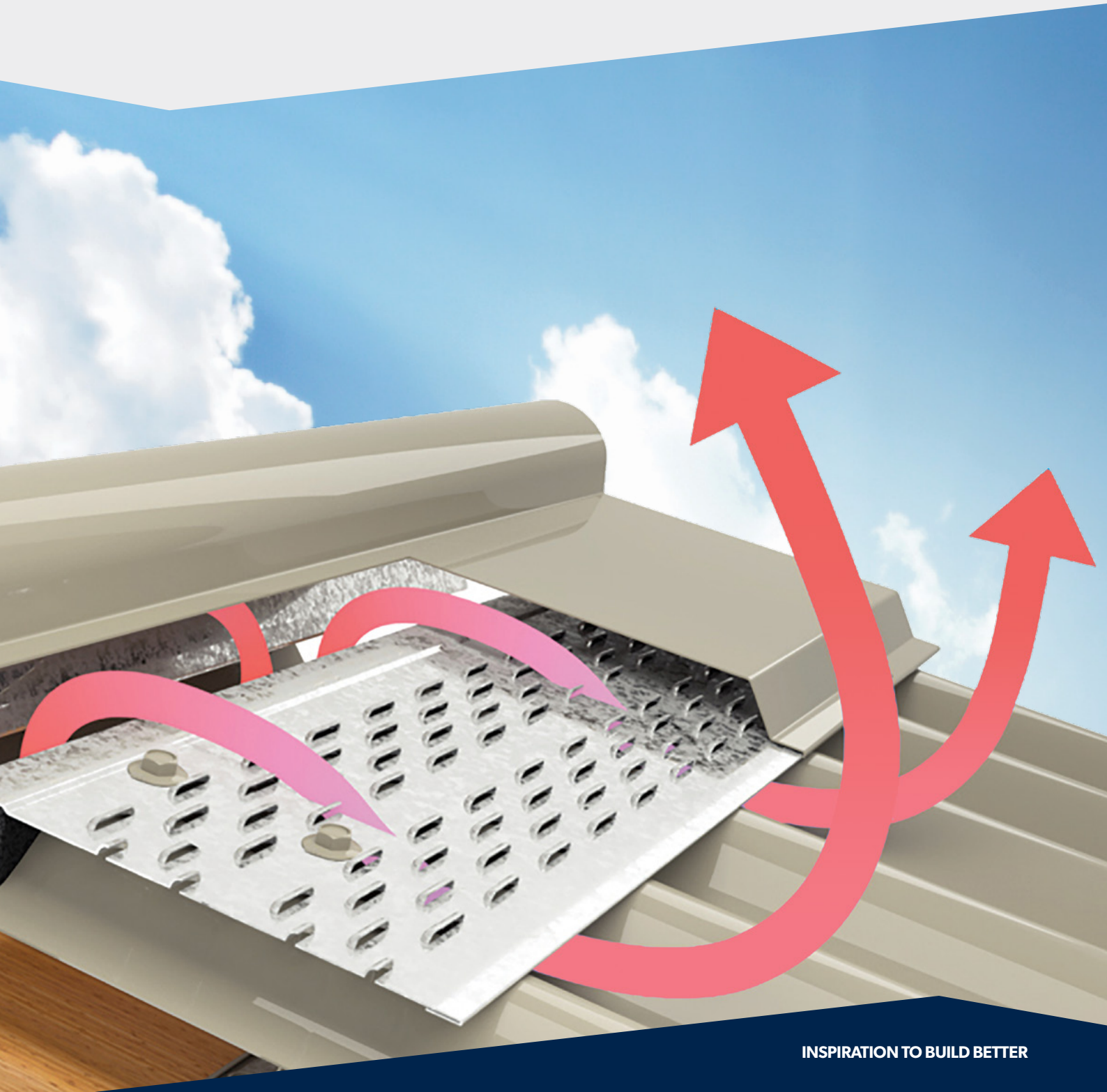
LYSAGHT

VENT-A-ROOF

VENT-A-ROOF®

ROOF VENTILATION SYSTEM DESIGN AND INSTALLATION MANUAL SUITABLE FOR CUSTOM ORB®, TRIMDEK® & KLIP-LOK®



INSPIRATION TO BUILD BETTER

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1.0 INTRODUCTION AND GENERAL NOTES

VENT-A-ROOF® is the latest technology in roof ventilation for LYSAGHT® steel roofs. VENT-A-ROOF® is a cost-effective, architecturally attractive solution for:

- Commercial buildings
- Light Industrial buildings
- Residential homes
- Sheds

VENT-A-ROOF® is a non-mechanical continuously operating, waterproof, cyclone-rated, metal roof ventilation system that provides a condensation management solution. Managing roof cavity condensation mitigates mould issues and contributes to improved health and safety in buildings across Australia.

BENEFITS OF VENT-A-ROOF®

- Improves roof ventilation with continuous airflow, reducing both roof space temperature and energy costs associated with cooling the building
- Full roof ventilation is made possible with both ridge and hip vents
- Mitigates condensation, humidity and mould
- Australian wind, bushfire and cyclone rated
- Cost-effective and integrated into the roof providing a low profile attractive alternative to turbine-style ventilators
- Keep cooler in summer and remove condensation in winter
- Certified for use in BAL 12.5 – 40 regions to prevent ember ingress at ridge and hips
- Certified for use in cyclonic regions
- DTC solution for 2019 NCC condensation management and roof ventilation requirements

HOW THE SYSTEM WORKS

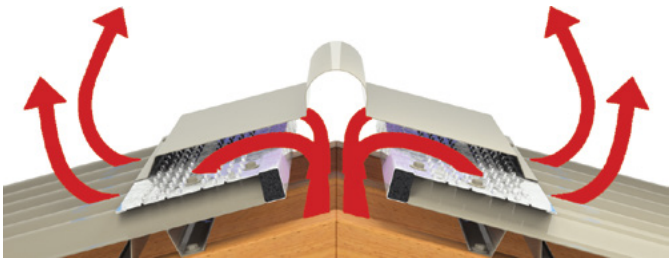


Figure 1.1:

This deceptively simple passive system allows fresh outside air to be taken into the roof space either through soffit/eave vents or in through the system itself. This cooler air rises from these intake points and mixes within the ceiling or building space to create a natural flow of air that leaves the hot air escaping through the top of the ridge/skillion.

Simultaneously, external breezes provide a positive airflow which crosses over the ridge of the house creating negative pressure which pulls air out from the ridge vent. Effectively, two thermal effects create a continuous flow of air, allowing cool air into the roof/building space whilst extracting hot air.

SCOPE

This manual is a guide to the design and installation of the VENT-A-ROOF® system for steel roofing and walling manufactured by Lysaght. We intend that it be used by all trades and professions involved with specifying and applying the VENT-A-ROOF® range of products.

We refer only to genuine steel roofing and walling manufactured by us and marketed under our brand names. Our recommendations should only be used for our products because they are based on comprehensive testing of our profiles, base metal thicknesses (BMT) and material finishes. More general design in installation with regard to steel cladding may be found in the LYSAGHT® Roofing and Walling Installation Manual. This manual covers a range of topics not covered in this manual.

WARRANTIES

For over 150 years we have consistently manufactured the highest quality building products. The LYSAGHT® brand is synonymous with Australian building. Our continuing confidence in our products is shown in the warranties we offer.

Our products are engineered to perform according to our specifications only if they are used in the appropriate conditions and installed to the recommendations in this manual and our other publications.

Naturally, the warranties require specifiers and installers to exercise due care in how the products are applied and installed and are subject to final use and installation. Also, owners need to maintain the finished work. The VENT-A-ROOF® system will not negatively impact warranties applicable to LYSAGHT® products.

We invite you to ask about the warranties applicable to your proposed purchase, at your supplier of LYSAGHT® products.

GENERAL NOTES TO READ BEFORE YOU USE THIS GUIDE

This Manual has been prepared for the VENT-A-ROOF® system for roofing applications using components manufactured or supplied by Lysaght.

Whilst this manual primarily deals with VENT-A-ROOF® in roofing applications the principles apply equally to walling applications. For specific walling advise speak with your local Lysaght branch. VENT-A-ROOF® louvres are not recommended for use at wall bases where they may be subjected to constant moisture.

This manual covers installation procedures for both new and retro fit applications in both non-cyclonic and cyclonic applications.

PROFESSIONAL ADVICE

All erection and connection details are to be made in accordance with the relevant standard connection details contained in this Manual. We recommend you get professional advice to ensure your particular needs are adequately met.

To ensure maximum lifespan of your building, consult your nearest Lysaght branch for information regarding maintenance, handling, storage and any other technical assistance you may require.

