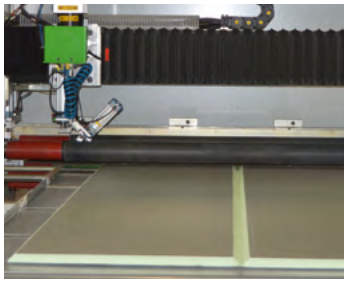
isocanale system

TECHNICAL MANUAL FOR AIR DUCT CONSTRUCTION

Pre-insulated ductwork for air distribution

stiferite® isocanale®



Stiferite facts and figures

Since 1963 Stiferite has been the Italian leading manufacturer of rigid polyurethane foam panels with flexible coatings.
In the 70s Stiferite worked out a special panel made of aluminium-coated polyurethane, specifically made for the construction of air distribution ducts.
The leader and contributor to the success of this application for many years now, Stiferite is still manufacturing this panel and has also become a competent and reliable partner for the supply of the entire pre-insulated ductwork construction system, which is currently one of the best known systems worldwide, after our over 50 years in business.

STIFERITE Quality & Certifications

CERTIFICAZIONE SISTEMA DI GESTIONE
DNV·GL
ISO 45001 = ISO 9001
ISO 14001

Quality Management System

STIFERITE audits the entire production process against the requirements of the ISO 9001 Quality System certification on a voluntary basis.

Health & Safety

STIFERITE has been certified against standard ISO 45001, which is specifically designed to safeguard the health and safety of workers.

Environmental Management

STIFERITE certifies its Environmental Management System against standard ISO 14001.

Institut Bauen und Umwelt e.V.

Environmental Product Declaration (EPD)

EPDs are available for STIFERITE products and these are issued following a procedure that is certified by a Third Party Entity (IBU - Institut Bauen und Umelt e. V.).

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1. The Isocanale system

1.1 Functions and main performances

The function of an air ductwork system is to convey the air from one room to another. The air may be conveyed from one room to another for various reasons: heating and/or cooling, air change (mechanical controlled ventilation systems to control the air humidity and purity) or industrial purposes (extraction of dust, fumes, etc.). Needless to say, the reason may also be a combination of the above motivations.

Below is a list of some crucial points in favour of the Isocanale system:

- the thermal performance, as guaranteed by a λ_i value equal to 0.021 W/mK, which remarkably reduces dispersed heat and the operating costs during system operation after assembly;
- the reduction of air losses thanks to the certified air tightness, class C (UNI EN 13403, EN 1507);
- the possibility to apply the system in hospitals (Isocanale Clean system);
- the possibility to apply the system in corrosive contexts (Isocanale Extreme system);
- seismic safety thanks to its lightweight (low density panels are 75% lighter than a conventional sheet metal panel, and high density panels are 70% lighter than a conventional sheet metal panel) and great flexural rigidity leading to limited deformations and movements and very low risks of crushing due to falling objects;
- fire safety, as the system can meet the reaction to fire requirements B s1 d0 and B s2 d0 in accordance with the Euroclass system.

The list below illustrates some crucial cost-effectiveness points in favour of the Isocanale system:

- lightweight ductwork means lower transportation and handling costs, as well as shorter installation times as it takes less labour to install the ductwork, thanks to a smaller number of mounting anchorages, among other factors;
- adaptability on site: parts can be modified directly on site without requiring haulage to the headquarters.

The type of panel to be used for the construction of the ductwork depends on the use of the finished ductwork. We recommend that the designer refers to the technical data sheets of the various panel and profile models.

INSULATION

As the Isocanale panels have greater insulating properties, the operating costs incurred during ductwork operation are reduced.
The design conductivity at 10°C λ_D, which is equal to 0.022 W/mK, makes the ductwork highly performing.
The conductivity of the main alternative insulating panels coupled with sheet metal ductwork is equal to 0.037-0.040 W/mK, within a thickness range between 13 and 25 mm.
As the attached table shows, where the insulating Isocanale panel is taken as reference for its very high performances, the reduction in dispersed heat is remarkable as alternative insulating panels have worse performances, with dispersion values raging between 36% and 108% higher.

	Isocanale	Glass wool	Neoprene
Design λ [W/mK]	**0,022**	0,040	0,037
Thickness [mm]	**20**	25	13
Resist. (internal surface) [m²k/W]	**0,043**	0,043	0,043
Insulating material resist.	**0,91**	0,63	0,35
Resist. (external surface) [m²k/W]	**0,122**	0,122	0,122
Resistance of the structure [m²k/W]	**1,075**	0,795	0,515
Thermal transmittance of the structure [W/m²k]	**0,93**	1,26	1,94

LIMITS RESULTING FROM AIR TEMPERATURE, PRESSURE AND SPEED

Below is a list of the max. requirements that need to be adhered to when manufacturing pre-insulated aluminium ductwork:

- max. temperature inside ductwork during continuous operation ≤ 70°C;
- max. air speed 15m/s;
- max. total pressure values can be higher if reinforcement are used, see ch. 9
- dimensions no limits on condition that the installation procedures are followed.

RESTRICTIONS

Ductwork must not be installed in the following applications:

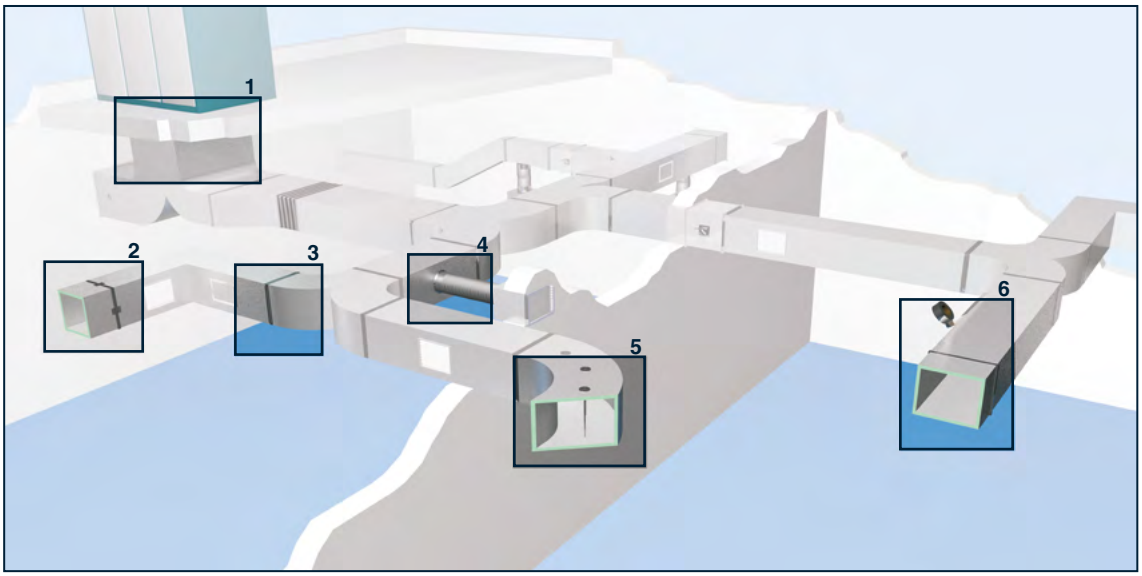
- kitchen extractors;
- solid material conveyor systems;
- chemical or fume exhaust systems;
- heating systems without automatic max. temperature control devices;
- applications fitted in the vicinity of heat sources exceeding 70°C;
- high pressure systems.

1.2 Air duct components

1. Plant connector
2. Tooth connector
3. Profiled flange
4. Hose clamp
5. Internal reinforcement rods
6. Ductwork edge taping

An air duct is normally made by a main body, vibration dumping joints for connection to the Air Handling Unit (AHU), branches, reducers to restrict the duct cross-section, elbows, flexible ducts, where needed, plenum boxes, air delivery and return outlets, gate valves to adjust the air flow, fire-retardant systems for protection against fire, inspection hatchways for maintenance, filters and systems to adjust the flow of the external air into the system for the air change.

A ducted system may not necessarily feature all the above mentioned components. However, ducts shall be made in such way as to be compatible with all the elements above.

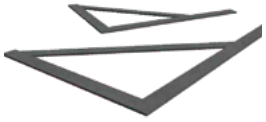


2. Tools and consumables used for ductwork construction

2.1 Drawing tools

All the tools described below are used to trace the lines that need to be followed when cutting the panels.

Metal tape measure (included in tool box, code 700312)



Code 700325 Square, 700 mm
Code 700326 Square, 1200 mm

Code 700412 Teflon marker to trace the cutting outlines (included in tool box, code 700312)

Code 700414 Scribing compass to trace curved lines (included in tool box, code 700312)

Code 700321 Clamping ruler, 4000 mm
Code 700323 Clamping ruler, 1200 mm

All operations preliminary to cutting and the subsequent panel cutting steps shall be performed on a work bench, specifically set up for these purposes.
We recommend using a 1200 x 4000 mm work bench and covering the top of it with a work mat in order to prevent scratching the panels during handling, damaging the edge of the blade in the cutting tools and safeguarding the work bench.

Code 700301 Table, 1200 x 4000 mm

Code 700304 Work mat

Templates may also be used to draw portions of the ductwork. These consist in metal sheets where the curved lines of the main ductwork sections are reproduced.

2.2 Cutting tools

Jack planes
These tools are used to cut and finish the edges of the panels that make up the ductwork. There are two main types of jack planes: single blade and double blade.

Single blade jack planes - these tools are used to cut panels from 18 to 30mm:

Code 700403 for 90° cutting (included in tool box, code 700312);

Code 700404 for 45° cutting, LH (included in tool box, code 700312)

Code 700405 for 45° cutting, RH (included in tool box, code 700312).

Double blade jack planes

Code 700401 for “V” cutting with 2 blades at a 45° angle, these tools are used to cut 20mm panels (included in tool box, code 700312)

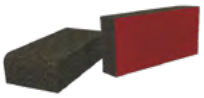
Code 700406 for “V” cutting with 2 blades at a 45° angle, these tools are used to cut panels from 18 to 30mm

Code 700402 for “V” cutting with 2 blades at a 22.5° angle, these tools are used to cut 20mm panels

Code 700407 for multi-angle cutting with 2 blades at a 10° to 120° angle, these tools are used to cut 20mm panels

Code 700333 Round hole cutters: the ideal tools to drill the holes for the clamps designed for connection to flexible ducts

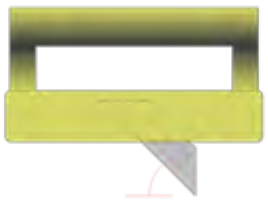
cutter required as support tool to perform all finishing operations at the duct heads (included in tool box, code 700312)



Code 700452 abrasive files (sandpaper) required to smooth, adjust and refine cut polyurethane foam surfaces (included in tool box, code 700312)

NOTE The angle of the blade to the surface of the panel that needs to be cut shall be inferior or equal to 45° so that the panel is cut without causing lumps of foam or wrinkling in the aluminium, which may cause problems during gluing of the ductwork edges.

☑ ok = 45°



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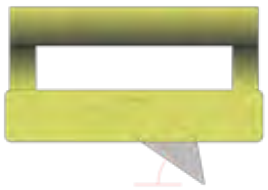
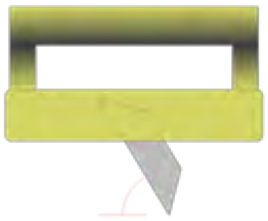


☒ no > 45°



2.3 Shaping tools

Code 700331 Bending machines - These tools are used to create curved surfaces without carving the panel coating. They are normally used together with the supplied rail (see Code 700335)

Code 700335 Rail - This tool is used to keep the panel perpendicular and to adjust the gap between consecutive creases.

Code 700416 Hard spatula - This is an essential tool to compress the edges of the panels immediately after gluing. More specifically, this tool is used to compress parts that require coupling and to round sharp aluminium sheet edges (also included in tool box, code 700312).

Cod. 700106 - 700107 Glue for Isocanale panels - This product is specifically used for foam-to-foam gluing when manufacturing the ductwork.

Code 700458 Glue spreader - This tool is used to apply glue onto Isocanale panels (see previous item). It makes glue application easier and reduces waste glue .

2.4 Internal sealing tools

Silicone gun - This tool is used to seal the inner thread of the joints.

Code 700123 Gray silicone neutral

Code 700334 Extension for silicone gun - This tool is used to seal the inner thread of the joints in the ductwork, access to which is not possible by simply extending your arm.

2.5 External sealing tools

Code 700411 Tape marker - This tool is used as a guide during standard and precise application of the aluminium tape (also included in tool box, code 700312).

Code 700415 Soft spatula - This tool is used for optimised application of the aluminium tape on both flat surfaces and the edge of the ductwork (also included in tool box, code 700312).

Cod. 700123 Gray silicone neutral

2.6 Profile application tools

Code 700109 Profile glue

Rubber mallet used to fit the aluminium profiles on the panel edges without damaging them

Code 700123 Neutral grey silicone

Profile angle grinder featuring an aluminium blade, preferably bench-mounted and with a vice to hold the machining profiles in place. Alternative saws or band saws are not recommended as their teeth may bend the profile at the carving point.

Metal brush, either manual or drill-mounted, used to remove burrs from the profiles resulting from cutting

2.7 Flanging tools

Code 700238 Adhesive gaskets

Code 700254 Galvanized self-threading screws

Screwdriver used to fit self-threading screws

Riveter used to lock profiles and clamps in place after drilling the necessary holes

2.8 Automatic cutting and bending tools

Automatic cutter - This tool is used to optimise cutting of the Isocanale panels and to perform cutting operations in a very short time. All the drawing and cutting operations are controlled from a PC terminal: the operator is only required to load the panel into the machine.

Automatic bending machine - This tool simplifies and speeds up machining of the panels that require shaping into elbows.

3. Construction procedure

3.1 How to build a duct

The design of the ductwork made by a qualified engineer is the starting point to build a ventilation duct following the instructions below.

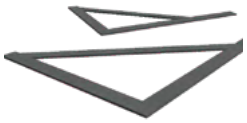
- The panels to be assembled need to be placed in such way that their inner face after assembly faces upwards. This is an important detail as panels may have aluminium coatings that are different in terms of thickness (e.g. 80/200 µm), appearance (smooth or embossed) or surface treatments (e.g. antimicrobial lacquer).
- After the panels are in position, the operator shall trace the lines, as shown in the attached diagrams. The requirements below should be kept in mind when tracing the internal lines along the length and width of the sides that make up the inner section of the ductwork: 40 mm shall be added if the panels are 20 mm thick (real 20,5 mm) and 60 mm shall be added if the panels are 30 mm thick (real 30,5 mm).
- Tracing of the surfaces that will eventually make up the ductwork shall be optimized to reduce waste as much as possible.

Specific software is available on the market to create optimized cutting patterns, depending on the panel size.

The panels may also be cut with the help of mechanical cutters, which remarkably simplifies these initial steps of the work processes.

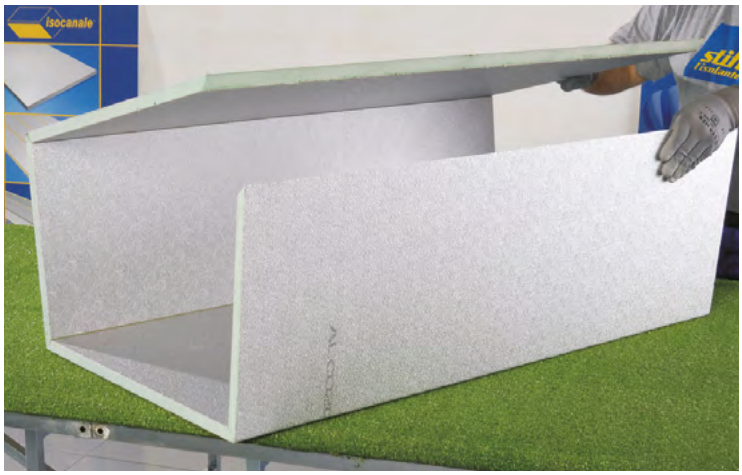
3.2 Tracing

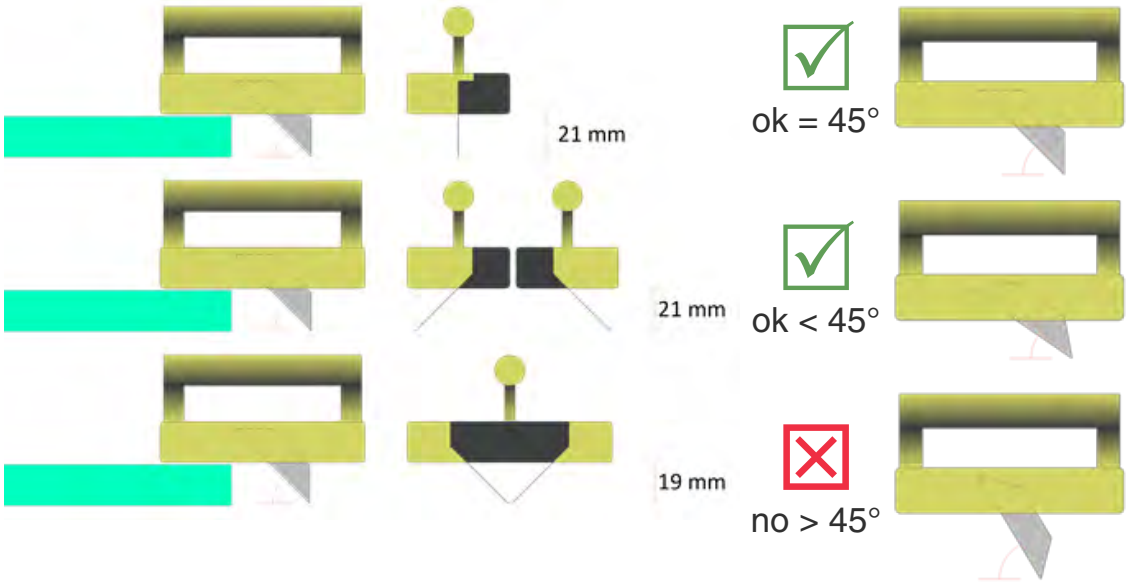
Lines shall be traced using a Teflon marker and with the help of battens, squares, bow compasses, tapes, and templates, where necessary, thus optimizing spaces, reducing waste and following the instructions given by any cut optimization software.



3.3 Manual cutting or with automated cutter

Cut the panels with the help of battens and manual cutters, paying special attention to the cutting angle of the blades that cut the recesses required to seal the ductwork. Once familiar with the jack planes, following the tracing, you can proceed with the manual cutting.





3.4 Panel sanding and gluing

After the panels are cut, a check is made folding the panel so that it takes the final shape of the ductwork. If there is excessive foam, the carved surface must be sanded in order to make any cut side compatible with the perpendicular face of the ductwork surfaces. Be careful! After sealing, the ductwork should not exert any pull force as forced sealing may affect the final shape and prevent it from being straight or may make it impossible to match with other ducts.
Once the panel cut sides are sanded and optimized, remove any dust or residues with a soft brush or with compressed air.
After this operation, apply glue to the panels - around 400g/m² - without spreading it over the aluminium surfaces.
Wait 5 to 10 minutes until the glue hardens.

Close all the sides of the duct until the final shape is obtained. Help yourself with the hard spatula to compress the various edges and to optimize gluing.

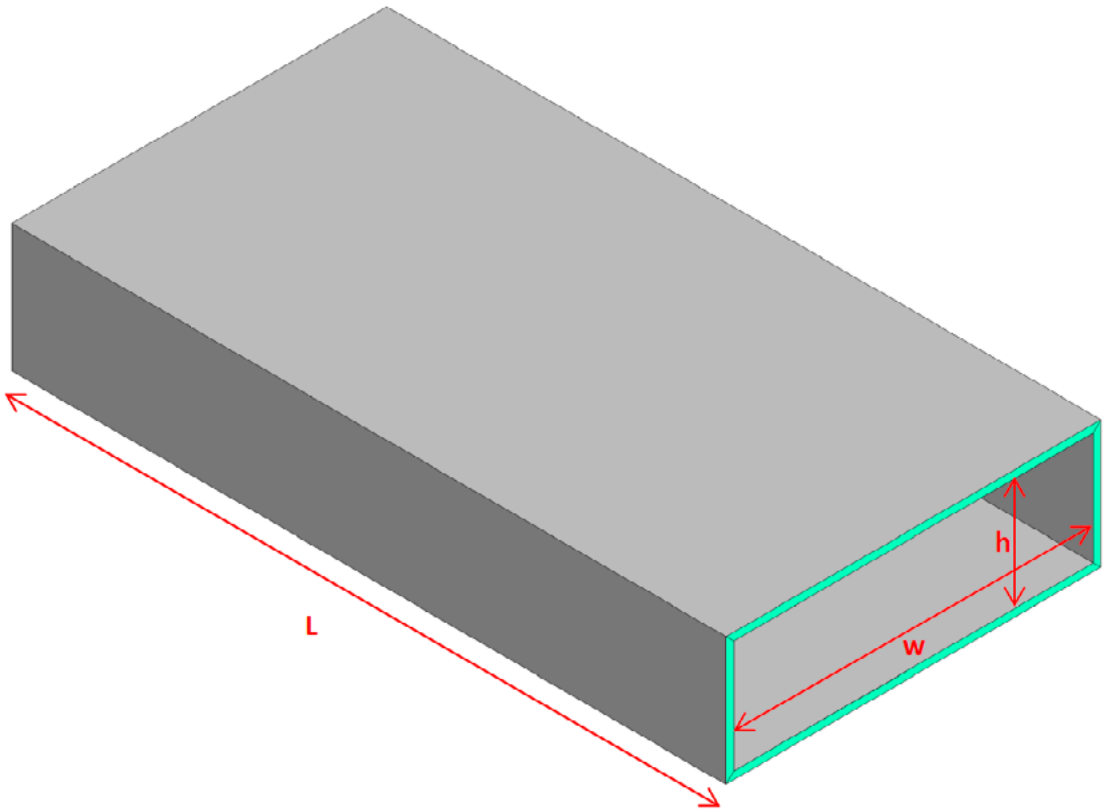
Seal the open edge with aluminium tape, as instructed below.
Use a tape marker to trace the reference line for the application of the aluminium tape.
Lay the tape along the reference line and stick the tape on the marked face only with the help of a soft spatula. Use the rounded side of the soft spatula to apply the tape on the panel edge. Then apply the tape to the second face of the ductwork, moving from the centre to the heads in order to minimise creases.
Remove any excess tape from the ductwork heads with the help of a cutter.

4. Construction of straight ductwork

4.1 Preliminary guidelines

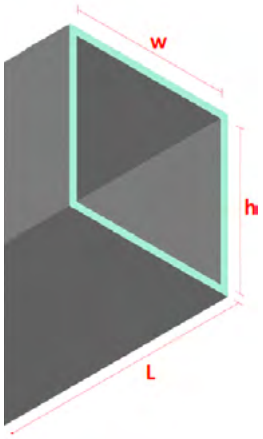
The Isocanale panel is 1200 mm x 4000 mm in size.
It is 20,5 mm thick, +/- 0,7 mm (a 30,5 mm thick version is also available upon request).

