



**MARQUIS  
SYSTEMS**

## MARQUIS ROOF SYSTEM

In the days before Marquis, architects had to rely on conventional profile cladding as an architectural metal roofing element. It was applied using “through-the-roof” fasteners, which made for an acceptable but less than efficient solution. Expansion and contraction of the roof sheet, application difficulties, poor detailing, and a reliance on caulking, often resulted in moisture penetrating the roof. With no means of removing the moisture, roof integrity was compromised and maintenance costs became a serious concern.

VICWEST knew there had to be a better solution. By applying RainScreen principles (see page 8), and after analysing all the potential problem areas, VICWEST developed the Marquis roof system.

After more than ten years of evolution, architects and builders continue to rely on the superior performance of VICWEST’s Marquis roof system. Today more than ever, Marquis responds to those designer needs of a high performance, energy conserving high R-value insulated metal roofing system. Its uncompromising quality, traditional board and batten good looks and wide range of colours and finishes have made it a favourite among architects looking for distinctive

design and reliable roof integrity. Marquis sets the standard of excellence in good roof systems:

- Long span capability
- Proven air and vapour barrier technology
- Thermal clip support system to accommodate expansion and contraction
- High insulation values up to RSI 7.6 (R43)
- Few “through-the-roof” fasteners
- Watertight seams
- Proper drainage management
- Application of RainScreen principles

Marquis is ideal for new construction, or retrofit applications. As a cladding application, or as part of a full roof system, Marquis combines design flexibility with reliable construction methods to deliver an economical roofing solution for today’s buildings.

Over the years, VICWEST has been at the forefront in solving the roofing challenges posed by architects. VICWEST has delivered ... by helping to design, manufacture, and install some of the most complex metal roofing projects ever undertaken. Such projects can be seen throughout this brochure and across the Canadian landscape. Read on, to find out how to select a Marquis roof system, and get great roofing performance, cost effectively ... with stunning good looks, of course.

Marquis profiles can be customized and create a dynamic effect to a curved roof layout.



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# THE SYSTEMS APPROACH

When it comes to metal roofing, architects, builders, and owners all share a common goal – performance. They demand a roof that delivers good performance and a long life, at low maintenance costs. The objectives, however, have often been difficult to achieve. Because of the way roofing is specified, performance responsibility is often scattered among any number of different trades. Lack of familiarity with the relationships between specified products can cause installation problems. Inadequate detailing can mean trade confusion.

To overcome those problems, VICWEST developed its integrated systems solution. It provides a single source of responsibility for the complete roof system. By eliminating trade confusion, and working with architects and builders in a team approach, owners are assured of maximum performance.

## DESIGN/ENGINEERING

Marquis is a fully engineered system. It combines a number of roofing elements that must be properly integrated to ensure good performance. To make sure the selected roof and all its components meet the specified performance needs, contact a VICWEST technical representative. All are well-trained in assisting architects and engineers to design using Marquis.

From conceptual design, through to project completion, VICWEST has the staff and resources to make sure every Marquis roof is properly designed and engineered.

## MANUFACTURING

VICWEST has always been a leader in the research and development of metal roof and wall systems.

VICWEST can manufacture and deliver metal roofing, metal wall cladding and engineered building envelope systems, to meet the construction schedule.

VICWEST's computerized project tracking system ensures your Marquis roofing products, and every component needed for a complete roof installation, are delivered to the site on time. As well, VICWEST's buying power ensures competitive pricing.

## INSTALLATION

To ensure the Marquis roof is installed in accordance with proven procedures, only authorized construction crews and sub-contractors are permitted to install Marquis.

## THE MARQUIS SYSTEM ADVANTAGE

### APPEARANCE

Marquis is a good looking product that delivers design freedom. Its bold, ribbed profile, hidden-fastener mounting system and choice of “board” widths, combine to provide architects with a flexible product that can be used in almost any application – from simple gable roofs to the more complex high pitch roof configurations. When there are design challenges to be met, architects always turn to VICWEST ... because VICWEST delivers.

### PERFORMANCE

Marquis is designed to meet or exceed standard roof performance criteria. Superior insulating values have been achieved by developing a thermal clip mounting system. The thermal clips not only help prevent thermal bridging across the roof system, but also allow for expansion and contraction of the roof sheet. Proper control of expansion and contraction means less stress on the roof joints. Hidden fasteners make sure the roof remains weather-tight. These features, combined with proven air/vapour barrier technology and a systems approach to the design, manufacture and installation, ensure that Marquis will meet or exceed specified performance criteria.

