

Place the cut out elements are put on the elbow and cover the circumference joints with PAROC Clad Tape with the sealing compound.

Bend - elbow below 90°
To perform insulation on a bend - elbows below 90° - you have to:



Measure the arc (diameter, distance at the lowest spot "a" and the highest spot "b");

Cut the mat with Clad T cladding to the appropriate length;

Divide the length of the mat in half;

From the bottom of the mat, mark the lengths of the lowest spot "a" and the highest spot "b" of the arc;

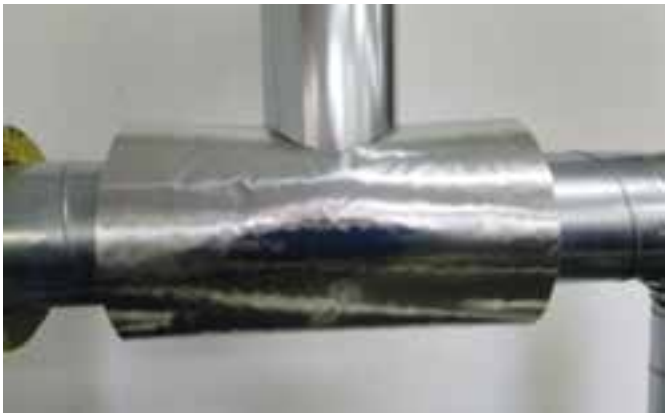
On both sides of the mat, draw arcs (with the radius corresponding to half the circumference of the insulated pipeline) that are tangential to the lowest spot “a” of the arc;

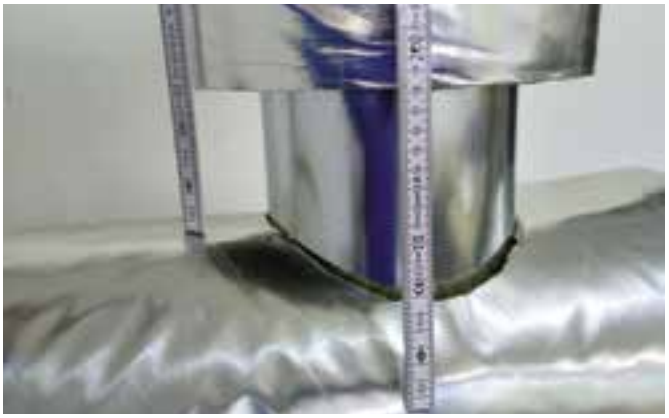
From the half of the mat, draw an arc (with a radius corresponding to half the circumference of the insulated pipeline), which is tangential to the highest spot “b” of the arc;

The curve formed from the drawn arcs is the line of penetration of the bend parts, where both elements form the whole insulation. The first element will have a folding line on the shortest bend, and the second one at the longest bend.

The cut out elements should be placed on the bend - the elbows below 90° - and the longitudinal and circumferential joints should then be covered with PAROC Clad Tape with the sealing compound.

Tees
In the case of branched elements such as tees you should:





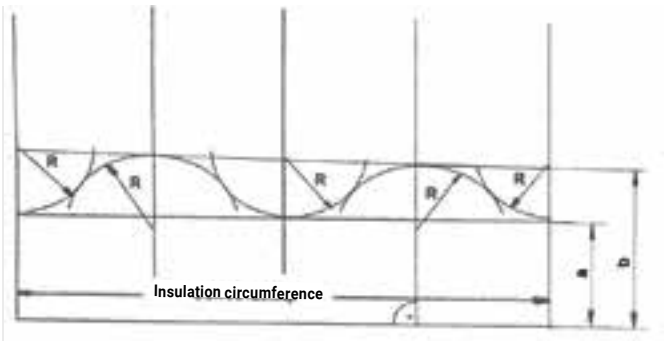
First, insulate the section of the pipeline to which the tee connects;

Then, measure the tee:
- dimension in the shortest spot,
- dimension at the longest spot measured after insulation;

Cut out the circumference of the insulation (mat) of the appropriate length;

Divide the circumference into 4 equal parts and draw perpendicular lines;

On the length of the mat, mark the length of the tee with a line in the shortest and longest spot;