- h = height with reference to the inner ductwork size
- w = width with reference to the inner ductwork size
- L = length with reference to both the inner and outer ductwork size



4.2 Cutting methods for rectangular ducts

The size of the Isocanale panel, which is 1200 mm x 4000 mm, is the starting point to build a ductwork.
The thickness is 20,5 mm, +/- 0,7 mm (the 30,5 mm version is also available upon request).
The surfaces making up the ductwork can be cut out of the panel in all directions, in other words in length and in width, as well as on both sides. Attention must be paid when the sides of the panel have different coatings (e.g. 80/200 µm or smooth/embossed): the inner or outer surfaces must have the specific coating required by the design specifications (e.g. if the panel coating is 80/200 µm, the outer coating must be 200 µm).
Four cutting methods can be taken into account, each characterised by a limit measure, to optimize the ductwork construction processes and to reduce waste.



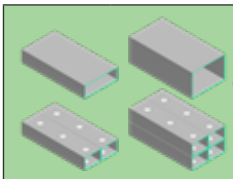
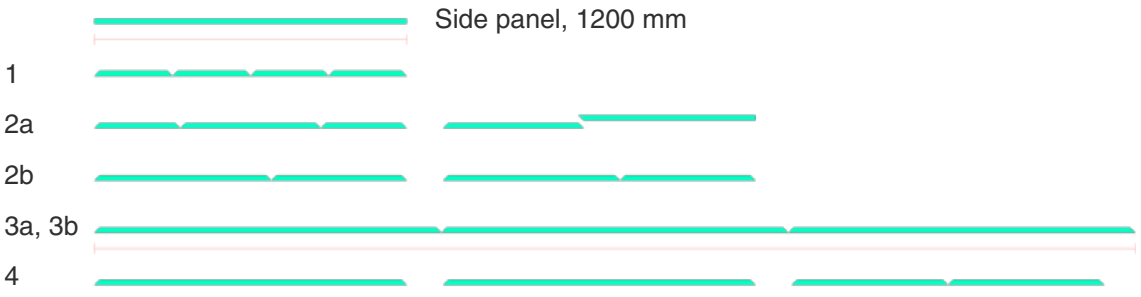


Table 1 – Construction of a straight duct

Method	Inner side dimensions		Max. length of ductwork segment "L"
	Panel, 20 mm thick	Panel, 30 mm thick	
1	2x (w+h) < 1040 mm sum of 4 sides	2x (w+h) < 960 mm sum of 4 sides	4000 mm
2a	(h+w+h) < 1080 mm sum of 3 sides	(h+w+h) < 1020 mm sum of 3 sides	4000 mm
2b	(w+h) < 1120 mm sum of 2 adjacent sides	(w+h) < 1080 mm sum of 2 adjacent sides	4000 mm
2c	w or h < 1160 mm any side	w or h < 1140 mm any side	4000 mm
3a, 3b	(h+w+h) < 3880 mm (w+h+w) < 3880 mm sum of 3 sides	(h+w+h) < 3760 mm (w+h+w) < 3760 mm sum of 3 sides	3600 mm
4	w or h < 3960 mm any side	w or h < 3940 mm any side	1200 mm

Cross-sections of cuts achieved using the methods listed in the table



Cross-sections of ductwork obtained using the methods listed in Table

1

2a

2b

3a, 3b

4

Calculation of values listed in the table
Example with Method 1: 5 cuts are made where 2 are 45° cuts on the panel sides and 3 are “V” cuts in the central area of the panel.

a) 20 mm thick panels
A 45° cut requires that a 20 mm portion of the inner surface be removed; a “V” cut requires that a 40 mm portion of the inner surface be removed.

Hence: 20+40+40+40+20 = 160 mm

The resulting value should be subtracted from the width (w) of the panel to obtain the max. length of the inner ductwork perimeter, which is calculated as follows:

1200 mm – 160 mm = 1040 mm.

b) 30 mm thick panels
A 45° cut requires that a 30 mm portion of the inner surface be removed; a “V” cut requires that a 60 mm portion of the inner surface be removed.

Hence: 30+60+60+60+30 = 240 mm

The resulting value should be subtracted from the width (w) of the panel to obtain the max. length of the inner ductwork perimeter, which is calculated as follows:

1200mm – 240mm = 960mm

Recommendation for assembly

The duct head templates are a valuable tool to build extremely precise sections of the ducts. They are not necessary at all times, but when the duct is especially large, they make assembly easier during the gluing stages.
These elements are made with easy-to-process materials and they can also be made with scrap Isocanale panels on condition that they have the same cross-section as the panel to be built, rounded edges to prevent damaging the duct during their removal, and handles/holes to be used for their extraction after the duct has been glued.
Place the templates on the panel side that is made to rest on the work bench at the end of the assembly process (Fig. 2). Then place the other sides already provided with the glue for polyurethane foam all around the templates (Fig. 3 and Fig. 4). After the panel has been glued and taped, the templates can be removed and re-used.
The advantage of this method is that the manufactured ducts have the same exact cross-section, in other words they are easy to match with both profiles and toothed joints.

fig.1

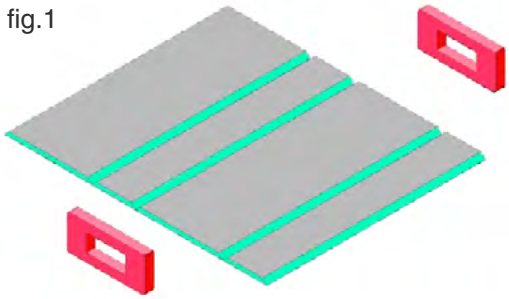


fig. 2

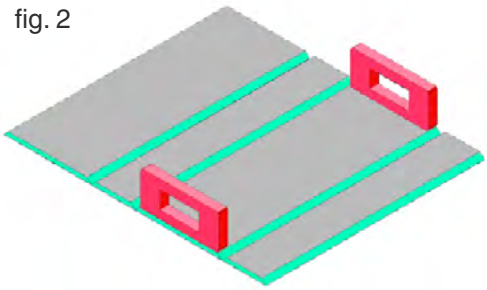


fig. 3

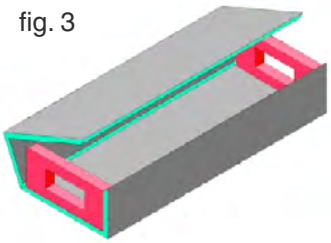


fig. 4

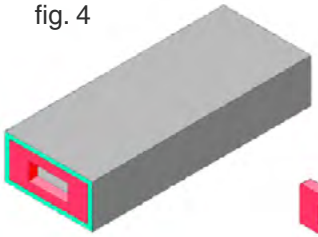
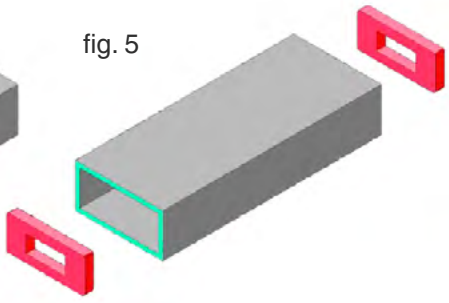


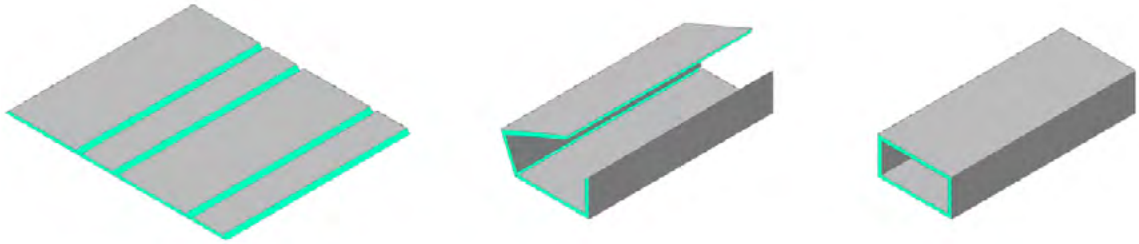
fig. 5



Method 1

The duct can be manufactured with one single panel, if the limit dimensions are those specified in Table 1 - 1040 mm for 20 mm thick panels and 960 mm for 30 mm thick panels.

The grooves are made parallel to the long side of the duct. The assembly procedure to be followed is that illustrated in Chapter 3 above.



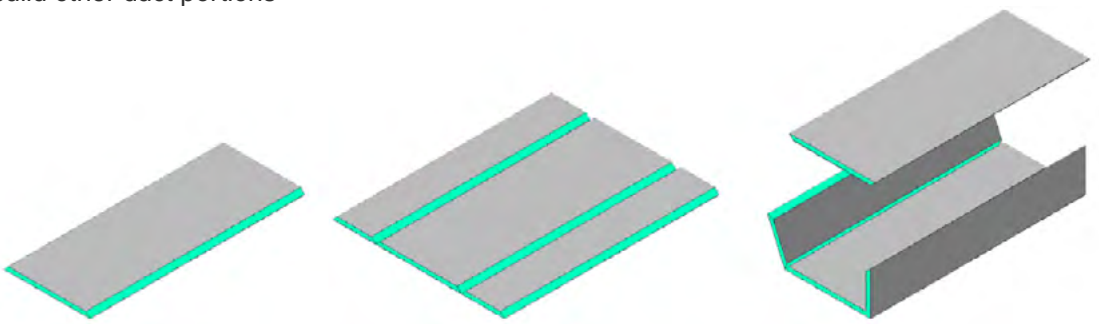
Method 2

This method is used to build straight ducts with a larger cross-section than in Method 1. Two panels are used in this case.
The cross-section of the duct shall be the driving element to decide whether to process the two panels that require shaping equally or differently.
Method 2a will apply to 20 mm thick ducts, if the sum of three of the four sides of the duct is equal or inferior to 1080. Alternatively, where the sum of two of the four inner sides of the duct is inferior to 1120, Method 2b will apply. Method 2a will apply to 30 mm thick ducts, if the sum of three of the four sides of the duct is inferior to 1020. Alternatively, where the sum of two of the four inner sides of the duct is inferior to 1080, Method 2b will apply.

Method 2a

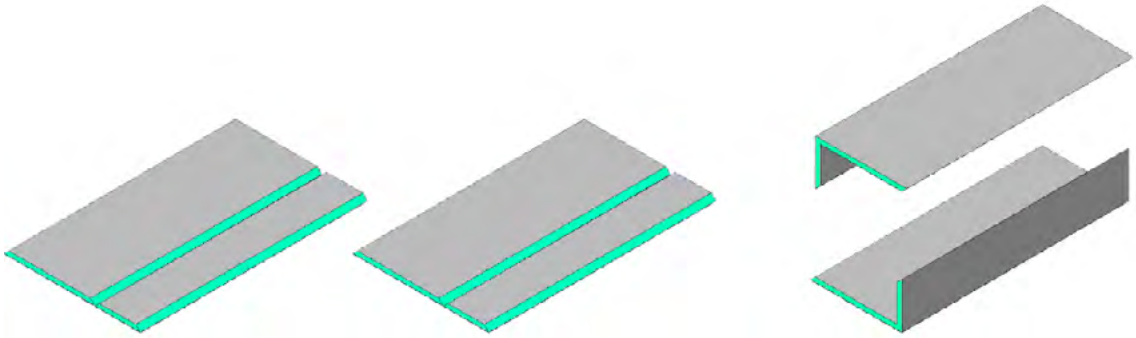
h + w + h < 1080 mm or w + h + w < 1080mm for 20 mm thick panels h + w + h < 1020 mm or w + h + w < 1020mm for 30 mm thick panels

Grooves are cut lengthwise.
Any scrap resulting from the panel that is used to cut the single side of the duct may be used to build other duct portions



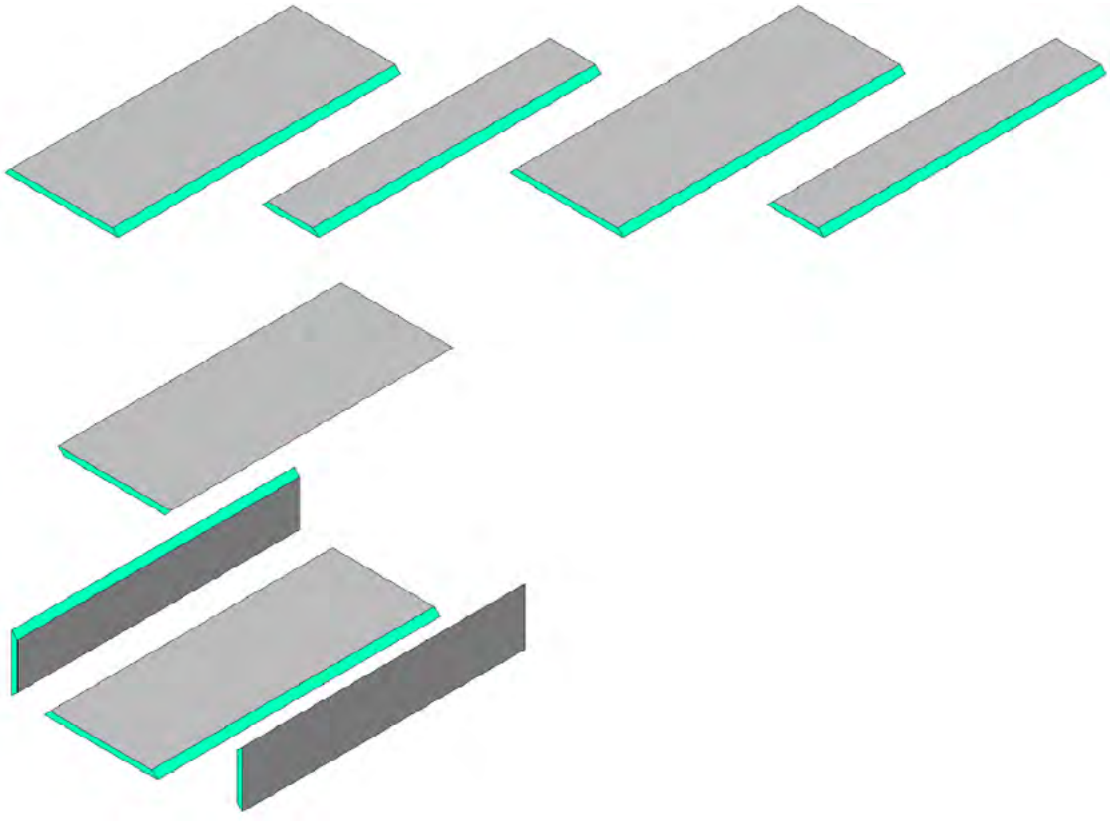
Method 2b

This method is used when the sum of the inner height and length of the duct are included within the values below:
w + h < 1120 mm for 20 mm thick panels
w + h < 1080 mm for 30 mm thick panels

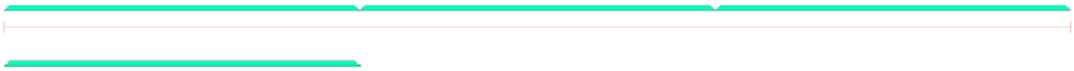


Method 2c

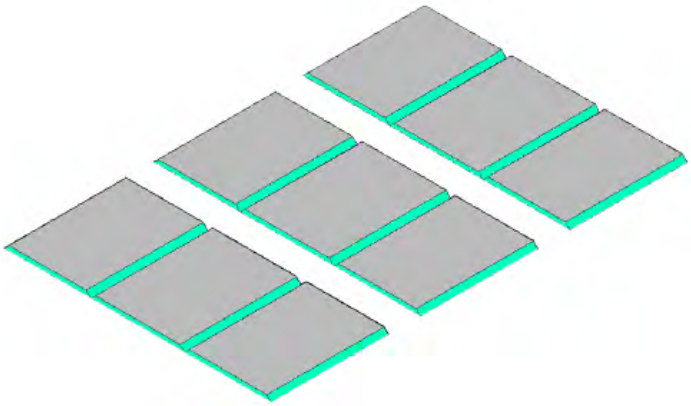
If the sum of two inner adjacent sides of the duct exceeds the values specified for Method 2b, the duct sides must be cut out of single panels, as instructed below: w and h < 1160 mm for 20 mm thick panels;
w and h < 1140 mm for 30 mm thick panels.
Grooves must be cut lengthwise and the duct length will be limited by the panel length: 4000mm.



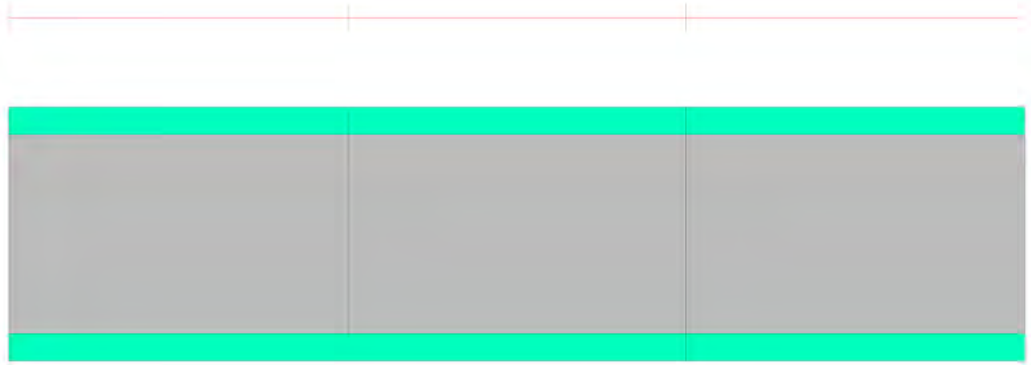
Method 3

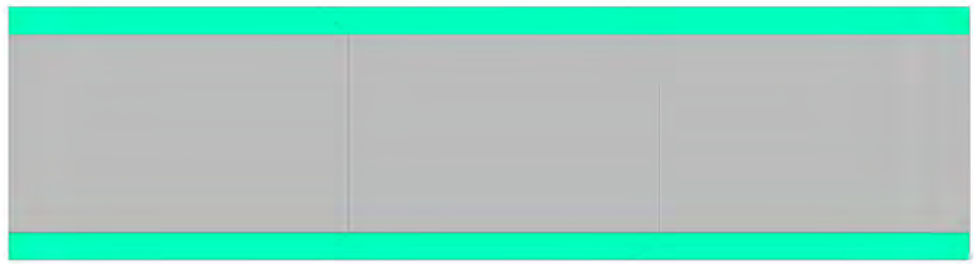


This method is normally used for very large ducts where the length of the duct is determined by the limit width of the panel. In this case, the V grooves are cut along the width of the panel, which is folded lengthwise to form a U-shaped portion of the duct.



The joints between the portions of the duct are made with tooth connectors (sect. 11.4). If the gluing surface between the portions needs to be improved, we recommend cutting the sides at 45° (see drawing). This will result in the final duct made with 20 mm thick panels losing 40 mm in length (60 mm lost in 30 mm thick panels), on the one hand, and greater pressure tightness of the duct, on the other.

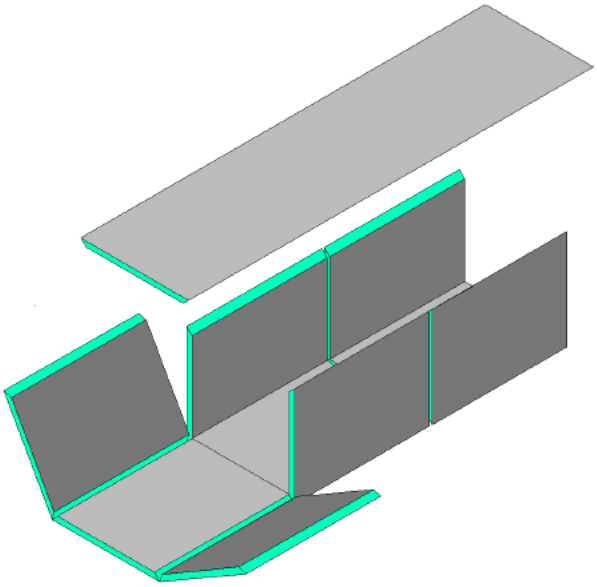




For information on how to build the last side, reference should be made to method 3a or Method 3b below.

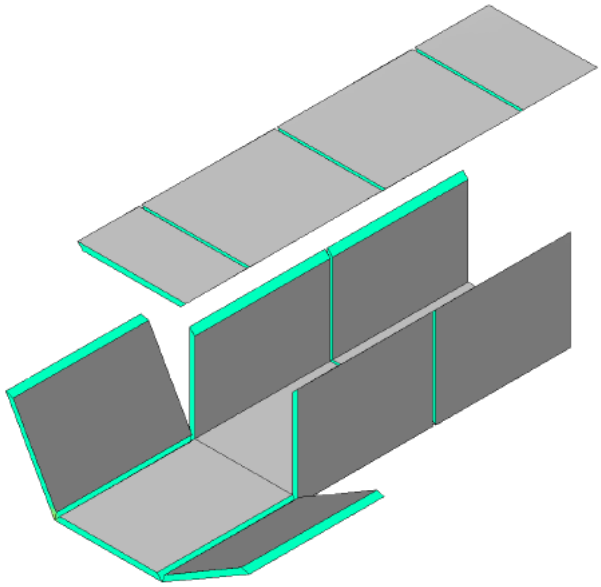
Method 3a

If the duct length is to be increased beyond the 1160 mm limit, three individual modules can be joined together in order to cover a max. length of 3560 / 3540 mm (the difference is due to the thickness of the panels - 20 / 30 mm -, considering three 1200 mm modules with two “V” joints), with a cover having max. inner width equal to 1160 / 1140 mm.



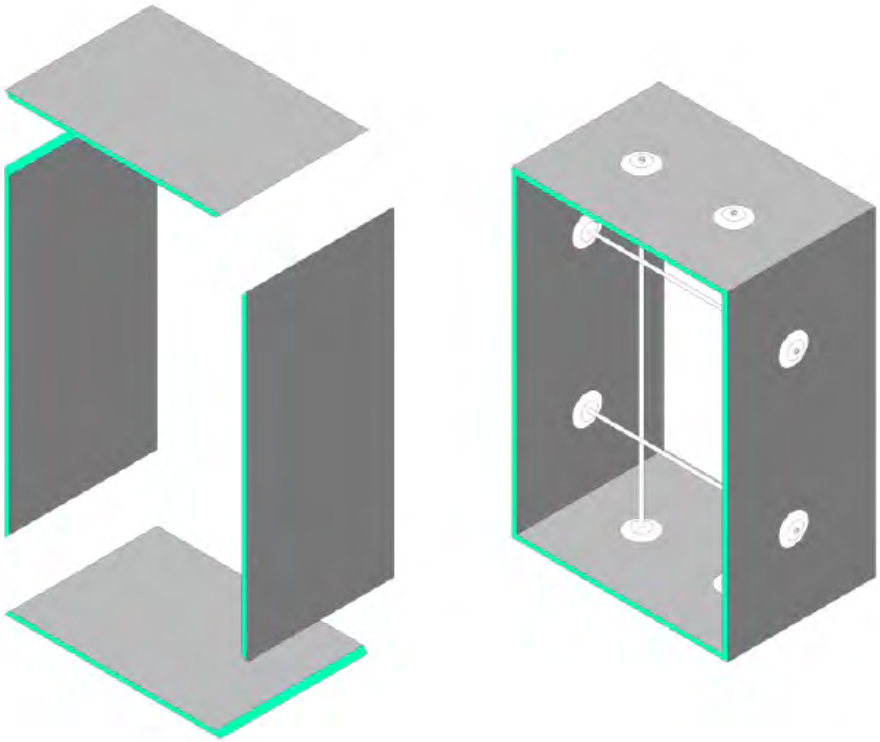
Metohod 3b

If the cover width exceeds 1160 / 1140 mm (depending on the thickness of the panels - 20 / 30 mm), the long side of the panel used as cover must be oriented perpendicularly to the direction of the duct, and, to reinforce the duct, the joints must not be in line with the three segments of the U-shaped body of the duct, as shown in the figure.