FURTHER INFORMATION ON PRODUCTS AND SERVICES

www.lysaght.com

Your supplier of LYSAGHT® products

Lysaght Information Service on 1800 641 417

2.0 DESIGN PRELIMINARIES

MATERIALS AND FINISHES

VENT-A-ROOF® components and LYSAGHT® cladding and flashings are manufactured from Australian made steel from BlueScope.

MATERIAL SPECIFICATIONS

VENT-A-ROOF® steel vent components are manufactured from 0.4mm BMT aluminium/zinc/magnesium alloy coated steel.

LYSAGHT® steel cladding and flashings are available in a range of materials and finishes including:

- Next generation ZINCALUME® aluminium/zinc/magnesium alloy coated steel complying with AS 1397 G300, AM125 125g/m^2 minimum coating mass.
- COLORBOND® steel is pre-painted steel for exterior roofing and walling. It is the most widely used. The painting complies with AS/NZS 2728 and the steel base is an aluminium/zinc alloy-coated steel complying with AS 1397. Minimum coating mass is AM100 (100g/m^2).
- COLORBOND® Metallic steel is pre-painted steel for superior aesthetic qualities displaying a metallic sheen.
- COLORBOND® Ultra steel is pre-painted steel for severe coastal or industrial environments (generally within about 100m - 200m of the source). The painting complies with AS/NZS 2728 and the steel base is an aluminium/zinc alloy-coated steel complying with AS 1397. Minimum coating mass is AM150 (150g/m^2).
- VENT-A-ROOF® louvres are not recommended for use with SUPERDURA® Stainless steel.

NCC ROOF SPACE VENTILATION REQUIREMENT V VENTILATION PERFORMANCE

Volume 1 of the National Construction Code (NCC) covering class 2-9 buildings (**non-Residential**) outlines requirements for ventilation of roof spaces at;

> Section F - Heath and amenity, Part F6 - Condensation management Performance requirements, Clause F6.4 – Ventilation of roof spaces (extract at Figure 2:1)

Similarly, Volume 2 of the NCC covering class 1 & 10 buildings (**Residential**) outlines ventilation of roof spaces at;

> Section 3 - Acceptable Construction, Part 3.8 - Health and Amenity, Part 3.8.7 - Condensation Management, Clause 3.8.7.4 - Ventilation of roof spaces.

Roof ventilation requirements for both Residential and non-Residential buildings are similar in that where an exhaust system from a kitchen, bathroom sanitary compartment or laundry discharges into a roof space that roof space must be ventilated to outdoor air through evenly distributed openings.

The required ventilation openings must have a total unobstructed area of:

- For roof pitch of greater than > 22 degrees - an unobstructed area of 1/300 of the ceiling area
- For roof pitch of less than < 22 degrees - an unobstructed area of 1/150 of the ceiling area
- At least 30% of the total unobstructed area must be located not more that 900mm below the ridge/hip with the remaining required area provided by eave vents

Figure 2.1:

NCC Volume 1 Extract

F6.3 Flow Rate and discharge of exhaust systems

(a) An exhaust system installed in a kitchen, bathroom, sanitary compartment or laundry must have a minimum flow rate of:

  (i) 25 L/s for a bathroom or sanitary compartment; and

  (ii) 40 L/s for a kitchen or laundry

(b) Exhaust from a kitchen must be discharged directly or via a shaft or duct to outdoor air

(c) Exhaust from a bathroom, sanitary compartment, or laundry must be discharged:

  (i) directly or via a shaft or duct to outdoor air; or

  (ii) to a roof space that is ventilated in accordance with F6.4.

F6.4 Ventilation of roof spaces

(a) Where an exhaust system covered by F6.3 discharges directly or via a shaft or duct into a roof space, the roof space must be ventilated to outdoor air through evenly distributed openings.

(b) Openings required by (a) must have a total unobstructed area of 1/300 of the respective ceiling area if the roof pitch is greater than 22˚, or 1/150 of the respective ceiling area if the roof pitch is less than or equal to 22˚.

(c) 30% of the total unobstructed area required by (b) must be located not more than 900 mm below the ridge or highest point of the roof space, measured vertically, with the remaining required area provided by eave vents.

Table 1 provides a ready reckoner for a Deemed to Comply solution for both turbine ventilators and VENT-A-ROOF® in both skillion and gable/hip roof configurations utilising eave vents as part of the ventilation solution.

Table 1

Roof pitch	Ceiling area (m^2)	No. of 300mm diameter turbine ventilators	No. of 400mm x 200mm eave vents	Linear metres of VENT-A-ROOF® required	
				Skillion ridge ventilation (lm)	Gable/hip ventilation (lm)
≤22°	100	3	7	22	11
	125	4	9	27	14
	150	5	10	32	16
	175	5	12	37	19
	200	6	14	43	22
	225	7	15	48	24
	250	8	17	53	27
	275	8	19	58	29
	300	9	20	64	32
	325	10	22	69	35
	350	10	24	74	37
	400	12	27	85	43
>22°	100	2	4	11	6
	125	2	5	14	7
	150	3	5	16	8
	175	3	6	19	10
	200	3	7	22	11
	225	4	8	24	12
	250	4	9	27	14
	275	4	10	29	15
	300	5	10	32	16
	325	5	11	35	18
	350	5	12	37	19
	400	6	14	43	22

Table 2 provides a similar a Deemed to Comply solution for both turbine ventilators and VENT-A-ROOF® in both skillion and gable/hip roof configurations where eave vents are unable to form part of the ventilation solution.

Table 2

Roof pitch	Ceiling area (m^2)	No. of 300mm diameter turbine ventilators	Linear metres of VENT-A-ROOF® required (No Eave Vents)	
			Skillion ridge ventilation	Gable/hip ventilation
≤22°	100	10	71	36
	125	12	88	44
	150	15	106	53
	175	17	123	62
	200	19	141	71
	225	22	158	79
	250	24	176	88
	275	26	193	97
	300	29	211	106
	325	31	228	114
	350	33	246	123
	400	38	281	141
>22°	100	5	36	18
	125	6	44	22
	150	8	53	27
	175	9	62	31
	200	10	71	36
	225	11	79	40
	250	12	88	44
	275	13	97	49
	300	15	106	53
	325	16	114	57
	350	17	123	62
	400	19	141	71

For residential buildings outside of the m^2 range in Tables 1 and 2 above the calculation example below maybe used.

Calculation example for a "typical" residential building with bathrooms and kitchen exhaust vans venting into roof space.

House ceiling m^2 = 250m^2

Roof pitch = 22.5 degrees

Therefore,

250m^2 ceiling area x requirement > 22 degree roof pitch i.e. 1/300 (0.003) = 0.833m^2 of ventilated opening. This may be split 30/70 between ridge and eave vents

Therefore

0.833m^2 x 30% = 0.250m^2 ridge vent

0.833m^2 x 70% = 0.583m^2 eave vents

Ventilation capacities

- 1m of VENT-A-ROOF® ridge provides 0.019008m^2 of unobstructed area for ventilation.
- Generally, a 300mm dia turbine ventilator (TV) provides an unobstructed area for ventilation of 0.07m^2 ea.
- A 400mm x 200mm eave vent (EV) will provide 0.08m^2 of unobstructed area for ventilation.

Therefore,

Turbine ventilator calculation

- 0.250m^2 ridge ventilation requirement/0.07m^2 TV capacity = 3.6 turbine ventilators i.e. 4 turbine ventilators.
- 0.833m^2 eaves ventilation requirement/0.08m^2 EV capacity = 10.4 i.e. 11 eave vents.

VENT-A-ROOF® calculation – with eave vents

- 0.250m^2 ridge/hip ventilation requirement/0.019008m^2 VAR capacity = 13.15 meters of VENT-A-ROOF® ridge ventilation.
- 0.833m^2 eaves ventilation requirement/0.08m^2 EV capacity = 10.4 i.e. 11 eave vents.

VENT-A-ROOF® calculation – no eave vents

- 0.833m^2 ridge/hip ventilation requirement/0.019008m^2 VAR capacity = 43.82 meters of VENT-A-ROOF® ridge/hip ventilation.

VENT-A-ROOF® AIRFLOW CAPACITIES

Whilst outside NCC requirements, airflow data provides valuable information to determine airflow changeover for both residential and commercial/industrial applications.

VENT-A-ROOF® airflow capacities at various wind speeds and ambient v attic temperature variation are provided at Table 3.