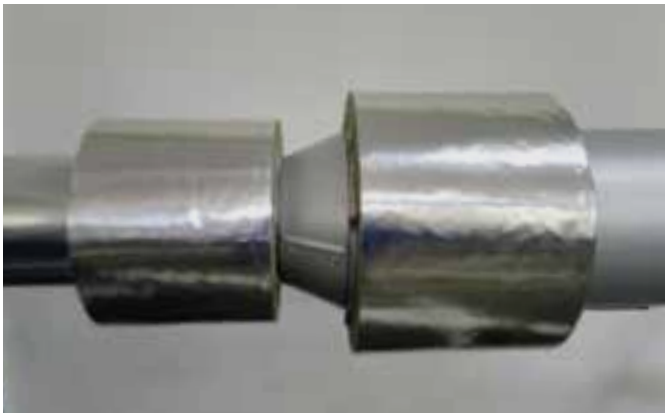
At the ends of the mat and at its centre (from the line of division into 4 parts), draw the arcs tangential to the line corresponding to the length "a" of the tee in the shorter spot using the compass. The value of the compass radius should be equal to half of the diameter of the pipeline together with the insulation to which the T-pipe connects;

Draw the arcs with the same value using the compass, tangential to the line indicating the length 'b' of the tee at its longest spot. The resulting arcs form a curve of the so-called tee penetration line;

Cut out the resulting figure and place it on the pipeline tee;

Seal the transverse joints with PAROC Clad Tape with the sealing compound.

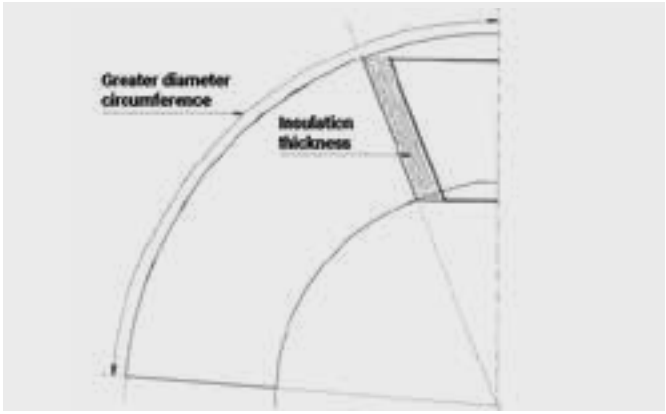
Reduction
To perform the insulation reduction of mats with Clad T cladding you have to:



Measure the reduction (large and small diameter and its length);

Execute insulation of large and small diameter reduction;

At the edge of the mat, draw half of the reduction side projection adding the insulation thickness to it;



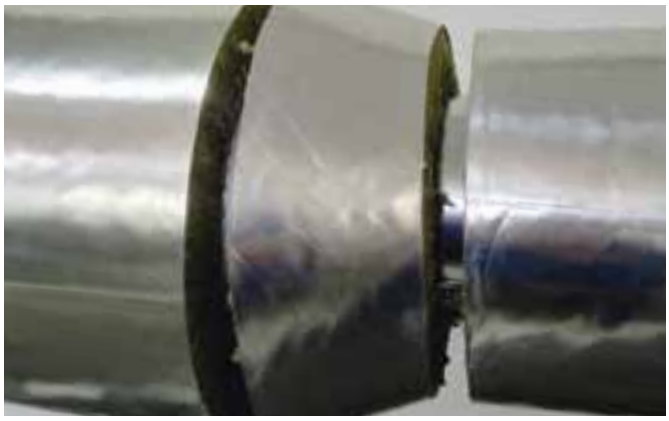
Extend the side surface of the reduction with the line by crossing its axis of symmetry and thus creating an “S” point.

From the “S” point, draw wide arcs crossing the edges of the large and small diameter reduction;

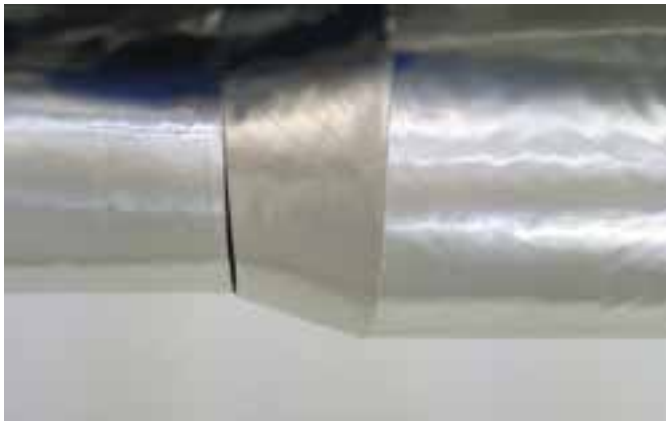
On a large-diameter arc, apply the perimeter dimension of the large-diameter mat;

From the point of circumference of the large diameter, draw a line connecting it to the “S” point, thus closing the reduction circumference.