Method 4

This method is normally used for very large ducts where a whole panel can be used as one single side and the max. inner width or height are 3960 / 3940mm (20 mm thick panels 4000 mm-40 mm = 3960 mm; 30 mm thick panels 4000 mm-60 mm = 3940 mm).
The segments will have a max. length of 1200 mm. This method necessarily requires the application of internal reinforcements (Chap. 9). Depending on the pressure and the air speed, it may be more convenient to apply the multiple duct method (Chap. 10).

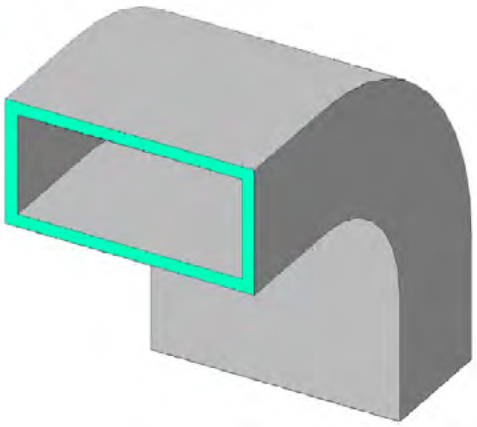


5. Construction of elbow ductwork and 90° elbows (turning vanes)

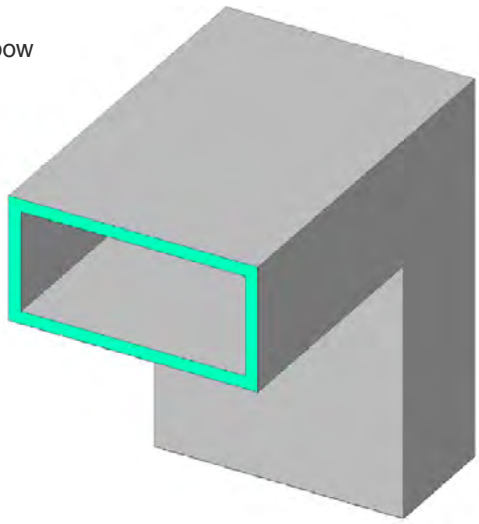
5.1 Elbows and special accessories

Elbows are probably the most common components in a ductwork. Below are some examples of elbows.

Radius elbow

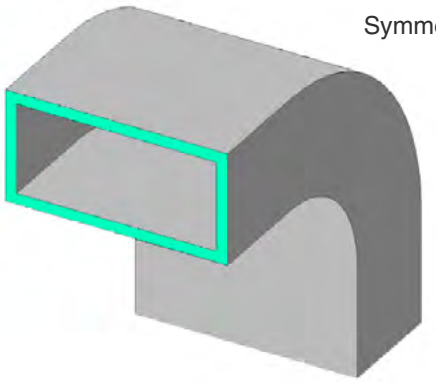


Square elbow

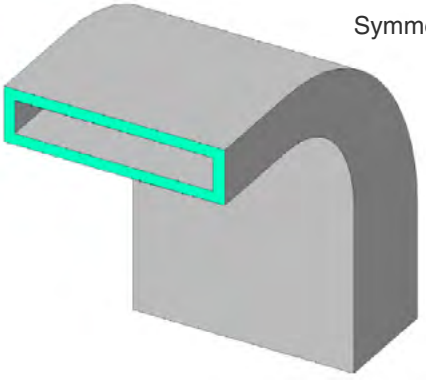


A radius elbow is the component where the air is free to flow smoothly along the elbow rounded path with minimal turbulence or resistance. On the other hand, a square elbow causes the air to be briskly deviated, which causes more resistance and turbulence. This is the reason why in this type of elbow the use of turning vanes is required.

Symmetrical elbow



Symmetrical elbow



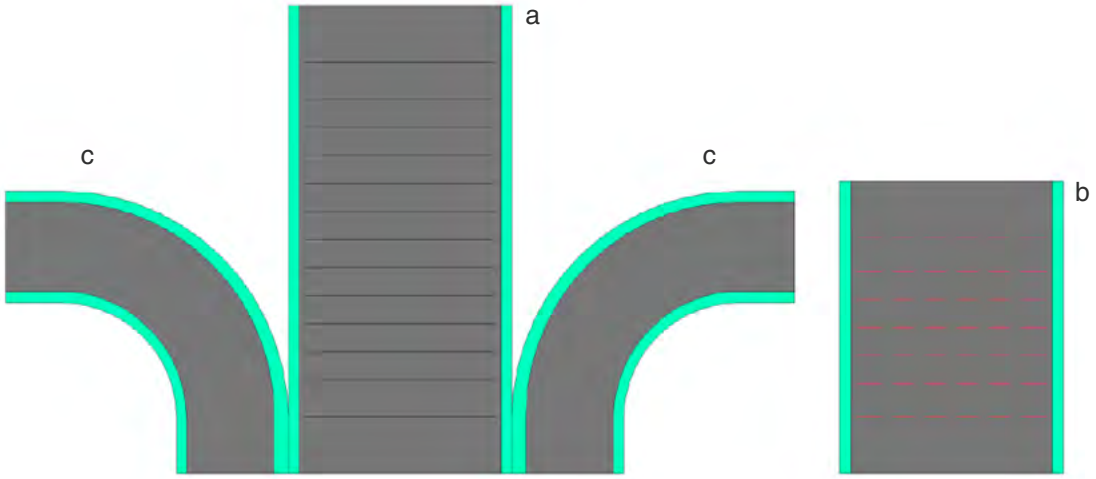
An elbow is symmetric when the dimensions of the inlet and outlet are the same, which is not the case with an asymmetric elbow where the inlet and outlet dimensions are not the same.

5.2 Elbow construction

First of all, four separate pieces must be cut, based on the inlet and outlet dimensions, the neck length and the radius requirements. The min. neck length must be 200mm and the inner radius must be 200mm. The distance between the creases on the inner and outer bands must be at least 50mm. All the cuts are made using a jack plane with an appropriate angle.

The four parts include: the outer band (a), the inner band (b) and the side bands (c) (see Figure).

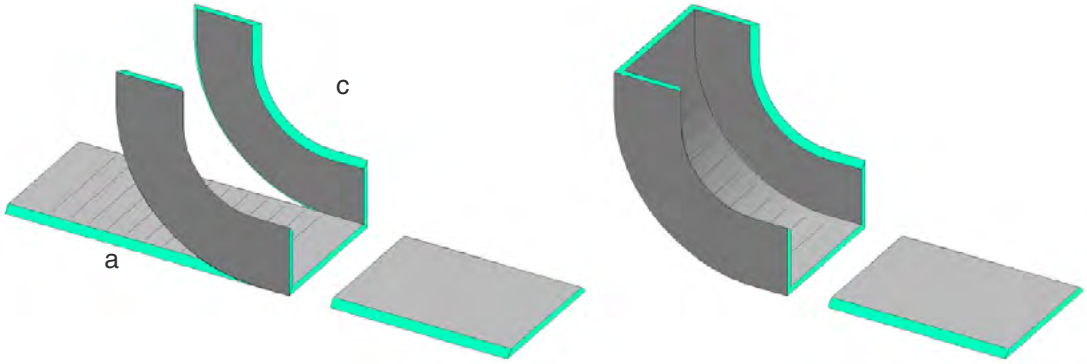
Elbow components



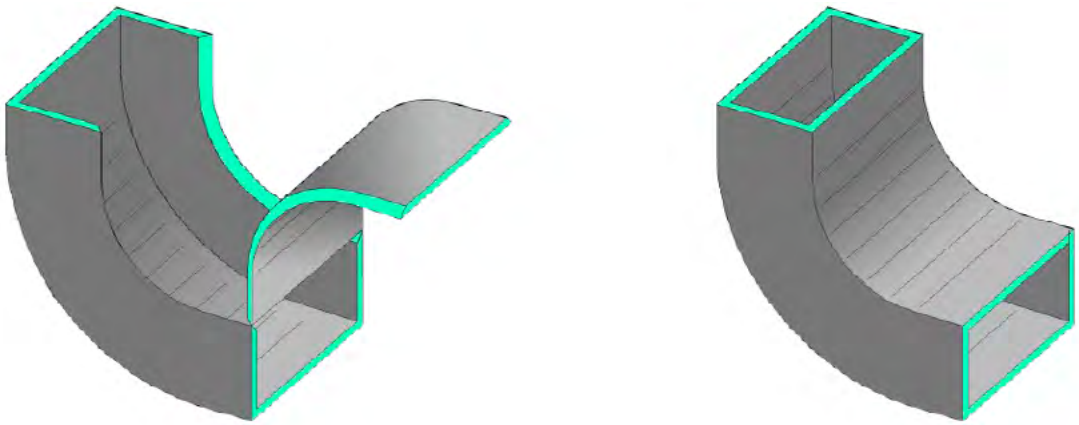
All the measurements must be taken on the inner side of the duct.
When measuring the inner and outer bands, a nominal amount should be added to compensate for the bending creases that form when the panel is folded. The inner and the outer bands should be creased with the help of an either manual or mechanical bending machine (see Chap. 2 Accessories) and the creases should be made on the panel surface facing the centre of the elbow in the duct. In other words, the creases in the outer band (a) (highlighted in black in the drawing) will be on the surface facing the inner side of the duct; the creases in the inner band (b) (highlighted in red and dotted as they are on the other side of the panel in the figure) will be on the surface facing the outer side of the duct

Below is a description of the assembly procedure:

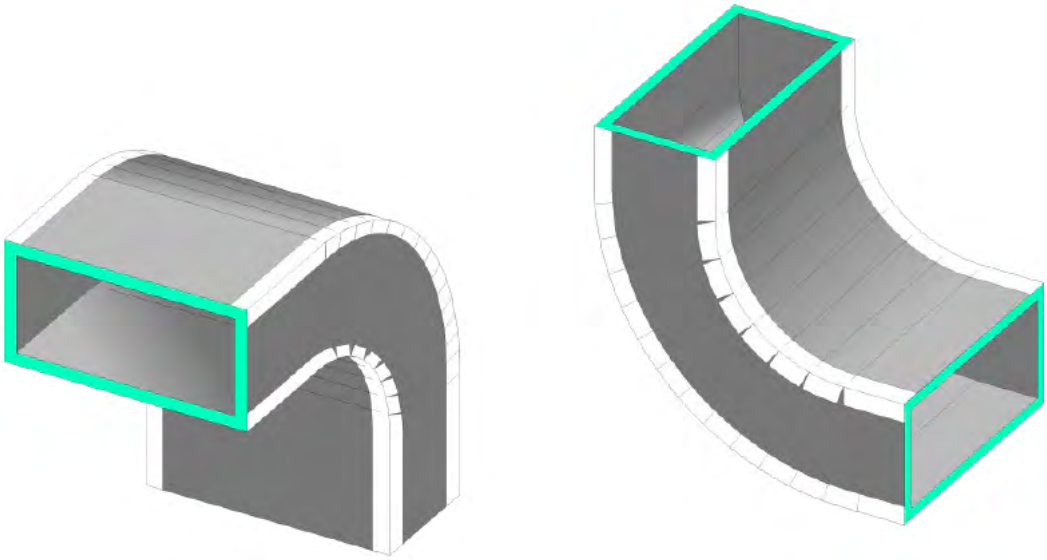
1. After following the construction procedure, including the gluing process, lay the outer band (a) on the work bench and start matching the portions of the neck of each side band (c), making sure that they are aligned with the duct edge, and then glue the parts as illustrated in sect. 2.2. Continue to match the parts along the entire length of the outer radius until all the portions of the neck at the other end of the elbow are glued together.



2. The inner band must be glued on the inner side of the elbow, starting from the same duct inlet at which the installation of the outer band had started. The inner band must be aligned with the duct edge and it must be installed gradually, crease by crease, until the neck of the opposite inlet of the elbow is glued.

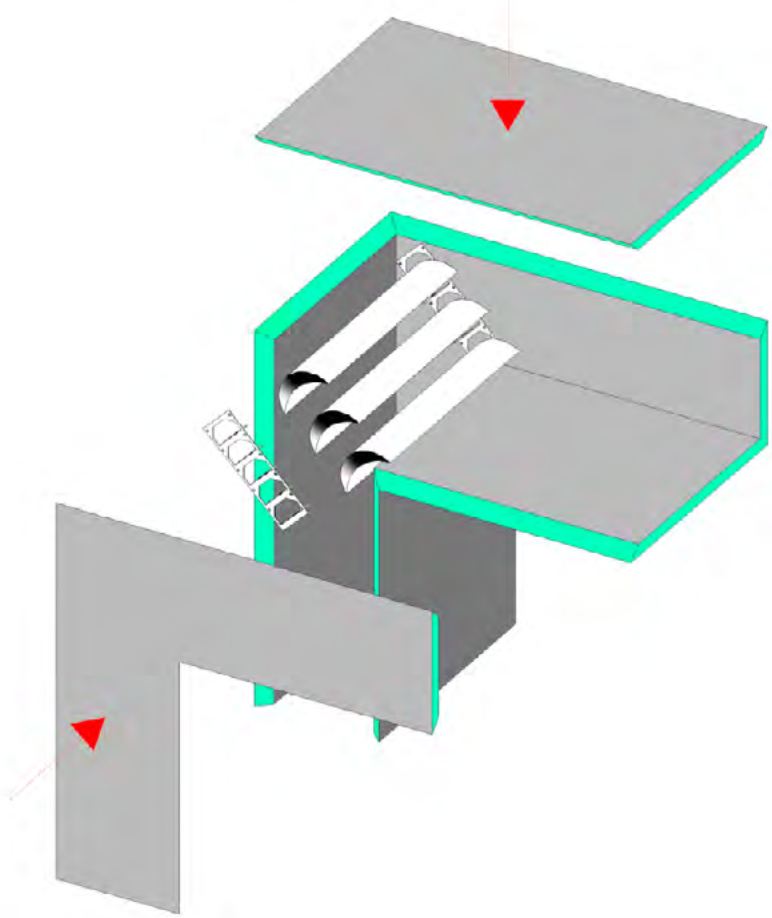


3. Compress the folded edges with the help of the hard spatula to ensure proper adhesion. Cut any exceeding parts from (a) and (b) using a jack plane with a perpendicular blade (90°). Then seal with silicone and tape the duct, as described in the section on duct construction (sect. 2.2). When placing tape on the corners, firstly glue the curved side and then apply the tape on the flat surfaces, as shown in the drawing, after making perpendicular cuts on the tape, approx. every 5 cm.



5.3 Metal turning vanes

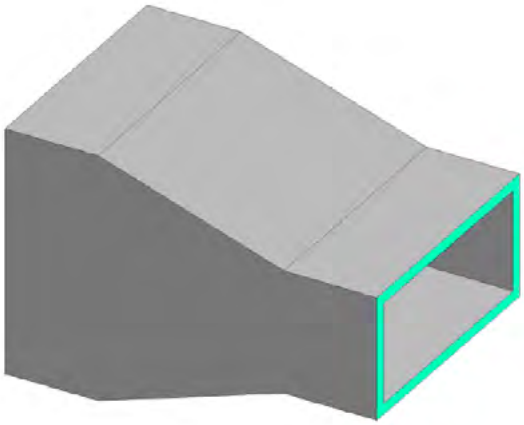
Square elbows are the ideal solution when there is little space and/or the design requires so. Square elbows must be fitted with turning vanes, which are basically systems consisting in a pair of side supports (normally made of aluminium) and curved aerodynamic profiles that are designed to enhance the air flow by limiting resistance and the amount of turbulence.



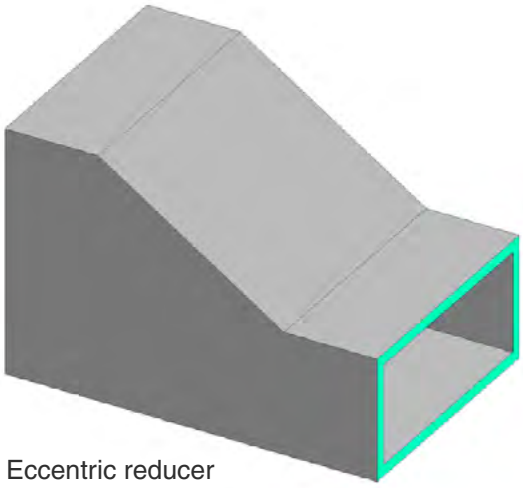
6. Construction of taper ends

6.1 Reducers

Reducers may have a taper on one side of the duct only, in which case they are classified as “eccentric” reducers. Alternatively, they may have both ends tapered, in which case they are classified as “concentric” reducers.



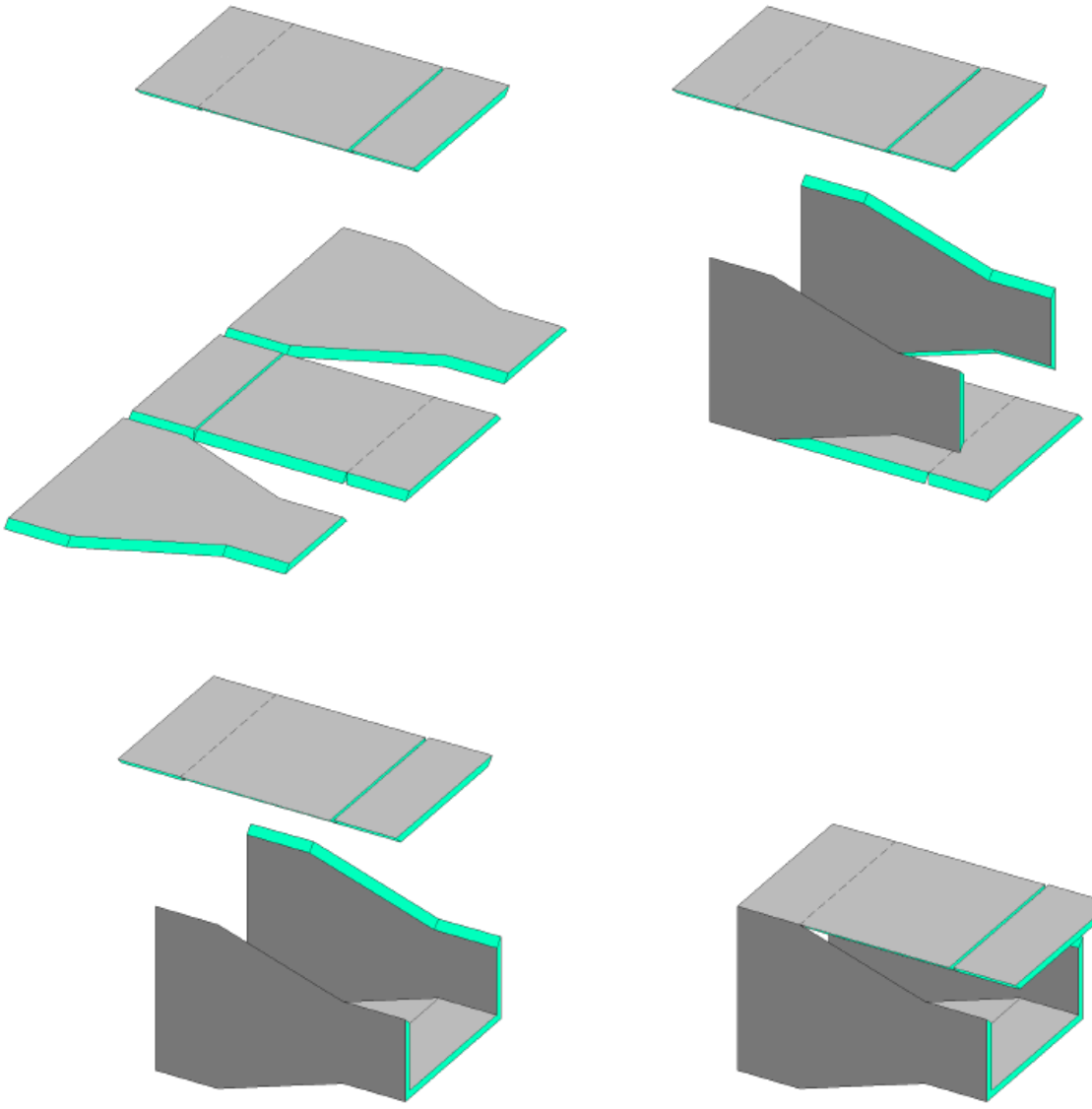
Concentric reducer



Eccentric reducer

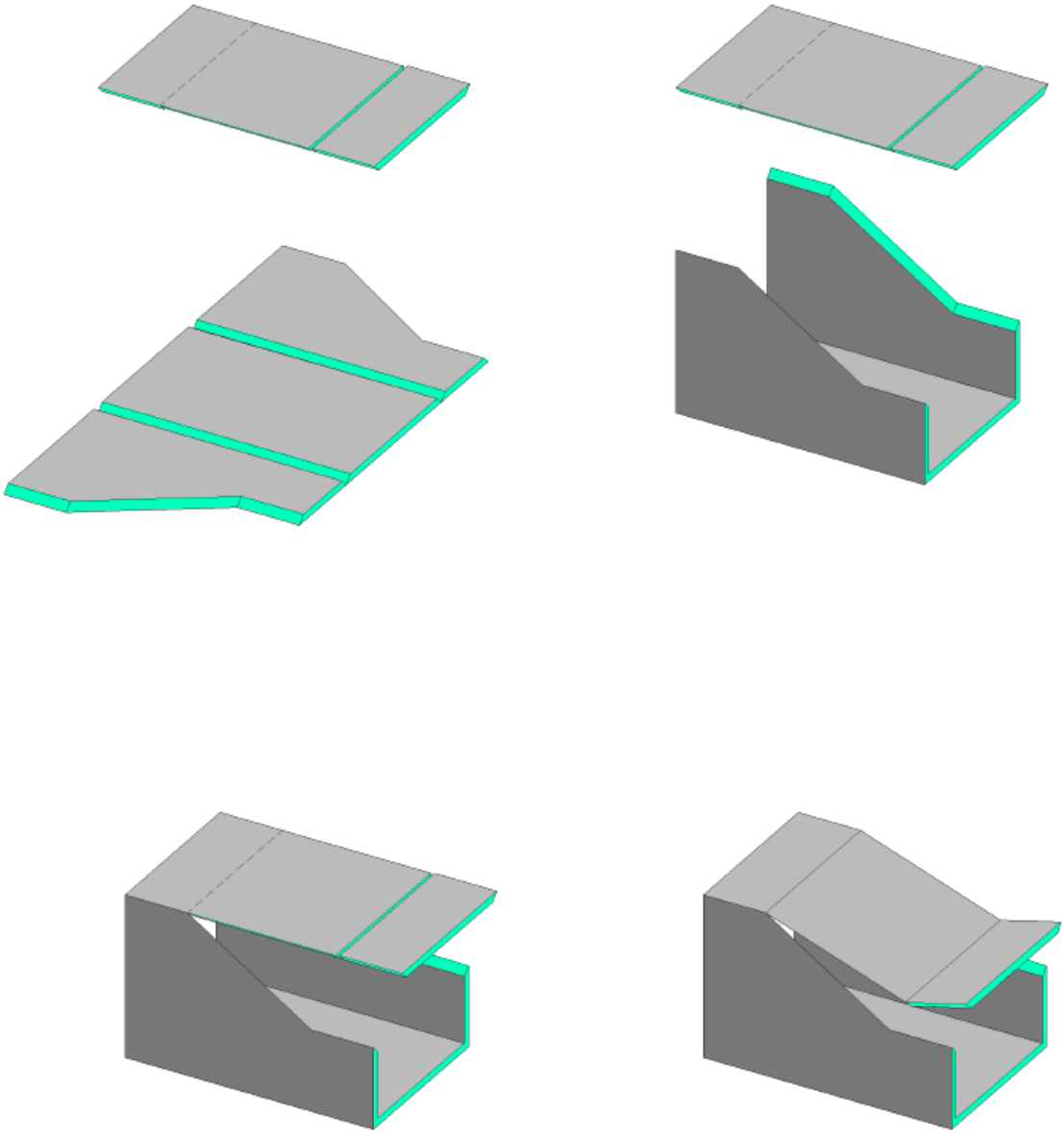
How to build a concentric reducer

To build a reducer, cut four separate pieces from an Isocanale panel, based on the inlet and outlet dimensions, and a minimum neck length of 200mm before and after the taper. The taper angle must not exceed 20°.
The four pieces are the two sides, the bottom side and the cover, as shown.
To assemble the parts, connect the sides to the base and then to the cover.
Concentric reducers have the base and the cover with a minimum of 2 creases each, which are made by carving the panel. The creases must be made on each side of the panel requiring folding, as shown in the drawing. If you do not wish to carve the panels on the inner side of the duct, creases can also be made using a bending machine.