Table 3

Airflow Calculations

	Wind Pressure Pa	Wind speed		External air temp differential to attic space air temp (degrees Celsius)	300mm turbine ventilator		1m VENT-A-ROOF® louvre skillion ridge (with 45-50mm throat dimension)		1m VENT-A-ROOF® louvre Gable/ Hip Ridge (2m of louvre) (with 45-50mm throat dimension)		1m VENT-A-ROOF® louvre skillion ridge = 1x300mm turbine ventilator		1m VENT-A-ROOF® louvre gable/hip ridge (2m of louvre)	
		km/h	Knots		Airflow (m^3/s)	Heat Extraction (kW)	Airflow (m^3/s)	Heat Extraction (kW)	Airflow (m^3/s)	Heat Extraction (kW)	Airflow (m^3/s)	Heat Extraction (kW)	Airflow (m^3/s)	Heat Extraction (kW)
Single storey house	0	0	0	6	0.019	0.137	0.006	0.046	0.013	0.091	3	3	1.5	1.5
				12	0.020	0.288	0.007	0.096	0.013	0.192	3	3	1.5	1.5
				18	0.021	0.454	0.007	0.151	0.014	0.302	3	3	1.5	1.5
				40	0.022	1.056	0.007	0.352	0.015	0.704	3	3	1.5	1.5
	2.0	6	3.2	6	0.029	0.206	0.01	0.069	0.019	0.138	3	3	1.5	1.5
				12	0.030	0.429	0.01	0.143	0.020	0.286	3	3	1.5	1.5
				18	0.031	0.677	0.01	0.226	0.021	0.451	3	3	1.5	1.5
	3.6	8	4.3	6	0.034	0.247	0.011	0.082	0.023	0.165	3	3	1.5	1.5
				12	0.035	0.5	0.012	0.167	0.023	0.333	3	3	1.5	1.5
				18	0.036	0.787	0.012	0.262	0.024	0.524	3	3	1.5	1.5
	8.0	12	6.5	6	0.051	0.37	0.017	0.123	0.034	0.246	3	3	1.5	1.5
				12	0.052	0.753	0.017	0.251	0.035	0.502	3	3	1.5	1.5
				18	0.053	1.137	0.018	0.379	0.035	0.758	3	3	1.5	1.5
	12.5	15	8.1	6	0.060	0.432	0.02	0.144	0.040	0.288	3	3	1.5	1.5
				12	0.060	0.871	0.02	0.29	0.040	0.58	3	3	1.5	1.5
				18	0.061	1.324	0.02	0.441	0.041	0.882	3	3	1.5	1.5
	14.2	16	8.6	6	0.063	0.456	0.021	0.152	0.042	0.304	3	3	1.5	1.5
				12	0.065	0.935	0.022	0.312	0.043	0.623	3	3	1.5	1.5

- Airflows represented for 0 km/h (Knots) wind speed are entirely due to convection.
- Increasing wind speeds will cool a sunlit roof hence reductions in attic v ambient temperatures for higher wind speeds.
- Shaded area represents default Australian design pressure of 12.5 Pa.

AIRFLOW CAPACITY/AIR EXCHANGE CALCULATION EXAMPLE FOR A "TYPICAL" LIGHT INDUSTRIAL SHED

Shed Dimensions

Length	50m
Width	18m
Wall height at eave	3m
Roof pitch	5 degrees
Roof Apex height	3.790m
Wind speed	Default design pressure 12.5pa or 8.1knots
External v internal air temp	12 degrees – warm day

Calculation

Step 1 – Shed Air Volume

- Air volume of shed = (50m x 18m x 3m) + (50m x 9m x 0.790m) = 2700 + 355.5 = 3055.5m^3

Step 2 – Air Extraction Rate

- From Table 3 we can see that the Airflow/Air Extraction Rate per metre of louvre at the ridge given a 12 degree external to internal temperature variation and 8.1knts of wind = 0.040m^3/s

Step 3 – Air Volume Extracted per Hour

- 0.040m^3/s per metre of louvre x 50m building length = 2m^3/second
  x 60 seconds = 120m^3/min
  x 60 minutes = 7200m^3/hr

Step 4 – Air Exchange Rate

- Shed air volume = 3055.5m^3
- Volume extracted per hour = 7200m^3

Therefore:

3055.5m^3 divided by 7200m^3/hr airflow provides for **complete shed air changeover every .424 hours or every 25 minutes** from the VENT-A-ROOF® system alone.

In practice, additional air changeover will occur via doorways, windows, shed wall to roof junctions etc.

VENT-A-ROOF® BAL (BUSHFIRE ATTACK LEVEL) PERFORMANCE

All new residential construction in Australia must undergo a BAL (Bushfire Attack Level) assessment as part of the building application process. Properties are assessed against 6 Bushfire attack Levels as outlined in Table 4.

Table 4

BUSHFIRE ATTACK LEVEL (BAL)	BAL ZONE DESCRIPTION
BAL Low	There is insufficient risk to warrant specific construction requirements
BAL – 12.5	Ember attack. (BAL 12.5 Construction Requirements) i.e. Non-combustible coverings roof/wall junction sealed. Openings fitted with non-combustible ember guards. Roof to be fully sarked
BAL – 19	Increasing levels of ember attack and burning debris ignited by windborne embers, together with increasing heat flux. (BAL 19 Construction Requirements) i.e. Non-combustible coverings roof/wall junction sealed. Openings fitted with non-combustible ember guards. Roof to be fully sarked
BAL – 29	Increasing levels of ember attack and burning debris ignited by windborne embers, together with increasing heat flux. (BAL 29 Construction Requirements) i.e. Non-combustible coverings roof/wall junction sealed. Openings fitted with non-combustible ember guards. Roof to be fully sarked
BAL – 40	Increasing levels of ember attack and burning debris ignited by windborne embers, together with increasing heat flux and with the increased likelihood of exposure to flames. (BAL 40 Construction Requirements) i.e. Non-combustible coverings roof/wall junction sealed. Openings fitted with non-combustible ember guards. Roof to be fully sarked and no roof mounted evaporative coolers
BAL – FZ	Direct exposure to flames from fire, in addition to heat flux and ember attack. (BAL FZ Construction Requirements) i.e. Roof with FRL of 30/30/30 or tested bushfire resistance to AS 1530.8.2. Roof/wall junction sealed. Openings fitted with non-combustible ember guards. No roof mounted evaporative coolers

VENT-A-ROOF® has been independently assessed as suitable ridge and hip treatment to prevent ember ingress for BAL-12.5 – BAL – 40 zones

LYSAGHT® steel cladding and ancillary products combustibility status are outlined in NCC compliance documents located at www.lysaght.com/resources/ncc-australia-compliance

VENT-A-ROOF® CYCLONIC PERFORMANCE

Air leakage testing conducted at Farabaugh Engineering and Testing, show that VENT-A-ROOF® assists pressure equalisation between internal and external pressures. Testing results as shown at Table 5, demonstrate that a greater volume of air "escapes" through the VENT- A-ROOF® system than what is let in, an approximate 8% difference. The results show that as the test pressure increases, the rate of air escaping through the VENT-A-ROOF® system increases.

NB Test results Infiltration = air exiting the roof cavity and Exfiltration = air entering the roof cavity.

(Nielson, 2019)

Table 5

Test Pressure (Psf)	Test Pressure (Pa)	Infiltration		Exfiltration		Ratio (%)		Difference (m^3/s)
		Air leakage rate (Cfm)	Air leakage rate (m^3/s)	Air leakage rate (Cfm)	Air leakage rate (m^3/s)	Infiltration	Exfiltration	
1.57	75.17	44	0.020765688	37.5	0.017698029	54%	46%	0.003067658
6.24	298.77	86.1	0.040634675	74.5	0.035160085	54%	46%	0.00547459

Based on these results, it is determined that installation of the VENT-A-ROOF® system to ridgeline areas of metal clad roofing to residential and commercial properties, will reduce internal pressures and as such reduce structural loads to these structures during cyclonic and high wind events. (Nielson, 2019)

VENT-A-ROOF® has been independently assessed and certified as suitable for use in cyclonic regions when affixed in accordance with the VENT-A-ROOF® Design and Installation Guide for cyclonic regions.

3.0 INSTALLATION - NEW INSTALLATIONS

3.1 STEP 1 - ROOF SHEETING INSTALLATION

Install LYSAGHT CUSTOM ORB®, LYSAGHT TRIMDEK® or LYSAGHT KLIP-LOK 700® sheeting in accordance with the LYSAGHT® Roofing and Walling Installation Manual, available on the Lysaght website.

Critical dimensions for roof ridge batten position and ridge throat dimensions are shown at Figure 3.1.1.

