CLIMAVER® STAR

For outdoor use

Installation manual

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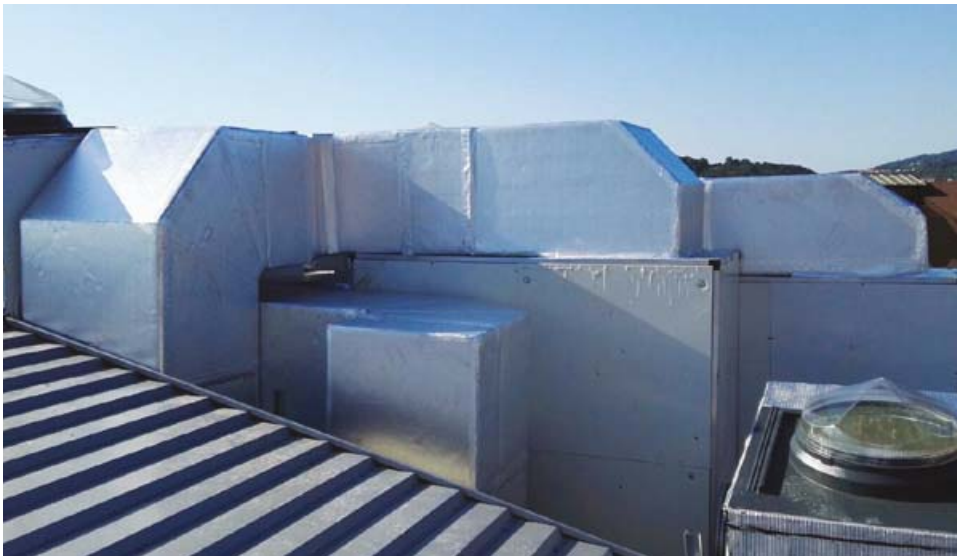
1. CLIMAVER® STAR



CLIMAVER® STAR is a rigid, high density, 40 mm thick mineral wool panel with a thermal conductivity of 0.032 W/m·K at 10 °C. The outer side is made of a laminated embossed aluminium complex that acts as a vapour barrier and makes the duct air tight, while its ultraviolet treatment makes it unalterable over time. The inner side of the duct is made of a **net fabric with high mechanical resistance to deal with the most demanding cleaning cycles and providing the best acoustic absorption thanks to its porosity, allowing the acoustic energy inside the duct to dissipate.**

1.1. Dimensions and packaging

CLIMAVER® STAR is supplied in panel format with the following dimensions and packaging.

Panel measurements (mm)		
Length	**Width**	**Thickness**
3,000	1,210	40

Packaging		
m^2/ Pallet	**m^2/ Truck load**	**Number of pieces per pallet**
65.34	1,568	18

1.2. Characteristics according to regulations

The table below includes all the technical characteristics referred to in the standards of reference: EN 13403, 13501-1, EN ISO 354, EN 12086, UN 12237.

Symbol	Parameter	Icon	Units	Value	Standard
λ_D	Declared thermal conductivity according to temperature		W/m·K (°C)	0.032 (10) 0.033 (20) 0.036 (40) 0.039 (60)	EN 12667 EN 12939
–	Reaction to fire		Euroclass	B-s1, d0	EN 13501-1 EN 15715
MU	Mineral wool: water-vapour diffusion resistance, μ		–	1	EN 12086
Z	Facing: water-vapour diffusion resistance		m^2·h·Pa/mg	150	EN 12086
MV	The vapour diffusion-equivalent air layer thickness, Sd		m	100	EN 12086
DS	Dimensional stability, Δε		%	<1	EN 1604
–	Air Tightness		Class	D	UNE-EN 13403 EN 12237
–	Pressure resistance		Pa	800	UNE-EN 13403

Working conditions: Air speed up to 18 m/s and circulating air temperature up to 90ºC.

Thickness (mm)	Weighted acoustic absorption coefficient, AW, α_ω	Acoustic absorption class	Designation code
EN 823	EN ISO 354 - EN ISO 11654	UNE EN ISO 11654	EN 14303
40	0.90 (1)	A	MW-EN 14303-T5-MV1

Acoustic trials with plenum: CTA 140003/REV. (1) Weighted acoustic absorption coefficient AW,α_w without plenum 0.70 (40 mm thickness) CTA 140053/REV-2.

1.3. Certification

CLIMAVER® STAR is CE and EUCEB certified. The CE marking is a mandatory certification that declares a product compliant with all standards applicable in the EU.

The EUCEB certification ensures the insulating mineral wool covered by the certificate of reference is considered “non-hazardous materials in terms of health”, as they comply with the physical-chemical conditions of bio-solubility set forth in Directive 97/69/EEC, transposed to Spanish Law by Ministerial Order of 10 September 1998.

1.4. Energy efficiency

Thermal installations might consume lower amounts of conventional energy and, as a result, have a limited production of greenhouse gases and atmospheric contaminants. To meet this goal, you must:

- Select generation and transport systems and equipment with high energy performance under any working conditions.
- Heat insulate the distribution networks of carrier fluids.
- Equip the installations with regulation and control systems to maintain the design conditions and adjust energy consumption.
- Recover the thermal energy from the fluids evacuated outdoors.
- Use renewable energies to cover part of the energy demand of the building.

In terms of duct networks, this translates into minimum thermal insulation requirements in order to decrease energy losses through heat transfer and air tightness in order to limit air leakage according to the type of installation and its power.

The CLIMAVER® STAR self-supporting panels have a material thermal conductivity at 10 °C of 0.032 W/m·K.

1.5. Air Tightness

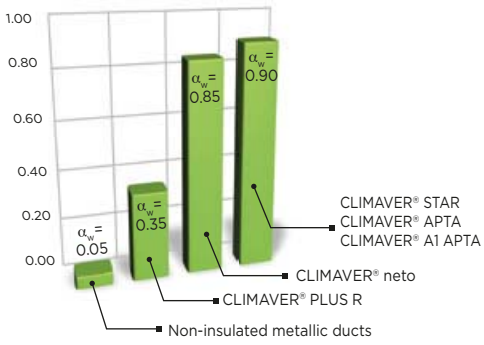
CLIMAVER® STAR is rated class “D”, which guarantees the highest air tightness defined.