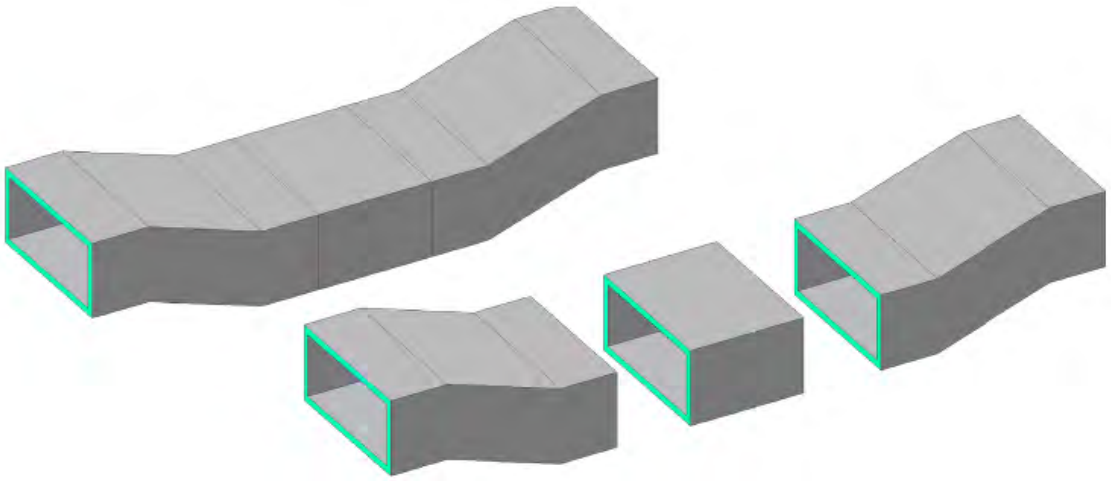
How to build an eccentric reducer

Eccentric reducers have 2 creases on the cover only. The creases are carved into the panel or made with the help of a manual bending machine. The creases must be made on each side of the panel requiring shaping, as shown in the drawing.



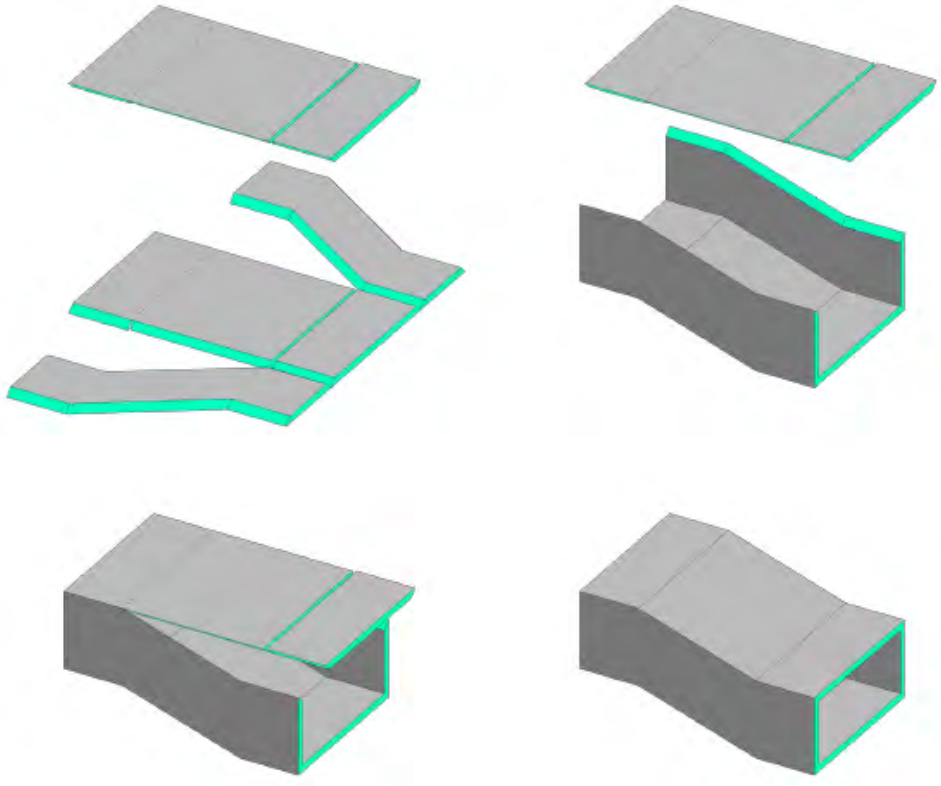
7. Ductwork movements and offsets

Offsets are often used to bypass an obstacle or to connect to a duct that has a different alignment. "V" jack planes of various angles can be used for cutting the grooves on the bases and covers. If you do not wish to carve the panels on the inner side of the duct, elbows can also be made using a bending machine.



7.1 Building an offset

Alike elbows and reducers, offsets are built by cutting four separate pieces out of an PIR panel, based on the inner and outer dimensions. The minimum neck length is 200mm and the angle does not exceed 30°. The four cut parts are then glued together, finished with tape and sealed.



8. Take-offs and branching

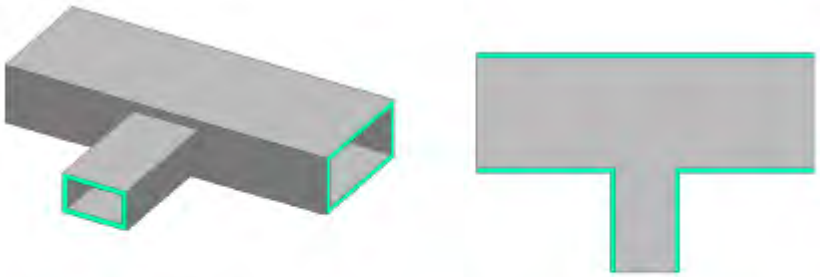
Take-offs can be grouped in two main categories:

- static take-offs, i.e. branches in the main duct that are located on the duct side and have a smaller cross-section than the main duct;
- dynamic take-offs, normally located at the point where there is a change in the cross-section of the main duct, that have the same cross-section as the main duct.

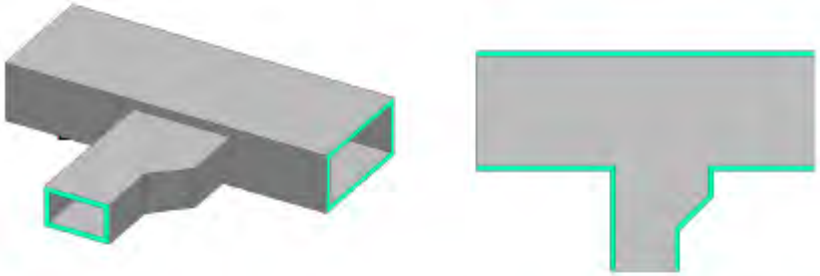
8.1 Static take-off

Static take-offs are normally distinguished into: straight, boot and angle take-offs.

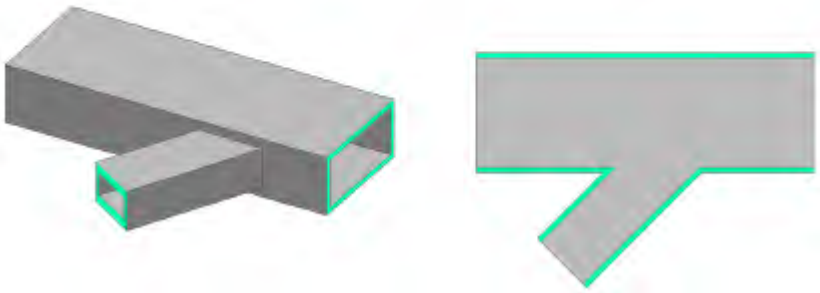
Straight take-off



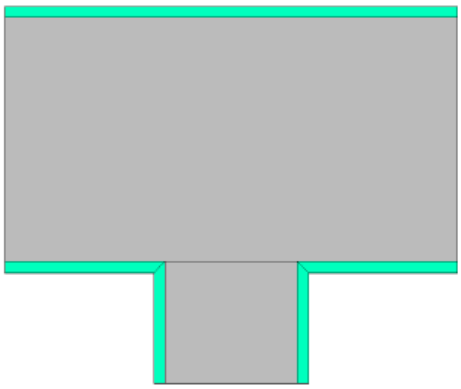
Boot take-off



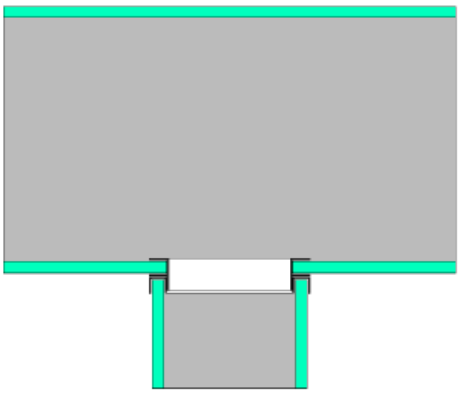
Angle take-off



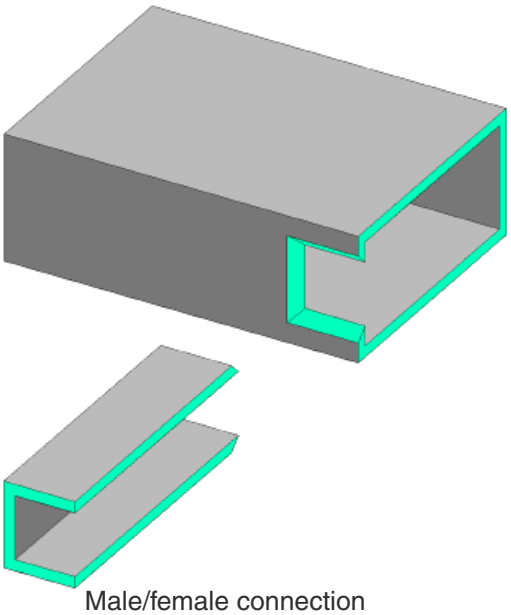
With short and lightweight extensions, static take-offs are connected to the main duct with a glue and tape connection known as “male/female connection”. When they are used to connect larger and longer duct sections or sections supplied with heavy accessories (e.g. diffusers, grilles and dampers), they are flanged.



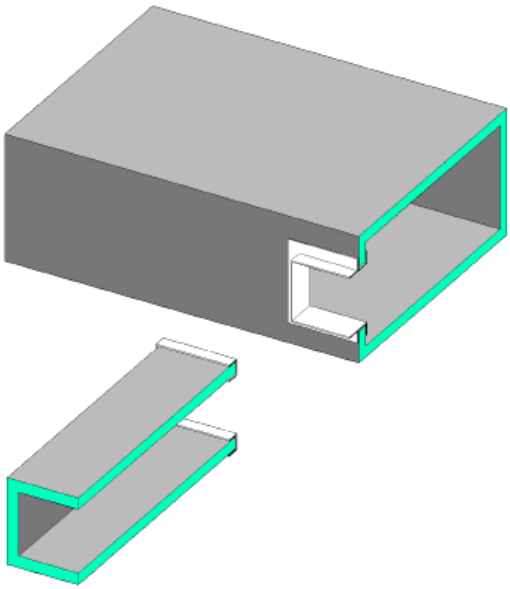
Male/female connection



Flanged connection



Male/female connection



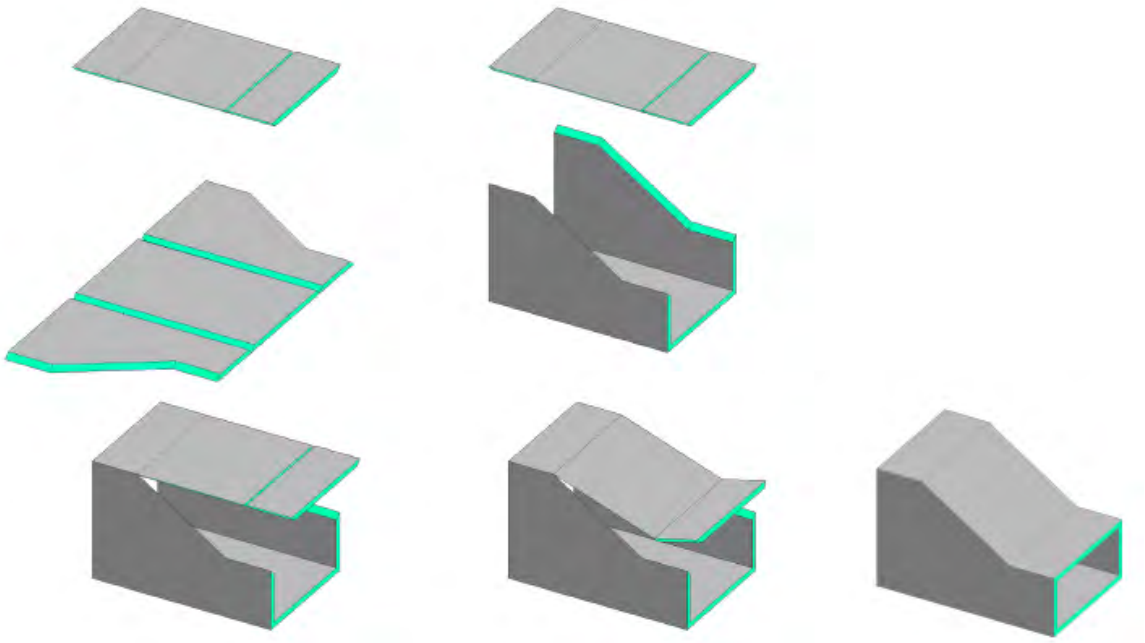
Flanged connection

The male/female connection is made by cutting the end of one take-off and the opening of the main duct using a 45° jack plane. Glue is then applied to both surfaces so that they are joined together. Finally, silicone is applied along the outer edge and tape is applied on the joints of the inner duct sides.

The flanged connection is made by using “U” profiles on the take-off duct and “F” profiles on the main duct. A gasket is fitted on the “U” profile head and all the assembled parts are finally secured together with self-drilling screws for aluminium (at least 2 on each side, max. centre distance 200 mm). This connection is feasible also with the invisible flange system, using the profile code 700239 on the main duct and the profile code 700227 on the deviation head.

Improved aerodynamics is the main reason for using a static boot take-off design. Conceptually, they are built exactly like eccentric reducers, the only difference being that the angled side can have a tilt of up to 45° and it is cut using a “V” jack plane with a blade angle of 22.5° (code 700402). In this case too, the take-off can be both connected to the main duct through a male/female connection and flanged, this solution being preferable as the inner joints are difficult to seal with tape as this requires the operator’s hand to enter the take-off.

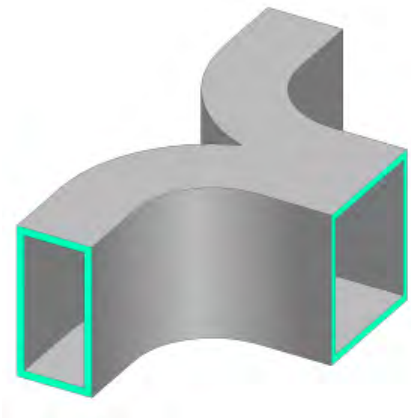
Boot take-off



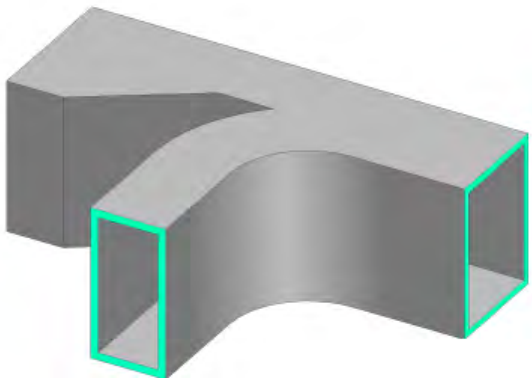
8.2 Dynamic take-off

Dynamic take-offs are used to direct the flow of the air stream.
Please find below some guidelines to be followed to build dynamic take-offs.

- The neck length must be at least 200 mm.
- The internal radius must be at least 200 mm.
- The creases in the bands must be at least 50 mm apart.



Dynamic take-off with two elbows

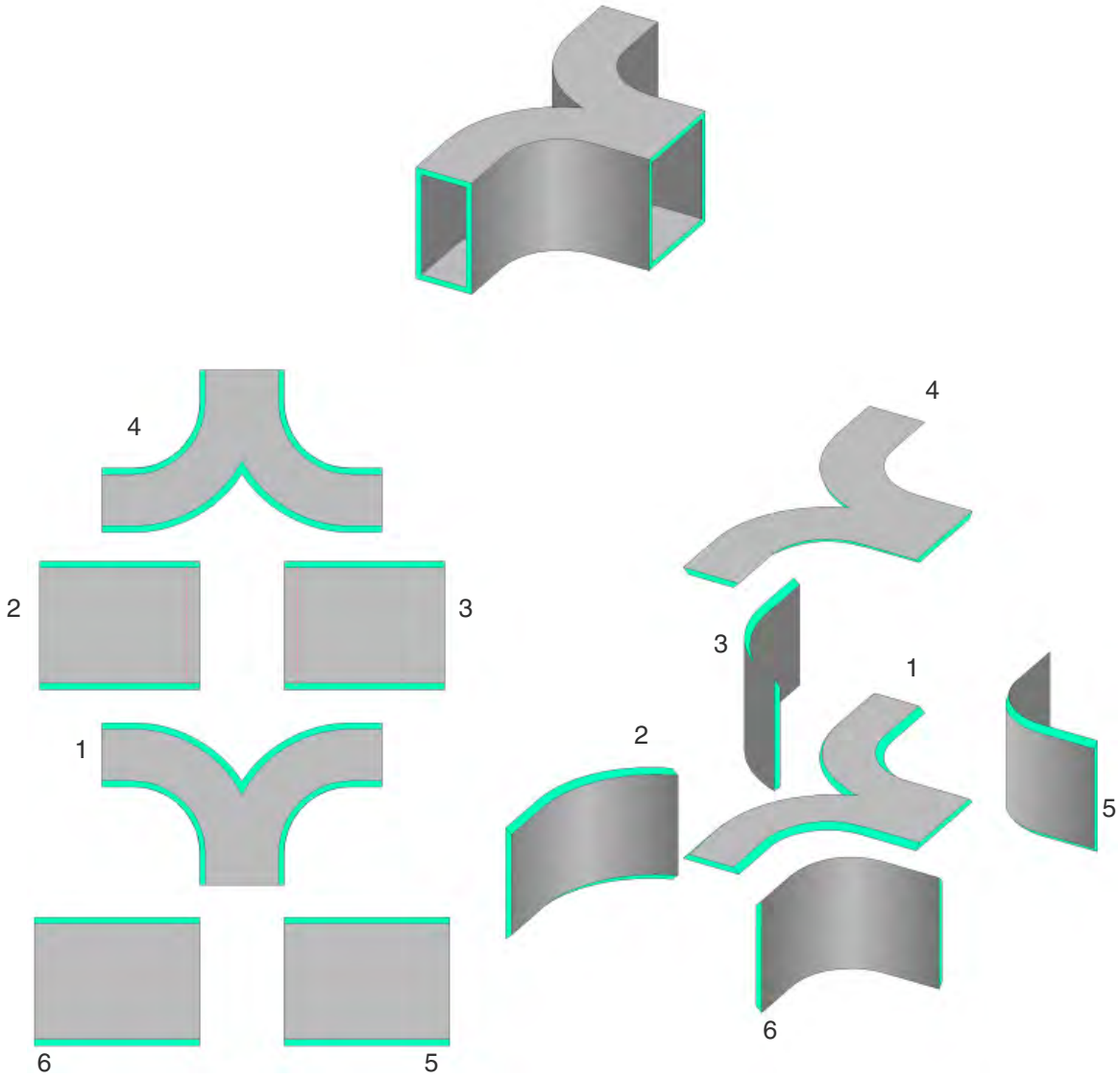


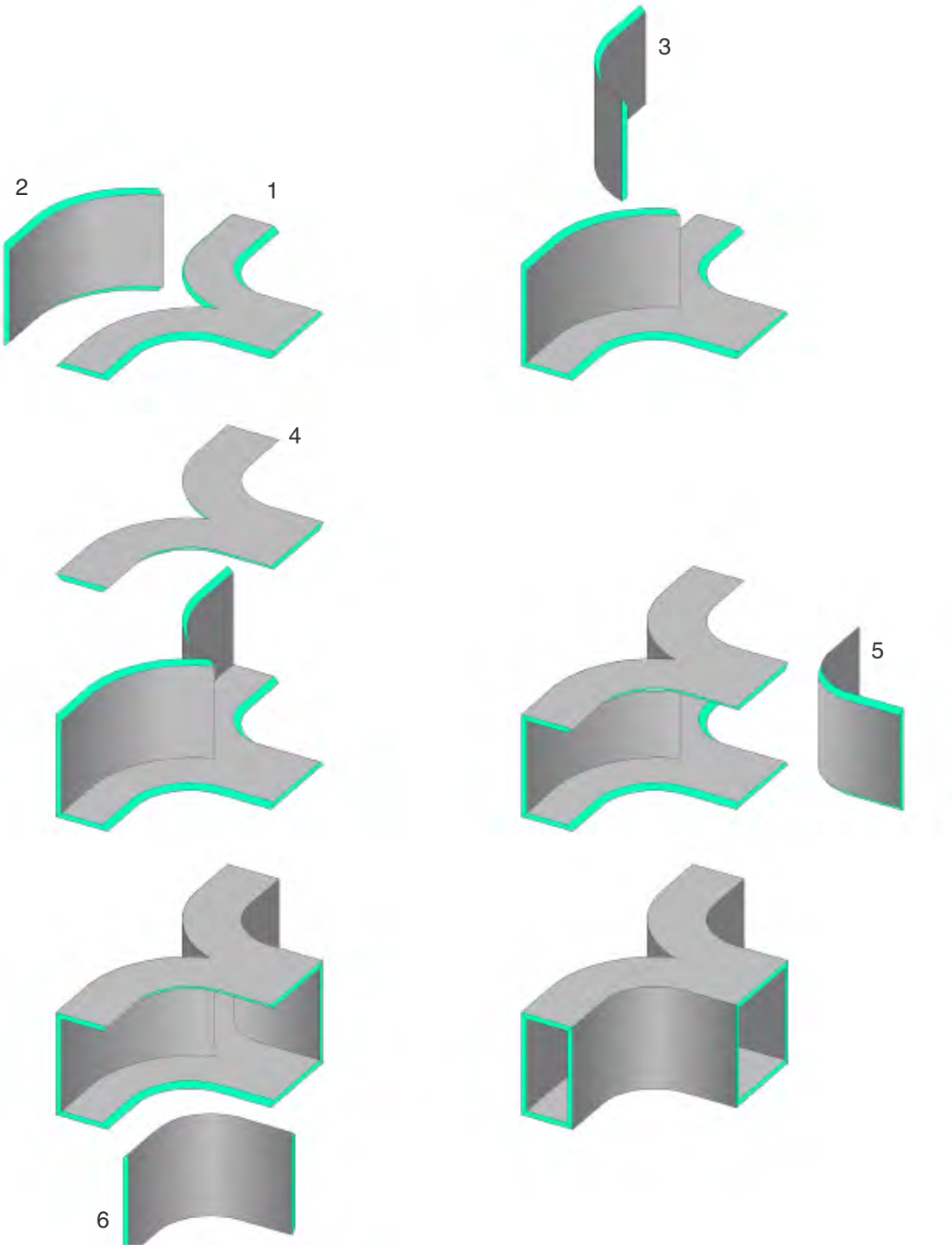
Tee take-off with elbow and duct

Dynamic take-off with two elbows

Dynamic take-offs with two elbows normally have the inlet cross-section equal to that of the main duct and tapered outlets. Conceptually, they are two asymmetrical elbows and they are built following the same method as elbows.
The first step in the take-off assembly sequence is the connection of the two outer elbows with the Y-shaped base. Then the other Y-shaped base is joined, followed by the two inner elbows.