Figure 3.1.1

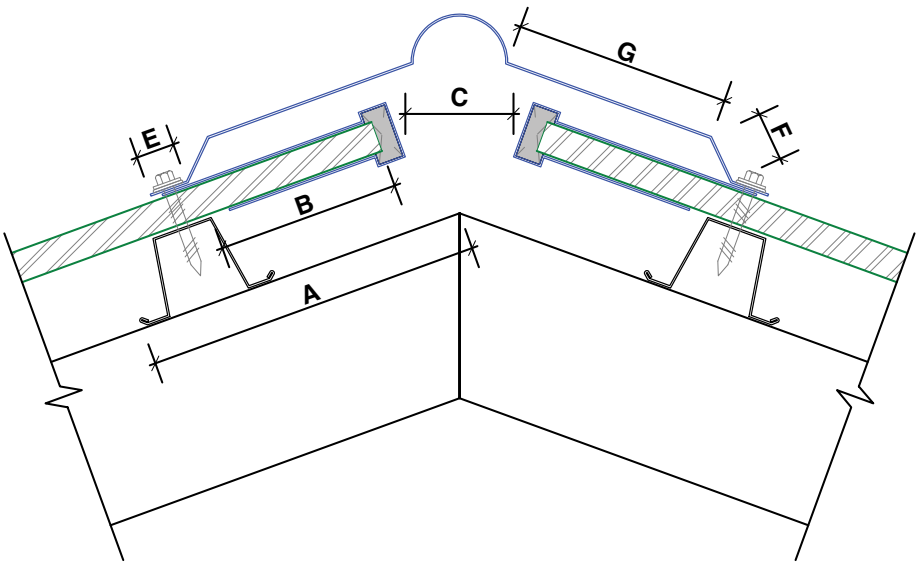


Table 6

LYSAGHT® roll top ridge

		Dimensions (mm)							
		Batten			Sheet	Throat	Ridge		
		Apex ridge to toe of batten			Sheet overhang top of batten	Sheet to sheet	Ridge legs		
		15˚	22.5˚	25˚			Toe	Step/Raise	Pan
State	Region	A			B	C	E	F	G
QLD	SEQ & Rockhampton	180	175	170	95	65-60	20	25	112
	Mackay, Townsville, Cairns	205	195	190	95	125-120	25	25	130
NSW	Coffs Harbour	175	165	160	95	60-55	17.5	25	106
	Cardiff								
	Emu Plains								
	Batemans Bay								
	Canberra								
	Tamworth								
	Dubbo								
VIC	Lyndhurst	175	170	165	90	55-50	17.5	25	102
	Albury								
	Geelong								
	Campbellfield								
TAS	Hobart	175	170	165	90	55-50	17.5	25	102
	Launceston								
SA	Mile End	165	155	150	91	30-17	12	22	91
	Gilman								
WA	Forrestfield	170	160	155	95	50-45	20	25	99

Figure 3.1.2

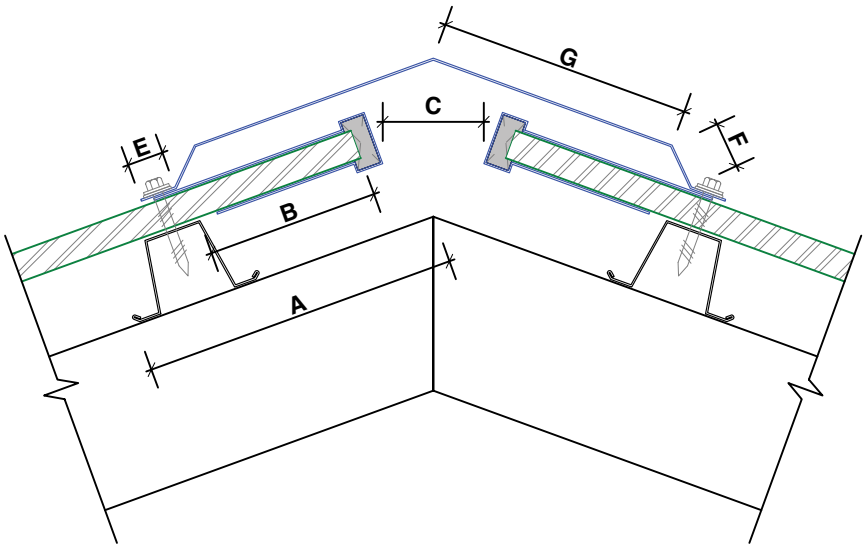


Table 7

LYSAGHT® folded ridge

	Dimensions (mm)								
	Batten			Sheet	Throat	Ridge			
	Apex ridge to toe of batten			Sheet overhang top of batten	Sheet to sheet	Ridge barge legs			Feed width
	15˚	22.5˚	25˚			Toe	Step/ raise	Pan	
Region	**A**			**B**	**C**	**E**	**F**	**G**	**(mm)**
Non cyclonic	180	175	170	95	55-65	22	25	150	400
Cyclonic	205	200	195	95	100-110	22	25	175	45

Figure 3.1.3

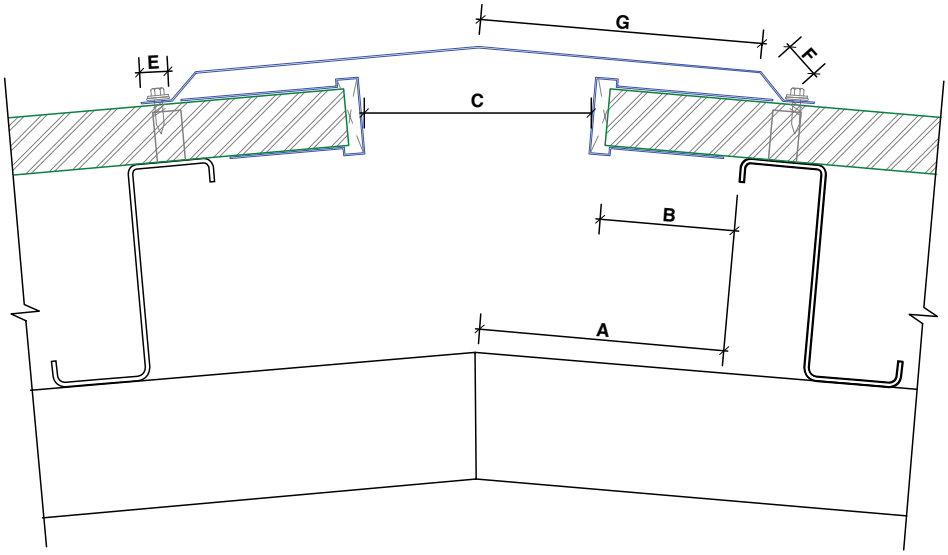


Table 7a

LYSAGHT® folded ridge (Commercial applications)

	Dimensions (mm)										
	Batten			Sheet			Throat	Ridge			
	Apex ridge to purlin edge			Sheet overhang top of Purlin			Sheet to sheet	Ridge barge legs			Feed width
	1˚	5˚	15˚	1˚	5˚	15˚					
Application	**A**			**B**			**C**	**E**	**F**	**G**	**(mm)**
Commercial/Industrial	173			95		110	140-180	22	25	200	500

Figure 3.1.4

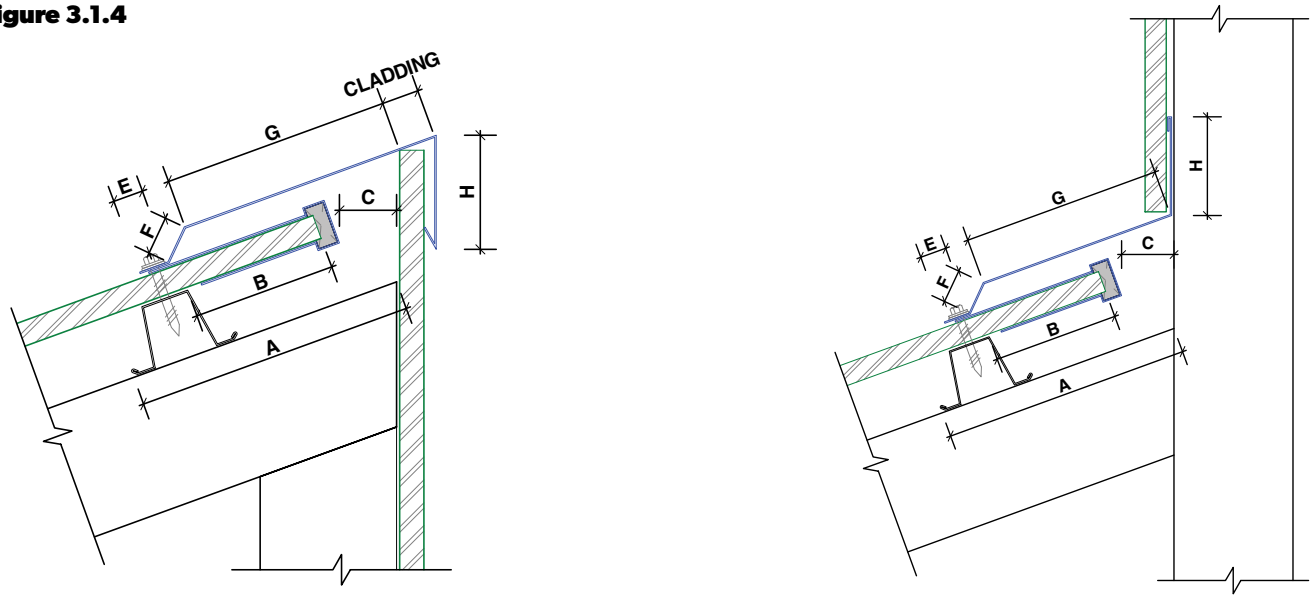


Table 8

Skillion roof ridge/Apron

	Dimensions (mm)								
	Batten			Sheet	Throat	Ridge Barge/Apron			
	Apex ridge to toe of batten			Sheet overhang top of batten	Sheet to sheet	Ridge barge legs			
	15˚	22.5˚	25˚			Toe	Step/Raise	Pan	Wall side
Region	**A**			**B**	**C**	**E**	**F**	**G**	**H**
Non cyclonic	190	185	180	95	40-35	25	25	150	75
Cyclonic	240	235	230	95	90-85	25	25	200	75

It is important that a consistent line is maintained at the ridge line of sheeting as per the dimensions noted in Figure 3.1.1-3.1.4 and Tables 6-8 as appropriate. Do not screw fix the ridge line of roof sheets. Sheet pans should not be turned up.

