GEBHARDT STAHL

Assembly recommendations Air duct profiles Premium

Tightness from the very start!

The sealing of flange connections must be done with very great care. Through this, the air-tightness of the ducting system is crucially influenced.

Appropriate sealing material and careful laying are basic requirements. Consequently, use tried and tested sealing material from GEBHARDT (see the entire catalogue), and please follow our assembly and processing instructions.

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System choice

Selection of profile sizes

The right profile size primarily depends on the longest side of the duct cross section. Secondly, the profile size depends on the respective operating pressure within the duct network (see appendix, page 12).
If you stick to the specifications stated within the table, the result will always be a solid, stable air duct. Although you can select a weaker connection, please note that additional struts, reinforcements, etc. are usually more expensive than the savings in the profiles and corner pieces.
For reinforcement recommendations, see working notes in the appendix (page 13).

Seam connections

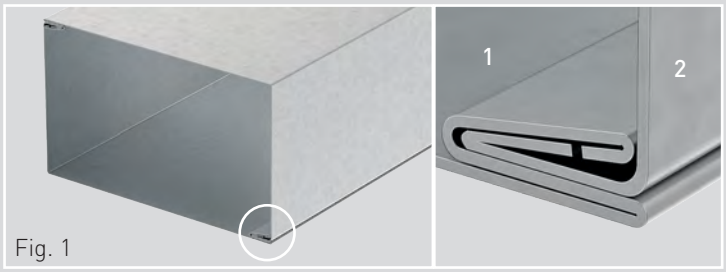


Fig. 1

Snap seam connection

1 Snap seam
2 Cam standing seam

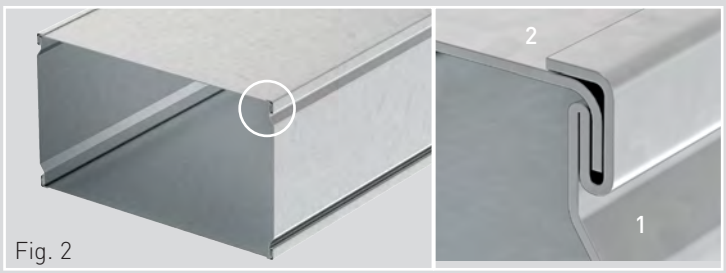


Fig. 2

Pittsburgh seam connection

1 Pittsburgh seam
2 Standing seam

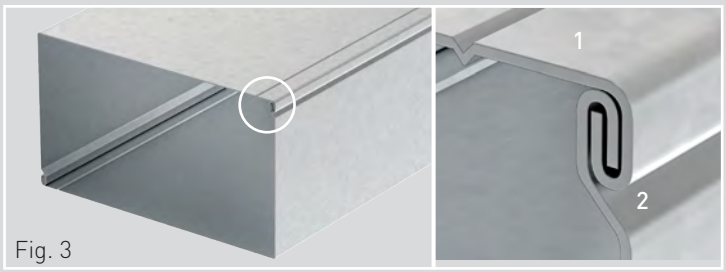


Fig. 3

Duct seam connection

1 Inner standing seam
2 Closed long seam

Fig. 4

Standing seam connection

1 Doubble standing seam
2 Standing seam

Installation

1. Cutting the profiles to length

The profile is cut according the type of corner angle. This is worked out as follows:

P corner piece – duct dimensions minus 32 mm
S corner piece – duct dimensions minus 32 mm
D corner piece – duct dimensions minus ≤ 5 mm

When sawing the following factors are important:
So that no vibrations occur, the profile should be as whole as possible and without distance.
Clamp the profile as shown (rod and section) on both sides of the saw blade.
This way, the burr side is always at inaccessible parts of the flange. All kinds of cold, circular saws are suitable.
(Accessories see below)

The P + S corner pieces
These corner pieces combine rational working with stability and a good tightness. Seam notching is no longer required and the screw head is easily accessible for all types of wrenches. During flange mounting on the sheet metal duct, the corner angles can no longer be damaged.

20 flange M8 x 25
30 flange M10 x 30
40 flange M10 x 30

Open-ended wrenches are only partially suitable. Ring wrenches and socket wrenches with a thick-walled socket can be used without restrictions.

The D corner piece
This corner piece results in a clean flange corner.
However, it needs to be borne in mind that the corner seams should be notched. Only Ring wrenches and socket wrenches with a thin-walled socket can be used.

20 flange M8 x 25
30 flange M10 x 30
40 flange M10 x 30

WORKING NOTES:

For optimum results when working with Gebhardt Stahl air duct profiles (with and without butyl), we recommend the following products:

Saw blade : Haeberle HSS 300 mm dia. x 1,7 mm x 40 mm, T4 Z 220

Cutting oil: Haeberle S 2000

Butyl residue on the saw blade can be removed without leaving any residue. It is recommended that you use rust remover i.e. Würth Industry Cleaner (Art. no. 0893140).

Fig. 1

Fig. 2

Fig. 3

Fig. 4

2. Putting the frame together

Warning: Always fit the frame vertically.

Procedure:

1. Insert 2 corner pieces into each of the 2 long profile bars.
2. Insert both short profiles.
3. Insert the long upper profile (see Fig. 1).

A rubber hammer is recommended for inserting the corner pieces.