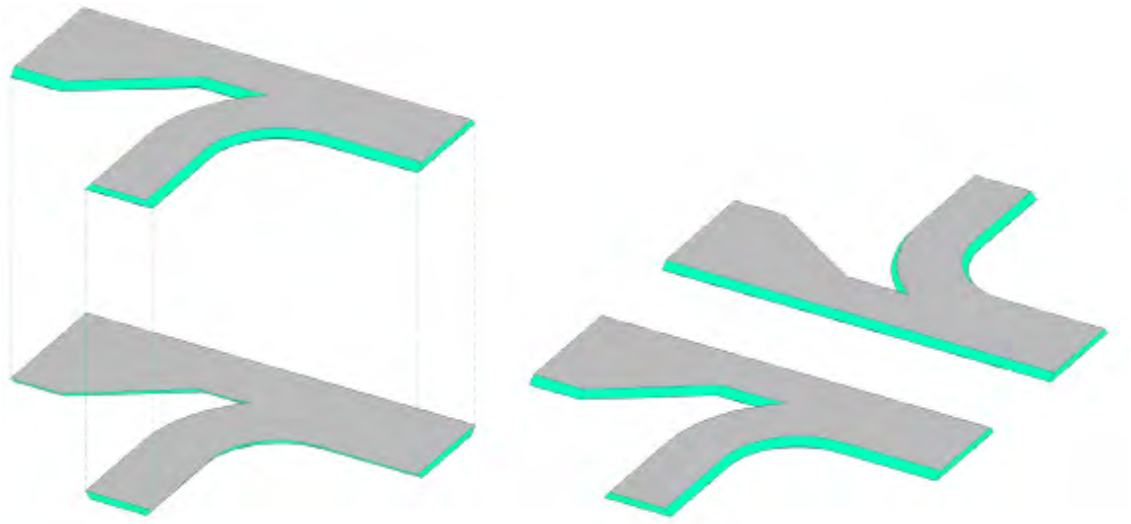
The taping procedure is the same as for the elbows (tape is firstly applied to the curved side: any protruding tape is cut into 50mm portions and finally these are smoothed on the flat surface). Before the inner edges are sealed with silicone, apply tape over the joint connecting the two outer elbows to improve the aerodynamic effect and to prevent dust build-ups.




2
1
3
4
5
6

Tee take-off with elbow and duct

Tee take-offs with elbow and duct are assembled following the same procedure as for assembling an elbow and a reducer.
Parts may appear to be more difficult to assemble, but this item is indeed very simple to build following the assembly drawing.
First, the side of the take-off needs to be made keeping in mind the requirements relating to the clamps (200 mm), the bending radius (min. 200 mm) and the max. reducer angle (45°). For the ease of simplicity, we recommend that, after cutting the first side, this should be used as a jig to cut the next side. Be careful! The panels must be cut at 45° mirror angles.

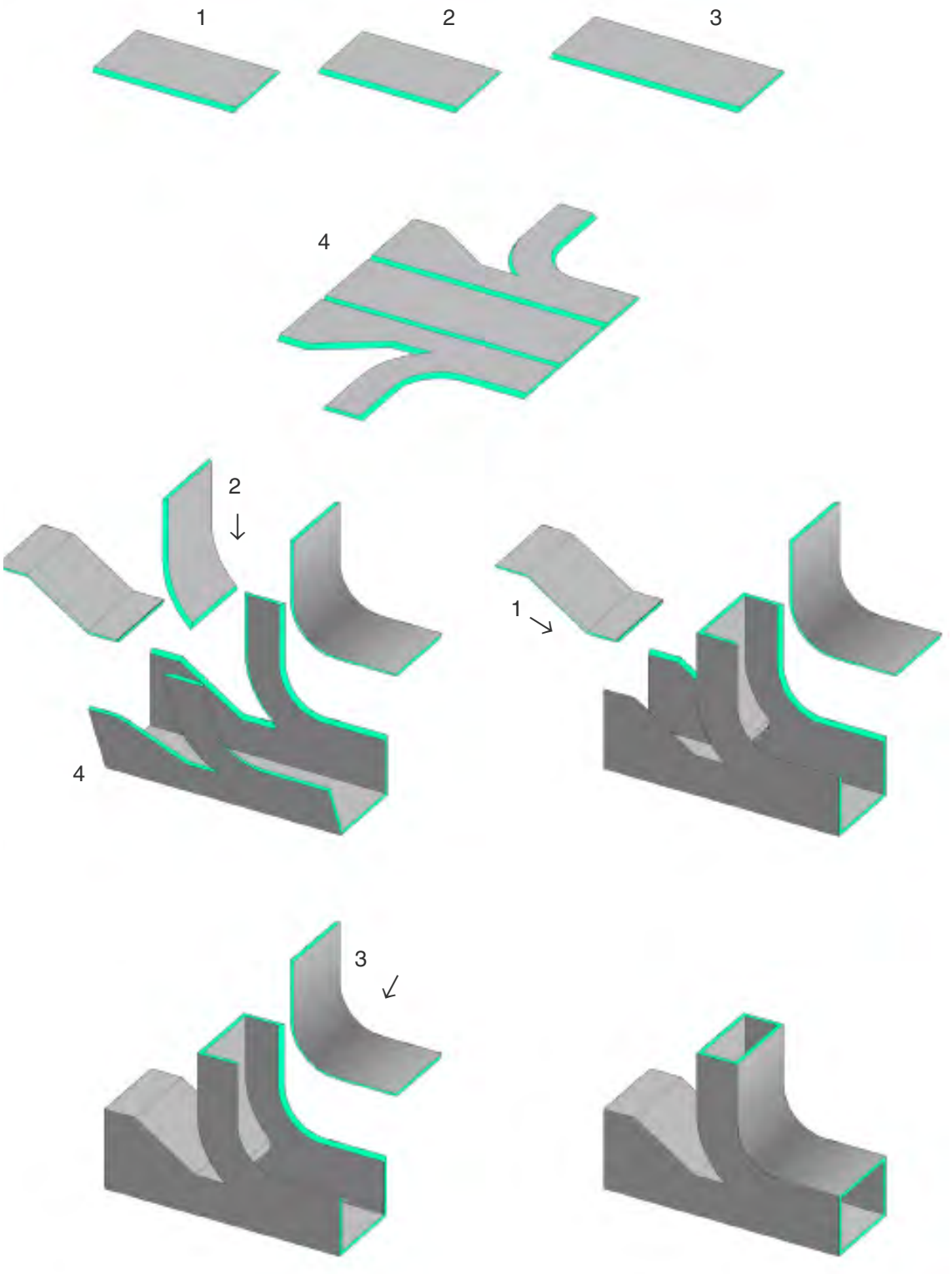


These 45° angled sides must be coupled with the edges of 4 square panels that are cut according to the duct width and the length of the above sides.
The base (larger panel) must be glued to the sides, after which the following must be glued:

- the outer elbow (as shaped using a bending machine);
- the shaped reducer panel (as shaped using a bending machine or using a 22.5° “V” jack plane);
- the inner elbow (as shaped using a bending machine).

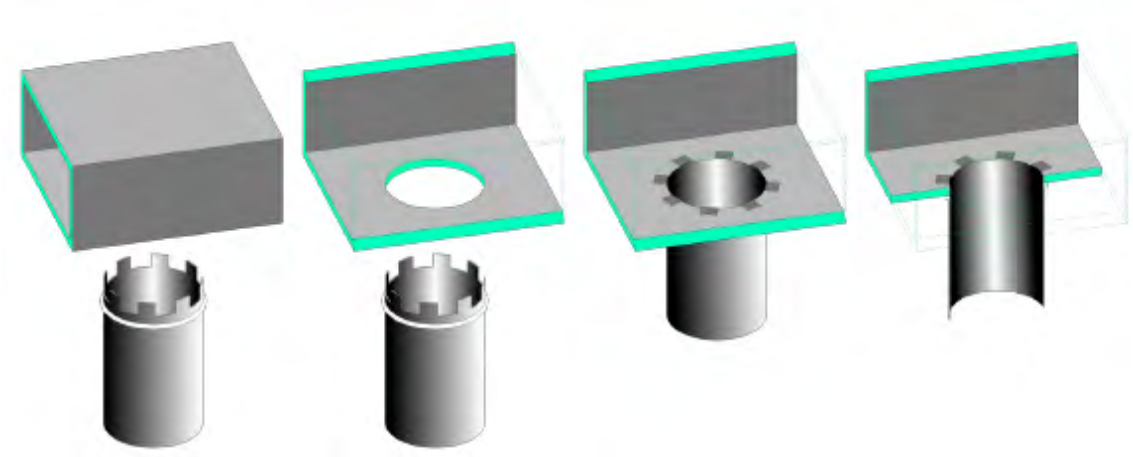
As for taping, follow the same procedure illustrated for the elbows.

Before the inner edges are sealed with silicone, apply tape over the joint connecting the outer elbow and the shaped panel to improve the aerodynamic effect and to prevent dust build-ups.


1
2
3
4
2
4
1
3

8.3 Duct branching with spiral fitting

Connection with aluminium spiral fittings
Close the fitting with rivets in the supplied holes.
Drill a hole having equal diameter to the fitting diameter (the fitting may be used as jig, if needed) with the help of a standard knife.
Place the fitting in the hole.
Fold the tabs against the inner panel surface.
Apply silicone around the groove between the outer surface of the fitting and the outer side of the ventilation duct.



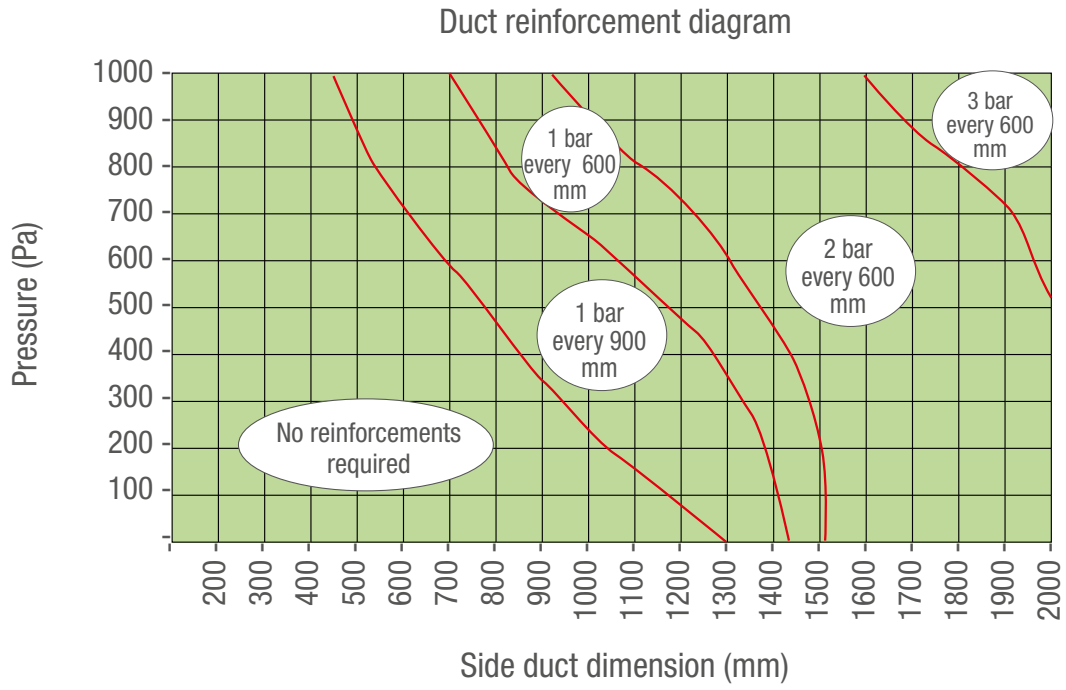
Install a spiral clamp

9. Duct reinforcement

Duct reinforcement is required in ductwork where there is a risk of deformations due to negative or positive pressure, or a combination of the two.

9.1 Reinforcement installation

The need for a reinforcement is determined by the dimensions of the duct and the total system pressure (static A/C system pressure) (see diagram).



9.2 Installation of reinforcement bars

The reinforcement system consists of three aluminium elements:

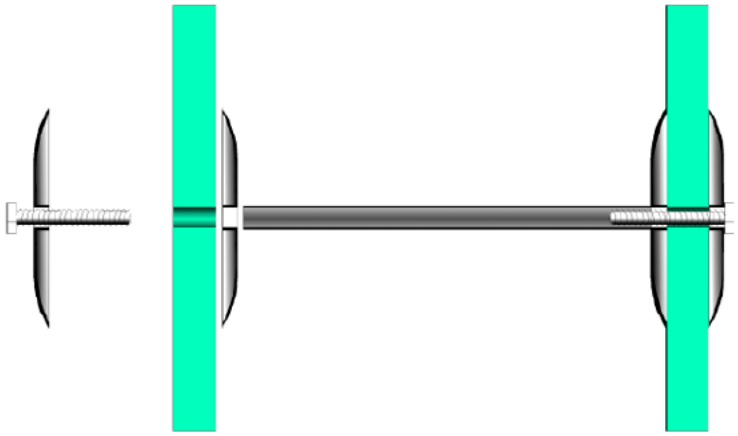
Code 700243 Aluminium reinforcement disc

Code 700247 Aluminium reinforcement bar

Code 700254 Galvanised self-threading screws 6.3 x 40 mm

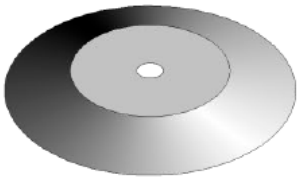
Four reinforcement discs - two in the duct and two on the outer surface of the duct - are installed on each bar that is to be cut at an equal length to the inner width requiring reinforcement. Two through holes are drilled on the duct at the desired position for bar installation (see table above). The hole diameter needs to be approx. 6 mm, which is required to fit the screw through.

The screw is firstly fitted in one disc and then in the duct, after which it is fitted in the second disc (inside the duct). Finally, it is screwed to the bar. Before tightening the first screw, on the opposite side a second screw is fitted in a second disc, then in the duct, and finally in an additional disc (inside the duct). Slightly bend the surface of the duct to straighten the bar until it is aligned with the second screw.
Now, the screws can be turned until the end of their stroke. For easier installation, we recommend holding the bar still using pliers or any other tool to prevent it from turning while the screws are being tightened.

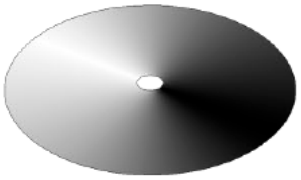


Reinforcement bar section

Code 700254

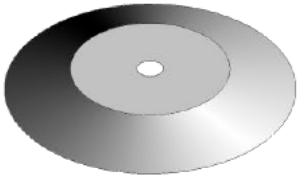


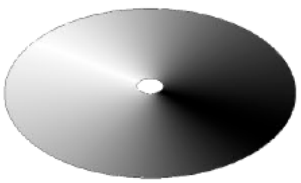
Code 700243



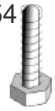
Code 700247

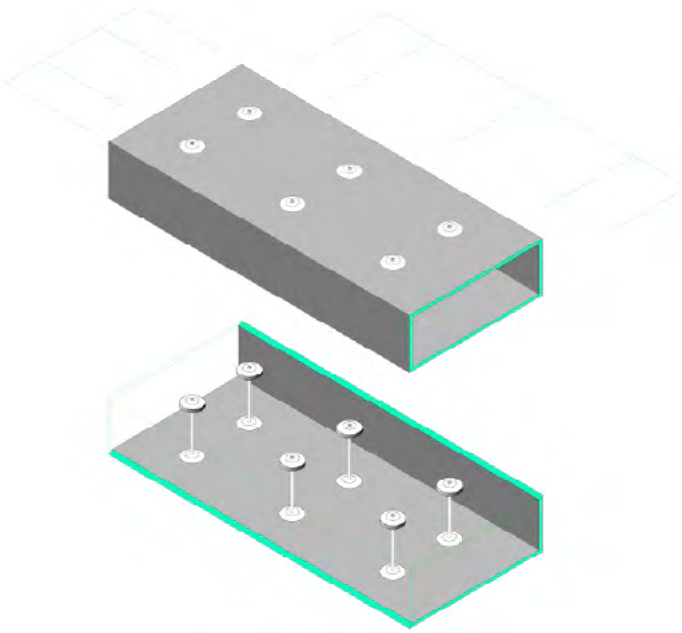
Code 700243



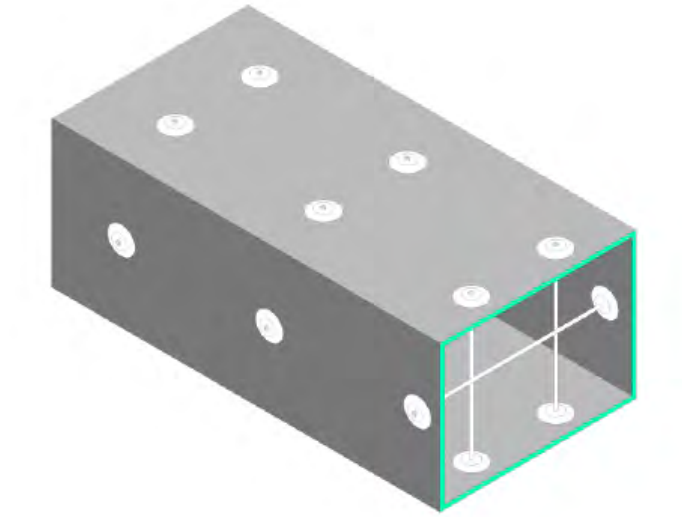


Code 700254





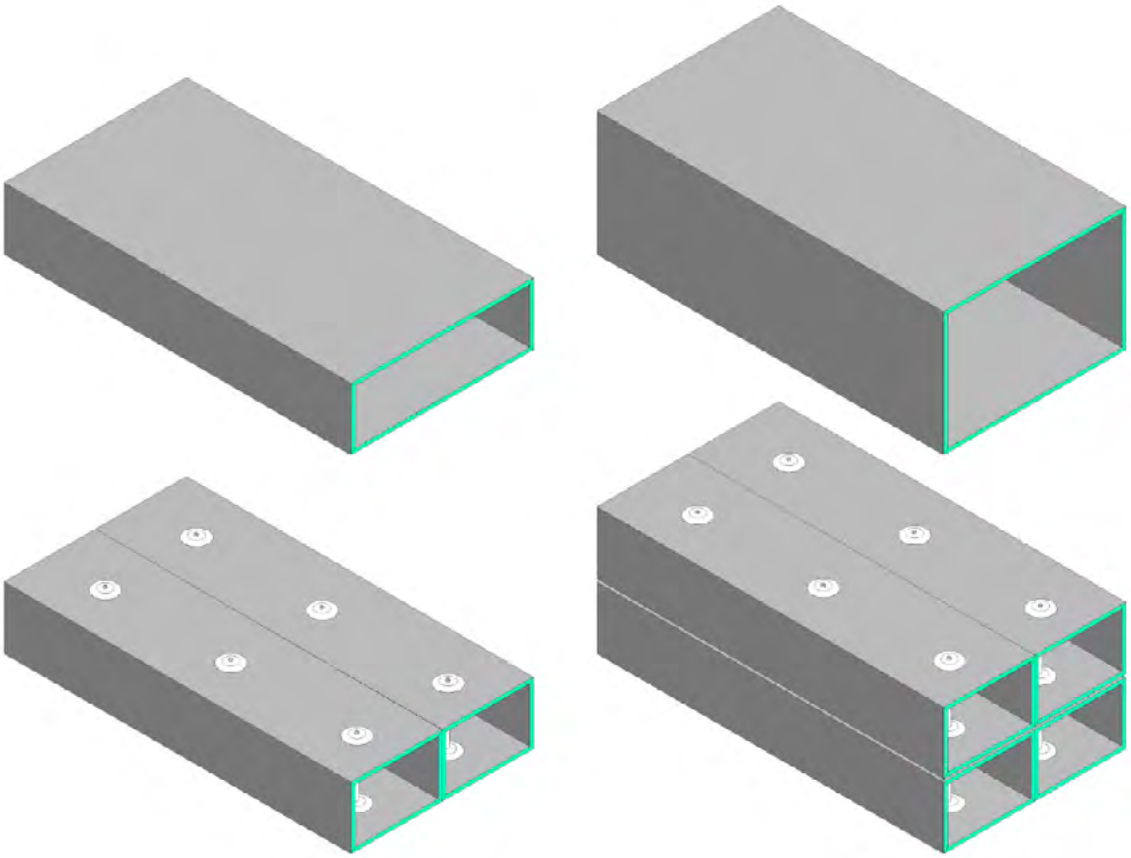
Configuration with 2 reinforcement bars every 600 mm



Configuration with reinforcement bars on all walls of the duct

10. Double and multiple ducts

Multiple ducts are the best solution in special cases when large ducts are associated with high pressures. This solution consists in splitting the delivery duct section in multiple ducts where the sum of the section areas equals the design duct area and the resistance to high pressures meets the design requirements.
Please find below some examples of the possible multiple duct configurations.