Cut out the mat element at a slanting angle so that after cutting out it may complete the insulation at the reduction spot;



Install the cut-out element in the place of reduction;



Seal the transverse joints with PAROC Clad Tape with the sealing compound.

RECTANGULAR DUCTS

handling of and working safely with with PAROC stone wool

TOOLS:

Following tools are required for installation of PAROC Pro Lamella Mat Clad:

- sharp mat knife - e. g. PAROC Knife XTK 001 or 003,
- tape measure or wooden measuring stick,
- marker,
- PHP insulation pin welder - e. g, PAROC welding device,
- 45° angle cutting strip.

PREPARATION:

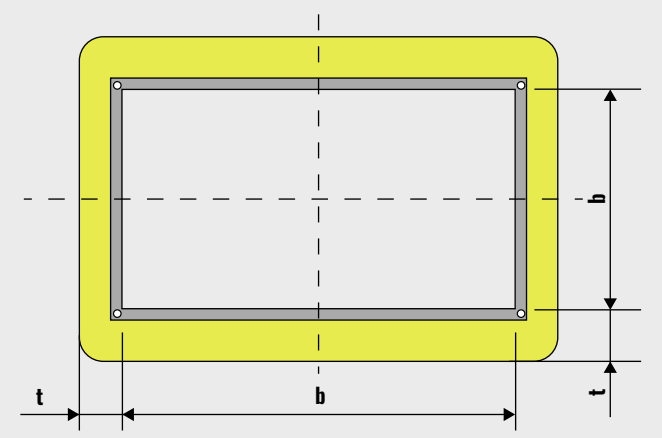
- The first step is to measure the duct: its width, height, and length;
- Before assuming installation, clean the duct surfaces of all dust, grease, and other dirt;
- Calculate the periphery. To calculate the periphery of insulation ("L") on ventilation ducts, you will need the following data:
- - width ("a") and height ("b") of the ventilation shaft,
- - insulation thickness ("t").

The following formula is used to calculate the mat length and required material:
where:
a – duct height,
b – duct width,
t – mat thickness.

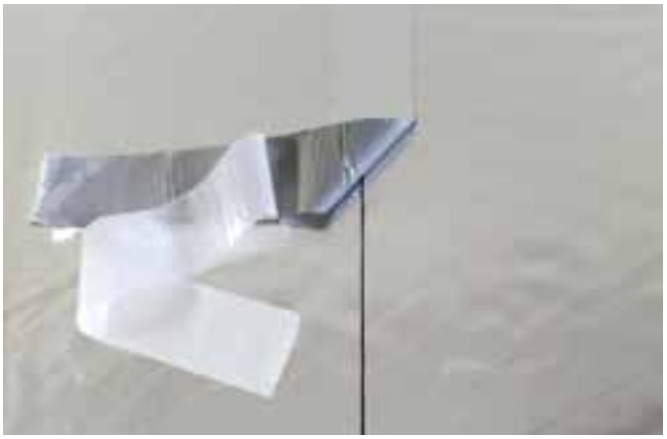
L = 2 x a + 2 x b + 8 x t

ACCESSORIES:

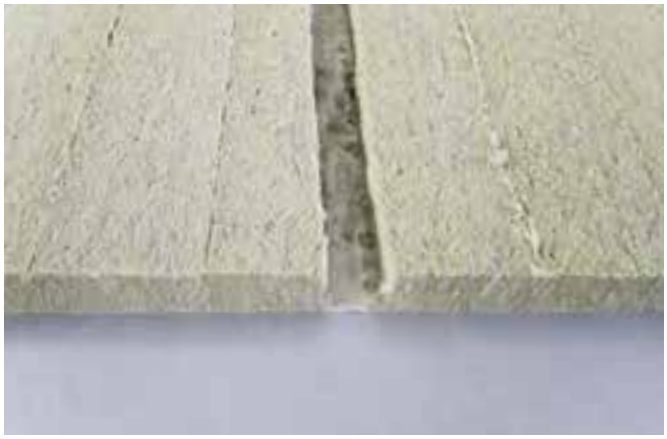
- **PAROC Head Pins Insulated:**
  For installing mats on the surfaces of ventilation ducts through the so-called reverse method by welding;
- **PAROC Clad Tape:**
  Water resistant butyl rubber tape with very high tack and very high ageing resistance
- **PAROC Clad Dots:**
  PAROC Clad Dots are the optimal solution when it comes to cover pins' heads
- spatula – for even connection of the tape to the lining , e. g. PAROC Spatula
- spray adhesive to additionally glue the mat to the duct surfaces.