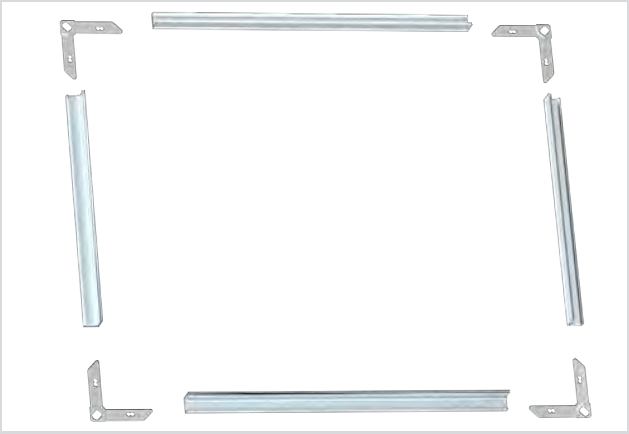


Fig. 1

Tip: Punch press

By stamping in cams, the corner piece which is to be plugged loosely into the profile is locked into place. Through this, the flanges can no longer fall apart as a result of transportation and setting up. Stability is improved considerably. The corner piece and profile are connected in such a way that they can only become detached from each other following the forceful destruction of the cam. The sealing surface of the profile is not deformed, and, as such, the tightness of the flange is not negatively affected in any way. They act as a measure for efficient production, and they can be omitted given careful transportation and installation of the air ducts. We recommend that this is done, however.

With the pneumatic punch press, 2-4 cams are always punched simultaneously (for further information, please refer to the catalogue).

Fig. 2

Fig. 3

Tip: Corner pieces with notch

The corner piece with notch has overhead hooks on both legs, wich are attached when they are smashed on the sheet metal. This achieves a permanent connection of the flange frame (only to be solved by force). In this case, punching is no longer necessary.

Fig. 4

3a. Frame installation (normal profile)

Start on a horizontal lying duct with an upper corner. Strike this corner fully. In order to be able to arrange the profiles easily, they should always be held slanting towards the duct sheeting.
Now strike the corner below. In doing so, the frame must always be held slanting. The upper corner follows and, finally, the last corner.

Each profile first gets a spot weld on the ends of the section, in the vicinity of each corner. The distance to the profile end should be about 10 mm. It is very important that, with these first spot welds, the profile abuts the edge of the sheeting fully. In order to accomplish this, the spot welding gun is shut down without welding current and the tightly clamped profile is hit with light blows of the hammer. The welding current is only triggered when the profile visibly abuts the area of the duct.

In the same manner, place an attachment point in the centre, whereby the striking of the profile on the duct sheeting is secured by light hammer blows. If the flange leg is attached in such a way, spot welding takes place in a single movement from side to side. The attachment can also be achieved using 'pressure joining technology' (for the sequence, see page 7).

Important:
During flange set-up, always arrange the section inclined to the edge of the sheeting! Strike both flanges on a flat table. Align the parts of the duct and only then spot weld!

Spot weld sequence
As the corner area is exposed to the greatest stress, there is only a gap of 20 mm between 1-4 and 2-9. The other spot weldings should adhere to the markings on the sections (page 7, figure 4).

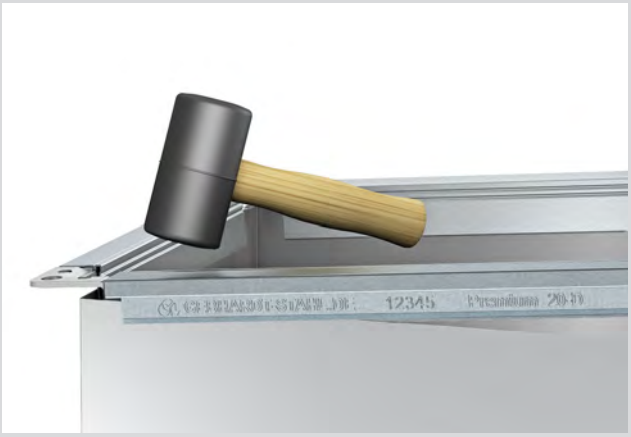


Fig. 1

Fig. 2

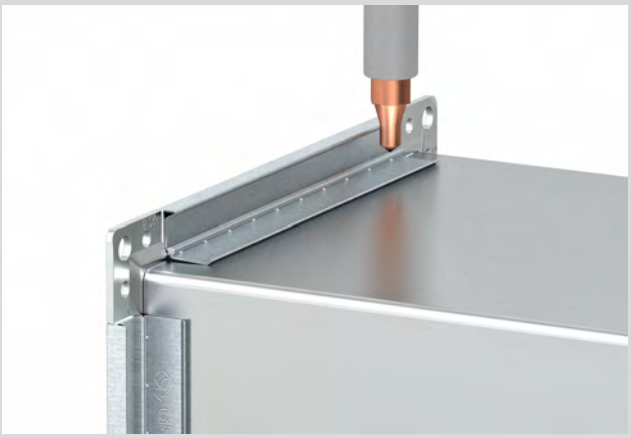


Fig. 3

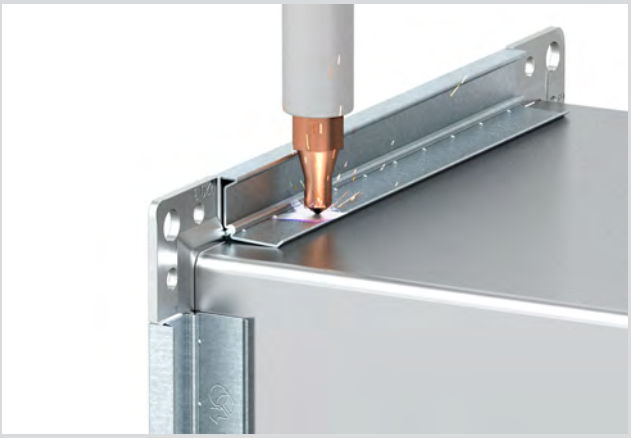


Fig. 4

3b. Frame installation (butyl profile)

