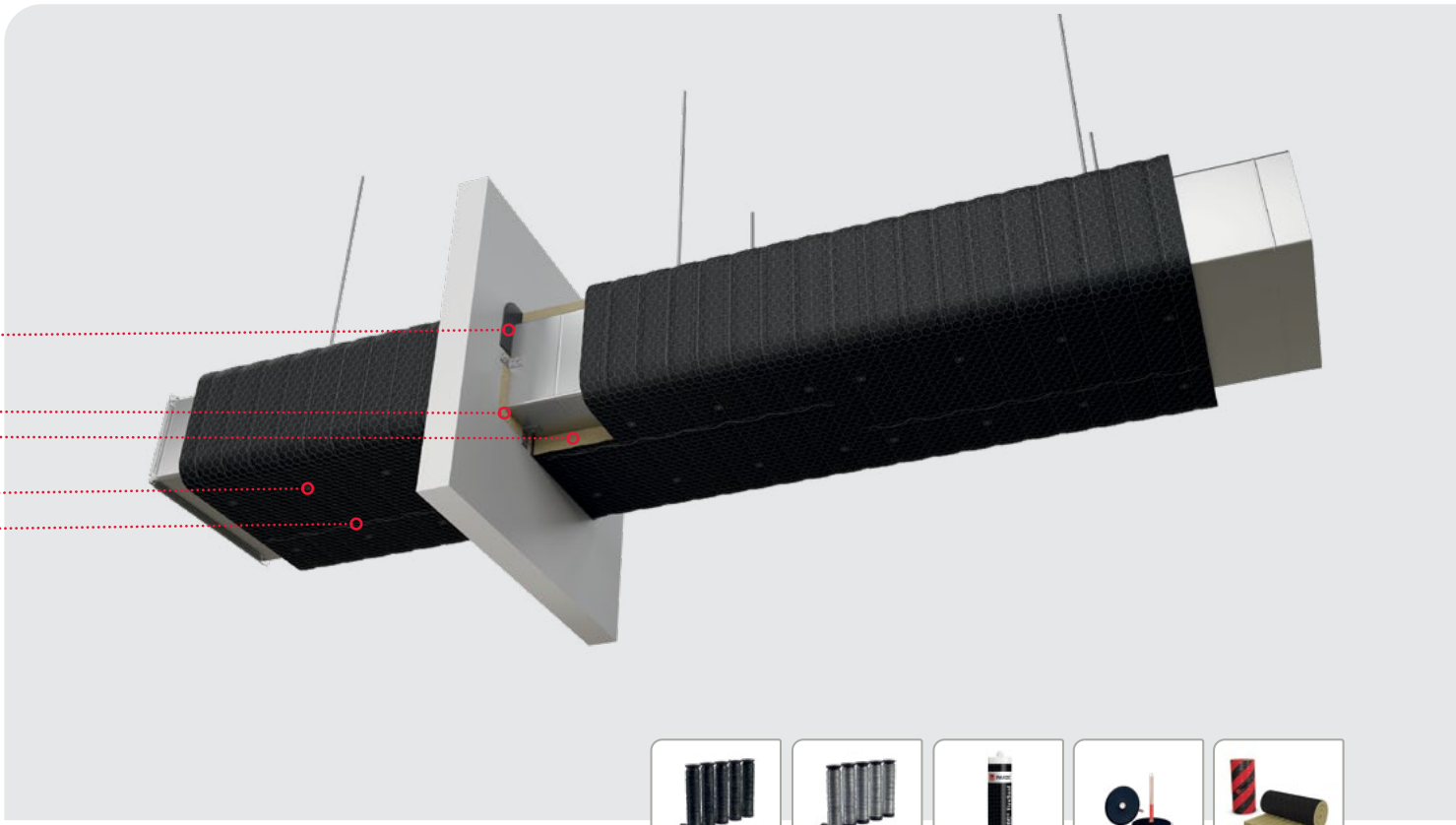
DESIGN AND INSTALLATION GUIDE

PAROC® VECT WIRED MAT BLACKCOAT EI30 RECTANGULAR

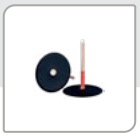
OWENS CORNING® PAROC®

SYSTEM DEFINITION

System for fire protection to steel ventilation ducts assembled on-site.






