

Stratflo® Ventridge

Ventridge Design Guide

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Applications

Stratflo® Ventridge provides continuous natural ventilation with effective weather protection, under normal weather conditions.

It is designed to effectively remove heat, smoke and fumes on an ongoing basis from factories and industrial buildings.

Design Theory

Stratflo® Ventridge takes maximum advantage of natural stack action, which is a result of temperature differences between the inside and outside of the building causing pressure variations resulting in air movement. Heat from machinery, personnel, and also solar heat radiating through the roof and walls, warm the inside air which rises and flows out of the building through the ventridge. It is for this reason that careful consideration should be made on the ridge of a sloping structure or above areas of heavy heat load, other than flat roofed buildings. This hot air is then replaced by cooler air which must be allowed to enter the building through openings at its base.

Note: It is important to provide adequate intake openings to ensure fans are not providing extraction; at least equal to or exceeding 150% of ventilator free area. Locate these inlets at the lowest possible level.

Profile

Stratflo® Ventridge has been designed to operate efficiently and is virtually maintenance free. Its design blends in with different building and structure styles due to its low profile.

Adaptability

The ventridge can be fitted to almost any part of the roof, providing the roof supports are installed at the recommended spacings (Figure 1.0). The clear spacing 'A' between the top purlins must be the ventridge throat width with a tolerance of −0mm to +40mm. For example, when using a 380mm throat ventridge the clear space must be between 380mm and 420mm.

Numerous units can be fitted over a concentrated area where an exhaust system is essential and can also be installed continuously along the ridge.

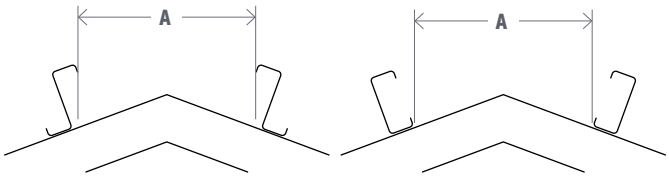


FIGURE 1.0

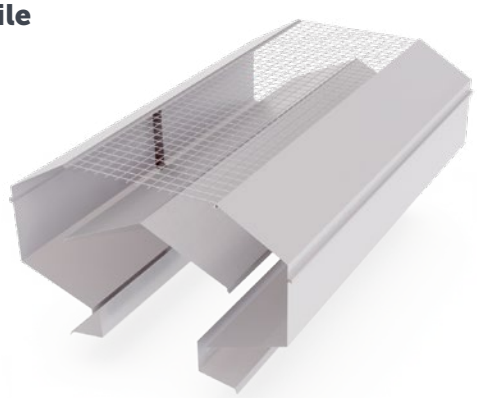
Lengths

Lengths are available to suit all applications and should be ordered to match the most efficient use of the specified bracket spacing - refer Table 5.0. Optimum length is 4600mm and maximum recommended length is 7600mm. Consideration should be given to handling and transportation of the material when ordering the required length.

Accessories

Birdwire mesh can be fitted to the Stratflo® Ventridge to stop birds or vermin entering the building through the ventridge.

Profile



Material Specifications

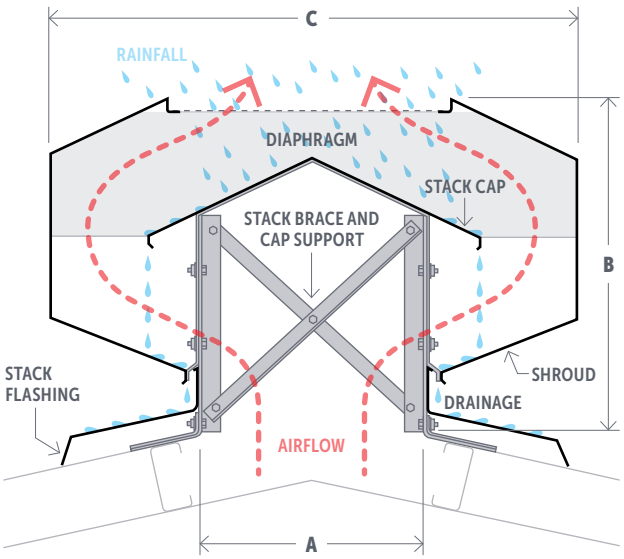
Table 1.0

Component	Base Metal Thickness (mm)	Material
Brackets	2.0	G300 Z275
	3.0	G300 Z275
Stack Cap, Stack Flashing & Shroud	0.55	G300 Z275

Standard Dimensions

Table 2.0

A Throat (mm)	B Height (mm)	C Width (mm)	Mass/Unit Length of Ridge Ventilators (kg/m)
150	230	390	8
225	325	575	12
300	425	760	16
380	520	960	18
450	605	1130	25
600	810	1510	31
750	1010	1885	52
900	1210	2260	62



Maximising Effectiveness

The effectiveness of Stratflo® Ventridge is not dependant on wind power, however wind will increase the extraction rate.