General note:

As the viscosity of the butyl sealing compound decreases at lower temperatures, the optimum processing temperature is around 20°C.

3.1 Place the duct on the floor with the open end pointing upwards and attach the profile frame at an angle by applying gentle, even pressure onto the duct sheeting (Fig. 1).

Fig. 1

3.2 Strike the profile frame on the duct until the duct sheeting is completely inserted (Fig. 2). In order to fulfil the requirements of seal class C, care should be taken that accurate working is carried out with respect to the duct and mould parts (Fig. 3).

Fig. 2

4. Spot welding/Clinching

As usual, set two spot welds at the ends of the profile (distance to end of the profile approx. 10 mm).
In the rest of the sequence of spot welds, set all other welding points with a gap of 140 mm max. (Fig. 4).
If installed properly, the high adhesive properties of the butyl (equivalent to approx. 30% of a spot weld) can replace every second spot weld. The butyl mass, however, always remains flexible and does not harden.

For ducts with a width of up to 200 mm, only set spot welds at the ends of the profile.
For ducts with a width of between 200 mm and 400 mm, only set spot welds at the ends of the profiles and one in the middle.

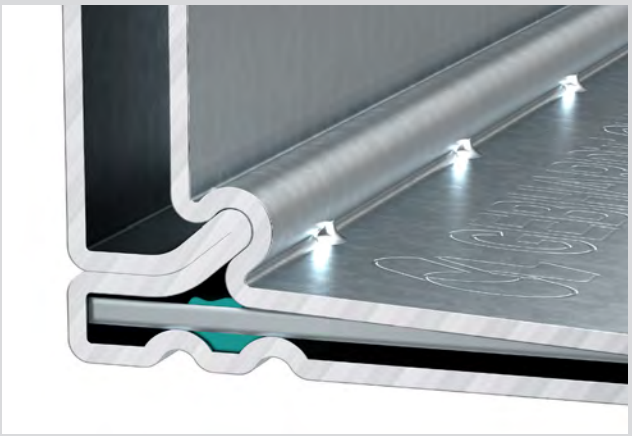
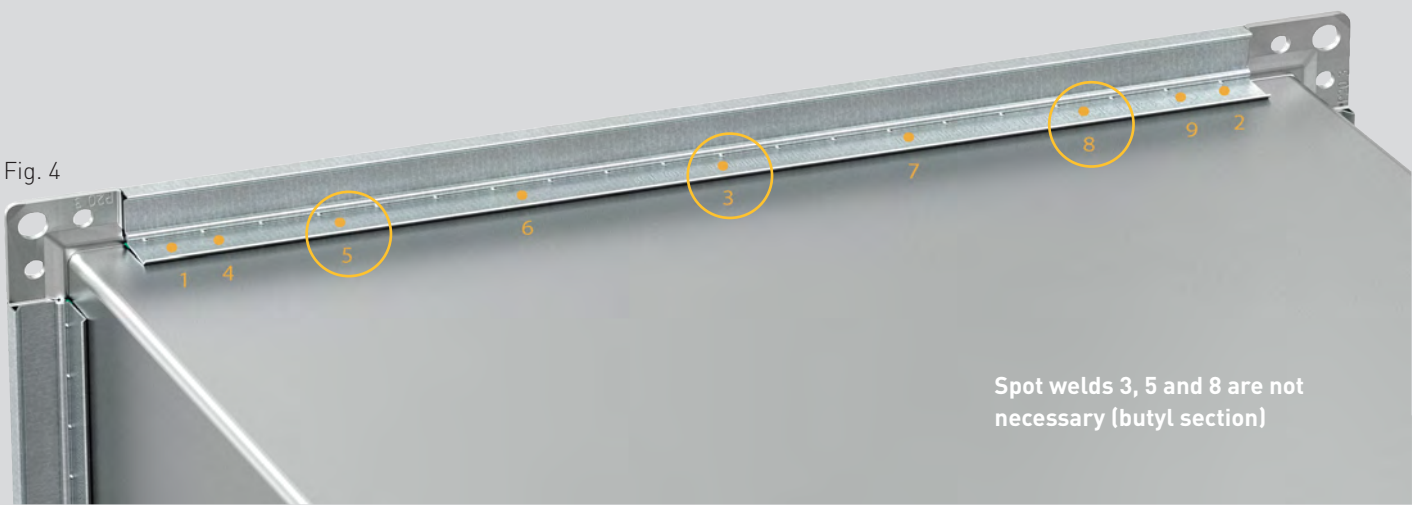


Fig. 3

Fig. 4



5. Sealing measures

Sealing mass in for P corner angles and S corner angles
Spray the sealing bead (e.g. Gebhardt Plast) approximately flush with the inner side of the duct. In the corner-area, overlap the sealing bead and apply more thickly. The front side of the seam bulge and the exposed duct sheeting must be well covered. Since the seam bulge is not notched, as is the case with the other corner angles, this provides an optimum tightness (see Fig. 1 and 2).