SYSTEM PARTS:

PART NAME	PART DESIGNATION	TECHNICAL SPECIFICATION
Duct insulation	**PAROC® Vect Wired Mat BlackCoat EI30**	EN 14303; PAROC Declaration of Performance
Penetration seal gap filler	**PAROC mineral wool**	Any PAROC mineral wool, unfaced, minimum density 60 kg/m^3, EN 14303 or EN 13162
Fire Sealant	**PAROC® FireSeal**	PAROC Technical Datasheet
Wire	**Steel wire**	Steel wire, minimum thickness 0,7 mm, galvanized, stainless steel or coated
Welding pins	**PAROC® Head Pins**	Insulated welding pins Ø2,7 mm, with cup (head) Ø30 mm

System components are specified in detail in the PAROC Technical Datasheets.

The system declared performance only applies if the specified components are used, the system is installed in accordance with the PAROC Installation Guide, and all the conditions of the PAROC Design Guide are met regarding specification of the ductwork to be insulated and wall/floor structures that the ductwork is penetrating. Parts, structural elements, and installation operations that are not specified in the PAROC documentation are assumed to follow manufacturers standards and standard practices.

DESIGN RULES

This fire protection duct system is designed for rectangular ducts, horizontal and vertical, standard sizes to EN 1366-1, tested at standard conditions for fire inside the duct (3 m/s air flow rate) and -500 Pa for fire outside the duct.

THE FIRE PROTECTION SYSTEM CAN BE APPLIED TO RECTANGULAR DUCTS THAT COMPLY WITH THE FOLLOWING PARAMETERS:

- Tightness class C or higher according to EN 1507 and maximum 500 Pa overpressure and underpressure.
- Duct sections are made tight with EPDM gasket 5x15 mm used between duct sections (flanges).
- Flanges: 20 mm height, joined with four bolts and nuts placed in the flange corners.
- Flanges are held together by C-profiles on all duct sides.
- Connection of flange to sheet steel: cold-pressed.
- Duct cross-section should be a maximum width 1250 mm, maximum height 1000 mm.
- Horizontal ducts are suspended on steel threaded rod hangers, using suspension profiles. The tension in the hangers in cold conditions must not exceed 9 N/mm². The threaded rods are attached to the ceiling by anchoring elements with the proven loadbearing capacity to carry the insulated ductwork for the same or higher fire resistance time than the duct system in standard fire conditions (ISO 834 / EN 1363-1 standard fire curve). Rods are placed on both sides of the duct.
- Length of duct segments should be a maximum of 1500 mm
- Horizontal installation: Distance between hangers should be a maximum of 1500 mm.
- Position of hangers relative to duct joints: 0-200 mm from flanges.
- Suspension profile – size: steel L-profile 30x30x3 mm;
- Vertical installation: Distance between floor levels can be a maximum of 8x the smallest side of the duct.

THE DUCTS MAY PENETRATE:

- Walls – plasterboard partitions fire rated at a minimum of the same as or higher than the duct system, opening reinforced by steel profiles.
- Walls & floors – light aerated concrete, concrete, masonry, all with a minimum fire resistance rating the same as or higher than that of the duct system.

PENETRATION SEAL THROUGH WALLS/FLOORS:

- Maximum gap between the duct and the wall/floor is 30 mm.
- Duct is attached to the wall/floor using steel L-angles, size 50x50x35x2 mm positioned on each side of the wall; on the floor, placed on the top only; otherwise the sealing system is identical for all types of walls/floors. The spacing between the L-angles and from the edges of the duct maximum 150 mm.
- Gap filler: any PAROC mineral wool, uncompressed density 60 kg/m³, tightly stuffed in the cavity to fill it completely and flush with wall/floor surfaces.
- Mineral wool filler is covered by a thin layer of fire sealant 3-5 mm thick and may extend to adjacent surfaces of the wall/floor.
- The edge surface of mineral wool insulation facing the wall/floor/ceiling is glued with PAROC® FireSeal to the penetration and wall/floor/ceiling.

INSULATING LAYER ON THE DUCT SURFACES:

- Insulation product PAROC® Vect Wired Mat BlackCoat EI30, nominal thickness 60 mm.
- Offset of longitudinal joints by a minimum of 100 mm.
- Fixing insulation to the duct – four optional methods of connecting the wire mesh joints:
  1. Wire mesh is twisted approximately each 150 mm.
  2. Wire mesh is sewn by wire with a minimum thickness of 0,7 mm.
  3. Wire mesh is connected with clips, approximately each 150 mm.
  4. Wire mesh is stitched by small steel wire loops with a minimum thickness of 0,7 mm, approximately each 150 mm.