RECTANGULAR STRAIGHT DUCTS



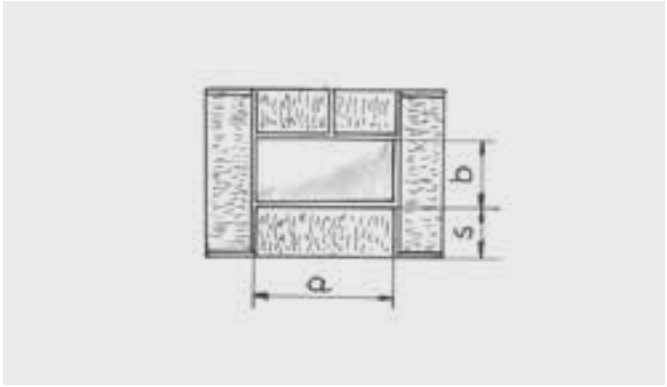
In order to follow requirements coming from DIN4140 standard related to a need of keeping min. 3% of gradient to protect a top surface of a rectangular ventilation duct against accumulation rainwater please put PAROC Pro Wedge (WR) and next on it install PAROC Pro Lamella (WR) Clad.

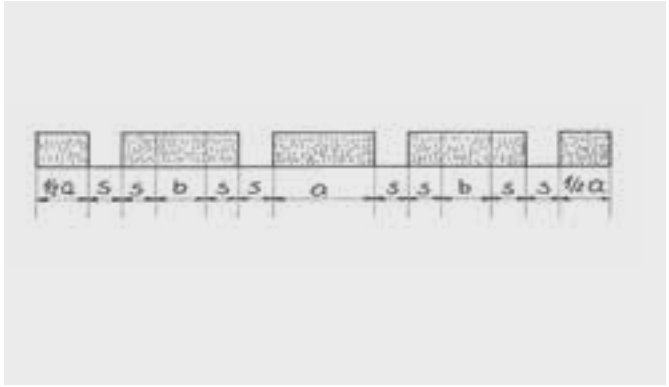


Cut the mat with the knife to the desired size from the side of the lining, taking into consideration additional dimension (height PAROC Pro Roof Wedge (WR)). Mark the duct dimensions and material thickness on the inside. Compensate for the folding point, which should appear in the middle of one of the duct sides. This way, you will not use as much PAROC Clad Tape when taping up the folded mat and ensure an aesthetic finish. If the fold is on the edge of the duct, you will have to tape up the whole insulation thickness.

During the installation work, you must make sure to eliminate any gaps between successive insulation elements to eliminate so-called thermal bridges and prevent the material from being damaged by birds.

The images below present division of segments by duct side length with consideration of insulation thickness. The fold points are cut to make the mat edges easier to fold;