Sealing bead dimensions:	**8-10 mm wide**
	6-8 mm thick

Sealing mass in the case of D corner pieces
Spray the sealing bead (e.g. Gebhardt Plast) approximately flush with the inner side of the duct. In the corner-area, cross over the sealing bead and apply a little more thickly, so that all the joints are well covered.

Sealing bead dimensions:	**8-10 mm wide**
	6-8 mm thick

Sealing tape for P corner pieces and S corner pieces
Stick the single-sided adhesive sealing tape flush with the inside of the duct so that the ends overlap in the corner (as shown). This ensures a complete covering of the front side of the seam bulge.

Sealing tape dimensions:

Section size	Sealing tape (width x thickness)
20 mm	15 mm x 4 mm
30 mm	20 mm x 4 mm
40 mm	25 mm x 4 mm

- at least 15 x 4 mm
- crease free, parallel to the inside of the flange
- glued at the corners over the cross

Sealing tape for D corner pieces
Stick the single-sided adhesive sealing tape flush with the inside of the duct so that the ends overlap in the corner (as shown). Paste over the corners with a slight arc (inner radius approx. 10 mm) so that the inner corner area is completely covered.

Sealing tape dimensions :

Section size	Sealing tape (width x thickness)
20 mm	15 mm x 4 mm
30 mm	20 mm x 4 mm
40 mm	25 mm x 4 mm

The sealing of the flange connections must be executed with extreme care in order to ensure the air-tightness of the duct system. As such, only use tried and tested Gebhardt sealing material!


Fig. 1


Fig. 2


Fig. 3

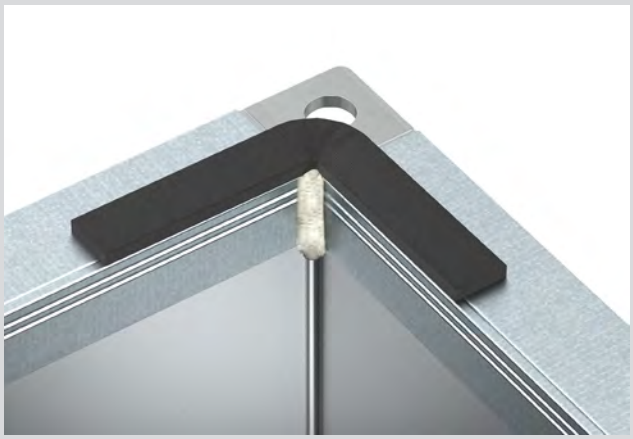


Fig. 4

6. Super seal corner

Super seal

The sealing tape is stuck in a recess (see the circle in the diagram). The sealing surface is not interrupted as a result of the rectangular course that passes through edges formed by the recess. Even a slight slipping of the sealing tape when sticking onto the flange is compensated for. Through the use of this sealing corner, there is a fully covered seal (i.e. a plane seal) in one layer. There is no doubling of material, and slippage inside the air duct is not possible. This embodiment can be compared with a prefabricated seal. A quick, simple and reliable way to seal the flange is achieved with rectangular components that carry air.

Simple, quick and safe installation:

A super seal corner ① is stuck onto the flange ③ on all four corners. The resulting gaps are filled by gluing a sealing tape ② that is an appropriate size (see Figure 1).

Product features :

- closed cell polyethylene foam
- anthracite colours and self-adhesive
- securely achieves a high air tightness class (air tight ness class B / air tightness class C) and, as such, low levels of leakage

Available in three sizes on a roll (in each case 284 pcs.):

SDE 20 round hole (sealing strip 15x4 mm) - suitable for air duct section with 20 mm profile

SDE 30 oval hole (sealing strip 20x4 mm) - suitable for air duct section with 30 mm profile

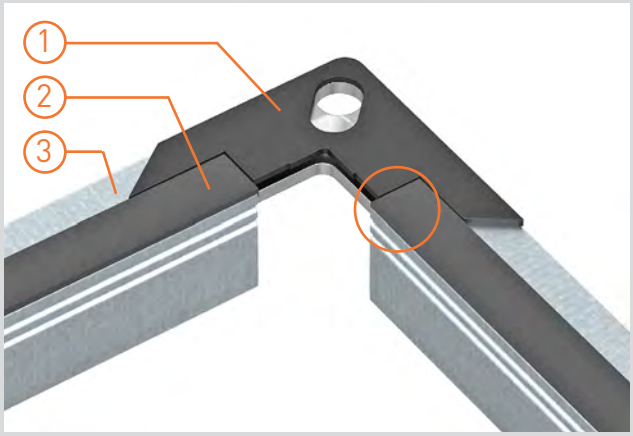


Fig. 1


Fig. 2


Fig. 3


Fig. 4

7. Sealing

Important!
At the corners, the sealing tape must be glued over the cross. This has to be done without pretension!