The most suitable ventridge is dependant on the number of air changes required per hour and the size of the building.

To calculate the suitable ventridge size, the usage of the building should firstly be determined and then the relevant number of air changes specified (see Table 3.0). For example, a building that is being used as a boiler room will require approximately 25–40 air changes per hour compared to 4–8 air changes per hour for a standard warehouse.

It is then appropriate to calculate the ventilation rate:

Required Flow Rate Volume Formula:

$$Q = \frac{L \times W \times H \times A}{3600}$$

Where: **Q** = Required volume flow rate in m^3 per second
L = Length of building in metres
W = Width of building in metres
H = Average height of building in metres:
A = Required air changes per hour
3600 = Conversion constant

$$H = \frac{\text{Wall Height} + \text{Ridge Height}}{2}$$

Example: To ventilate a building 60 metres long, 30 metres wide and 6 metres high with a required air change rate of 10 air changes per hour (for building to be used for light manufacturing).

Calculate the required volume flow rate using the formula:

$$Q = \frac{60 \times 30 \times 6 \times 10}{3600}$$

Q = $30m^3$ per second

Formula to Select Ventilator Throat Size:

$$\frac{Q}{\text{Ventridge Length} \times \text{Exhaust Velocity}}$$

Assume effective stack height as 6 metres.
Assume length of ventridge as 55 metres.
Temp. difference between outside & inside of ventridge as 6°C.
Then refer to (Table 4.0) for the exhaust velocity.
Assuming a wind velocity of 2m/s.
Then use 1.32 metres per second, for exhaust velocity.

$$\frac{30}{55 \times 1.32}$$

Ventilator Size = 413mm
Therefore use throat size 450mm.

Suggested Air Change Rates for Typical Buildings Exhaust Capacities

Table 3.0

Types of Building	Air Changes Per Hour
Public Halls	
Assembly Hall	15–20
Auditoriums	10–15
Bowling Alley	10–20
Churches	10–15
Class Rooms	15–20
Restaurants	20–30
Theatres & Cinemas	15–20
Toilet Rooms	12–15
Poultry Sheds	
Brooder Houses	*(factor of bird numbers)*
Hen Houses	*(factor of bird numbers)*
Incubator Rooms	8–10

Types of Building	Air Changes Per Hour
Heavy Manufacturing Industries	
Engine & Motor Rooms	15–20
Forge Shops - Cold	16
- Hot	25–40
Foundries - Moulding	40–50
Pouring & Core Room	60–70
Furnace Rooms	*(factor of heat loss)*
Galvanising Shops	12–20
Heat Treatments	30–40
Machine Shops	6–10
Rolling Mills	30–40
General Industries	
Motor Garages	10–12
Light Manufacturing	10–12
Warehouses	4–8

Types of Building	Air Changes Per Hour
Kitchens & Food Processing	
Bakeries	25–40
Breweries	20–30
Commercial Kitchens	20–30
Packing Houses	15–20
Power Plant & Associated Buildings	
Boiler Rooms	25–40
Power Houses	*(factor of power steam loss)*
Pump Houses	12–15
Sub-Stations	*(factor of power loss)*
Transformer Bays	*(factor of power loss)*
Clothing Industries	
Dry Cleaning	30–40
Dye Houses	40
Laundries - Ironing	30–40
- Washing	20–30

Exhaust Velocity

Table 4.0

Temperature Diff. Exhaust k(°C)	Effective Stack Height (m)	Wind Velocity (m/s) 0	1	2	3
3	3	0.31	0.66	1.01	1.37
	6	0.43	0.79	1.14	1.50
	9	0.53	0.88	1.24	1.59
	12	0.61	0.96	1.32	1.67
	15	0.68	1.04	1.39	1.75
6	3	0.43	0.79	1.14	1.50
	6	0.61	0.96	1.32	1.67
	9	0.75	1.10	1.46	1.81
	12	0.86	1.22	1.57	1.93
	15	0.97	1.32	1.68	2.03

Temperature Diff. Exhaust k(°C)	Effective Stack Height (m)	Wind Velocity (m/s) 0	1	2	3
9	3	0.53	0.88	1.24	1.59
	6	0.75	1.10	1.46	1.81
	9	0.91	1.27	1.62	1.98
	12	1.06	1.41	1.77	2.12
	15	1.18	1.54	1.89	2.25
12	3	0.61	0.96	1.32	1.67
	6	0.86	1.22	1.57	1.93
	9	1.06	1.41	1.77	2.12
	12	1.22	1.57	1.93	2.28
	15	1.36	1.72	2.07	2.43

The above velocities are indicative only and when used in the formula shown will determine approximate ventridge throat sizes.