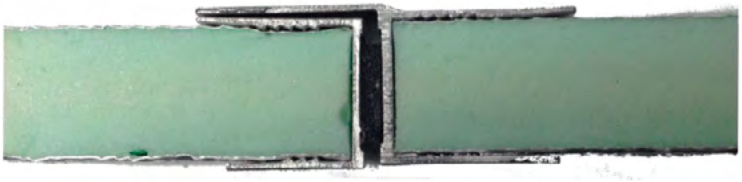


11. Connection systems

Connection systems are used to provide for duct continuity in terms of continuous connection, resistance to pressure and structural strength.
Different connection systems are available having different specifications and performance levels.

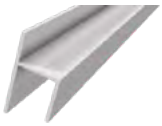
Connection	"h+U" 700223 + 700224	"h" 700223	Outer bayonet connector 700221	Inner bayonet connector 700227	Tiger 700253	"F" 700222
Structural	yes	yes	yes	yes	no	yes
Can be inspected or disassembled	yes	no	yes	Hardly so	no	yes
For connection with machinery	yes	yes	no	no	no	yes
For use with vibration damper	Yes - "h" profile only	yes	no	no	no	yes
Requires gaskets	yes	yes	yes	no	no	yes
Requires silicone	no	no	no	yes, at corners	yes, along the entire duct outlet	yes, at corners
Requires glue for profiles	yes	yes	yes	yes	no	yes
Requires angular pieces	yes, two types 700153 + 700158	yes, one type 700153	yes, one type 700151	yes, one type 700158	no	yes, one type 700158
Air tight certified (EN 13403:2004 Cor.1-2011)	Class A	/	Class B	Class C	Class C	/
Antibacterial treatment	yes	yes	-	yes	yes	yes
Suitable profile for branching	yes	yes, when together with other profiles	no	yes	yes	yes, when together with other profiles
Dimensional restrictions					600 mm of duct side	
Can be used to create inspection hatches	yes	yes, when together with other profiles	no	no	yes	no

11.1 “h and U” connection

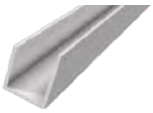


Connection system with aluminium profiles.

Material required to create this connection:



Structural “h” profile, aluminium
Code 700223 for 20 mm thick panels
Code 700230 for 30 mm thick panels



Structural “U” profile, aluminium
Code 700224 for 20 mm thick panels
Code 700235 for 30 mm thick panels

Galvanized reinforcement square bracket
Code 700158 for 20 mm thick panels
Code 700157 for 30 mm thick panels

Double nylon angular piece for “h” profiles
Code 700153 for 20 mm thick panels

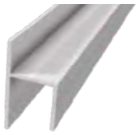
Glue for profiles
Code 700109

Adhesive gasket
Code 700238

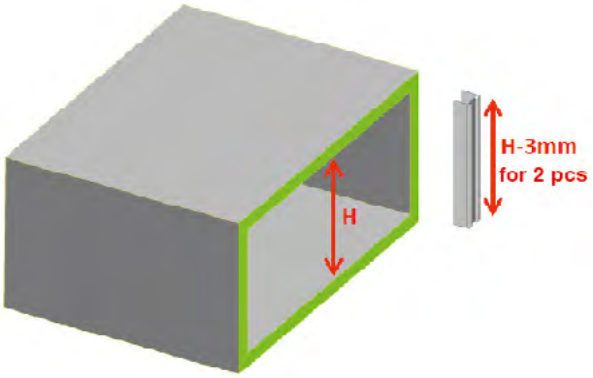
Self-drilling screws for aluminium
Length 15mm
Screw head NON countersunk

Procedure

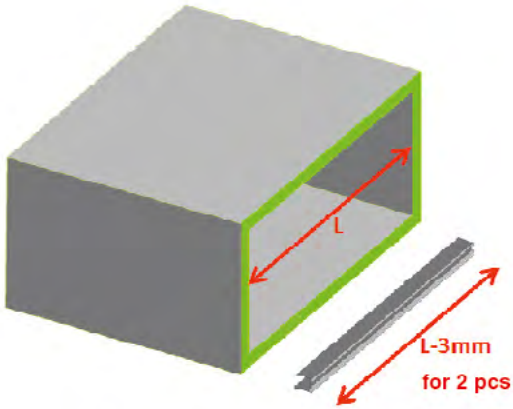
"H" profile



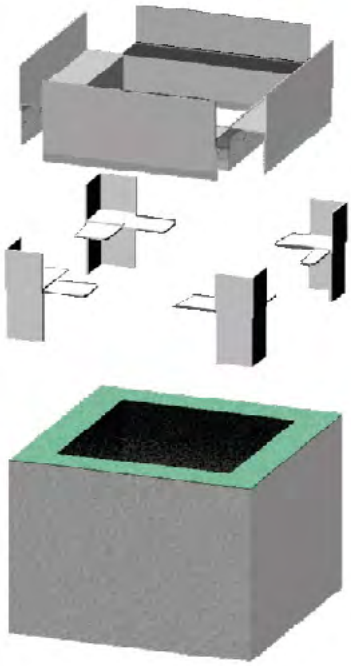
After the duct is assembled, cut the profiles making sure they are as long as the inner sides of the duct minus 3 mm. This arrangement frees the necessary space to accommodate the thickness of the profiles inside the duct during the assembly stage.
Simulate assembly and check that the profile length is correct.
Wipe the edge of the Isocanale panel and remove any residual dust. Wipe away any residual oil or lubricants (left after cutting or construction) from the aluminium profiles that need to be glued.



Take an "h" profile and spread a line of profile glue along the side that will eventually come into contact with the polyurethane foam. Do not use an excessive amount of glue as it tends to grow its volume during hardening and to come out of the glued joint.

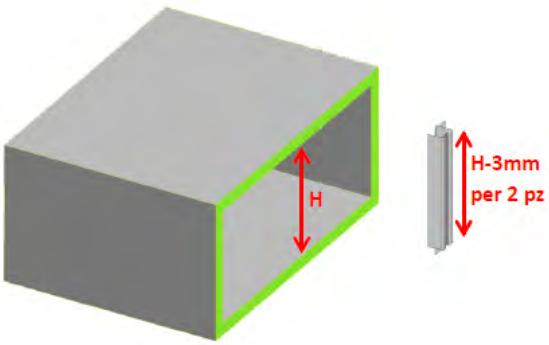


Fit an angular piece and block in place using one head of the profile to be glued. Then fit the second angular piece at the opposite head of the profile and place a profile in the panel - a rubber head mallet may be used to tap the profile in position, where necessary.
Follow the procedure above with all the profiles until the duct outlet perimeter is covered.

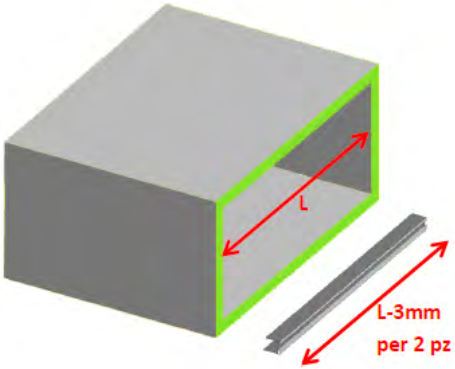


"U" profile

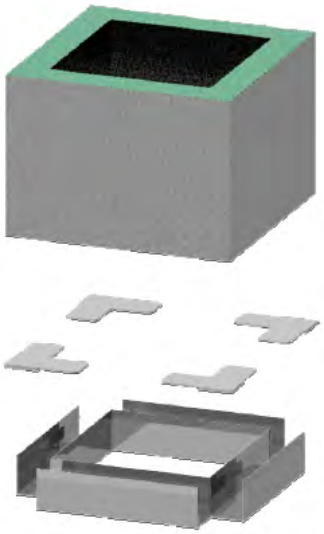
After the duct is assembled, cut the profiles making sure they are as long as the inner sides of the duct minus 3 mm. This arrangement frees the necessary space to accommodate the thickness of the profiles inside the duct during the assembly stage.
Simulate assembly and check that the profile length is correct.
Wipe the edge of the Isocanale panel and remove any residual dust. Wipe away any residual oil or lubricants (left after cutting or construction) from the aluminium profiles that need to be glued.



Take a "U" profile and spread a line of profile glue along the side that will eventually come into contact with the polyurethane foam in the panel. Do not use an excessive amount of glue as it tends to grow its volume during hardening and to come out of the glued joint.



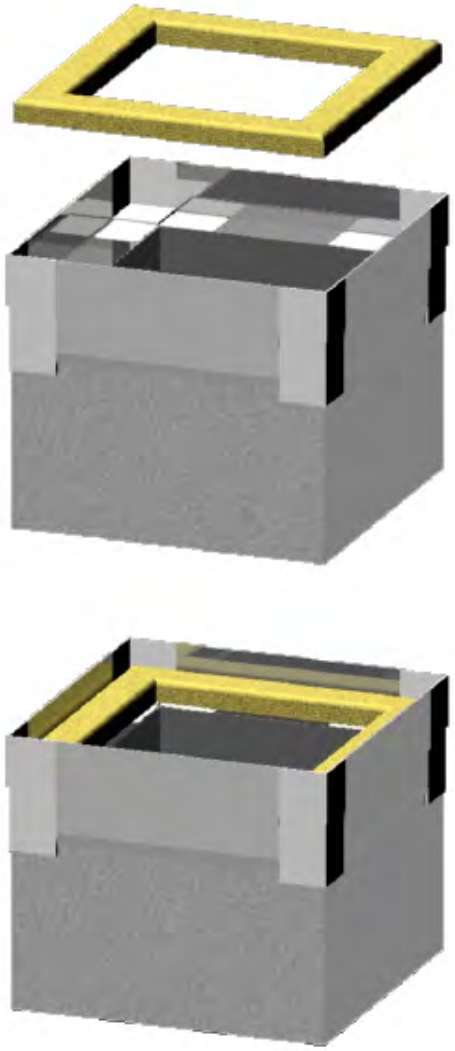
Fit a square bracket and block in place using another square bracket of the profile to be glued. Then fit the second angular piece at the opposite head of the profile and place a profile in the panel - a rubber head mallet may be used to tap the profile in position, where necessary.
Follow the procedure above with all the profiles until the duct outlet perimeter is covered.



Adhesive gas

After the profiles have been assembled and glued to the duct (drying time = 24 hours), check for glue burrs. If you identify excess glue on the contacting surfaces, mechanically remove such excess glue using a cutter or spatulas.
Apply the adhesive gasket onto the head of the “h” profile, starting half way through one of the sides. Do not apply the gasket from the corners as the overlapping side of the closing gasket may prove inefficient in terms of air pressure resistance.
The gasket must be placed in the shaped housing with which the profile is supplied and it must not be stretched, bent without prior flattening, torn at the angular joints.
Fit the gasket along the entire perimeter length until it overlaps the starting point of the sheath for at least 3 cm.

Now, the two heads of the ducts are ready for coupling.

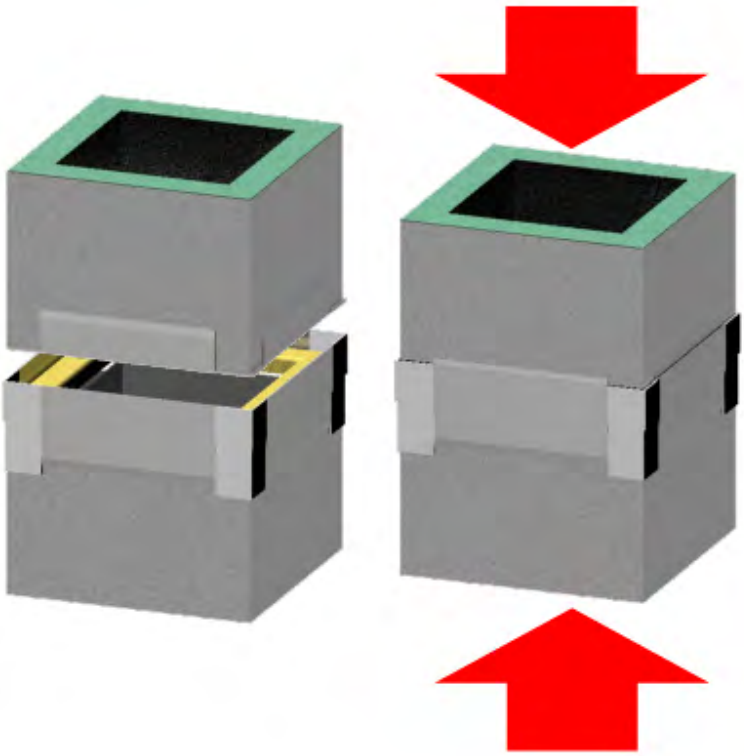


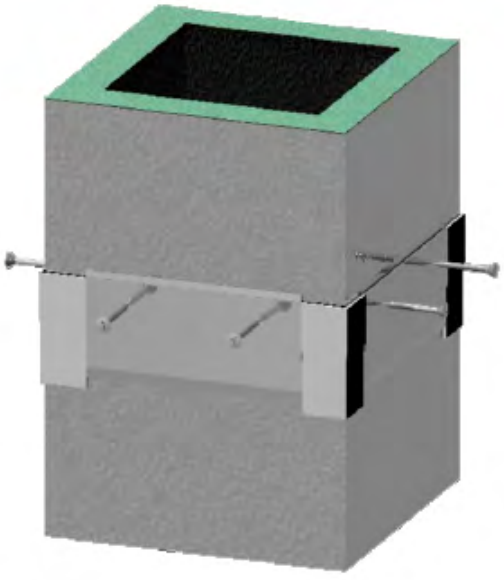
Duct connection

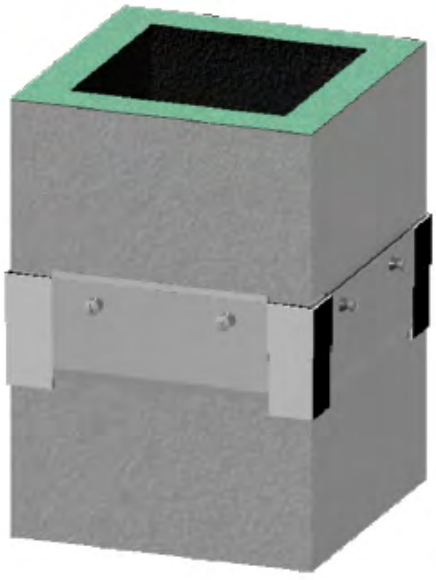
Put the two duct heads with the “h” and “U” profiles close to one another, then fit the duct head with the “U” profiles into the duct head with the “h” profiles. Push the two ducts one against the other and compress the gasket until the aluminium heads are in contact.

Keep the gasket compressed and mechanically secure the “h” profile on the “U” profile, as shown in the drawing,

using self-drilling aluminium screws with a NON countersunk head.





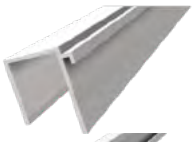


The ducts are now connected.

11.2 External bayonet connection

Connection system with aluminium profiles

Material required to create this connection:



Aluminium flange profile
Code 700221 for 20 mm thick panels

Aluminium bayonet profile
Code 700211

Nylon angular piece
Code 700151 for 20 mm thick panels

Glue for profiles
Code 700109

Adhesive gasket
Code 700238

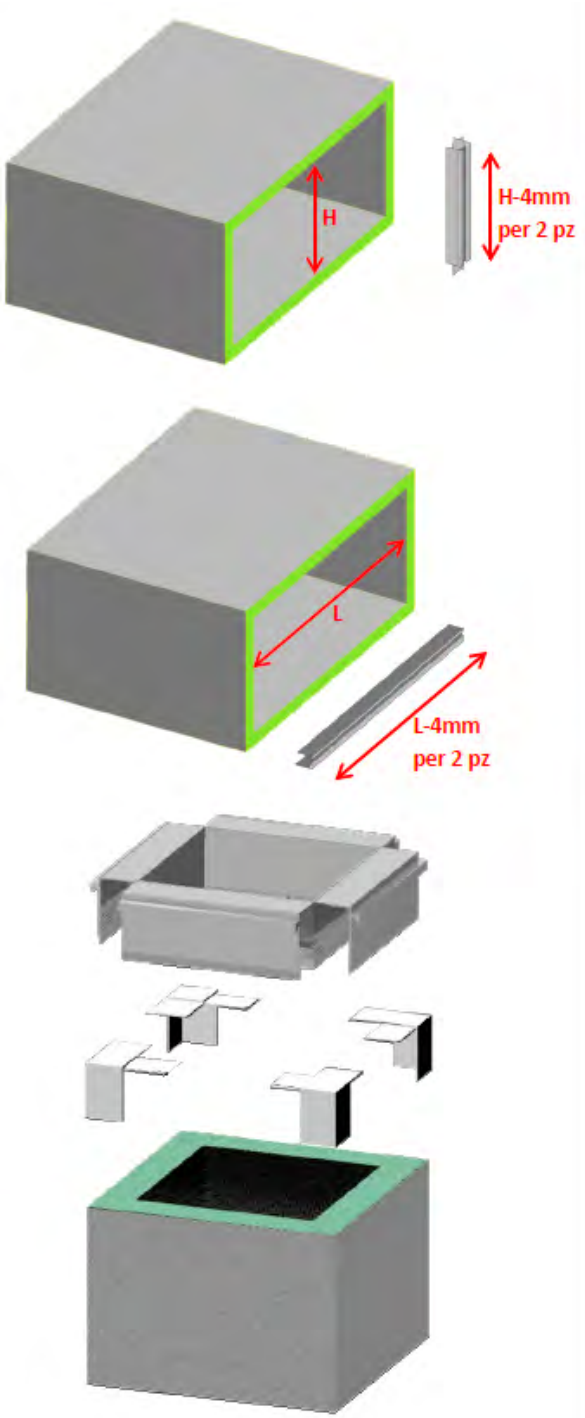
Procedure: flange profile

After the duct is assembled, cut the profiles making sure they are cut as long as the inner sides of the duct minus 4 mm in length. This arrangement frees the necessary space to accommodate the tooth of the angular pieces inside the duct during the assembly stage.
Simulate assembly and check that the profile length is correct.
Wipe the edge of the Isocanale panel and remove any residual dust. Wipe away any residual oil or lubricants (left after cutting or construction) from the aluminium profiles that need to be glued.

Take a flange profile and spread a line of profile glue along the side that will eventually come into contact with the polyurethane foam in the panel. Do not use an excessive amount of glue as it tends to grow its volume during hardening and to come out of the glued joint.

Fit an angular piece and block it in place using one head of the flange profile to be glued. Then fit the second angular piece at the opposite head of the profile and place a profile in the panel - a rubber head mallet may be used to tap the profile in position, where necessary.

WARNING! The aluminium profile must be applied in such way that the flange faces the outer side of the duct.
Follow the procedure above with all the profiles until the duct outlet perimeter is covered.
Repeat the procedure with the head of the second duct.



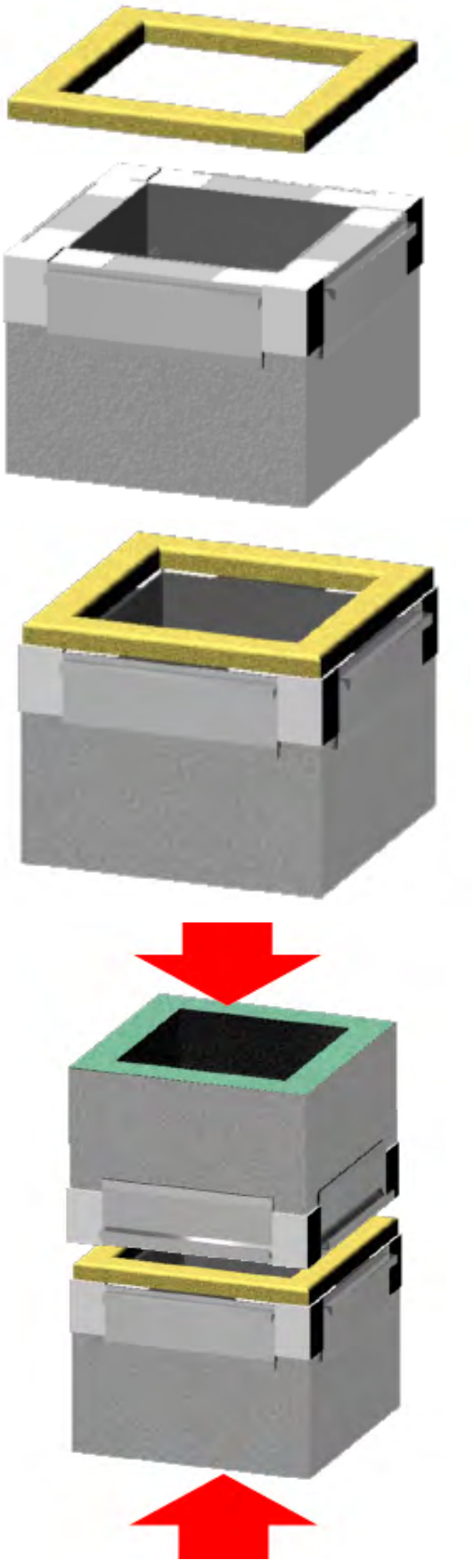
Adhesive gasket

After the profiles have been assembled and glued to the duct (drying time = 24 hours), check for glue burrs. If you identify excess glue on the contacting surfaces, mechanically remove such excess glue using a cutter or spatulas.
Apply the adhesive gasket onto one of the duct heads, starting half way through one of the sides. Do not apply the gasket from the corners as the overlapping side of the closing gasket may prove inefficient in terms of air pressure resistance.
The gasket must be placed in the shaped housing with which the profile is supplied and it must not be stretched, bent without prior flattening, torn at the angular joints.
Fit the gasket along the entire perimeter length until it overlaps the starting point of the sheath for at least 3cm.

Now, the two heads of the ducts are ready for coupling.

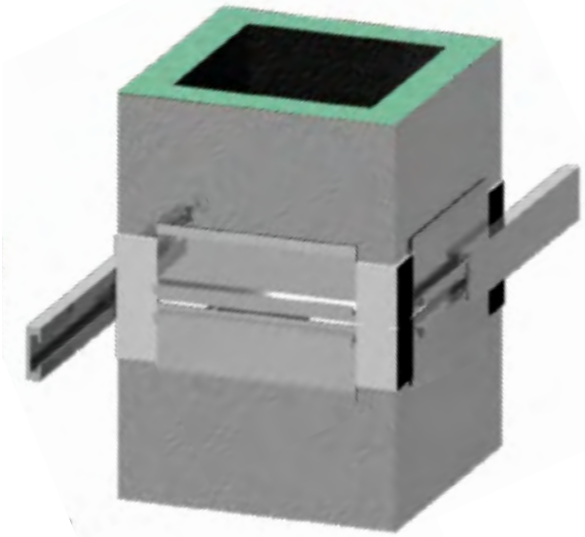
Duct connection

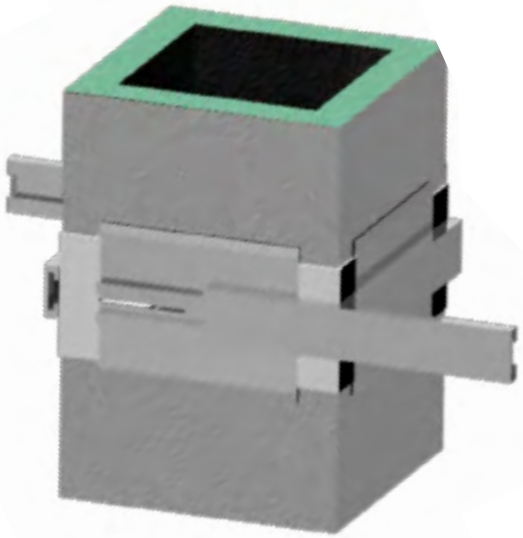
Put the duct head with the gasket and the head without gasket close to one another and lean one head on the other to compress the gasket.