Energy losses represented by leakage, by air tightness rating and according to example				
Air tightness rating	Authorised leakage	% of the total flow represented by leakage	Equivalent energy losses (12 hours)	Savings
-	L/(s·m²)	%	kWh	%
B	0.37	5	10	0
D	0.004	0.5	1	90

1.6. Acoustic features

Acoustic absorption is an intrinsic characteristic of a material and corresponds to its capacity to absorb the sound energy and limit sound reverberation.

CLIMAVER® STAR is launched in the HVAC market as the best self-supporting panel in terms of acoustic absorption, with overall absorption coefficients of up to (α_w=0.9).



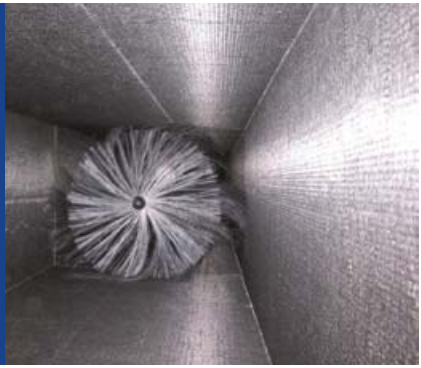
1.7. Fire safety

CLIMAVER® STAR has a reaction to fire rating of B-s1, d0, which means it has the highest safety level in relation to the contribution to fire and to smoke toxicity (s1), as well as to the production of flaming droplets or particles (d0).

1.8. Indoor air quality guarantee

CLIMAVER® STAR ensures the necessary mechanical resistance for the hygienisation of HVAC systems in accordance with Standard EN 100012:2005, including the most demanding cleaning tests such as brushing and compressed air, without causing any damage and without requiring subsequent duct encapsulation treatment.

The CLIMAVER® range, made of inorganic wool, does not encourage or feed the growth of microbes or bacteria. CLIMAVER® STAR ducts have passed the resistance to microbial growth standards of European non-metallic duct standard EN 13403. Inoculated mould does not spread, the structure is not damaged, and the joints do not open.



2. Applications

2.1. On-site installation. Easy installation

Just like the entire CLIMAVER® range, the CLIMAVER® STAR solution can be installed *on site*, reducing installation and adaptability times. As a self-supporting panel, CLIMAVER® STAR also minimises the number of operations to be performed on outdoor installations, allowing for a duct to be simply shaped with high thermal, acoustic, and fire reaction features in line with the same cutting and installation philosophy as all the other products in the CLIMAVER® range.

2.2. Regulations. Working conditions

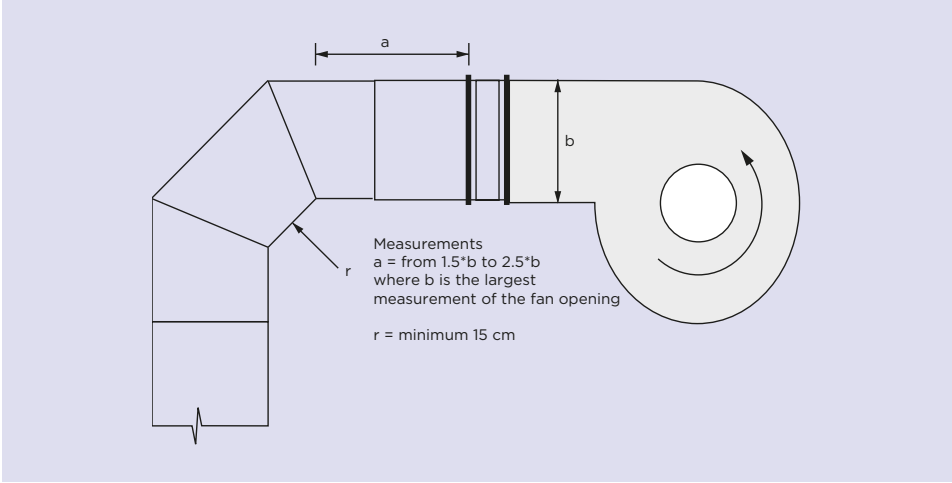
According to EN-13403, the use of CLIMAVER® STAR ducts is not recommended in the following cases:

- Air circulation at temperatures over 90 °C inside the duct.
- Maximum room temperature of 60 °C and minimum outdoor temperature of -30 °C.
- Transport of corrosive solids and liquids.
- Underground ducts with no additional protection.
- Chlorine-saturated environments.

- Ducts for hood extraction, fume cupboards (kitchens, laboratories, industry, etc.).
- Ducts with a cross-section of over two metres on one side and maximum available pressures above 800 Pa, as specified in Standard EN 13403.
- Relative air humidity above 85%.

2.3. Manufacturer's recommendations

- The fan outlet must continue along a straight duct of a length that is 1.5-2.5 times the largest measurement of the fan opening.
- If reductions are made after the outlet from the machine, these must be on a maximum gradient of 15°.
- If an elbow joint is used at the outlet from the machine, the air circulation direction will be the same as the direction of rotation at the outlet from the fan.
- The equipment connection must be adjusted by inserting a flexible coupling to avoid the spread of vibrations.
- The connection to the HVAC unit will be made using PERFIVER H to guarantee the air tightness and stability of the installation, as the machine outlet is a critical point in installation flow and pressure rates.
- Install flashing boards or sloping covers in areas of ducts where, due to their gradient in relation to the horizontal plane or run-off, pools of water are likely to accumulate.
- Create supports that are independent or are parallel in height to the duct network so that each duct discharge or return line is independent and the ducts are not resting on each other.



3. CLIMAVER® Tools

Specific cutting tools: To cut 40 mm thick CLIMAVER® STAR panels, the ISOVER R&D team has developed specific tools to make duct cutting and shaping easier.

Note: CLIMAVER® 25 mm tools are not valid for cutting 40 mm thick panels, but 25 mm panels can be cut using the 40 mm tools if you use the adaptor block for this thickness.