Fixing Recommendations

Stratflo® Ridge Ventilators are supplied in an unassembled form for ease of transport, and are erected on site at the time of the roof construction.

The various ventridge components are fixed to the roof with brackets located at a maximum of 1500mm centres.

The assembly procedure is as follows:

Step One

The brackets are bolted together using 8mm x 25mm hex head bolts as detailed in Figure 2.0. The brackets are slotted to allow adjustment to the height of the ventridge.

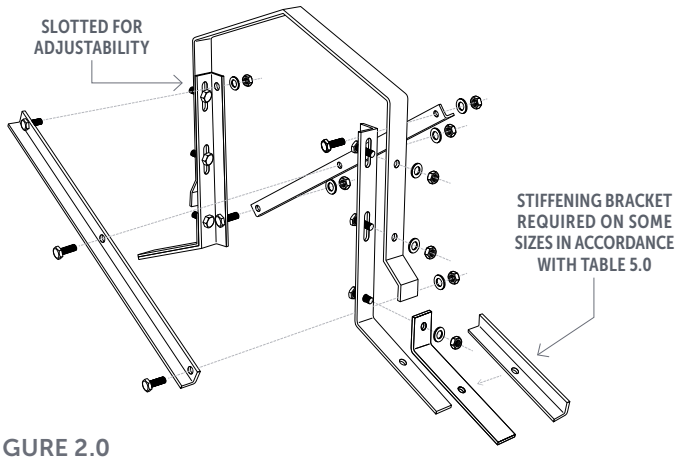


FIGURE 2.0

Step Two

The brackets are screwed to the purlins using two 12-14 x 20 self drilling screws on each side through pre-drilled clearance holes in the bracket. The brackets are fixed at maximum centres in accordance with Table 5.0 with additional stiffening brackets if required.

Step Three

When all the brackets are fixed in position, the height is adjusted to a string line. The sheet metal components of the ventridge are now attached to the brackets following Steps 4–6 (component locations shown in Figure 3.0).

Step Four

Notch the apron flashing to suit the roofing profile and fix to both the bracket and the roof sheeting.

Fixings: Fasten with one 10 x 16mm self drilling screw to each bracket and one 10 x 16mm self drilling screw to every second rib of roof sheeting.

The apron flashing upstand must be located hard up against the underside of the bracket tab as shown in Figure 4.0.

Step Five

The stack cap is placed on top of the brackets and together with a diaphragm is screwed to each bracket as shown in Figure 5.0.

Step Six

The shrouds are attached on both sides at point A to the diaphragm and at point B to the bracket tab (Figure 6.0).