Note: On the corners, as usual, additionally seal using a sealing compound

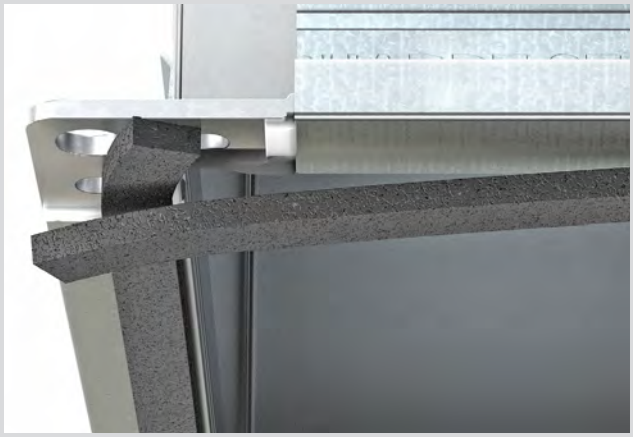


Fig. 1

8. Connecting the ducts

Hexagonal screws DIN 931 (galvanised) and hexagonal nuts DIN 934 (galvanised) are generally used as connecting screws. As all of the connecting bolts are of a sufficient size, the normal quality (8.8) is sufficient.
The screw length is such that the nut fits well, even if, initially, there is a large gap between the corner angles as a result of the seal and manufacturing inaccuracies. If the corner angles are contracted, the extra length of the screw protrudes beyond the nut.
If this protrusion detracts from the good looks of the duct, 5 mm shorter screws can also be used, but here you should take into account the fact that it will be more difficult to thread the nut. Conversely, for very thick seals or large manufacturing inaccuracies, screws that are 5 mm longer than the specified length are also used.


Fig. 2

D corner pieces
20 flange M8 x 20
30 flange M10 x 30
40 flange M10 x 30

Please only use a ring wrench or a socket wrench with a thin-walled socket!


Fig. 3

P corner pieces
20 flange M8 x 25
30 flange M10 x 30
40 flange M10 x 30

Ring wrenches and socket wrenches with a thick-walled socket can be used without restrictions. Open-ended wrenches are only partially suitable.

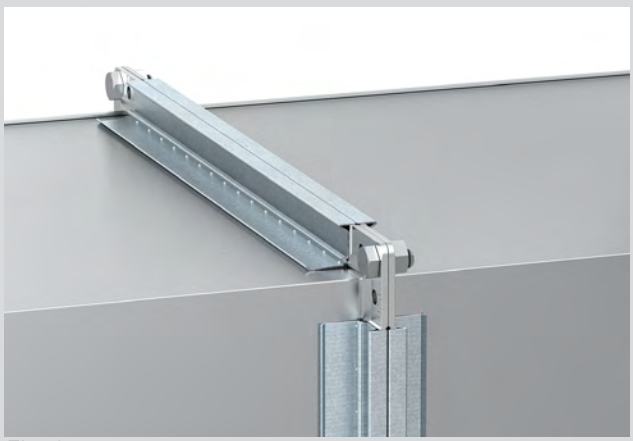
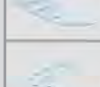


Fig. 4

Summary profiles/corners

	L- Profile		S- Profile			P- Profile			Premium		
											
	20	30	20	30	40	20	30	40	20	30	40
 L 20/3K	●										
 L 20/3L	●										
 L30/V		●									
 P 20/3K			●			●			●		
 P 20/3			●			●			●		
 SL 20/3 slotted hole			●			●			●		
 P 20/3VH notch			●			●			●		
 P 20/3L			●			●			●		
 SL 20/3 L slotted hole			●			●			●		
 D 20/3 slotted hole			●			●			●		
 SL 30/3 slotted hole				●			●			●	
 SKL 30/3				●			●			●	
 S 30/4				●			●			●	
 S 30/3H notch				●			●			●	
 SD 30/V slotted hole				●			●			●	
 SKD 30/V				●			●			●	
 P 40/4					●			●			●
 P 40/V					●			●			●
 P 40/V slotted hole					●			●			●
 P 40/VH notch					●			●			●
 D 40/V					●			●			●

Manufacturing directions
Air duct sections and installation angles (Plus)

Edge length of duct in mm	Operating pressure (Pascal)																					
	up to 200			200 up to 400			400 up to 600			600 up to 800			800 up to 1000			1000 up to 1200			1200 up to 1500		
	Profiles	Corners	Clamps	Profiles	Corners	Clamps	Profiles	Corners	Clamps	Profiles	Corners	Clamps	Profiles	Corners	Clamps	Profiles	Corners	Clamps	Profiles	Corners	Clamps
100	Profile 20	20/3K	0	Profile 20	20/3K	0	Profile 20	20/3K	0	Profile 20	20/3K	0	Profile 20	20/3K	0	Profile 20	20/3K	0	Profile 20	20/3K	1
200		20			20			20			20			20			20			20	
300																					
400																					
500			1			1			1			1			1			1			1
600																Profile 30	30		Profile 30	30	
700			2			2			2			2			2			2			2
800																					
900			3			3			3			3			3			3			3
1000																					
1100	Profile 30	30	4	Profile 30	30	4	Profile 30	30	4	Profile 30	30	4	Profile 30	30	4			4			4
1200																					
1300			5			5			5			5			5			5			5
1400																					
1500			6			6			6			6			6			6			6
1600																					
1700			7			7			7			7			7	Profile 40	40	7	Profile 40	40	7
1800																					
1900			8			8			8			8			8			8			8
2000																					
2100	Profile 40	40	9	Profile 40	40	9	Profile 40	40	9	Profile 40	40	9	Profile 40	40	9			9			9
2200																					
2300			10			10			10			10			10			10			10
2400																					
2500			11			11			11			11			11			11			11
2600																					
2700			12			12			12			12			12			12			12
2800																					
2900			13			13			13			13			13			13			13
3000																					