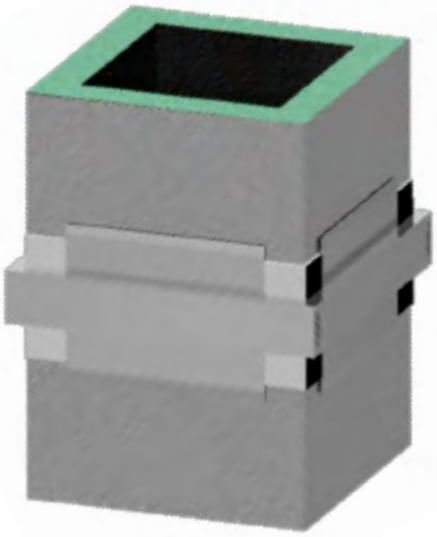


Aluminium bayonet profile

Cut the bayonet profiles in such way that the final vertical profiles are cut as long as the outer side of the duct, and the horizontal profiles are cut as long as the outer side of the duct plus 8 mm.
Fit the vertical profiles first, followed by the horizontal profiles. This arrangement prevents the bayonet connectors from sliding when the joint is slightly loose, which would cause the joint to become weak.







The ducts are now connected.

11.3 Invisible flange connection

Connection system with aluminium profiles

Material required to create this connection:

Aluminium profile with invisible flange
Code 700227 for 20 mm thick panels
Code 700226 for 30 mm thick panels

H bayonet connector made of PVC
Code 700700 for 20 and 30 mm thick panels

Galvanized reinforcement square bracket
Code 700158 for 20 mm thick panels
Code 700157 for 30 mm thick panels

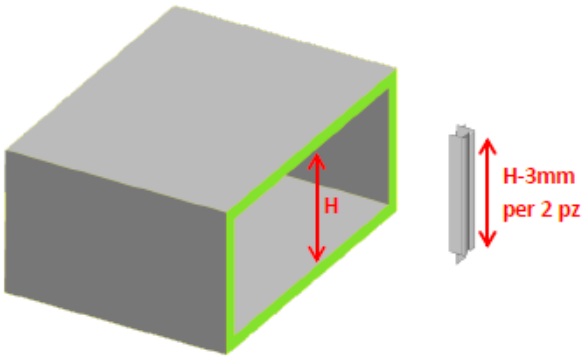
Glue for profiles
Code 700109

Covering angular piece
Code 700155 for 20 mm thick panels
Code 700154 for 30 mm thick panels

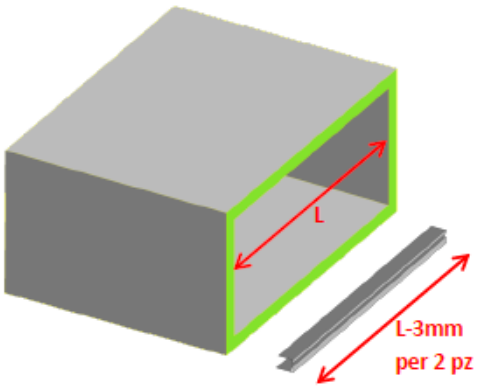
Silicone
Code 700123 Neutral, grey in colour

Procedure:
profile with invisible flange

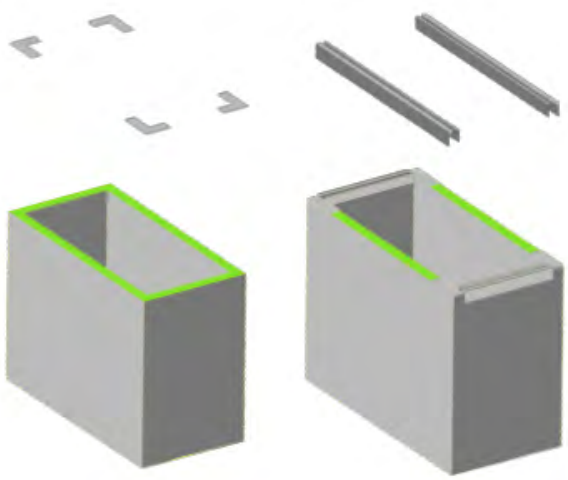
After the duct is assembled, cut the profiles making sure they are cut as long as the inner sides of the duct minus 3 mm in length. This arrangement frees the necessary space to accommodate the tooth of the angular pieces inside the duct during the assembly stage.
Simulate assembly and check that the profile length is correct.
Wipe the edge of the Isocanale panel and remove any residual dust. Wipe away any residual oil or lubricants (left after cutting or construction) from the aluminium profiles that need to be glued.



Take a flange profile and spread a line of profile glue along the side that will eventually come into contact with the polyurethane foam in the panel. Do not use an excessive amount of glue as it tends to grow its volume during hardening and to come out of the glued joint.



Fit a square bracket and block it in place using one head of the flange profile to be glued. Then fit the second square bracket at the opposite head of the profile and place a profile in the panel - a rubber head mallet may be used to tap the profile in position, where necessary.



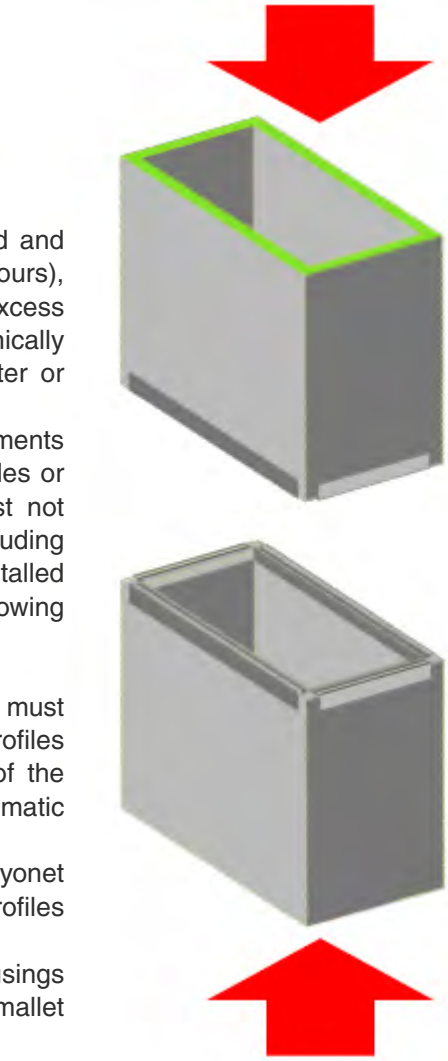
WARNING! The aluminium profile must be applied in such way that the closest side to the round shaped band faces the outer side of the duct. Follow the procedure above with all the profiles until the duct outlet perimeter is covered.
Repeat the procedure with the head of the second duct.

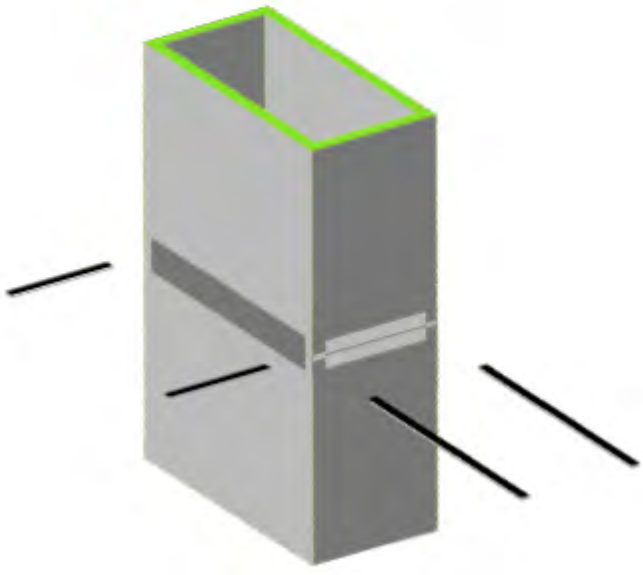
PVC bayonet connector

After the profiles have been assembled and glued to the duct (drying time = 24 hours), check for glue burrs. If you identify excess glue on the contacting surfaces, mechanically remove such excess glue using a cutter or spatulas.
Cut the PVC bayonet connector into elements that are as long as the aluminium profiles or slightly longer (the excess length must not exceed 10 mm, otherwise the protruding portions of the bayonet connectors installed first may make it difficult to fit the following bayonet connectors).

WARNING! The bayonet connectors must not be cut shorter than the metal profiles as missing bayonets along a portion of the profiles may create gaps in the pneumatic tightness of the connection system.
Bent nose pliers may be used during bayonet connector installation to hold the profiles together.
If bayonet connector sliding into their housings is particularly difficult, a rubber head mallet may be used.

Now, the two heads of the ducts are coupled, but they are not pneumatically tight yet.

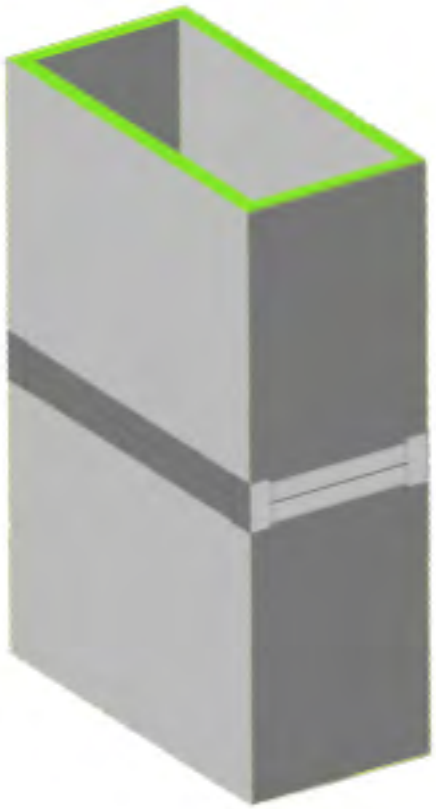




Covering angular pieces

Fill the cavities at the corners with silicone, mainly at the edge that forms between the pairs of perpendicular profiles.

To fit the covering angular piece, place the tabs located centrally on the sides into the C-shaped housings in the aluminium profiles.



The ducts are now connected.

11.4 Teeth connection or connection without profiles

Connection system without profiles: the ideal solution for small section ducts

This is not a structural joint and it is not suitable for high pressures.

Material required to create this connection:

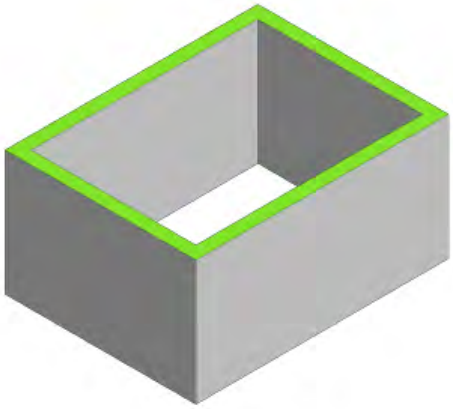
Smooth aluminium tape
Code 700112

Silicone
Code 700123 Neutral, grey in colour

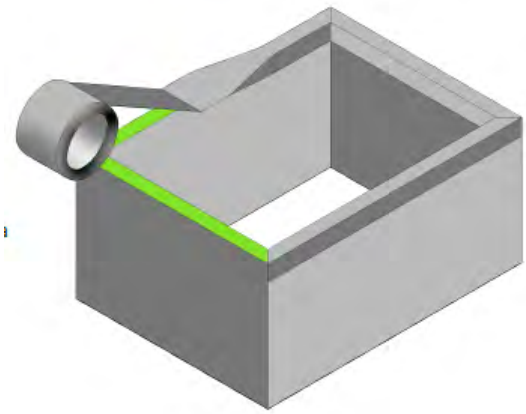
Teeth connector
Code 700253

Procedure:
preparing the heads

Check that the duct heads to be glued are perfectly planar and perpendicular to the duct length.
Wipe the edge of the Isocanale panel and remove any residual dust. Wipe away any residual oil or lubricants (left after cutting or construction) from the aluminium profiles along a band of 100 mm.
Use a tape marker to trace the reference line at a distance of approx. 30 mm from the edge on the outer side of the panel.



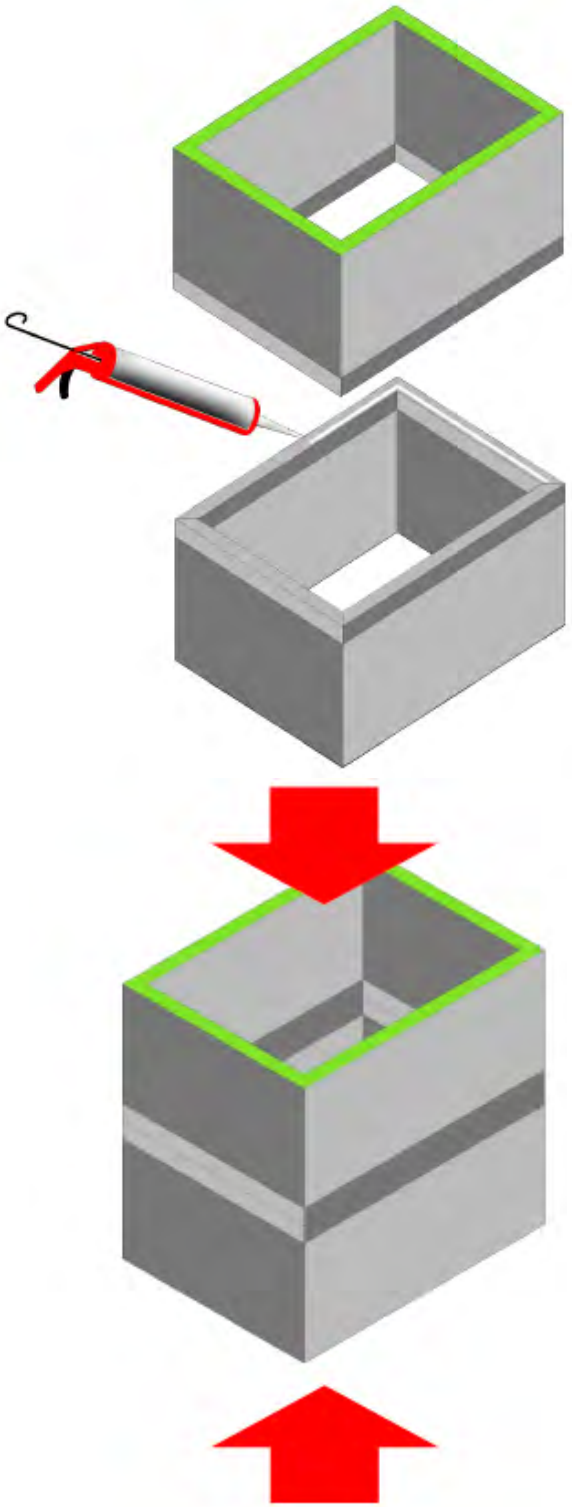
Apply tape as shown in the drawing and make sure that creases do not form on the surface that is in direct contact with the foam. To prevent creases, use the soft spatula specifically supplied to flatten the tape along the outer edges of the duct.
We recommend starting from the centre of one side so that the tape ends are joined easily and crease-free.



Repeat the procedure with all the heads of the ducts that need joining.
Move the heads of the ducts to be coupled close to one another and check that their surfaces come into full contact and they are planar. Detached parts may be neglected on condition that the gap is max. 2 mm thick.
Mark these areas with a felt tip pen.

Silicone

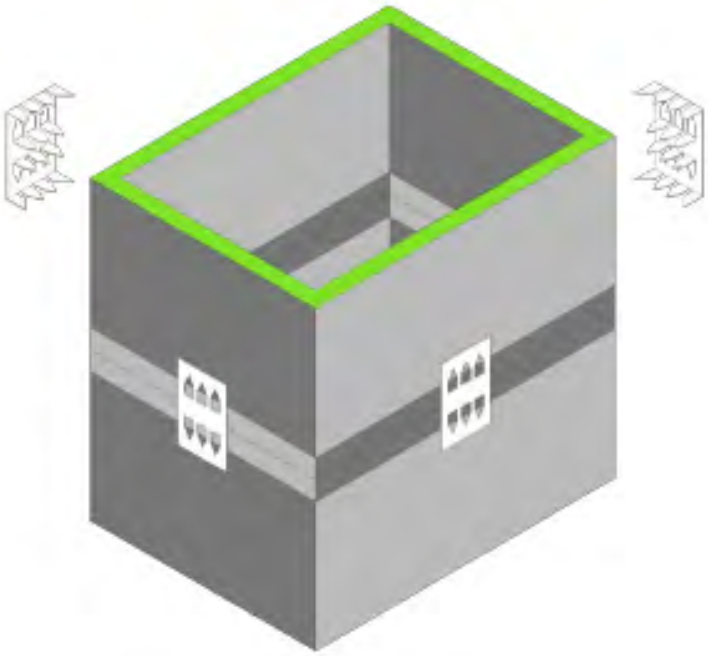
Silicone should only be spread on one of the two heads to be coupled: apply a large amount of silicone on the preliminarily marked areas so that silicone can grip on both coupling surfaces.



Compress one duct head against the other

Teeth connector

Apply one teeth connector on each side of the ducts to be joined, placing it halfway through each side across the connection line (filled with silicone), and do not bend or flex it. A rubber head mallet may be used to help fit the teeth on the panel surface.

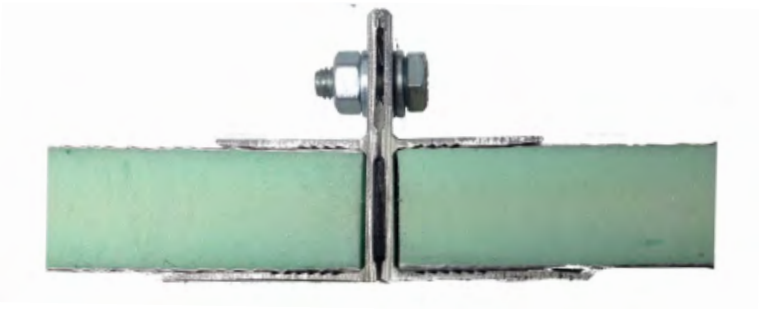


Final taping

Wipe the edge of the Isocanale panel and remove any residual dust and/or oil. Where silicone leaks are experienced, the tape can be applied immediately if the silicone is fresh. If it has hardened already, any excess silicone must be removed with a cutter without carving the surface of the panel.
Use the edges of the tape applied to lay the tape, as shown in the drawing. With the help of the soft spatula specifically supplied flatten the tape along the outer edges of the duct.
If the tape comes off at the connectors, several wraps of tape must be applied to safeguard the aluminium tightness.
The connector does not necessarily have to be fully covered, although this is a better looking solution in cases where the duct is not concealed.

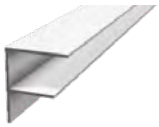
The ducts are now connected.

11.5 “F” connection



Connection system with aluminium profiles

The ideal solution for ducts requiring disassembly for inspection purposes
Material required to create this connection:



Structural “F” profile, aluminium
Code 700222 for 20 mm thick panels
Code 700228 for 30 mm thick panels

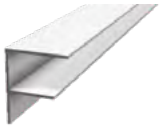
Galvanized reinforcement square bracket
Code 700158 for 20 mm thick panels
Code 700157 for 30 mm thick panels

Profile glue
Code 700109

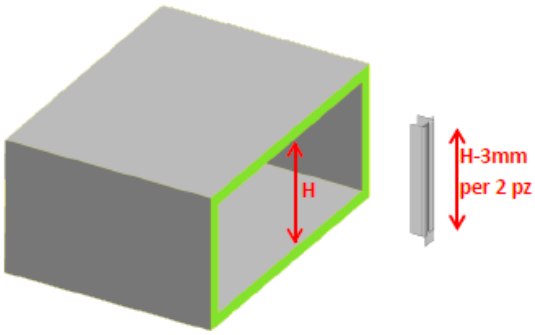
Adhesive gasket
Code 700238

Nuts and bolts
Length 15mm

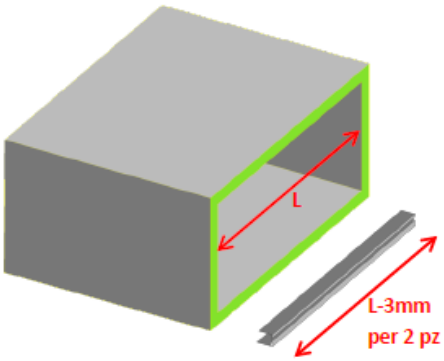
Procedure:
“F” profile



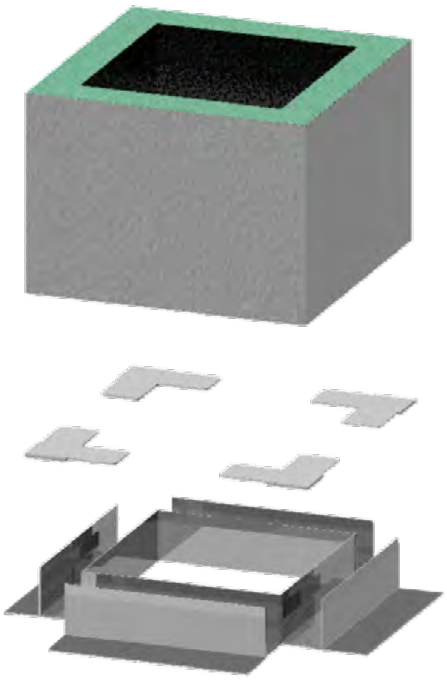
After the duct is assembled, cut the profiles making sure they are as long as the inner sides of the duct minus 3 mm in length. This arrangement frees the necessary space to accommodate the thickness of the profiles inside the duct during the assembly stage.
Simulate assembly and check that the profile length is correct.
Wipe the edge of the Isocanale panel and remove any residual dust. Wipe away any residual oil or lubricants (left after cutting or construction) from the aluminium profiles that need to be glued.



Take an “F” profile and spread a line of profile glue along the side that will eventually come into contact with the polyurethane foam in the panel. Do not use an excessive amount of glue as it tends to grow its volume during hardening and to come out of the glued joint.