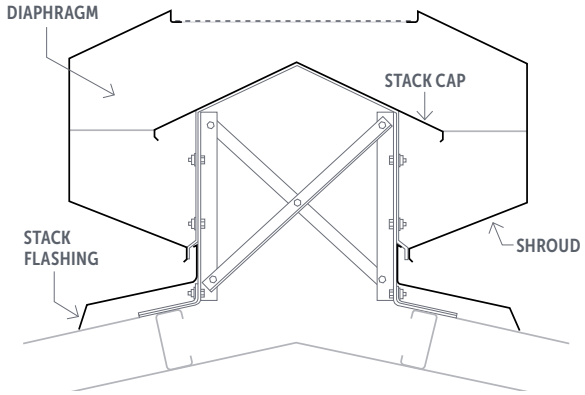


FIGURE 3.0

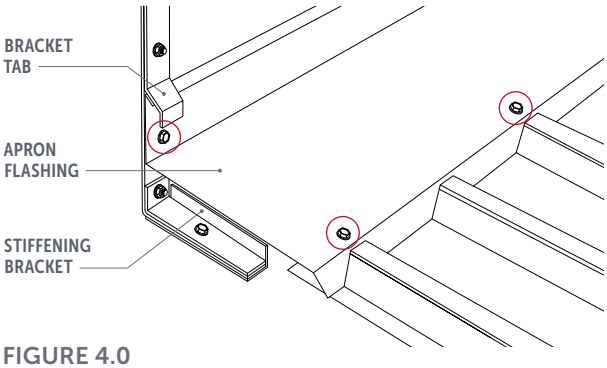


FIGURE 4.0

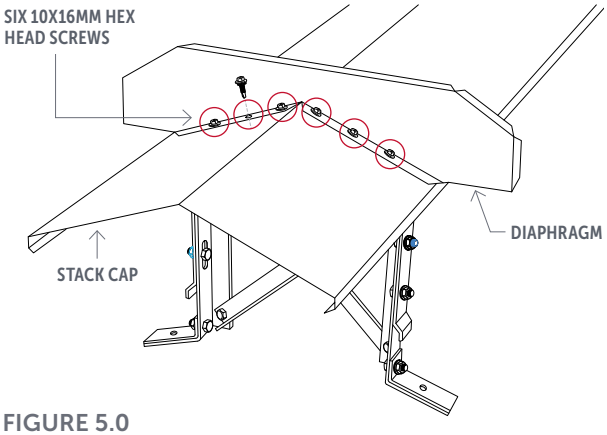


FIGURE 5.0

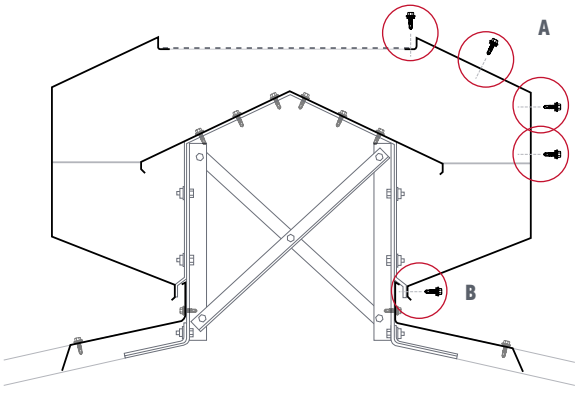


FIGURE 6.0

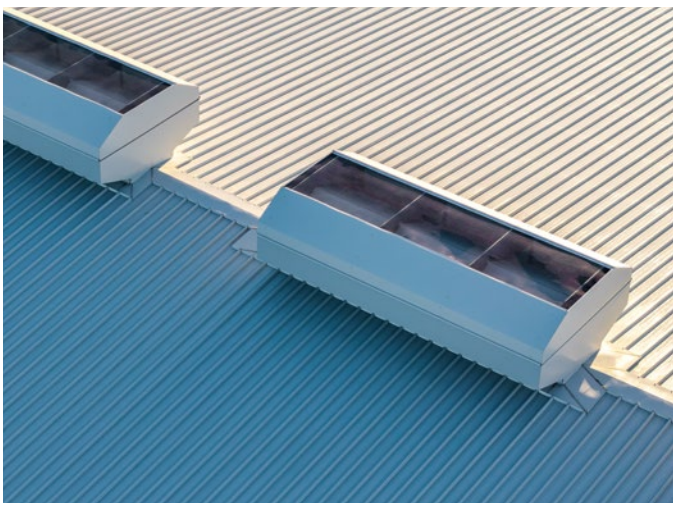
Ventridge Maximum Bracket Spacing (mm)