- A 4-screw corner joint and the use of appropriate channel sealing tape are required (see page 8).
- Furthermore, ensure that the ducts are properly reinforced.
- Notice bending of the flange frame in accordance with DIN EN 1507. For this, select the corresponding measures.
- As an alternative to installing with a threaded clamp (Clamps), a connection can be chosen using drive cleats (700 mm long)
- Maximum aspect ratio of duct is 1:5, for larger ducts parts air seperations must be made. This cannot be done with reinforcing rods, as these do not prevent unwanted turbulence of the air. As a rule, the larger side is halved here.
- The use of the products stated above must be adapted to the prevailing conditions and tested before use.
- The information that we use to advise you is based on our experience using original Gebhardt products.
- All values stated in this table are not only dependent on the material that is used, but also design and processing.
- We cannot accept any liability for results that arise from the application of this article.

Specifications

Air duct reinforcement

In rectangular air ducts, the thin sheet can be displaced due to vibrations as a result of air currents. This can cause annoying vibration noise. In order to avoid these noises, the best possible insulation is required. Air ducts with large cross-sections and alternating negative and positive pressure should be optimally reinforced in order to ensure maximum stability and freedom from flutter.

Ventilation ducts are executed diagonally to the direction of air flow using beading reinforcements (Z-profiling) or diagonal reinforcement. For duct lengths of above 1,400 mm and unfavourable cross-sectional conditions, our AIR DUCT-REINFORCEMENT design system achieves maximum stability through tubing reinforcements. With the respective structural pressure, the flange should not sag more than 1/250th of its longest side if it is exposed to a maximum nominal pressure (for duct classification). Furthermore, in the case of the corresponding structural pressure, no duct wall (of the duct to be tested) should have bulges and/or indentations greater than 3% of the width, or more than 30 mm, whichever value is the smaller. Particularly when ducts, in accordance with DIN EN 1507, are advertised, non-compliance with the reinforcement rules can have a serious impact on the entire duct system.
Please refer to our recommended installation instructions!

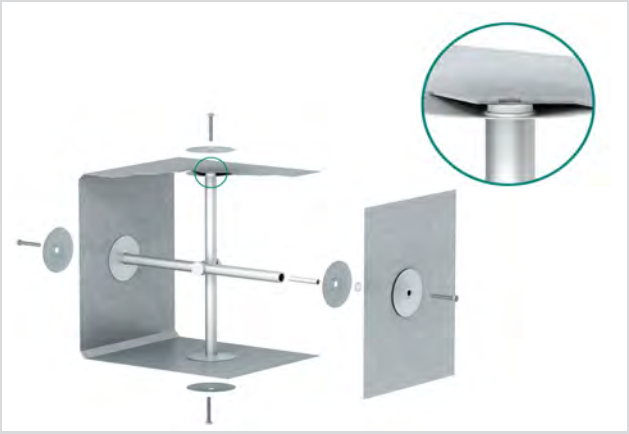


Fig. 1

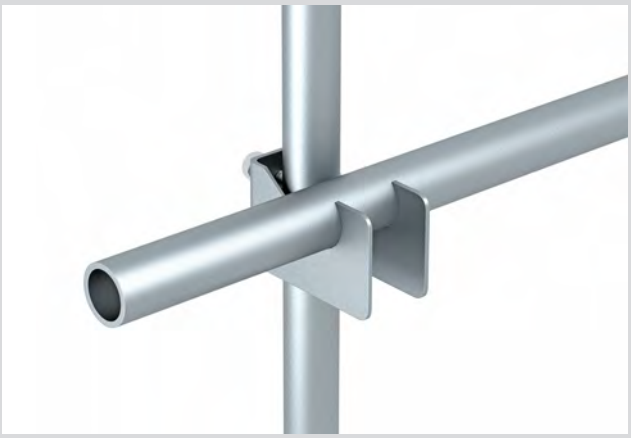
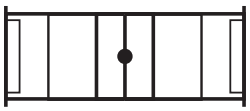
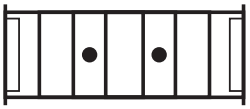
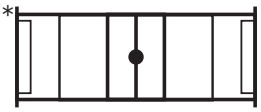
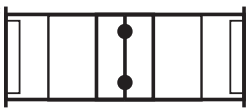
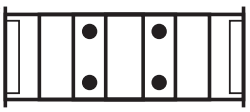
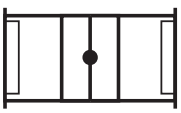
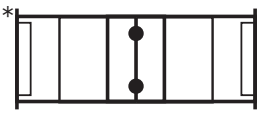
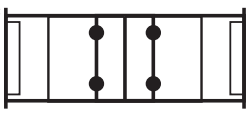
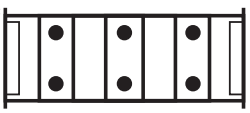