3.1. Red dot tool

Tool primarily designed to make the straight duct. It makes halved-joint cuts to fold the sides of the duct to 90°.

Note: It is also used to make the overlap, passing it twice instead of using the blue tool.

There are two ways of leaving an overlap on the straight duct:

- Pass the red blade twice over the last cut (4.5 cm + 4.5 cm = 9 cm with overlap).
- Pass the red blade over the last cut and then position the angle width (+3 cm) and cut with the blade. (4.5 cm + 3 cm = 7.5 cm with overlap).

3.2. Black dot tool

This is used to machine the males and females on CLIMAVER® STAR ducts. It is generally used when the installation requires smaller cross-sections than the width of the panel, ports, figures for covers, straight ducts, etc.

3.3. Straight Duct Method (S.D.M.) Tool

Green tools that are used to cut and make figures with 22.5° angles.

- *Green tool with white dot*: Makes a precise, straight cut through the entire thickness of the panel.
- *Green tool with yellow dot*: Makes cuts at a 22.5° angle to make the 45° turns for the figures of the installation.

4. Universals CLIMAVER® Tools

Specific cutting tools for making 40 mm and 25 mm ducts (complete CLIMAVER® range).

The piece change is made easily without the need of tools.

The CLIMAVER® 25mm and 40mm panel cutting tools are in the same case.

Easy and without the use of auxiliary tools for its change, adapter plugs for the different measures are available inside the case.

4.1. Red tool

Tool whose main mission is to make the straight section. Make the grooves for folding the sides of the duct at 90 °.

4.2. Blue tool

Make the last groove to fold the sides of the duct to 90° leaving an overlap for closing duct.

4.3. Dovetailing tool

To make the dovetailing in the CLIMAVER ducts. Generally used when the installation requires sections less than the width of the panel, connections, straight sections, etc...

4.4. Universal SDM Tool

Tool to cut and make figures with angles at 22.5 °.

With a single tool, it allows a straight and precise cut of the entire thickness of the panel. Inclined the same tool allows to make cuts at an angle of 22.5 ° to make the 45 ° turns of the installation figures.

5. CLIMAVER® STAR accessories

The accessories supplementing the CLIMAVER® STAR system are mostly designed to guarantee air tightness, making installation easier for fitters, and ensuring an optimum finish on the installation.

5.1. CLIMAVER® Angle Guide

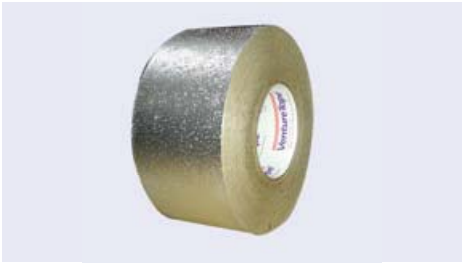
Transports the cross-sections of the inner sides of the duct to the panel. It is calibrated to be able to cut 25 mm and 40 mm thick panels.

5.2. CLIMAVER® STAR adhesive

Solvent-free installation adhesive designed to seal ducts in outdoor environments to guarantee the air tightness of the duct. It is used to work with the Straight Duct Method (S.D.M). and to seal the mechanical fastenings crossing the duct, reinforcements, supports, etc.

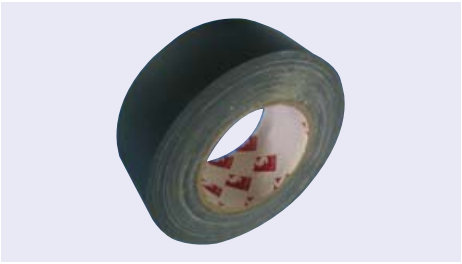
5.3. CLIMAVER® STAR tape

This is used to seal the lengthways and perimeter joints on the outside of the duct and is specific for exteriors, guaranteeing the air tightness and waterproofing of the duct. It is the only one that ISOVER, as the manufacturer of the CLIMAVER® STAR solution, has tested for this use (sold in rolls that are 50 m long and 75 mm wide).



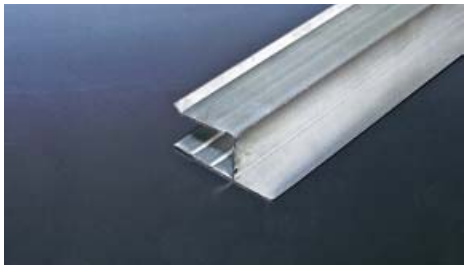
5.4. CLIMAVER neto tape

This is the standard tape used on all panels in the CLIMAVER® range with Neto fabric on the inside to guarantee the quality of the indoor air at connections to end parts and cuts on the inside of the panel.



5.5. PERFIVER H

This accessory is used primarily to connect ducts and metal elements, such as machines, elastic gaskets, inspection panels, end parts, etc. It can also be used on figures and developments requiring as such, and is of great use to fitters when connecting two parts of the installation.