Longitudinal joints of wire mesh must be connected using any of the methods above. Connecting transversal joints is optional, using methods 2 to 4. If transversal joints are twisted (method 1), the mesh wires can be twisted; never twist the perimeter wire.

Additionally, the insulation is attached to the bottom side of horizontal duct by welding pins. Maximum distance between welding pins and duct edges is 300 mm along the duct axis, maximum 500 mm across and minimum 40 mm from edges of the mats. The welding pins may be additionally placed on other duct surfaces.

INSTALLATION PROCEDURE

INSTALLATION OF PENETRATION:

Before starting the installation, the openings in the wall/floor must be checked if these are clean and following the design rules given in this document. Working temperature is minimum 10 °C

1. Fill the gap tightly and completely with PAROC stone wool, minimum uncompressed density 60 kg/m³, without facings. The resulting surface of mineral wool filling must be flush with both surfaces of the wall/floor.
2. Prime the surface of the mineral wool filling and surrounding wall/floor surfaces with clean water.
3. Apply a continuous layer of sealant on both sides of the mineral wool filler compressed in the gap, thickness between 3 to 5 mm; this may extend to adjacent surfaces of wall/floor.
4. Make the sealant surface even and smooth with a wet brush or spatula.
5. Stabilise the duct by attaching steel L-angles (if not installed already).

Screws for fixing the L-angles to the wall/floor must be made of steel and be of an appropriate type for the wall/floor material. They may include dowels or other type of anchors suitable for fire resistance of the duct.

BASIC RULES FOR HANDLING THE INSULATION MATS

- Mats must be handled with care to avoid damage to the insulation or facing.
- Unpack and unfold the mat on a flat surface, remove the plastic foil and shake the mat gently and let it rest for a minimum of 10 minutes, until it regains its original thickness and releases any tension due to packing compression.
- The insulation layer must have a uniform thickness, therefore, avoid too much stress or pinching fingers during product handling & installation.

The insulation material compensates surface irregularities of the duct through its material properties. Therefore cuts for brackets or flanges are not required. Bends and T-joints can be insulated by cutting segments of the insulation material.

INSTALLATION OF MATS ON THE DUCT

Before installing the insulating layer, the ductwork must be checked if:

- It fulfils air tightness criteria.
- It is assembled according to design, with proper quality, without visible holes or gaps or mechanical damage.
- Duct joints are tight and properly fit together.
- All the sizes and components comply with this guide.
- Penetration seal is installed in compliance with this guide.

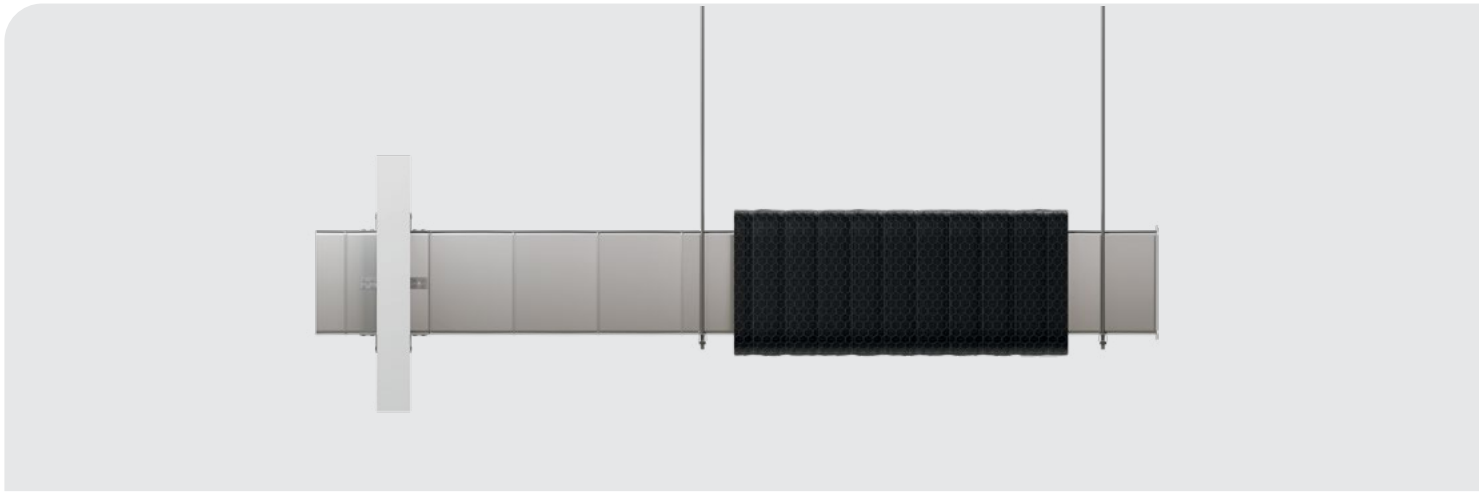
Mat length is calculated as: 2x (steel duct width + height) + 4x insulation thickness + addition for mat compression). Addition for mat compression is approximately 20 mm or a minimum 2% of the mat length. If the mat is too short to wrap the duct in a single piece, the correct final length can be made by connecting several pieces of mat by wired mesh (see below for connecting options for wired mat joints). Minimum size of any single piece of mat in any direction is 200 mm.