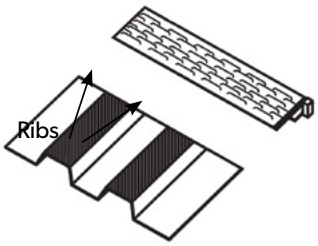
3.2 STEP 2 - BEGIN VENT-A-ROOF® LOUVRE INSTALL

Looking at ridge or hip line, begin the installation of VENT-A-ROOF® louvres from left to right.

For hipped roofs where only ridge potions of the roof are to be vented, start installation of the VENT-A-ROOF® louvres at the crown point of the roof.

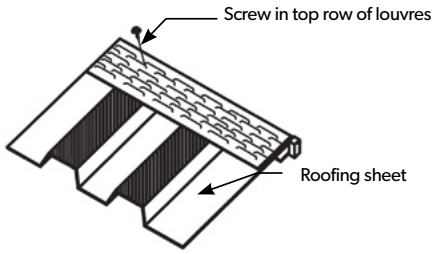
3.3 STEP 3 - SLIDE LOUVRE OVER SHEET

Slide VENT-A-ROOF® louvre over the end of metal sheet.

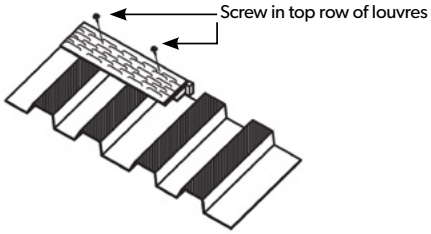


3.4 STEP 4 - FIX LOUVRE TO SHEET

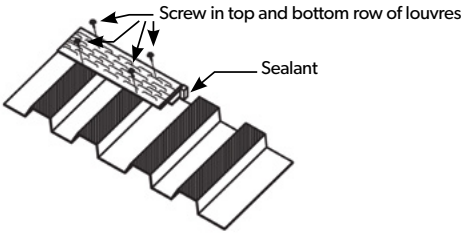
At the left end of louvre, apply enough pressure that the metal sheeting embeds a minimum of 3mm into the foam. To hold louvre into place, install one screw (10-16 x 16mm Teks® screw minimum class 3 coating) through the top of louvre into the rib of sheeting.



Continue installing the louvre from left to right screwing the top line of the louvre first. Ensure the louvre is pulled tight when installing the 10-16 x16mm Teks® screws so that the sheet is embedded a minimum of 3mm into the foam.

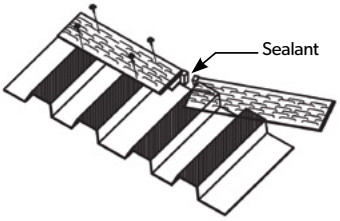


Finish screw placement through the louvre. Screws are to be installed as per screw pattern shown at Table 4. Install full sealant bead to the end of louvre and foam.

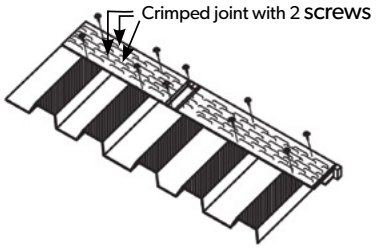


3.5 STEP 5 - ADD ADDITIONAL LOUVRES

Slide next length of louvre at an angle overlapping and insert it into the crimped end of the installed louvre, making sure the sealant and foam make good contact to ensure a weather-tight seal.



While fitting the louvre against previous louvre, ensure that the foam is in place and against metal sheeting. Screw in place as done in Steps 3 - 5.



Continue along the ridge, repeating Steps 3 - 5.

3.6 STEP 6 - INSTALL RIDGE CAP

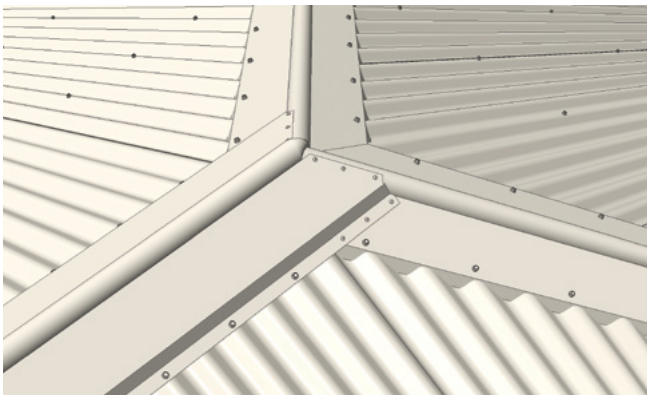
Install ridge cap in accordance to AS 1562.1 using screws recommended in the LYSAGHT® Roofing and Walling Installation Manual. Screws should penetrate ridge, VENT-A-ROOF® louvre, roof sheet and batten below providing fixing to both roof ridge and ridge cap.

No scribing is required with VENT-A-ROOF® louvre, due to the closed cell weather tight foam within the VENT-A-ROOF® louvre.

For applications where only the ridge portion of the roof is utilising VENT-A-ROOF® the VENT-A-ROOF® ridge will sit 25mm above the hips caps. This will allow the VENT-A-ROOF® roll top ridge to neatly marry to the hip roll top ridge as shown in Figure 3.6.1.

Please note that for South Australian applications utilising roll top ridge that some pressure is required to "spread" the roll top ridge to cover the VENT-A-ROOF® louvres and maintain ridge throat dimension.

Figure 3.6.1



3.7 HIP INSTALL

The same principles apply to installation of hips with critical dimensions being identical

3.8 SCREW PATTERN

Cyclonic and Non Cyclonic

Table 9

Louvre fixing screw pattern - cyclonic and non cyclonic applications

Sheet Type	LYSAGHT			Screw
	CUSTOM ORB®	TRIMDEK®	KLIP-LOK 700®	
shown at	Figure 3.8.1	Figure 3.8.2	Figure 3.8.3	
Recommended spacing of VENT-A-ROOF® fixing screws		1st and last sheet rib		10 - 16 x 16mm Teks®
	then every 4th rib	then every 2nd rib	then every rib	
Distance from front/bottom edge of VENT-A-ROOF® louvre		60mm		
Distance from top edge of VENT-A-ROOF® louvre		25mm		
Fixing spacing at VENT-A-ROOF® joints		Both sides of join		
Spacing of ridge cap fixing screws	Every 2nd rib	Every rib	Every rib	As per Lysaght published data for roof sheeting
	for cyclonic applications cyclonic zips should be used for ridge cap fixing screws			

Figure 3.8.1

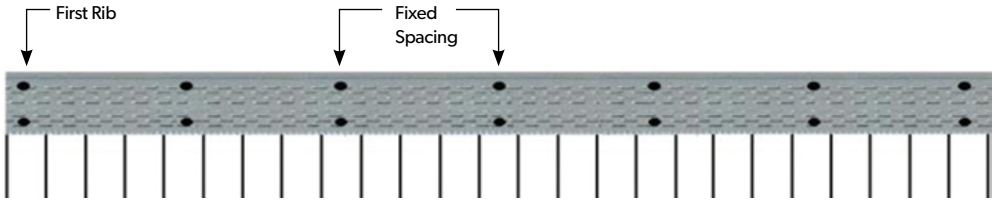


Figure 3.8.2

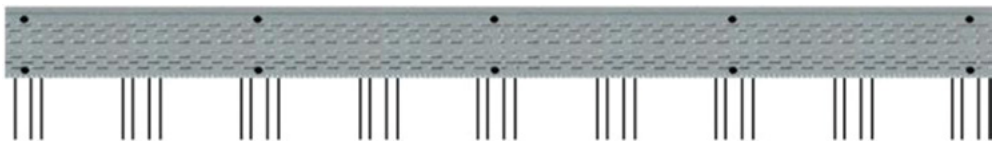


Figure 3.8.3

4.0 INSTALLATION - RETRO-FIT

The vast majority of Australia's existing residential and light commercial and industrial buildings do not comply with the current NCC specification for roof ventilation.