6. CLIMAVER® STAR Duct Construction Basics

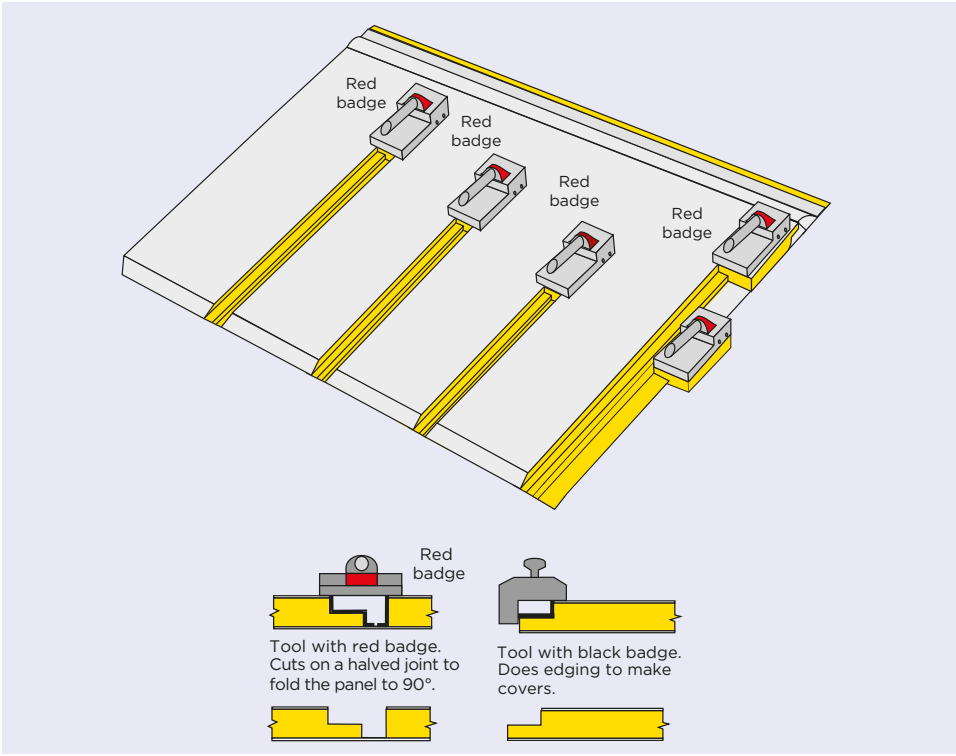
6.1. Layout

Once the cross-sections and the types of element or figures forming the duct network (straight duct, elbow joint, bypass, etc.) are known, the lines are laid out on the straight duct at 22.5° to determine the specific figure. Whether you are going to use the Straight Duct Method or the traditional Cover method, mark the different pieces on the panel using the CLIMAVER® markers before cutting and assembling to obtain the figure in question.

Note: The layouts developed in this manual are specific to the CLIMAVER® tools for 40 mm thick panels, i.e. CLIMAVER® STAR and CLIMAVER® APTA panels.

6.2. Cutting

To cut the CLIMAVER® self-supporting panels, the ISOVER R&D team has developed a set of specific cutting tools to make duct machining easier. The *angle guide* is calibrated with blade distances so that a straight duct can be made directly based on its interior measurements (AxB). Without having to subtract or add any additional measurement and only bearing in mind the interior measurements of the ducts (AxB). Furthermore, as the pioneer of the Straight Duct Method, CLIMAVER® has developed specific cutting tools to take at angles of 22.5°.

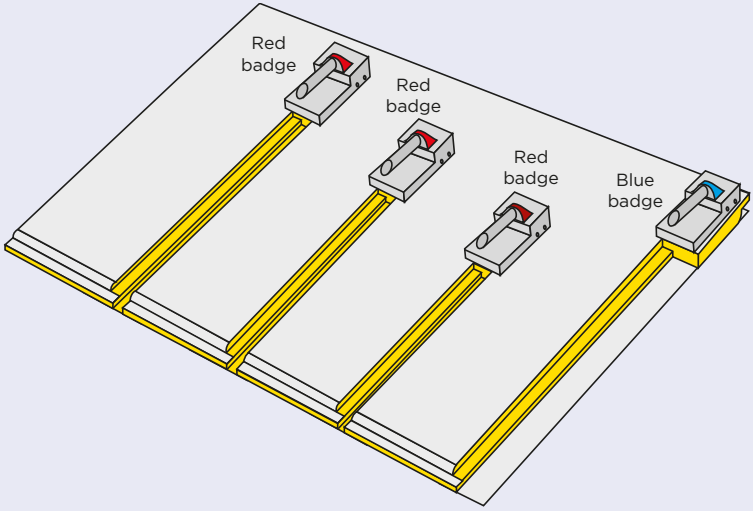


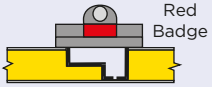
There are two ways of leaving an overlap on the straight duct:

a) Pass the red blade twice over the last cut (4.5 cm + 4.5 cm = 9 cm with overlap).

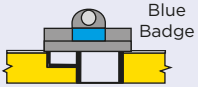
b) Pass the red blade over the last cut and then position the angle width (+3 cm) and cut with the blade. (4.5 cm + 3 cm = 7.5 cm with overlap).

After make the overlap. If the CLIMAVER® Universal tools are used to create the duct, the duct is made by passing the red tool three times and making the last cut with the blue tool to make the overlap that will permit close the duct .

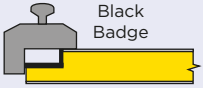




Tool with red badge. Cuts on a halved joint to fold the panel to 90°.



Blue tool. Make the last "chair-shape" cut and the flap for the stapling.



Tool with black badge. Does edging to make covers.

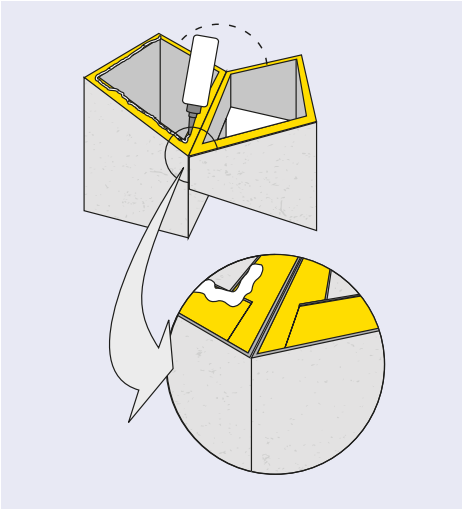
6.3. Sealing

Straight duct: Sealing exclusively involves CLIMAVER® STAR staples and tape to make the duct.

Straight Duct Method: Once the straight duct is complete and the cuts have been made at 22.5°, apply a double seal on each of the parts forming the figure.

Interior sealing: This is made using CLIMAVER® STAR adhesive to obtain figures, elbow joints, bypasses, etc., and it consists of applying a perimeter line over the surface of the glass wool on the pieces to be connected.

Exterior sealing: This is also made using CLIMAVER® STAR adhesive and consists of applying a perimeter line on the seal connecting the parts of the figure on the outside to guarantee air tightness and avoid water filtration.