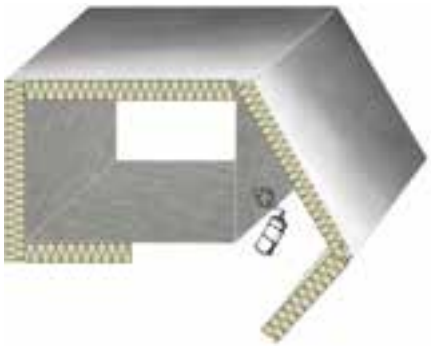




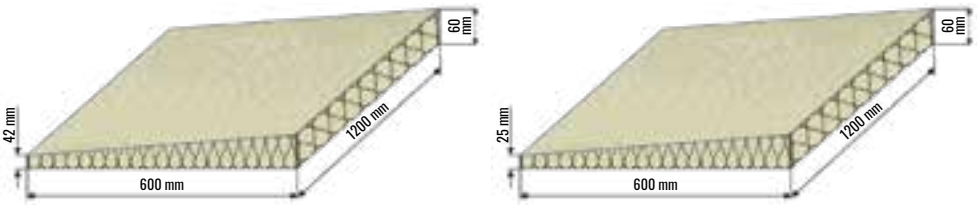
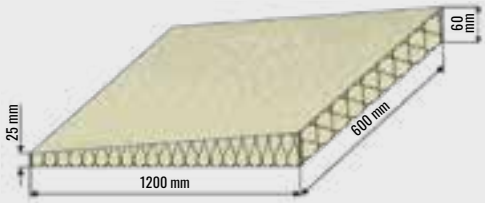
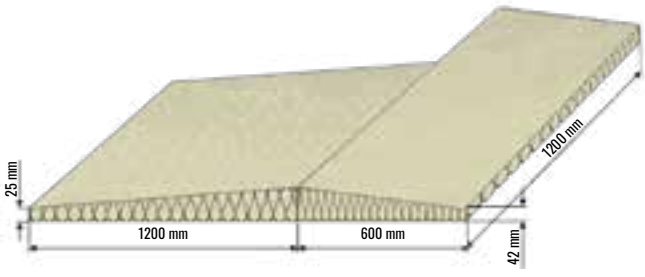
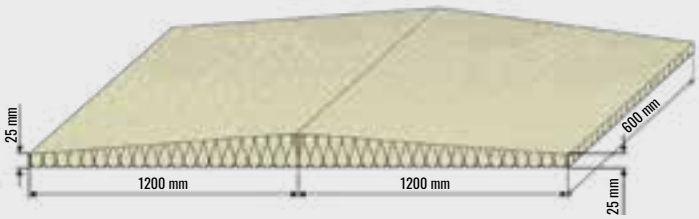
SOLUTION

STEP 1: Installation of wedges

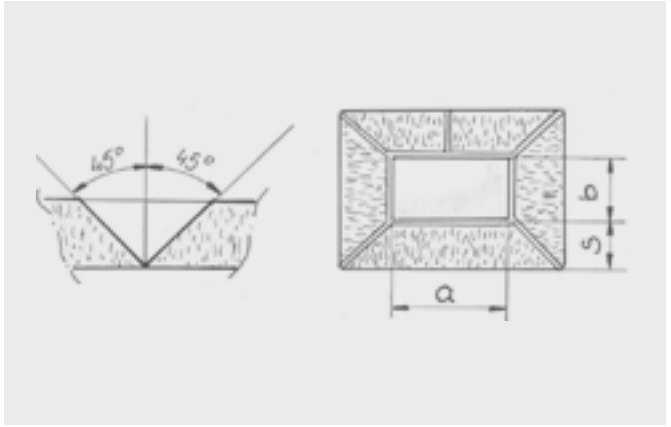
STEP 2: Installation of PAROC Pro Lamella Mat (WR) Clad (on top of the Wedge)

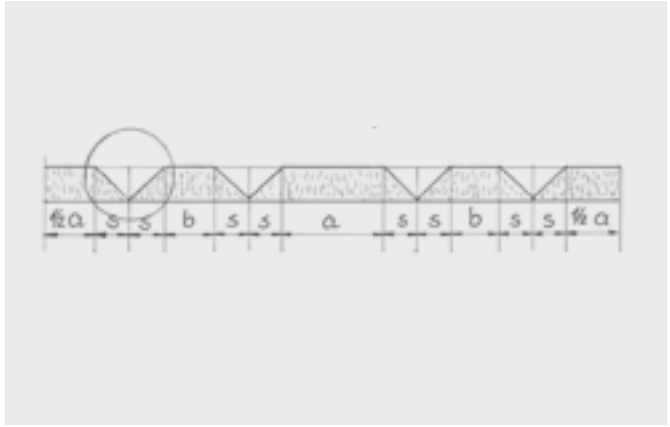


Solution

Air duct with [mm]	Dimension of the wedge [mm]	
<600	42/60×600×1200 **or** 25/60×600×1200	
600-1200	25/60×1200×600	
1200-1800	25/60×1200×600 + 42/60×600×1200	
1800-2400	25/60×1200×600 + 25/60×1200×600	

A different way is presented below. The fold points are cut at a 45° angle with consideration of two thicknesses of the applied insulation material. This cut can be made with a cutting strip with the same angle. The fold points are cut to make the mat edges easier to fold.





The images below present division of segments by duct side length with consideration of insulation thickness with this method.