Installation of a VENT-A-ROOF® system to an existing building can provide immediate benefits to health and amenity of the building by improving condensation management and reducing thermal loads within the roof space and thus living space.

4.1 STEP 1 - DETERMINE REPLACEMENT RIDGE FLASHING DIMENSIONS

Remove a small number of screws from a portion of the exist ridge to allow measurement from the ridge screw line (and mid-line of existing batten) to the top of the existing sheets.

Compare the measured dimensions with those in Table 6 to determine if roll top ridge or a special folded ridge is required.

Measure and order ridge lengths and VENT-A-ROOF® louvres.

4.2 STEP 2 - REMOVE EXISTING RIDGE

Remove the portion of the existing ridge to be replaced by the VENT-A-ROOF® system to expose the ridge throat.

4.3 STEP3 - MARK ROOF SHEETS TO BE CUT

From the calculations determined in Step 1 mark each end of the ridge to be cut. Using a chalk line ping a line across the ridge in preparation to cut the sheets back.

4.4 STEP 4 - CUT BACK THE SHEETS

Using a cold cut steel saw, excalibur shears or similar cut back the roof sheets and cut back any insulation or sarking to reveal throat gap.

4.5 STEP 5 – INSTALL VENT-A-ROOF® LOUVRES

Start laying VENT-A-ROOF® louvres, left to right, as per 3.2 through to 3.10 of new installation instructions following appropriate screw patterns.

4.6 STEP 6 – INSTALL NEW RIDGE FLASHINGS

Following guidelines from 3.10 cut and screw fix new ridge flashings to vented ridge.

4.7 STEP 7 – CLEAN UP

Clean all debris from roof paying particular attention to swarf from cutting of sheets and screw installation.

4.8 STEP 8 – INSTALL EAVE VENTS

Install 400mm x 200mm eave vents, if required, in accordance with manufacturer's instructions.

5.0 APPENDICES

FORM 15 – BAL-12.5 – 40

Version 3 – March 2013

Form 15—Compliance Certificate for building Design or Specification

NOTE

This is to be used for the purposes of section 10 of the *Building Act 1975* and/or section 46 of the *Building Regulation 2006*.

RESTRICTION: A building certifier (class B) can only give a compliance certificate about whether building work complies with the BCA or a provision of the QDC. A building certifier (Class B) can not give a certificate regarding QDC boundary clearance and site cover provisions.

1. Property description

This section need only be completed if details of street address and property description are applicable.

EG. In the case of (standard/generic) pool design/shell manufacture and/or patio and carport systems this section may not be applicable.

The description must identify all land the subject of the application.

The lot & plan details (eg. SP / RP) are shown on title documents or a rates notice.

If the plan is not registered by title, provide previous lot and plan details.

Street address *(include no., street, suburb / locality & postcode)*

All Australia

Postcode

Lot & plan details *(attach list if necessary)*

In which local government area is the land situated?

2. Description of component/s certified

Clearly describe the extent of work covered by this certificate, e.g. all structural aspects of the steel roof beams.

Vent a Roof product as per product guide to BAL 12.5- 40

3. Basis of certification

Detail the basis for giving the certificate and the extent to which tests, specifications, rules, standards, codes of practice and other publications, were relied upon.

AS 3959:2018 Construction of buildings in bushfire-prone areas

ACT Fire Engineering Opinion

NCC2016 Volume 2 P2.3.4 and 3.7.4.0

4. Reference documentation

Clearly identify any relevant documentation, e.g. numbered structural engineering plans.

AS 3959:2018 Construction of buildings in bushfire-prone areas

ACT Fire Engineering Opinion

NCC2016 Volume 2 P2.3.4 and 3.7.4.0

5. Building certifier reference number

Building certifier reference number

6. Competent person details

A competent person for building work, means a person who is assessed by the building certifier for the work as competent to practise in an aspect of the building and specification design, of the building work because of the individual's skill, experience and qualifications in the aspect. The competent person must also be registered or licensed under a law applying in the State to practice the aspect.

If no relevant law requires the individual to be licensed or registered to be able to give the help, the certifier must assess the individual as having appropriate experience, qualifications or skills to be able to give the help.

If the chief executive issues any guidelines for assessing a competent person, the building certifier must use the guidelines when assessing the person.

Name (*in full*)

William Mark Anderson

Company name (*if applicable*)

ACT

Contact person

Phone no. *business hours*

0426801512

Mobile no.

0426801512

Fax no.

Email address

William1512@sky.com

Postal address

13 Toomaroo Street Warner

Postcode QLD 4500

Licence or registration number (*if applicable*)

RPEQ 16514

7. Signature of competent person

This certificate must be signed by the individual assessed by the building certifier as competent.

Signature

Date

28/02/2019

The *Building Act 1975* is administered by the Department of Housing and Public Works

Queensland Government

FORM 15 AUSTRALIAN WIND REGIONS A 1-7, B, C & D

Version 3 – March 2013

Form 15—Compliance Certificate for building Design or Specification

NOTE

This is to be used for the purposes of section 10 of the *Building Act 1975* and/or section 46 of the *Building Regulation 2006*.

RESTRICTION: A building certifier (class B) can only give a compliance certificate about whether building work complies with the BCA or a provision of the QDC. A building certifier (Class B) can not give a certificate regarding QDC boundary clearance and site cover provisions.

1. Property description

This section need only be completed if details of street address and property description are applicable.
EG. In the case of (standard/generic) pool design/shell manufacture and/or patio and carport systems this section may not be applicable.

The description must identify all land the subject of the application.

The lot & plan details (eg. SP / RP) are shown on title documents or a rates notice.

If the plan is not registered by title, provide previous lot and plan details.

Street address *(include no., street, suburb / locality & postcode)*

Australia Wind Regions A 1 – 7, B, C & D

Postcode

Lot & plan details *(attach list if necessary)*

In which local government area is the land situated?

All Australia

2. Description of component/s certified

Clearly describe the extent of work covered by this certificate, e.g. all structural aspects of the steel roof beams.

Vent-A-Roof product, as per product guide.

3. Basis of certification

Detail the basis for giving the certificate and the extent to which tests, specifications, rules, standards, codes of practice and other publications, were relied upon.

AS 1562.1:2018, AS/NZS 1170.2:2021 & AS 4055:2021

4. Reference documentation

Clearly identify any relevant documentation, e.g. numbered structural engineering plans.

J.C. Engineers Letter of Advice dated 4th February 2019.

5. Building certifier reference number

Building certifier reference number

6. Competent person details

A competent person for building work, means a person who is assessed by the building certifier for the work as competent to practise in an aspect of the building and specification design, of the building work because of the individual's skill, experience and qualifications in the aspect. The competent person must also be registered or licensed under a law applying in the State to practice the aspect.

If no relevant law requires the individual to be licensed or registered to be able to give the help, the certifier must assess the individual as having appropriate experience, qualifications or skills to be able to give the help.

If the chief executive issues any guidelines for assessing a competent person, the building certifier must use the guidelines when assessing the person.

Name *(in full)*

Brendan Nielsen

Company name *(if applicable)*

J.C. Engineers Pty. Ltd.

Contact person

Brendan Nielsen

Phone no. *business hours*

(07) 3063 7581

Mobile no.

Fax no.

Email address

brendan.nielsen@jce.engineering

Postal address

Building 5 – 22 Magnolia Drive,

BROOKWATER Postcode 4300

Licence or registration number *(if applicable)*

RPEQ: 18317

7. Signature of competent person

This certificate must be signed by the individual assessed by the building certifier as competent.

Signature

Date

4/2/2019

The *Building Act 1975* is administered by the Department of Housing and Public Works

Queensland Government

JCE A150 - LETTER OF ADVICE - VENT-A-ROOF® PRODUCT

Brendan Nielsen
Director
J.C. Engineers Pty. Ltd.
Level 13, 50 Cavill Avenue,
SURFERS PARADISE
QLD 4217

19 February 2019

Director
Vent-A-Roof
PO Box 189
CLEVELAND
QLD 4157

Re: JCE A150 – LETTER OF ADVICE – VENT-A-ROOF PRODUCT

Dear Doug,

This letter summarises professional advice on the installation of the Vent-A-Roof product on residential and commercial properties throughout Australia, focusing on Structural aspects.