INSTALLATION OF MATS ON HORIZONTAL DUCT

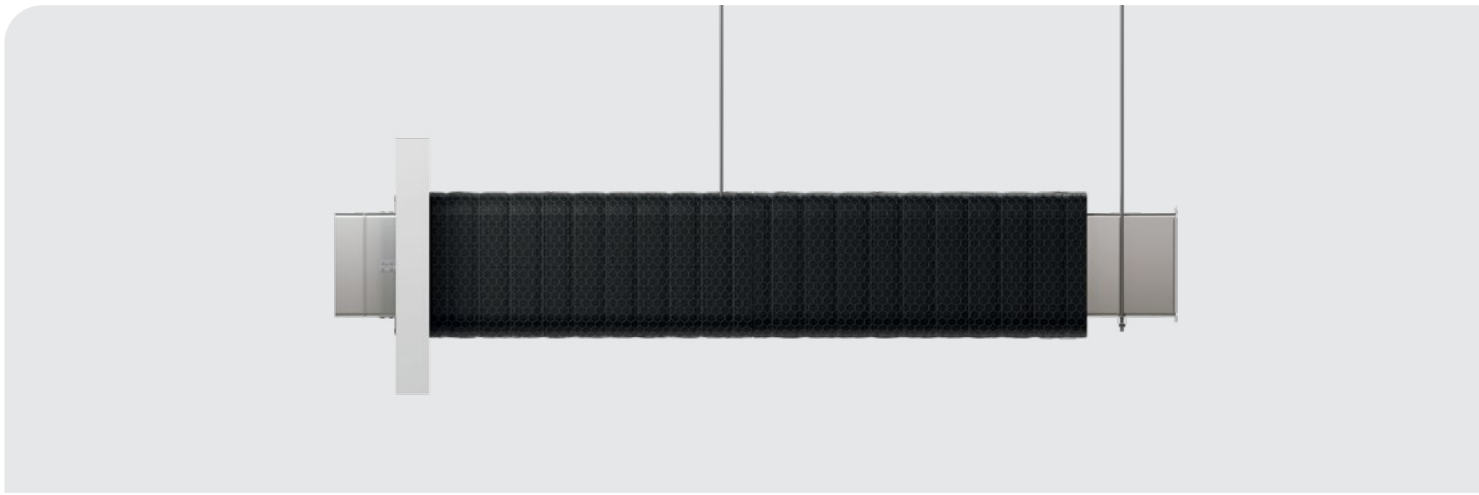
1. Cut the mat to the correct length, leaving 100 mm extra facing for overlapping.