Once the interior and exterior seal have been applied, attach CLIMAVER® STAR tape to the outer perimeter of the duct, distributing the area of adherence between the parts to be connected.

6.4. Cross connection of ducts

The cross connection of ducts is made by placing the two duct sections on the same plane, first inserting the male into the female, and leaving the male overlap on the outside of the female so that it can then be stapled and taped.

Note: The easiest way of carrying out this operation with CLIMAVER® STAR, given the cross sections and weight of the ducts to be connected on many occasions, especially if working with ducts made up of more than one piece (U + Cover or L + L), is to rest the ducts vertically on the ground so that they are easier to work on and assemble.

7. CLIMAVER® STAR work methods

There are two very different work methods for the CLIMAVER® STAR system: the Straight Duct Method (S.D.M.) and the traditional Cover, Piece or Riser method. Both are valid when installing CLIMAVER® STAR ducts if you follow the manufacturer's recommendations.

Each of these work methods has its own singularities and they can be used at the discretion of the fitter depending on the complexity or layout of the installation.

The Straight Duct Method makes better use of the material, and CLIMAVER® STAR adhesive is required to guarantee the air tightness of the duct and its waterproofing at each of the remaining joints when figures are shaped at 45° angles.

The traditional Cover method, however, creates figures based on patterns that are marked on the panel and correspond to each part of a given figure. Its shaping only requires stapling and taping.

Note: Overlaps should be left on the sides of the duct, in areas least exposed to accumulated water, such as the top side.

7.1. Straight Duct Method (S.D.M.)

A method patented by ISOVER, it is based on the creation of a straight duct of square measuring (AxB) with a square or rectangular geometry produced using the *CLIMAVER®* angle guide and the *red dot cutting tool* on a halved joint and, from this, creating different the figures that are required along the installation. Always with the same philosophy of work, making 22.5° cuts using the *green S.D.M. Tools* to give 45° outlets in the direction of the air with minimum load losses. If you use this method, you must guarantee the air tightness of the duct by sealing the joints on the inside and outside of each of the parts making up the end figure using CLIMAVER® STAR adhesive and then CLIMAVER® STAR tape.

- **Making the straight duct.** To make a straight duct, use the *angle guide* to directly transport the interior measurements of the duct (AxB), using the red dot blade to cut. To obtain the overlap to close the duct, use the red dot blade and pass it twice on the last cut, or use the red blade and position the angle guide at the cut furthest to the right (+3 cm) before cutting directly with the blade.

Note: On roofs it is very like that you will have to work with the two-piece straight ducts (U + Cover) / (L + L), given their measurements. It is therefore essential to bear in mind the waste generated so that you can make the most of the panels. To make panel developments easier for fitters when making a straight duct, tables have been created and are included on the end pages of this manual (Pages 28 and 29).

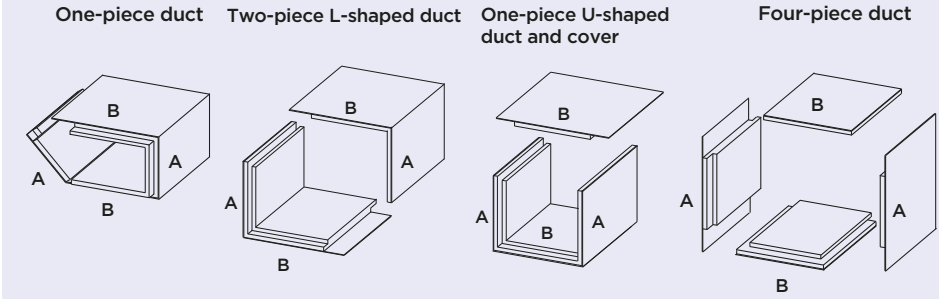
Once the interior measurements of the AXB side duct are known. How many additional cm of panel are required to produce the duct?

The red blade needs 4.5 cm on each cut, and the *angle guide* provides (+2 cm) to the interior measurement of the duct, which is lost when the duct sides are folded to 90°. The additional measurements for the interior development of the four sides of a duct are indicated below, depending on the number of pieces to be used to produce a straight duct.

Additional measurements to produce a straight duct, interior measurements (AXB)						
According to duct manufacturing	**1st cut**	**2nd cut**	**3rd cut**	**4th cut**	**Total cm**	
1-piece straight duct	(4.5 cm + 2 cm)	(4.5 cm + 2 cm)	(4.5 cm + 2 cm)	(4.5 cm + 4.5 cm + 2 cm)	30.5	29*
2-piece straight duct (U +Cover)	(4.5 cm + 2 cm)	(4.5 cm + 2 cm)	(4.5 cm + 4.5 cm + 2 cm)	(4.5 cm + 4.5 cm +2 cm)	35	32*
2-piece straight duct (L+L)	(4.5 cm + 2 cm)	(4.5 cm + 4.5 cm + 2 cm)	(4.5 cm + 2 cm)	(4.5 cm + 4.5 cm + 2 cm)	35	32*
4-piece straight duct	1st Straight piece (+ 4 cm Interior measurement)	2nd Straight piece (+ 4 cm Interior measurement)	1st Piece with double overlap (9 cm + 9 cm)	2nd Piece with double overlap. (9 + 9 cm)	44	41*

*** Using width of angle guide.**

Note: The total of the table may vary by 1.5 cm on one-piece straight ducts and by 3 cm on two- and four-piece ducts, depending on whether the red blade is passed twice to leave an overlap or just once plus the angle guide width.
The two-piece straight duct can be made in two ways (U with overlap + cover with overlap) or (straight U + Cover with double overlap), but the panel development and cuts are the same. The same occurs when working on (L + L).



Producing figures

- Mark the lines at 22. 5°.