This letter references the following documentation:

- Ez Vent-N-Closure System Cross Section drawings, provided to J.C. Engineers on 10th December 2018.
- Sekisui Foam Australia's Material Safety Data Sheet for Volara Crosslinked Polyolefin Foam, provided to J.C. Engineers on 4th February 2019.
- Ez Vent-N-Closure Profile Drawings, provided to J.C. Engineers on 10th December 2018.
- Vent-A-Roof CAD Profile Drawings, provided to J.C. Engineers on 10th December 2018.
- Vent-A-Roof's Brochure for Residential Homes, provided to J.C. Engineers on 10th December 2018.
- Machinery Solutions Pty. Ltd.'s Report for Vent-A-Roof, dated 18th October 2018.
- Farabaugh Engineering and Testing Inc.'s Air Leakage Test Performance Report, dated 25th January 2018.
- Farabaugh Engineering and Testing Inc.'s Wind Driven Rain Test Summary Report, dated 21st May 2018.
- Australian Standard 1562.1:2018 Design and Installation of Sheet Roof and Wall Cladding Part 1: Metal.
- Australian/New Zealand Standard 1170.2:2011 Structural Design Actions Part 2: Wind Actions.
- Australian Standard 4055:2012 Wind Loads for Housing

AERODYNAMIC SHAPE FACTOR – INTERNAL PRESSURES

AS 1170.2:2011 describes internal pressure as *"a function of the external pressures, and the leakage and openings in the external surfaces of the building or an isolated part of a larger building"*. Figure 1 provides a visual representation of the difference between internal and external pressures.

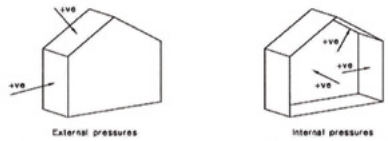


Figure 1: Illustration of External and Internal Pressures on Houses (extracted from AS 1170.2:2011 on 20/12/2018)

Naturally, internal pressures can vary in direction and intensity as a result of the external pressures applied to the building (i.e. wind gusts in storms). Generally, the external roofing/walls are subject to forces in the resultant pressure (i.e. difference between external and internal pressures). For example; if the internal pressures are greater than the external pressures, roofing/walls are forced to 'push-out' from their original position.

The purpose of the Vent-A-Roof product is to provide free-flowing permanent ventilation for the house. It is installed on the highest points of the house (i.e. ridgeline of the roofing) to maximum the opportunities of temperature control. Figure 2 provides an visual example of air movement through the Vent-A-Roof product.

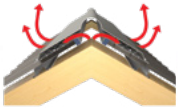


Figure 2: Illustration of Air Movement through Vent-A-Roof product

Farabaugh Engineering and Testing Inc. have undertaken Air Leakage Testing on the Vent-A-Roof product. Table 1 provides a summary of these results.

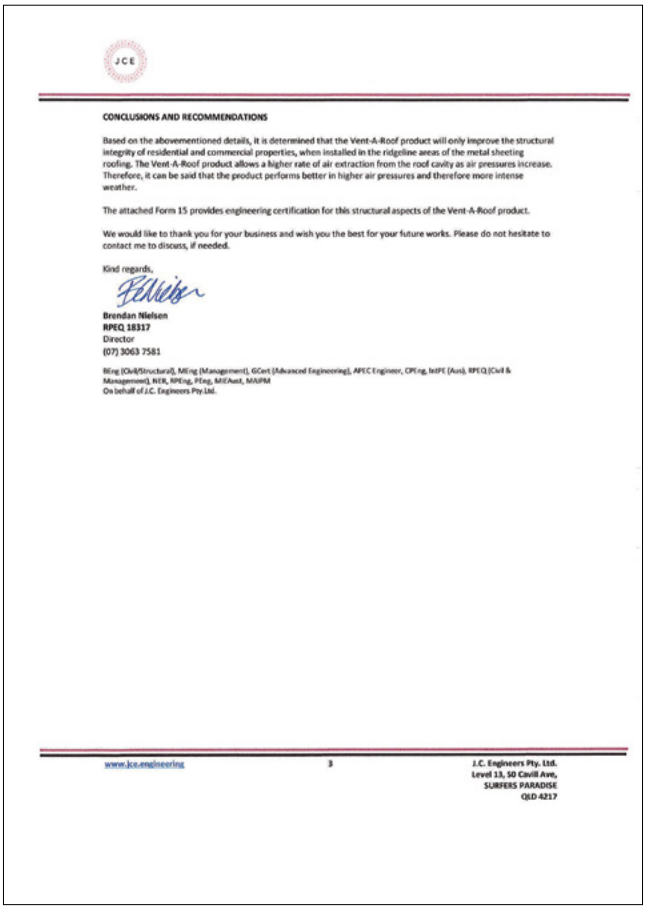
****Please note: 'Infiltration' = air exiting the roof cavity and 'exfiltration' = air entering the roof cavity**.**

Table 1: Test Data from Farabaugh Engineering and Testing Inc's Air Leakage Testing

		Infiltration		Exfiltration		Ratio (%)	
Test Pressure (Pa)	Test Pressure (Psf)	Air Leakage Rate (Cfm)	Air Leakage Rate (cm³/s)	Air Leakage Rate (Cfm)	Air Leakage Rate (cm³/s)	Infiltration	Exfiltration
1.57	0.03	44	20.8	37.5	17.7	54%	46%
6.24	0.13	96.5	45.5	79.5	37.5	54%	46%

The test results show that a greater volume of air 'escapes' through the Vent-A-Roof product than what is let in, approximately 8% difference. The results also show that as the test pressure increases, the rate of air escaping through the Vent-A-Roof product increases.

JCE A150 - LETTER OF ADVICE - VENT-A-ROOF® PRODUCT (CONTINUED)



CONCLUSIONS AND RECOMMENDATIONS

Based on the abovementioned details, it is determined that the Vent-A-Roof product will only improve the structural integrity of residential and commercial properties, when installed in the ridgeline areas of the metal sheeting roofing. The Vent-A-Roof product allows a higher rate of air extraction from the roof cavity as air pressures increase. Therefore, it can be said that the product performs better in higher air pressures and therefore more intense weather.

The attached Form 15 provides engineering certification for this structural aspects of the Vent-A-Roof product.

We would like to thank you for your business and wish you the best for your future works. Please do not hesitate to contact me to discuss, if needed.

Kind regards,

Brendan Nielsen
RPEQ 18317
Director
(07) 3063 7581

BEng (Civil/Structural), MEng (Management), GCert (Advanced Engineering), APEC Engineer, CPEng, IntPE (Aus), RPEQ (Civil & Management), NER, RPEng, PEng, MIEAust, MAIPM
On behalf of J.C. Engineers Pty Ltd.

www.jce.engineering 3 J.C. Engineers Pty. Ltd. Level 13, 50 Cavill Ave, SURFERS PARADISE QLD 4217

PERFORMANCE TEST SUMMARY TAS-100A ON EZ VENT-N-CLOSURE FOR VENT-A-ROOF®

Farabaugh Engineering and Testing Inc.

FET Project No. T346-12A

Date: October 5, 2012

Revised May 21, 2018

Performance Test Summary

TAS-100A

Test Procedure for wind and Wind Driven Rain Resistance and/or Increased Windspeed Resistance of Soffit Ventilation Strip and Continuous or Intermittent Ventilation System Installed at the Ridge Area

On

EZ Vent-N-Closure

For

Vent-A-Roof

38 Nuemann Rd.

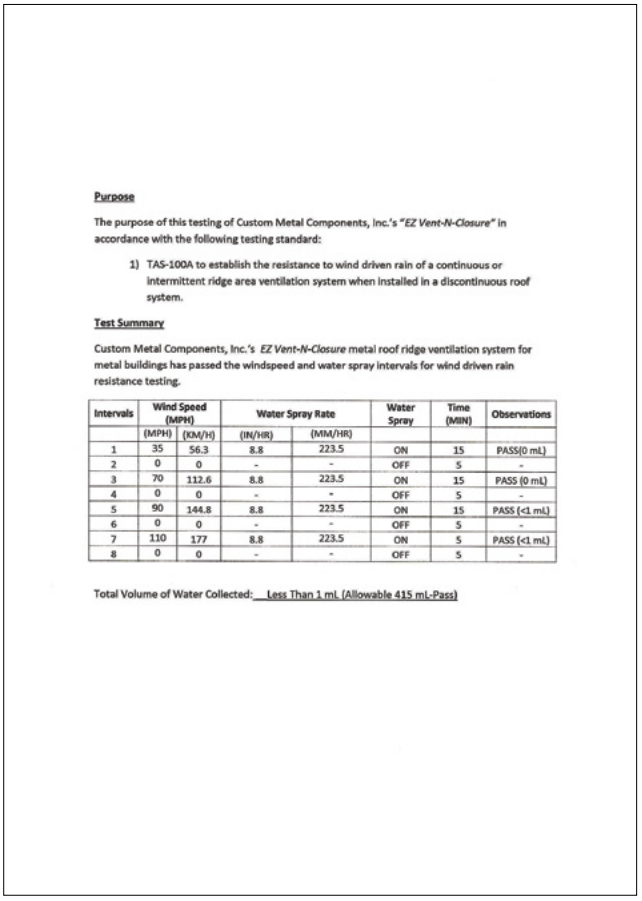
Capalaba Q 4157

Australia

Daniel C. Farabaugh,

Farabaugh Engineering and Testing Inc.