2. Wrap the insulation around the duct tightly, so that no gaps occur at the insulation joints.

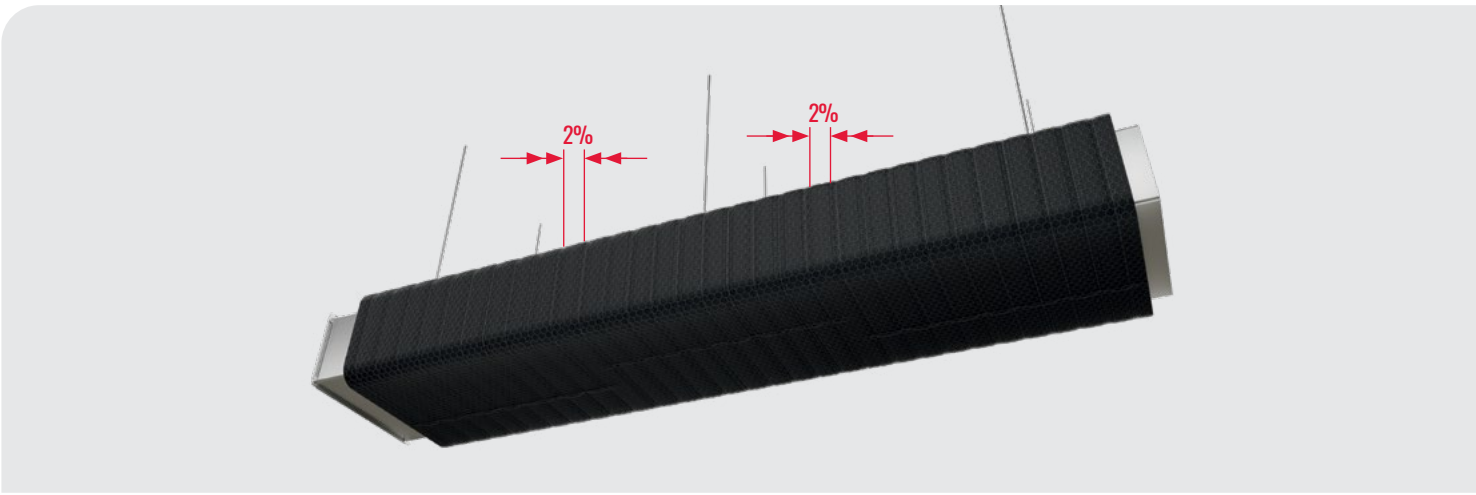
3. First install the second mat, leaving the space on the duct between the second mat layer and the wall minus 30 mm or a minimum 2% of actual size of the gap, to allow the first mat to be adequately compressed against the wall.



4. Install the first mat adjacent to the wall. Unless the sealant is still wet, the wall surface must be primed with clean water and another layer of sealant applied to create a gluing layer for the insulation. Spread the sealant with a wet brush or spatula to make a soft layer approximately 1 mm thick. Immediately after, the insulation is glued to the wall while the sealant is still wet.



5. Place the following mats on the duct after one another compressing all the mats to the final installed width of 20 mm or a minimum of 2% less than the original mat width. The last mat must be glued to the wall with PAROC® FireSeal following the principles of 3.



6. In places where suspension rods penetrate the insulation, make a cut in the insulation, up to where suspension rod will be placed; new joint will be created this way.

7. Apply a line of sealant in the corner between walls and mats around the perimeter. If there are any visible gaps between mats and walls, apply an appropriate amount of sealant therein so that the insulation edge is glued to the wall on all its edge area. Excess sealant needs to be removed.