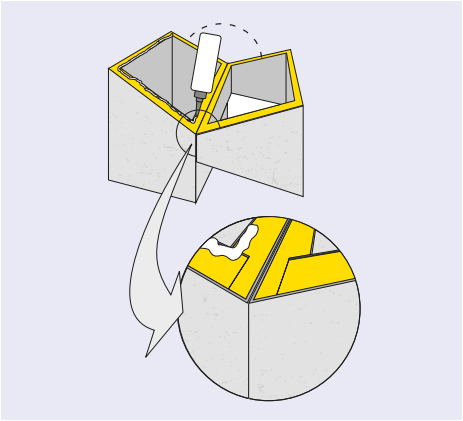
If you are going to use the S.D.M., mark the lines at 22.5° positioning the angle guide at 67.5° which is its complementary angle, on the appropriate plane, and the straight lines by positioning the angle guide at 90° on the other plane.

Note: Mark on both sides of the duct with the angle guide, as these are generally large cross-sections and a small deviation of just a few degrees on an angle would lead to large differences in the cut of the parts making up the figure.

- Sealing CLIMAVER® STAR figures.

The CLIMAVER® STAR ducts should first be sealed on the inside by applying CLIMAVER® STAR adhesive to the edges of the duct on each part making up the figure and then, once the figure has been shaped, applying another line of CLIMAVER® STAR adhesive to guarantee the air tightness of the duct. Then seal the outside with CLIMAVER® STAR tape to guarantee the air tightness and waterproofing of the duct.

Note: You can use stables before taping to bring the cuts on each of the parts shaping the figure closer together, as the exterior complex allows for as such without ripping.



7.2. Traditional cover method

This is based on obtaining figures by marking each of the pieces forming the figure on the panel. The inside is generally marked using CLIMAVER® markers. The general method of working with CLIMAVER® STAR is to make two of the straight pieces that were blade cut using the CLIMAVER® straight *green tool with a white dot*, with the interior duct measurement (+ 4 cm), and then making the duct surrounds with an overlap by passing the red blade twice in one directly and another of the interior measurement in order to ensure the ledge of the blade remains attached to the inside of the duct or Neto complex.

8. Auxiliary operations

8.1. Machine connection

The conditioning unit outlet to the ducts is one of the critical points of the installation in terms of the speed and the maximum flow and pressure of the installation at these points.

Remember that the fan outlet must continue along a straight duct of a length that is between 1.5 and 2.5 times the largest measurement of the fan opening. Pay special attention to reinforcements, depending on the pressure and cross-section of the duct.

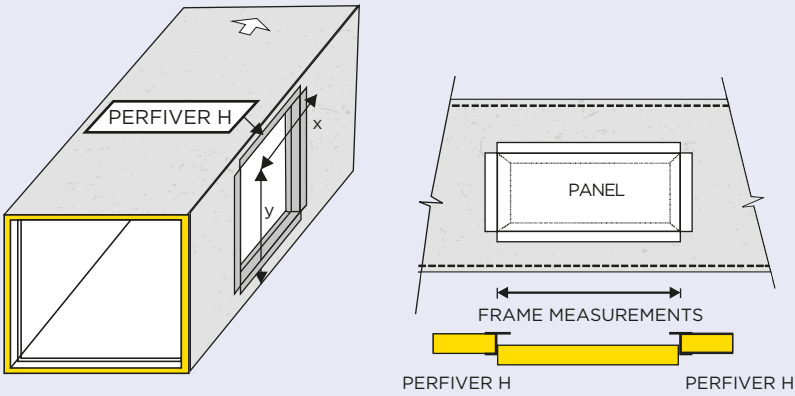
Use a PERFIVER H metal profile to connect the CLIMAVER® STAR duct to the machine structure or to its anti-vibration canvas.

8.2. Access ports

Both existing UNE regulations and the Spanish regulation on Thermal Installations in Buildings (RITE), indicate the need for access ports on ducts so that the installations can be inspected.

The procedure involved in making an access port involves cutting a window of the required size (AxB) using the cutter or the green blade with the white dot before fitting the PERFIVER H metal profile previously cut to the size of the frame. To cut the profiles and shape the frame to make the inspection cover, cut the profile at a right angle. Fit the previously cut cover over it and apply CLIMAVER® STAR tape to guarantee the air tightness of the port and the duct.

The PERFIVER H profile is not exclusively for the CLIMAVER® METAL System but can be applied to make access ports and machine connections.



8.3. Transitions between ducts from 40 mm to 25 mm in thickness

No additional figure is required (reduction, cover) to make the transition between two ducts with a different thickness. Simply make the 25 mm duct with 1 cm more on each side than the measurements of the CLIMAVER® STAR so that the males and females fit correctly. Then staple and tape to guarantee the air tightness of the installation.

This transition should be made inside the building.

9. CLIMAVER® STAR reinforcements

9.1. Procedure

The distance between reinforcements depends on the **largest side of the duct** and **the maximum operating pressure available,** so as not to reach the maximum allowable deflection, which is one hundredth of the measurement of the largest side of the duct.

For the CLIMAVER® STAR installation, ISOVER recommends using continuous perimeter frame-type reinforcements, with the maximum reinforcement distances being the same for discharge and for return (see reference table on Page 25).

In order to build the continuous perimeter frames you will need a drilled rail (1.2 mm / 2 mm in thickness), depending on the cross-sections and maximum operating pressures of the air conditioning units, A.T.Us, heat exchangers, machines, etc. It is important to connect the corners of the frames with brackets and screws to create a continuous frame that withstands the discharge and return pressure of the installation.

The frames are fitted around the outside of the CLIMAVER® STAR duct and are attached to the inside with typical screws (zinc-coated hex-headed screw at least 50 mm in length or similar) and plates will be inserted on the inside that are approximately: 150 mm x 70 mm and 2 mm in thickness or similar in order to secure the mechanical attachment of the perimeter frame to the duct. The maximum distance between plates will be 400 mm.

All the holes will be sealed with CLIMAVER® STAR adhesive to avoid water filtrations.

Wherever possible on CLIMAVER® STAR installations, perimeter reinforcements should be fitted on the male and female connections.

General recommendations for reinforcements on straight ducts according to CETIAT test

Table. Maximum distances of discharge/return perimeter reinforcements for straight ducts.