401 Wide Drive, McKeesport, PA 15135 (412) 751-4001 FAX (412) 751-4003 WWW.FETLABS.COM



Purpose

The purpose of this testing of Custom Metal Components, Inc.'s *"EZ Vent-N-Closure"* in accordance with the following testing standard:

1) TAS-100A to establish the resistance to wind driven rain of a continuous or intermittent ridge area ventilation system when installed in a discontinuous roof system.

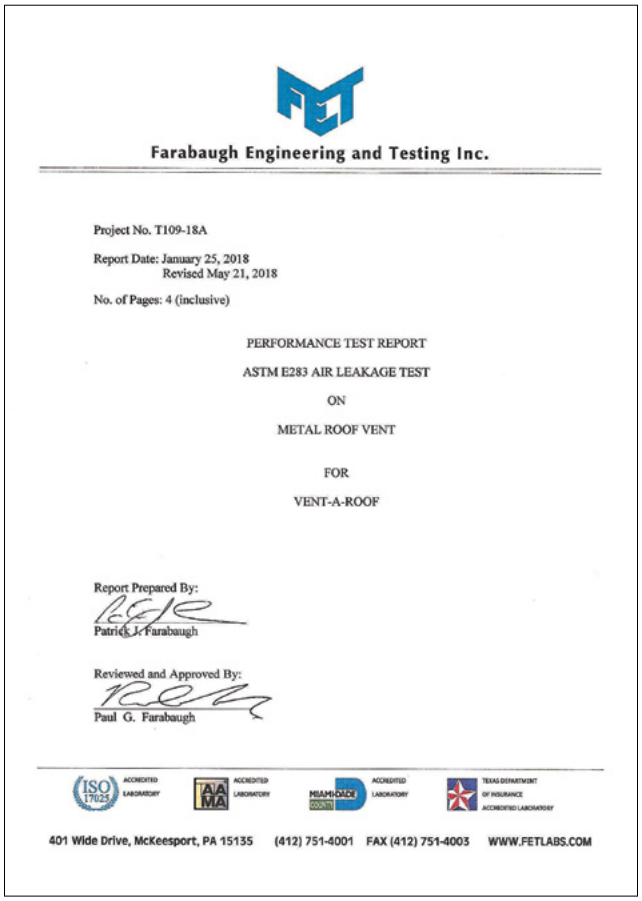
Test Summary

Custom Metal Components, Inc.'s *EZ Vent-N-Closure* metal roof ridge ventilation system for metal buildings has passed the windspeed and water spray intervals for wind driven rain resistance testing.

Intervals	Wind Speed (MPH)		Water Spray Rate		Water Spray	Time (MIN)	Observations
	(MPH)	(KM/H)	(IN/HR)	(MM/HR)			
1	35	56.3	8.8	223.5	ON	15	PASS(0 mL)
2	0	0	-	-	OFF	5	-
3	70	112.6	8.8	223.5	ON	15	PASS (0 mL)
4	0	0	-	-	OFF	5	-
5	90	144.8	8.8	223.5	ON	15	PASS (<1 mL)
6	0	0	-	-	OFF	5	-
7	110	177	8.8	223.5	ON	5	PASS (<1 mL)
8	0	0	-	-	OFF	5	-

Total Volume of Water Collected: Less Than 1 mL (Allowable 415 mL-Pass)

PERFORMANCE TEST REPORT ASTM E283 AIR LEAKAGE TEST ON METAL ROOF VENT FOR VENT-A-ROOF®



Farabaugh Engineering and Testing Inc.

Project No. T109-18A

Report Date: January 25, 2018
Revised May 21, 2018

No. of Pages: 4 (inclusive)

PERFORMANCE TEST REPORT

ASTM E283 AIR LEAKAGE TEST

ON

METAL ROOF VENT

FOR

VENT-A-ROOF

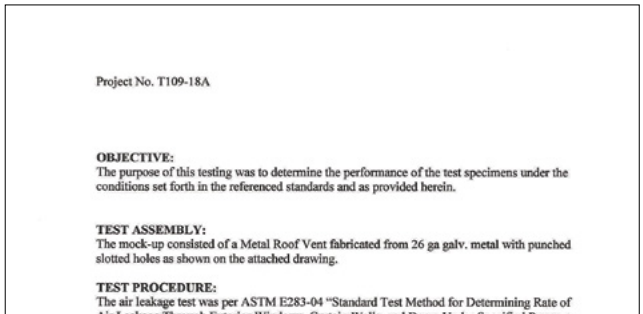
Report Prepared By:

Patrick J. Farabaugh

Reviewed and Approved By:

Paul G. Farabaugh

401 Wide Drive, McKeesport, PA 15135 (412) 751-4001 FAX (412) 751-4003 WWW.FETLABS.COM



Project No. T109-18A

OBJECTIVE:
The purpose of this testing was to determine the performance of the test specimens under the conditions set forth in the referenced standards and as provided herein.

TEST ASSEMBLY:
The mock-up consisted of a Metal Roof Vent fabricated from 26 ga galv. metal with punched slotted holes as shown on the attached drawing.

TEST PROCEDURE:
The air leakage test was per ASTM E283-04 "Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen" and as provided herein. A controlled blower provided a uniform load the specimen mock-up.

TEST DATA

Test Date: 1/25/18

Specimen: 26 ga Slotted Metal Roof Vent

Test Area: 12" (304.8 mm) Length of Slotted Holes

ASTM E283-04 Air Test

INFILTRATION

TEST PRESSURE (PSF)	TEST PRESSURE (Pa)	AIR LEAKAGE RATE (CFM)
1.57	75.17	44.0
6.24	298.77	86.1

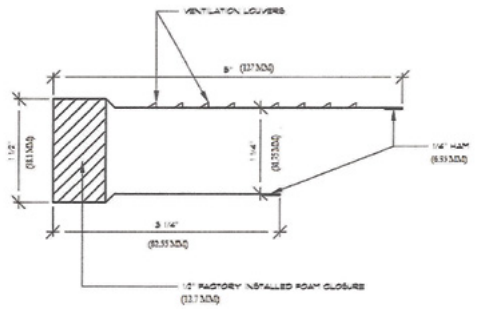
EXFILTRATION

TEST PRESSURE (PSF)	TEST PRESSURE (Pa)	AIR LEAKAGE RATE (CFM)
1.57	75.17	37.5
6.24	298.77	74.5

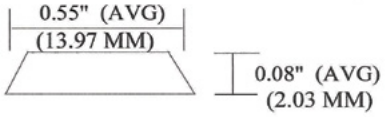
2

PERFORMANCE TEST REPORT ASTM E283 AIR LEAKAGE TEST ON METAL ROOF VENT FOR VENT-A-ROOF® (CONTINUED)

Project No. T109-18A



1 1/4" PROFILE
(31.75 MM)



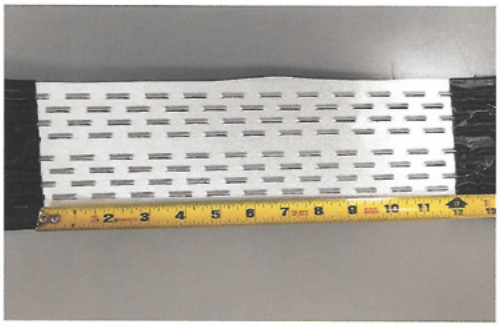
SLOTTED OPENING DIMENSIONS

3

Project No. T109-18A

INFILTRATION AIR FLOW DIRECTION

EXFILTRATION AIR FLOW DIRECTION



TEST SPECIMEN AREA

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AUSTRALIAN STANDARDS

Australian Standard	Definition
AS 1397:2021	Continuous hot-dip metallic coated steel sheet and strip — Coatings of zinc and zinc alloyed with aluminium and magnesium
AS 1530.8.2:2018	Methods for fire tests on building materials, components and structures, Part 8.2: Tests on elements of construction for buildings exposed to simulated bushfire attack — Large flaming sources
AS 1562.1:2018	Design and installation of sheet roof and wall cladding - Part 1: Metal
AS 3959:2018	Construction of buildings in bushfire-prone areas
AS 4055:2021	Wind loads for housing
AS/NZS 1170.2:2021	Structural design actions, Part 2: Wind actions
AS/NZS 1530.3:1999	Methods for fire tests on building materials, components and structures Part 3: Simultaneous determination of ignitability, flame propagation, heat release and smoke release (Reconfirmed 2016)
AS/NZS 2728:2013	Prefinished/prepainted sheet metal products for interior/exterior building applications - Performance requirements

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