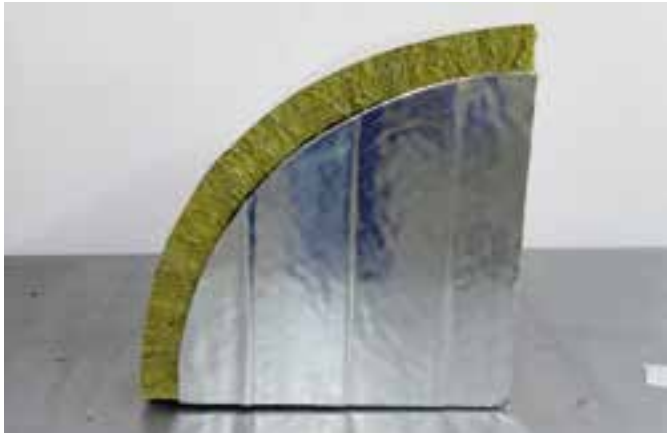
the mat is installed to the duct by placing it on the duct surface and matching the cuts to the edges while simultaneously piercing the lining with the pins and welding them to the duct surface.

All folds of the individual mats and the points of welded pins must be secured with PAROC Clad Dots. We recommend that you use the spatula to ensure that the dots adhere tightly to the lining.

ELBOWS AND PROFILED SURFACES

Measure the arcs of the (inner and outer) elbow of the ventilation duct;

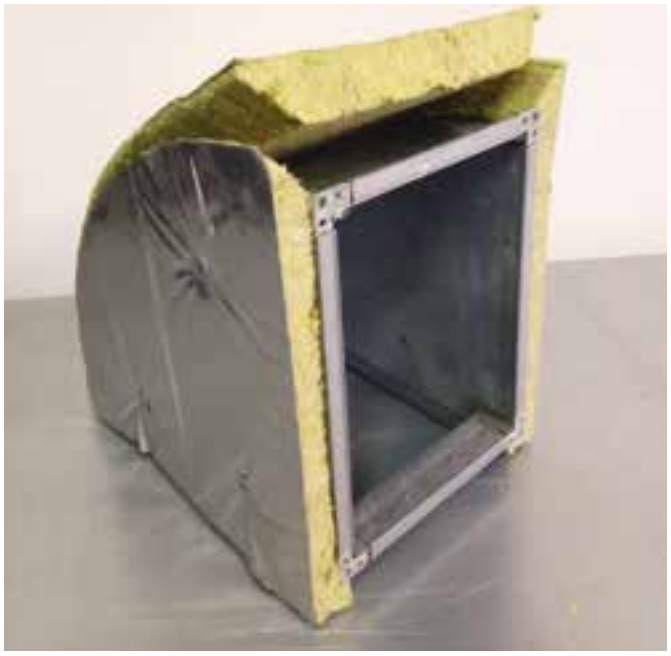
Mark them on the material by adding the equivalent of insulation thickness to the outer arc;



Add the value corresponding to two times the insulation thickness to the mat strip for the arc duct surface so you will not have to tape up the fold on the duct edge on the entire insulation thickness;

Cut out two (mirror) arc elements for the side surfaces of the elbow and a segment for the arc surface of the elbow;

Cut the sections intended for the elbow sides and the arc surface of the elbow at a 45° angle in order to avoid having to tape up the entire insulation thickness;



The components of elbow insulation are installed by placing them on the duct surface and matching on the edges while simultaneously piercing the lining with the pins and welding them to the duct surface;

All points of welded pins must be secured with PAROC Clad Dots. The fold points of individual mats are taped as follows:
- first on the arc surface,
- then in spots around every 50 mm to the side surfaces.

We recommend that you use the spatula to ensure that the Dots adhere tightly to the lining

DURABLE

REUSABLE

SOUND REDUCING

FIRE PROOF

MOISTURE PROOF

SAFE

ENERGY EFFICIENT

PAROC® stands for energy-efficient and fire safe insulation solutions of stonewool for new and renovated buildings, marine and offshore, acoustics and other industrial applications. Behind those products, there is an 80-year history of stonewool production knowhow backed with technical insulation expertise and innovation.

Building Insulation offering covers a wide range of products and solutions for all traditional building insulation. The building insulation products are mainly used for the thermal, fire and sound insulation of exterior walls, roofs, floors and basements, intermediate floors and partitions. Sound absorbing ceilings and wall panels for interior acoustic control, as well as industrial noise control products, are available in the range.

Technical Insulation offering includes thermal, fire and sound insulation in HVAC systems, industrial processes and pipework, industrial equipment as well as shipbuilding and offshore industry.

For more information please visit ***www.paroc.com***

Applications: January 2023
TIEN0123