Fig. 2

Largest duct length a and/or b	Duct length L 800 mm to 1000 mm	Duct length L 1001 mm to 1250 mm	Duct length L 1251 mm to 1500 mm	Duct length L 1501 mm to 2000 mm
from 1250 mm to 1500 mm				
from 1501 mm to 1999 mm				
from 2000 mm to 3000 mm				

* Cross bracing when dimensions of b › 1000 mm

Border areas:
Edge lengths of just under 1250 mm and duct lengths of just under 800 mm must be reviewed separately.
Maximum aspect ratio of a duct is 1:5, for larger duct parts air separations must be made (no reinforcing rods).
In accordance with DIN EN 1507, the bending of the flange frame must also be taken into account. Unfavourable cross sections in the vicinity of the flange should be additionally reinforced.

Note: Our statements reflect the current state of technological development. They do not claim to be complete. We assume no liability against failures, however, the best security to guard against these is achieved through testing. The changing circumstances of application, working methods and materials mean that an adaptation of the respective application options is necessary.

Installing the weather louvre

Before carrying out work, the specified dimensions should be studied in order to determine whether the external dimensions are required, or the respective 'plug-in' or 'cut-out' dimensions. The dimensions that the blades are reduced by should lie between 27-28 mm.

Example:

Installation dimensions	Blade length
400 x 400 mm	372 to 373 mm

When inserting the blades (Fig. 2.2) into the blade support (Fig. 3.2) you should start with the top slat.
The blade support that has been prepared with the blades can then be placed into the frame that has been previously made and connected with it. Here, you can use spot welding, screwing or riveting.

The last blade (which also serves as a rain drain) can be attached depending on the available space.

There are two possibilities for this choice:
a) fastening the last blade directly onto the sheeting of the frame
b) attaching the blade in the last slot of the blade support. Here, it is a very important to ensure a stable attachment.

With both options, ensure that the blade extends beyond the frame and, as such, performs its function as a drainage blade when it rains.

If weather louvres with a larger width (larger than approx. 1500 mm) are required, the frame can be made from a single piece. The blade support can then act as the central ligament. Here, the blade support (with the blades in a modular design) are each inserted into the existing frame and joined together.

If you need a weather louvre without a frame, only the blade support is used. Here, the inserted blades should be connected to the blade support using spot welding. This provides a stable and ergonomic weather louvre.
This version is especially ideal as a front grille in a powder-coated finish.


Fig. 1


Fig. 2.1


Fig. 2.2


Fig. 3.1

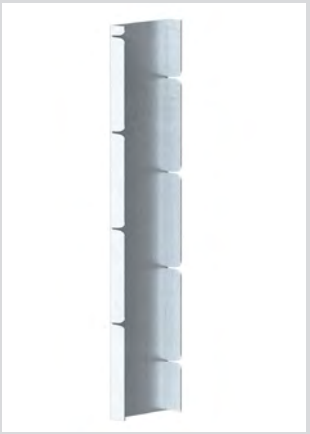


Fig. 3.2

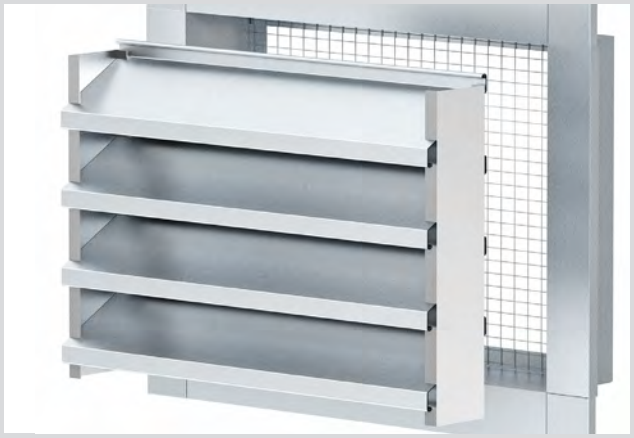


Fig. 4

Useful recommendations

Duct assembly

In order to achieve maximum performance with little time, the suspended duct piece should be so long that it can be positioned and fastened with the available tools and aids (pump trucks, lifts and similar machinery). The duct piece with branches and changes of direction is measured accurately at the installation site. The adapters are shortened accordingly and then bolted together on the floor.
The **suspensions** are prefabricated and kept available as needed. The ducts need to be free from dust on the inside and, as the case may be, wiped with a cloth. The duct can now be hung up. It is aligned with the spirit level and the suspensions are tightened to such an extent that the load is evenly distributed over the anchor bolts.
Branches and end pieces that are provisionally open have to be temporarily closed with foil or a metal panel.
Each flange connection must be suspended (max. spacing 1.5 m).
If the ducts are lines which are regularly cleaned from inside (e.g. in hospitals) then easily accessible inspection covers must be used every 7.5 m (kitchen extraction ducts every 3 m) and at the following points: arc changes, cross-section changes, changes of direction and size changes.