Interior side measurement A o B (mm)	Maximum static pressure			
	< 200 Pa	200 Pa - 400 Pa	401 Pa - 600 Pa	601 Pa - 800 Pa
less than 500	–	–	–	–
500 to 599	–	–	1200 mm	600 mm
600 to 699	–	1200 mm	600 mm	600mm
700 to 799	1200 mm	1200 mm	600 mm	600 mm
800 to 999	1200 mm	600 mm	600 mm	600 mm
1000 to 1099	1200 mm	600 mm	600 mm	400 mm
1100 to 1399	600 mm	600 mm	400 mm	400 mm
1400 to 2000	600 mm	600 mm	400 mm	400 mm

1.2 mm drilled rail. 2.0 mm drilled rail. – No reinforcement.

Recommendation

Wherever possible, follow the recommendations below when making perimeter reinforcements:

- Maximum distance 1200 mm: Perimeter reinforcements on male-female connections.
- Maximum distance 600 mm: Perimeter reinforcements on male-female connections and in the centre of the ducts.
- Maximum distance 400 mm: Perimeter reinforcements on the male-female connections and two reinforcements per duct every 400 mm.

Reinforcements on figures

Figures that require reinforcements, due to their operating pressure or cross section, will have then fitted on each of the parts forming the figure so that the reinforcements are increased at these points, distributing the operating loads.

Due to the shape and size of the machine ports, one perimeter reinforcement is recommended half-way along the figure.

10. Supports

10.1. Requirements/ general

Supporting a duct on the roof requires greater demands that doing so inside the building, basically for two reasons. Firstly because the ducts have a larger cross section and weight, as the A.T.U. outlets are found on the roof with their maximum flow rate and pressure, and secondly because of the weather, mostly wind, rain and snow. Therefore, a structure or supporting base must be provided depending on the ducts running along the roof to guarantee the solution.

The CLIMAVER® STAR roof support will have similar requirements to that used on metallic ducts and the site management will determine the procedure in question.

10.2. Recommended distances on supports for straight ducts

The distance between supports will be determined by an interior cross section on the largest side of the duct, according to the following table:

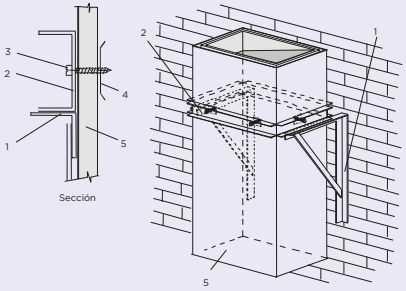
Interior measurement (mm)	Maximum distance (m)
< 800	1.8
800 - 2000	1.2

Figures must have their own supports.

Note: Perimeter reinforcements, if fitted according to the manufacturer's recommendations, could be used as supporting points.

10.3. Supporting points

On supports where the supporting point does not match a perimeter reinforcement frame, the duct will be fitted with a supporting system in order to distribute loads and prevent the outer complex from being marked at this point. For example, an L-shaped profile with wings measuring 10 cm x 10 cm and 15 cm in length could be used.



1. L-shaped profile support bracket.
2. Clamp for vertical installation built using L or U-shaped profile.
3. Screw-plate.
4. 40 mm washer.
5. CLIMAVER® STAR **glass wool duct.**

10.4. Vertical support

The vertical support for CLIMAVER® STAR ducts that ISOVER recommends has the same requirements as that of the horizontal support. When the duct is supported on a vertical wall, the tie-off point must match the reinforcement. The support will be made using an angular profile measuring at least 30 mm x 30 mm x 3 mm.

Where the reinforcement does not match or the installation of reinforcements is not required, perimeter frames will be made to attach the duct to the tie-off points of the vertical support.

11. Tables showing panel development on straight ducts

11.1. One-piece straight duct

A/B	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110
20	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
25	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	
30	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290		
35	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290			
40	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290				
45	160	170	180	190	200	210	220	230	240	250	260	270	280	290					
50	170	180	190	200	210	220	230	240	250	260	270	280	290						
55	180	190	200	210	220	230	240	250	260	270	280	290							
60	190	200	210	220	230	240	250	260	270	280	290								
65	200	210	220	230	240	250	260	270	280	290									
70	210	220	230	240	250	260	270	280	290										
75	220	230	240	250	260	270	280	290											
80	230	240	250	260	270	280	290												
85	240	250	260	270	280	290													
90	250	260	270	280	290														
95	260	270	280	290															
100	270	280	290																
105	280	290																	
110	290																		

CLIMAVER® STAR panel development one-piece duct in cm.

Note: These are interior measurements. They have been rounded off and 30 cm added to the development of the 4 sides and the overlap has been made by passing the red blade over once + angle guide width (4.5 cm + 3 cm).

11.2. Two-pieces straight duct

A/B	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200
30	292	302	312	322	332	342	352	362	372	382	392	402	412	422	432	442	452	462	472	482	492
35	302	312	322	332	342	352	362	372	382	392	402	412	422	432	442	452	4620	472	482	492	502
40	312	322	332	342	352	362	372	382	392	402	4120	422	432	442	452	462	4720	482	492	502	
45	322	332	342	352	362	372	382	392	402	412	422	432	442	452	462	472	482	492	502		
50	332	342	352	362	372	382	392	402	412	422	432	442	452	462	472	482	492	502			
55	342	352	362	372	382	392	402	412	422	432	442	452	462	472	482	492	502				
60	352	362	372	382	392	402	412	422	432	442	452	462	472	482	492	502					
65	362	372	382	392	402	412	422	432	442	452	462	472	482	492	502						
70	372	382	392	402	412	422	432	442	452	462	472	482	492	502							
75	382	392	402	412	422	432	442	452	462	472	482	492	502								
80	392	402	412	422	432	442	452	462	472	482	492	502									
85	402	412	422	432	442	452	462	472	482	492	502										
90	412	422	432	442	452	462	472	482	492	502											
95	422	432	442	452	462	472	482	492	502												
100	432	442	452	462	472	482	492	502													

CLIMAVER® STAR
panel development in cm.
2-PIECE DUCT
U+ Cover L+ L

Note: These are interior measurements. They have been rounded off and 32 cm added to the development of the 4 sides and the overlap/overlaps have been made by passing the red blade over once + angle guide width (4.5 cm + 3 cm).