INSTALLATION OF MATS ON VERTICAL DUCT

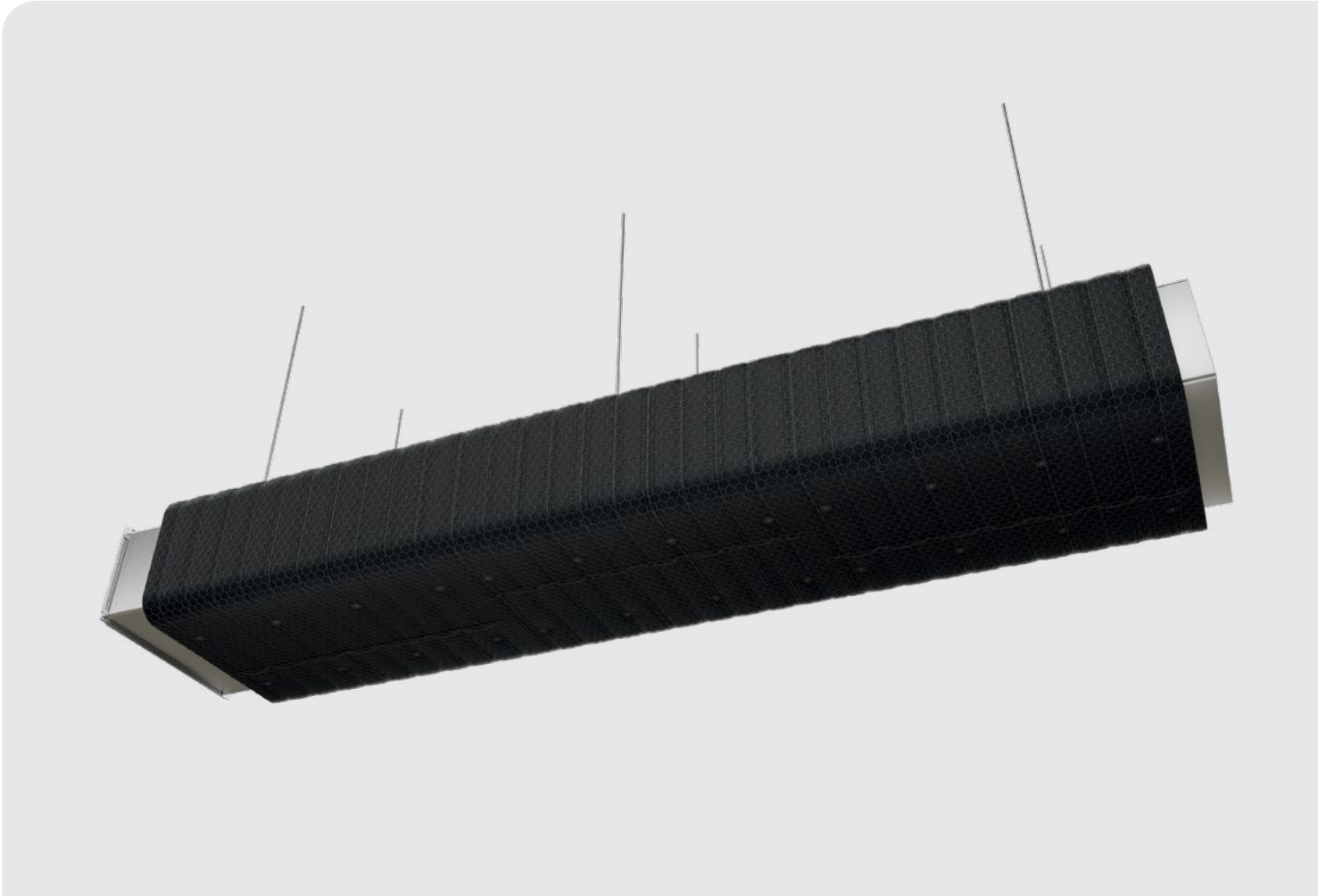
1. Cut the mat to the correct length corresponding to the circumference of the duct, leaving 100 mm extra facing for overlapping.
2. Wrap the insulation around the duct tightly, so that no gaps occur at the joints.
3. Install the first mat adjacent to the floor/ceiling. Unless the sealant is still wet, the floor/ceiling surface must be primed with clean water and another layer of sealant applied to create a gluing layer for the insulation. Spread the sealant with a wet brush or spatula to make a soft layer approximately 1 mm thick. Immediately after, the insulation is glued to the floor/ceiling while the sealant is still wet.
4. Place the remaining mats on the duct after one another compressing all the mats to the final installed width 20 mm or a minimum of 2% less than the original mat width. The last top/bottom mat must be glued to the ceiling/floor with PAROC® FireSeal following the principles of 3.

5. Apply a line of sealant in the corner between the walls and mats around the perimeter. If there are any visible gaps between mats and walls, apply an appropriate amount of sealant therein so that the insulation edge is glued to the wall on all its edge area. Excess sealant needs to be removed.

SECURING THE INSULATION LAYER ON THE DUCTWORK

Fixing insulation to the duct – four optional methods of connecting the wire mesh joints:

1. Twist the wires in longitudinal joints approximately each 150 mm. If transversal joints are twisted (method 1), the mesh wires can be twisted; never twist the perimeter wire.
2. Sew the longitudinal (optionally also transversal) joints by wire with a minimum thickness of 0,7 mm.
3. Connect the longitudinal (optionally also transversal) joints with clips, approximately each 150 mm.
4. Stitch the longitudinal (optionally also transversal) joints by small steel wire loops with a minimum thickness of 0,7 mm, approximately each 150 mm.
5. Attach the insulation to the bottom side of horizontal duct duct by welding pins with minimum 2,7 mm diameter and with minimum 30 mm head/washer diameter of appropriate length (depending on the real insulation thickness and duct surface geometry) to create a safe and tight connection of insulation to the duct, not causing compression of mineral wool in excess of 10%. Maximum distance between welding pins and duct edges is 300 mm along the duct axis, maximum 500 mm across and minimum 40 mm from the edges of mats. The welding pins may be additionally placed on other duct surfaces.



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