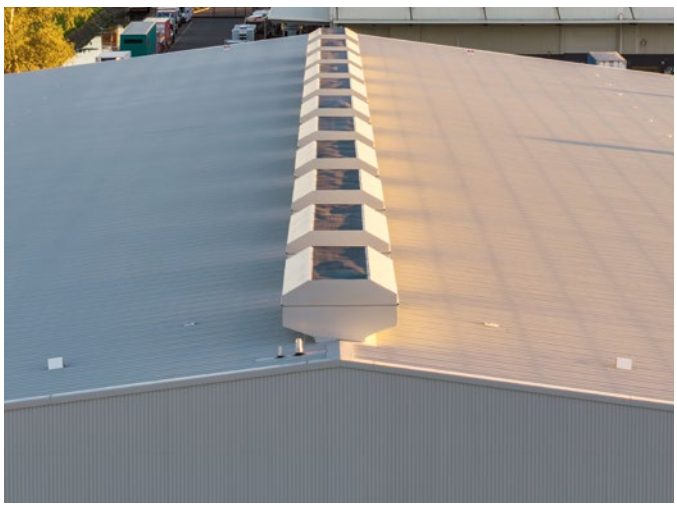
Table 5.0

Region	Terrain Category	Throat Width (mm)					
		150	300	450	600	750	900
A1, A2, A3, A4, A5	Cat 3	1500	1500	1500*	1500*	1500*	1500*
	Cat 2.5					1200*	1200*
	Cat 2						900*
A0	Cat 3	1500	1500	1500*	1500*	1200*	900*
	Cat 2.5						
	Cat 2						
B1	Cat 3	1500	1500	1500*	1500*	1200*	900*
	Cat 2.5				1200*	900*	600*
	Cat 2				900*	600*	
B2	Cat 3	1500	1500*	1500*	1200*	900*	600*
	Cat 2.5			1200*	900*	600*	
	Cat 2						
C	Cat 3	1500	1500*	1200*	900*	600*	600*
	Cat 2.5			900*	600*		–
	Cat 2		1200*			–	
D	Cat 3	1500	1200*	600*	600*	–	–
	Cat 2.5		900*		–		
	Cat 2						

**Additional stiffening bracket fixed to mounting plate (40x40x3 G300 Z275, 150mm long)*







Stratflo® Ventridge

Engineered Design

Stratco Stratflo® Ventridge has been designed and tested in accordance with the appropriate Australian Standards (AS 1170 Part 2 wind loading code, AS 1250 Steel Structure Code). The testing results apply to buildings with a roof pitch of less than 10 degrees and height up to 10 metres.

Adjustability

A unique feature of Stratflo® Ventridge is the height adjustable internal bracket. The bracket can be adjusted to compensate for any variations in the roof line caused by sagging due to the distance between support beams. You can then achieve an attractive horizontal ridge line.

Ordering

When ordering your Stratflo® Ventridge please state the:

1. **Throat size that is required:** The throat size is easily determined from information contained in this brochure.
2. **The location:** The location is the town, city and state where it will be installed.
3. **Terrain category where it will be installed:** The terrain category will be one of the following:

   TERRAIN CATEGORY 2

   This is open or exposed terrain however, has well scattered buildings or obstructions. These buildings or obstructions are generally 1.5 to 10 metres in height.

   TERRAIN CATEGORY 2.5

   This terrain sits between open and suburban conditions and is typically used where development is emerging.

   TERRAIN CATEGORY 3

   This terrain has many closely spaced buildings or obstructions, usually the size of domestic houses.
4. **Pitch of roof:** The pitch of the roof in degrees.

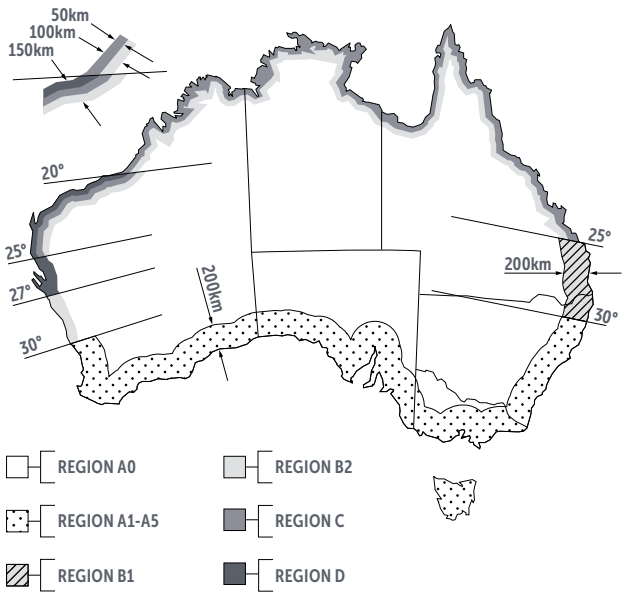


FIGURE 7.0

Draft Specification

When specifying Stratflo® Ventridge on a project, the following text can be used:

"Ventilators shall be Stratco's Stratflo® Ventridge of the sizes and lengths indicated on the drawings (or state size) supplied by Stratco.

Ventilators shall be weather resistant under normal operating conditions capable of withstanding a wind loading of ___ m/s in wind category 1/2/3/4 under cyclonic/non cyclonic conditions. Water entering the top of the ventridge under normal wind conditions will be carried to the outside through drainage passages.

Ventilators shall be manufactured to the required lengths and material thicknesses in accordance with manufacturer's instructions.

Birdwire will (will not) be fitted."



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How To.

MAINTENANCE The performance of a Stratflo® Ventridges over time depends on its correct application and maintenance. Maintenance should be performed as often as is required to remove any dirt, salt and pollutants. Where used in severely corrosive environments, cleaning should be performed more often. Refer to the Stratco 'Selection, Use and Maintenance' brochure, for more detailed information about the correct use and maintenance of this product.

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