CLIMAVER® STAR

CLIMAVER® self-supporting ducts for exterior use

ISOVER high-density glass wool panel for exterior use A non-absorbent panel, faced externally with plasticised embossed aluminium providing a completely impermeable water vapour barrier and ultra-violet protection, and attached to the stonewool panel through a system that is resistant to exposed environments. The interior is lined with a black reinforced Neto glass fibre weave which offers great strength. Due to its excellent thermal and acoustic performance, ***CLIMAVER® STAR*** is the ideal solution when installing: · Air distribution self-supporting duct systems in heating and cooling installations on building exteriors.

Technical properties

Symbol	Parameter	Icon	Units	Value	Standard
λ_D	Thermal conductivity declared as a function of temperature		W/m·K (°C)	0,032 (10) 0,033 (20) 0,036 (40) 0,039 (60)	EN 12667 EN 12939
—	Reaction to fire		Euroclasse	B-s1, d0	EN 13501-1 EN 15715
MU	Mineral wool: water-vapour diffusion resistance, μ		—	1	EN 12086
Z	Facing: water-vapour diffusion resistance		m²•h•Pa/mg	150	EN 12086
MV	The vapour diffusion-equivalent air layer thickness, Sd		m	100	EN 12086
DS	Dimensional stability, Δε		%	< 1	EN 1604
—	Airtightness		Class	D	UNE-EN 13403 EN 12237
—	Pressure resistance		Pa	800	UNE-EN 13403

Working conditions: Air speed up to 18 m/s and circulating air temperature up to 90°C.

Thickness d (mm)	Weighted acoustic absorption coefficient, AW, α_w	Acoustic absorption class		Designation code
EN 823	EN ISO 354 EN ISO 11654	UNE EN ISO 11654		EN 14303
40	0,90(1)	A		MW-EN 14303-T5-MV1

Acoustic trials with plenum: CTA 140003/REV. (1) Weighted acoustic absorption coefficient AW, α_w without plenum 0,70 (40mm thickness) CTA 140053/REV-2 and α_w without plenum 0,90 (50 mm thickness) CTA 140045/REV-2.

	Frequency (Hz)					
	125	250	500	1000	2000	4000
Thickness d, mm	Practical acoustic absorption coefficient, α_P EN ISO 354 / EN ISO 11654					
40	0,40	0,70	0,85	0,85	0,90	1,00
Section, S mm²	Acoustic attenuation on a straight section, ΔL (DB/m)*					
200x200	5,82	12,75	16,73	16,73	18,12	21,00
300x400	3,40	7,43	9,76	9,76	10,57	12,25
400x700	2,29	5,01	6,57	6,57	7,12	8,25

*Estimate based on the formula: $\Delta L = 1{,}05 \cdot \alpha_p^{1,4} \cdot \frac{P}{S}$, (P = perimeter)

For the sound power of a ventilator with a 20, 000 m³/h, flow, load loss 15mm ca.

Presentation

Thickness d (mm)	Length l (m)	Width b (m)	m²/pallet	m²/truck
40	3,00	1,21	65,34	1.568,16

Advantages

- Resistance to the elements Climatic cycle ageing testing based on the ISO 9142 standard, section D3 - passed.
- Ideal for direct application onto building exteriors.
- High thermal performance.
- Maximum watertightness level.
- Optimal acoustic environment quality.
- Resistant to the most aggressive cleaning methods, UNE 100012.
- Fast, simple installation. Maximum on-site efficiency.
- Join continuity thanks to the exclusive panel tongue and groove system.
- No proliferation of mould or bacteria, EN 13403.
- Sustainable product. 100% recyclable. Recycled material > 50%.

Certificates

Installation Guide

Consult the ***CLIMAVER®*** Ducts Assembly Manual
Additional information available at: www.isover.es

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ISOVER SAINT-GOBAIN

Universal CLIMAVER® Tools

UNIVERSAL CLIMAVER® TOOLKIT

Specific cutting tools for making 40 mm and 25 mm ducts (complete ***CLIMAVER®*** range). The piece change is made easily without the need of tools.

The ***CLIMAVER®*** 25 mm and 40 mm panel cutting tools are in the same case. Easy and without the use of auxiliary tools for its change, adapter plugs for the different measures are available inside the case.

Red tool

Tool whose main mission is to make the straight section. Make the grooves for folding the sides of the duct at 90°.

Blue tool

Make the last groove to fold the sides of the duct to 90° leaving an overlap for closing duct.

Dovetailing tool

To make the dovetailing in the ***CLIMAVER®*** ducts. Generally used when the installation requires sections less than the width of the panel, connections, straight sections, etc...

Universal SDM Tool

Tool to cut and make figures with angles at 22.5°. With a single tool, it allows a straight and precise cut of the entire thickness of the panel. Inclined the same tool allows to make cuts at an angle of 22.5° to make the 45° turns of the installation figures.

UNIVERSAL CLIMAVER® GUIDE:

Aluminum Angle Guide with the most common used angles predefined (90 °, 22.5 ° and 45 °). Simplifies duct measuring and cutting operations.

CLIMAVER® STAR ACCESSORIES

CLIMAVER® STAR tape

75 mm wide, 305 micron acrylic-based embossed aluminium tape for the installation of ***CLIMAVER***® self-support ducts on building exteriors. Ensures the air tightness of the duct and the perfect and permanent adhesion of the tape to the duct.

Presentation
Roll of pure aluminium - 305 micra thick, 75 mm wide and 50 m long.
Operating temperature from -70° C to 149° C.

CLIMAVER® STAR adhesive

Fast, strong solvent-free installation adhesive.
Specially prepared for glass wool joints.
Odourless, non-toxic and non-flammable for application on the sealing of interior connections when making figures in ***CLIMAVER® STAR*** on outdoor installations.

Presentation
300 ml cartridges.
In boxes of 12 cartridges.

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Notes

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Notes

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CLIMAVER® STAR

under the stars

For outdoor use

ISOVER outside airduct solution.

SAINT-GOBAIN

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RRP: €8.60