Volume control damper

These are mainly used as shut-off or regulating flaps. The individual blades are installed in a common frame and are connected together by a linkage or by cogwheels. Following installation, it is necessary to check whether the blades can be operated without faults. Hidden built-in flaps must have a position indicator (a manual is available separately)

Throttles and regulating flaps

During commissioning, these serve to regulate air volume. They are planned at intersections where artificial resistance (pressure equalisation) has to be produced. Sheet metal discs (preferably punched plates) and primitive gauges are used for small duct cross sections (up to 0.25 m²). These are totally adequate as this is only the air stream that has to be throttled. In any case, the control lever must be provided with a position indicator and it must be easily accessible. For duct dimensions with a side length over 600 mm, volume control dampers have to be used because of the stability that is necessary.

Weather protection grid

These consist of inclined fixed slats and protect the air intake and/or exhaust air openings from the ingression of rain. Behind this, there is a grille with a 15 mm mesh. In no case should a grille be used with smaller mesh sizes. This is because the meshes become soiled quickly and, as a result, the air flow is reduced (see previous instruction sheet).

Access doors

These are designed to be simple with a good seal and are incorporated into ducts which have to be cleaned. They are available for a round and a rectangular duct. For cost reasons, it is mainly the oval cover that is used in air ducts. They are pressed and therefore very stable. They are also clamped to the housing of the duct using two grips.
The duct cutout must be deburred very carefully. Alternative the access doors are also available with self-adhesive edge protection.

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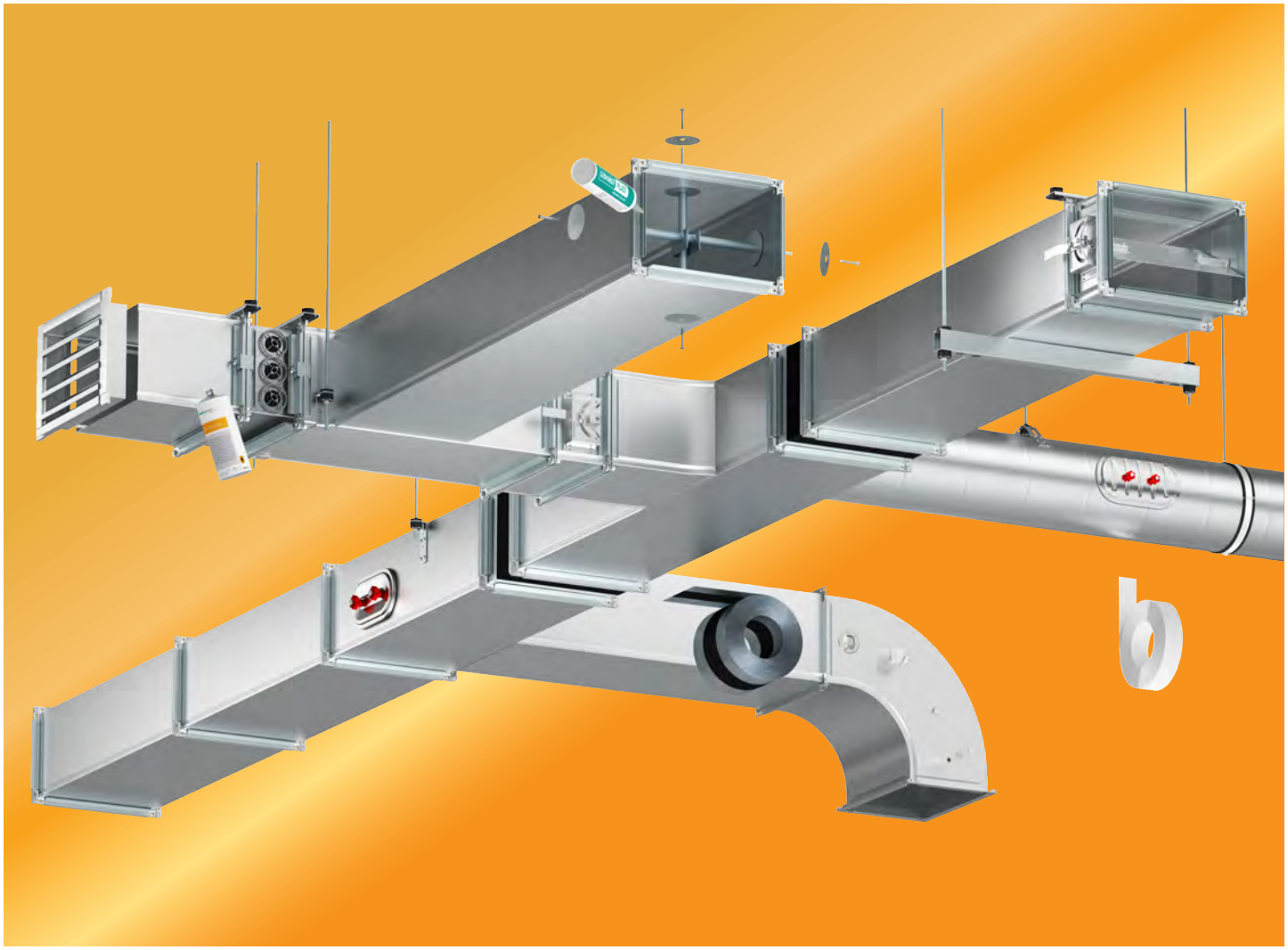

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