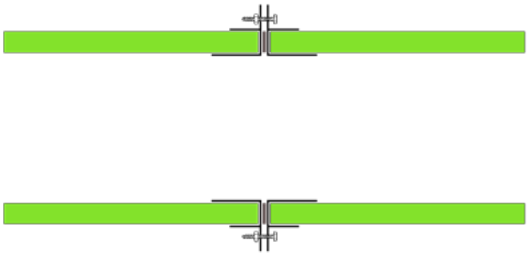
Fit a square bracket and block it in place using one head of the profile to be glued. Then fit the second square bracket at the opposite head of the profile and place a profile in the panel - a rubber head mallet may be used to tap the profile in position, where necessary.
Follow the procedure above with all the profiles until the duct outlet perimeter is covered.
Repeat the procedure with all the heads that need coupling.



Adhesive gasket

After the profiles have been assembled and glued to the duct (drying time = 24 hours), check for glue burrs. If you identify excess glue on the contacting surfaces, mechanically remove such excess glue using a cutter or spatulas.
Apply the adhesive gasket onto the head of only one of the two ducts to be coupled, starting half way through one of the sides. Do not apply the gasket starting from the corners as this may cause the two ends of the overlapping gaskets to not match perfectly, thus making the air tightness inefficient.
The gasket must be placed in the shaped housing with which the profile is supplied and it must not be stretched, bent without prior flattening, torn at the angular joints.
Fit the gasket along the entire perimeter length until it overlaps the starting point of the sheath for at least 3cm.

Now, the two heads of the ducts are ready for coupling.



Duct connection

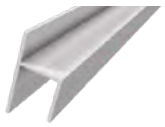
Place the two heads of the ducts previously fitted with the “F” profiles close to one another. Then push one duct against the other and compress the gasket until the aluminium heads come into contact.

Keep the gasket compressed and drill through holes (two on each side) with a suitable diameter to receive the threaded portion of the locking nut. For easier installation, we recommend drilling two holes on two opposite sides, then fitting a nut and bolt to tighten the two heads, and finally drilling the other six holes.
The ducts are finally connected when all the nuts are tightened on the corresponding bolts.

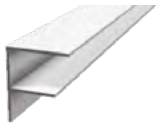
WARNING! We recommend that self-locking bolts or toothed washers are used to prevent unscrewing due to vibrations and sudden temperature changes.

11.6 Connections and parts which are external to the duct

This is the ideal solution for duct connection to machinery, walls or other.



Structural “h” profile, aluminium
Code 700223 for 20 mm thick panels
Code 700230 for 30 mm thick panels



Structural “F” profile, aluminium
Code 700222 for 20 mm thick panels
Code 700228 for 30 mm thick panels

Galvanized reinforcement square bracket
Code 700158 for 20 mm thick panels
Code 700157 for 30 mm thick panels

Glue for profiles
Code 700109

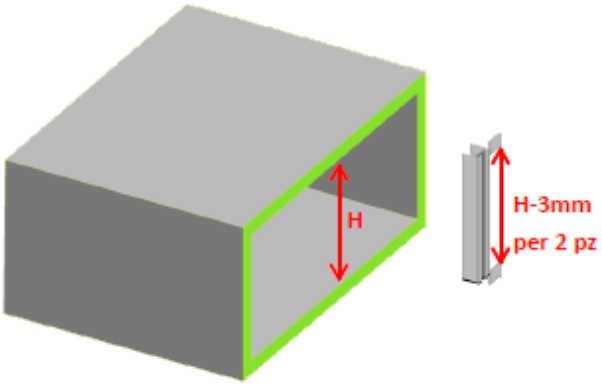
Adhesive gasket
Code 700238

Nuts and bolts
Length 15mm

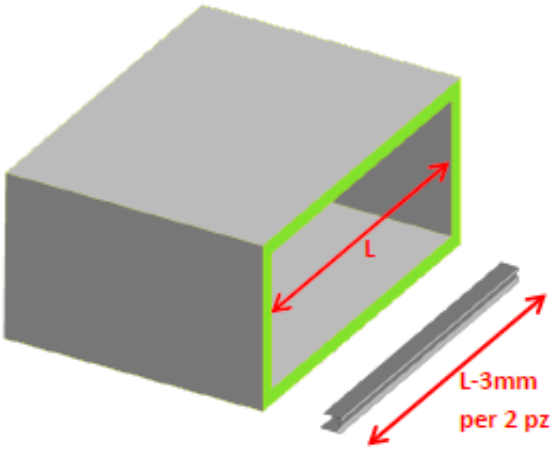
Procedure:
“F” or “h” profile

After the duct is assembled, cut the profiles making sure they are as long as the inner sides of the duct minus 3 mm in length. This arrangement frees the necessary space to accommodate the thickness of the profiles inside the duct during the assembly stage.
Simulate assembly and check that the profile length is correct.

Wipe the edge of the Isocanale panel and remove any residual dust. Wipe away any residual oil or lubricants (left after cutting or construction) from the aluminium profiles that need to be glued.
Take an “h” profile and spread a line of profile glue along the side that will eventually come into contact with the polyurethane foam in the panel. Do not use an excessive amount of glue as it tends to grow its volume during hardening and to come out of the glued joint.



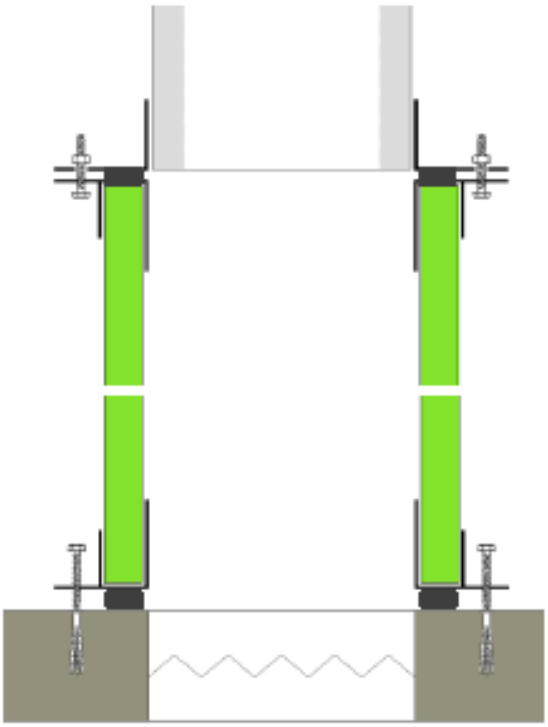
Fit a square bracket and block it in place using one head of the profile to be glued. Then fit the second square bracket at the opposite head of the profile and place a profile in the panel - a rubber head mallet may be used to tap the profile in position, where necessary.
Follow the procedure above with all the profiles until the duct outlet perimeter is covered.
Drill the profiles at the wings to anchor the duct to the AHU inlet, if any, or to the machinery that needs to be installed on the duct.



Adhesive gasket

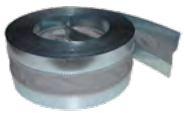
After the profiles have been assembled and glued to the duct (drying time = 24 hours), check for glue burrs. If you identify excess glue on the contacting surfaces, mechanically remove such excess glue using a cutter or spatulas.
Apply the adhesive gasket onto the head of only one of the two ducts to be coupled, starting half way through one of the sides. Do not apply the gasket starting from the corners as this may cause the two ends of the overlapping gaskets to not match perfectly, thus making the air tightness inefficient.
The gasket must be placed in the shaped housing with which the profile is supplied and it must not be stretched, bent without prior flattening, torn at the angular joints.
Fit the gasket along the entire perimeter length until it overlaps the starting point of the sheath for at least 3cm.
Keep the gasket compressed and fit and tighten all the nuts with the corresponding bolts.

WARNING! We recommend that self-locking bolts or toothed washers are used to prevent unscrewing due to vibrations and sudden temperature changes.



11.7 Vibration damping flange

It is required when the vibration damping joint is installed.

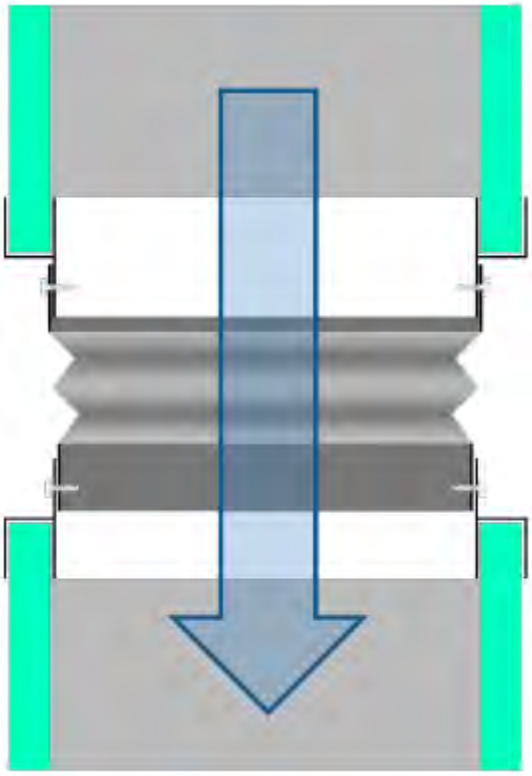


Cod 700233

Installation of the vibration damping joint is always recommended when the duct is coupled with AHUs, splits and potentially vibrating machinery. We recommend making the connection using “h” profiles for direct coupling and “F” profiles for coupling with plenums.
After the installation of “h” or “F” profiles, as illustrated above, the vibration damping gasket can be fitted with the help of self-drilling screws.
The two rubber ends of the joint must then be closed with an approx. 10cm overlap, which must be sealed with silicone.

WARNING! We recommend that rivets are used for locking purposes or, where the joint needs to be removable, self-locking bolts or bolts combined with toothed washers are used to prevent unscrewing due to vibrations and sudden temperature changes.
Where possible, the vibration damping joint must be installed taking the air flow into account (see cyan arrow in drawing). It must also be secured outside the “h” profile on the joint side facing the air flow inlet and inside the “h” profile on the joint side facing the air flow outlet.

For optimized pneumatic tightness of the system we recommend that an adhesive gasket is fitted at all times between the “h” profile and the vibration damping gasket.



12. Ductwork mounts

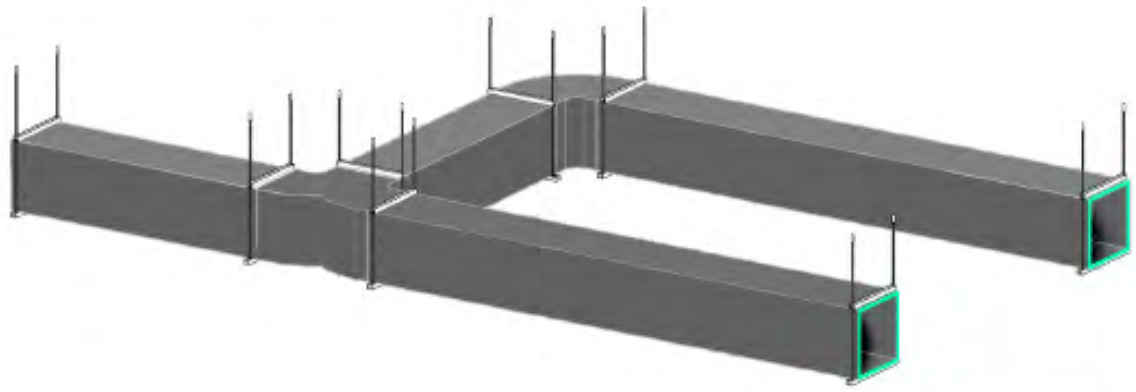
The Isocanale panels are so lightweight that the number and sizing of the anchor sleeves is minimised. The weight of 20mm panels varies between 0.7 and 0.9 Kg/m², depending on the density of the selected model. On average, the weight of the duct taken as reference for the anchoring systems is 1.4 Kg/m² (including profiles and accessories), multiplied by two as a precautionary measure.

The anchoring systems are selected by the fitter who takes full responsibility for their suitability for wall mounting (concrete, brickwork, wood, etc.) and makes sure that they do not loosen over time, with special reference to concrete or brickwork mounts.

We recommend that the mounts selected can dampen vibrations that may be transferred through the duct in order to minimise their propagation and to prevent damage to the outer surfaces of the ductwork.

Recommendations:
- the max. straight distance between the mounts MUST NOT exceed 4 metres;
- the anchoring system must be placed at the joints of the duct sections;
- provision must always be made for a mount at static or dynamic branching;
- provision must always be made for specific mounts supplied with suitable anchoring systems, which must be sized according to the load, to support accessories such as damper control blades, fire dampers, filters, humidifiers, etc.;
- provision must always be made for anchoring mounth with aluminium profiles code 700324 when the size of the duct size exceeds 700 mm or when double or coupled ducts are fitted (see page 73).

Two anchoring procedures may be followed for ceiling-mounting of the ducts:



12.1 Anchoring with hook bracket

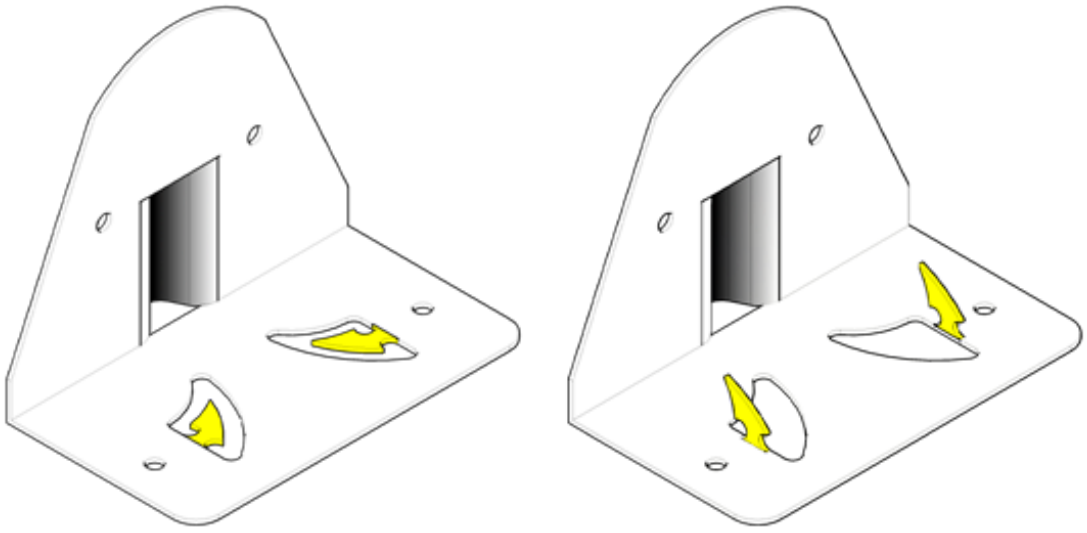
This is the ideal solution for ducts with a max. side length of 700mm.
Material required for these mounts:

Hook bracket
Code 700280

Steel threaded bar, max. dia. 8 mm, including bolts

Anchoring sleeve (type and model selected according to ceiling support type)

The procedure consists in the application of the anchoring sleeves to the ceiling in such way that the threaded bars can run along the duct sides.
Take the hook bracket and lift the flat tabs located on the base of the bracket, as shown in the drawing (tabs in yellow).



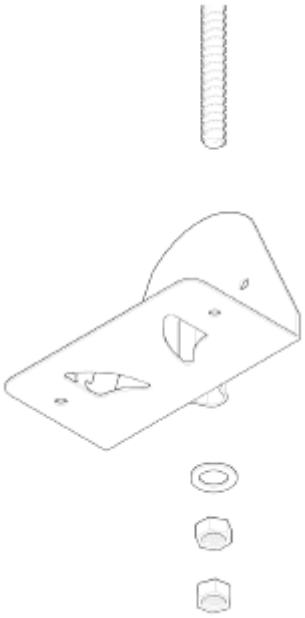
Ceiling-mounted applications

Fit a hook bracket from the bottom with the tabs facing the duct and run the threaded bar in its housing. Lock the bracket with a washer and a self-locking bolt or two bolts tightened to one another.
Cut off any protruding portion of the threaded bar.

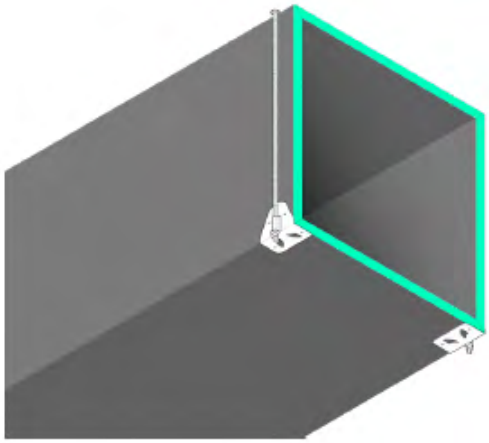
Off-ceiling applications:

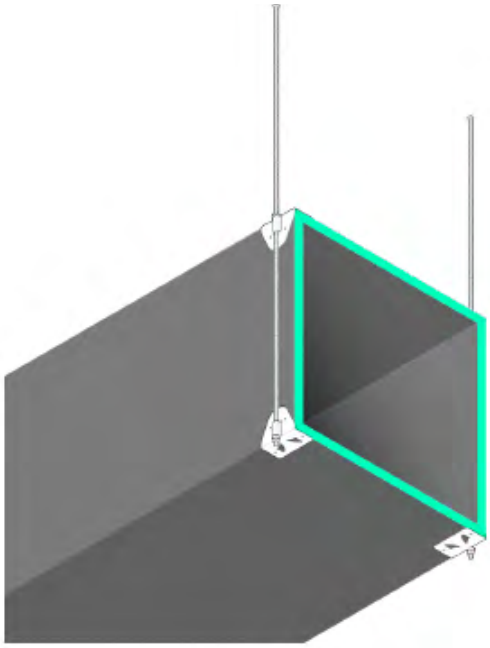
1. Screw a nut on the threaded bar up to a height 5 cm taller than the top side of the duct.
2. Fit a washer and a pair of hook brackets, facing one another (see drawing), both with tabs facing the duct.
3. Anchor the bottom bracket to the duct using the tabs and lock it in place with a washer and a self-locking bolt or a washer and two bolts tightened to one another.
4. Then lock the top bracket and anchor it to the duct using the tabs, and finally secure it with the nut (one) fitted at earlier stages (point 1).

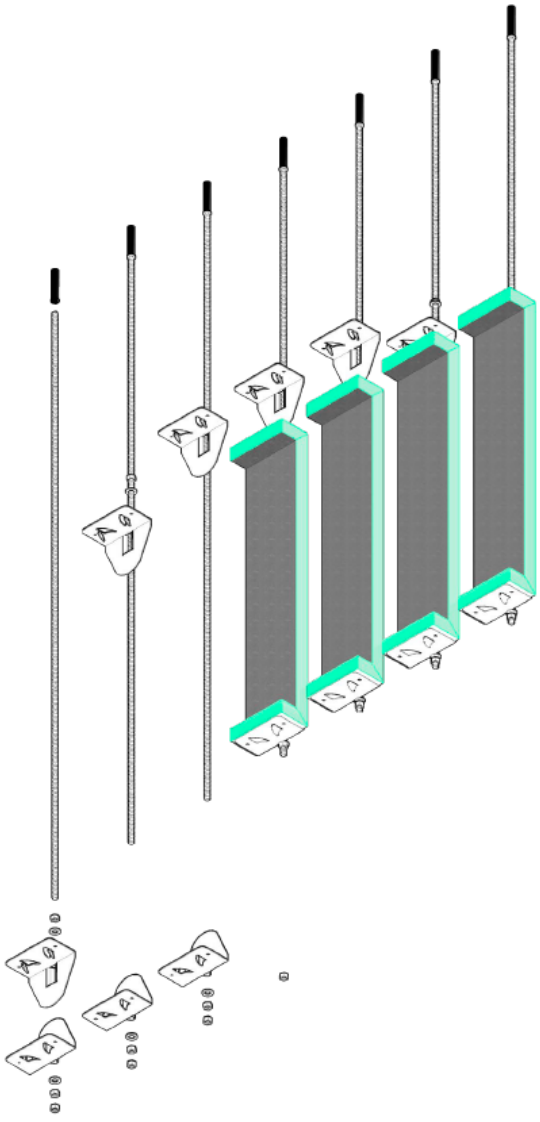
Cut off any protruding portion of the threaded bar



12.2 Ceiling anchor







This is the ideal solution for ducts of any size.
Material required for these mounts:

Aluminium rectangular profile, our code 700324

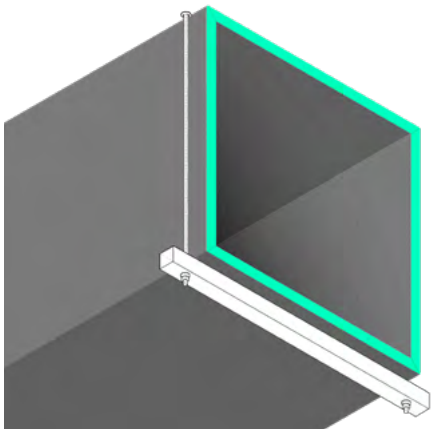
Steel threaded bar max diameter 8 mm with related bolts

Anchoring sleeve (model and type has to be selected according to the ceiling support type)

The procedure consists in the application of the anchoring sleeves to the ceiling in such way that the threaded bars run along the duct sides (please consider at least 5 mm between threaded bars and duct sides).

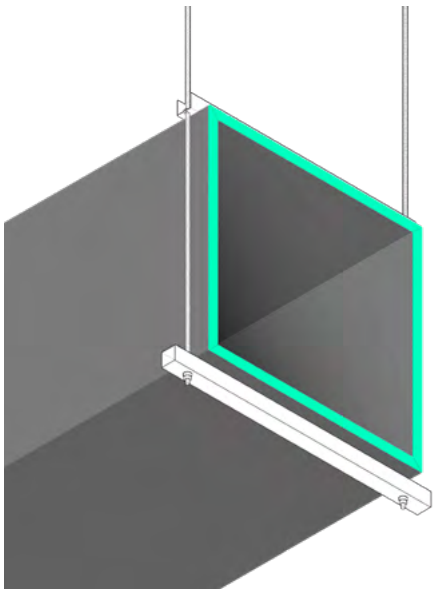
Ceiling-mounted applications:

fit a rectangular profile from the bottom, with the 20mm side in contact with the duct, by sliding the threaded bar in the previously prepared specific holes - which have an interaxis equal to the distance of the axis of the threaded bars – on the profile; lock the bracket with a self-locking bolt or two bolts tightened to one another.
Cut off any protruding portion of the threaded bars.



Off-ceiling applications:

Screw a nut on all the threaded bars up to a height 10 cm taller than the top side of the duct, fit the first profile from the bottom, with the holes – which have an interaxis equal to the distance of the axis of the threaded bars - on the 20 mm side; place the duct and fit the second profile – which has the same dimensions and holes of the first one – and fix it with a self-locking bolt for each bar, or with two bolts tightened to one another. After having leveled the duct and blocked the lower profile, secure the top profile by fixing it on the threaded bar with the previously inserted nuts. Cut off any protruding portion of the threaded bars.



13. Remarks and contacts

This Instruction Manual is intended to give our Customers useful recommendations on correct installation of our products.

Any information in it is the result of the experience acquired by STIFERITE and confrontation with expert industry professionals. It was drafted with utmost care in function of state-of-the-art knowledge and technologies.

In addition to compliance with the existing regulations, STIFERITE recommends that the Customer also consults the instructions for installation provided by the manufacturers/ producers of the materials involved in any specific application.

For further information on the products and their performances, please refer to our website: www.isocanale.com.

For clarifications or advice on the installation procedures, contact:

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