### ECONOMY

Marquis Roof Systems are light weight, low maintenance, high performance, good looking, and cost effective, designed solutions for your roofing problems.

### FLEXIBILITY

Marquis offers excellent design flexibility: with systems that can accommodate spans of up to 3 metres (10'-0"); with continuous sheet lengths of up to 12 metres (40'-0"); with choices of air/vapour barriers; with variable insulation values and with extensive selections of coating finishes and colours. All this adds up to a remarkably flexible approach to roof design. And with the snap-cap batten, Marquis can make the transition from sloping roof, to wall, to soffit, for even more flexibility.

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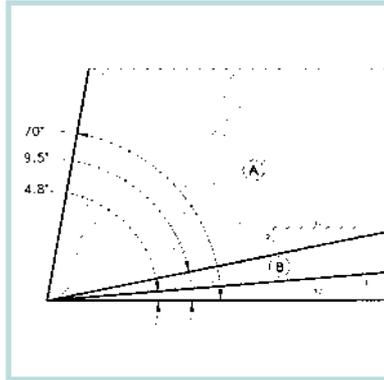
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## DESIGN CONSIDERATIONS

Metal roofing has some unique characteristics that can affect its performance, which means that a number of engineering design factors must be taken into account when selecting a Marquis roof system. Members of VICWEST's engineering group are available to help designers determine proper selection criteria.



### ROOF SLOPE

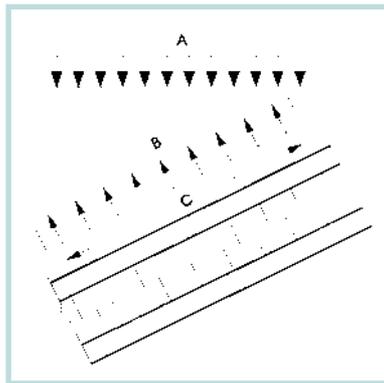
Marquis is designed for roofs with slopes equal to 2 in 12 or more, and is well suited for steep slope applications. With the optional snap-cap batten, roof slopes down to 1 in 12 can be accommodated. For extreme low slope applications, select VICWEST's TSR Roofing System.

#### ZONE A

For slopes between 2 in 12 and 70 degrees, the use of the Snap-Cap is optional.

#### ZONE B

For slopes between 1 in 12 and 2 in 12, the Snap-Cap batten must be used.



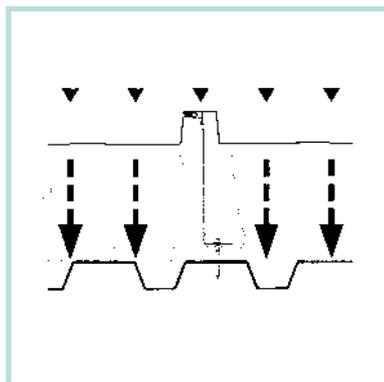
### ENVIRONMENTAL LOADING

Metal roof design should take into consideration, "A" - the potential snow and rain loading, "B" - wind loading and "C" - thermal loading which might be imposed on the structure. These values are published in the National Board Code of Canada (NBC), and vary depending on the region of the country, and the geometry of the structure.

Typically the imposed snow load can be calculated as:

$$S = [0.8 \times S_g \text{ (Ground Snow Load)}] + S_R \text{ (Rain Load)}$$

Where snow pile up is expected, refer to the current edition of the National Building Code.



### LOAD TRANSFER

Imposed gravity loads normal to the plane of a Marquis system roof are transferred to the structural liner by way of the insulation. Only rigid insulation types should be used. The selection of insulation is based on its load transfer capacity and resistance to deformation.

For approved insulation options and load transfer capabilities, refer to the Marquis System 3000, Load tables and Guide Specification brochure, or contact your local VICWEST office.

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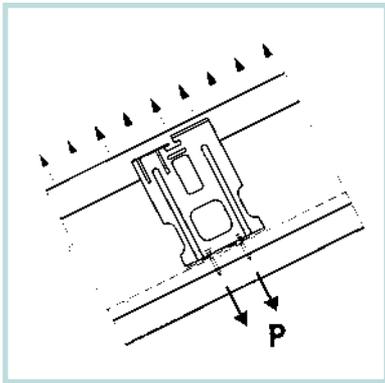
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### WIND UPLIFT

Wind uplift is an important consideration in the design of metal roofing. Calculations are needed to determine the proper spacing of the thermal support clips and other roof fastening systems. For Marquis, the maximum wind uplift pressure, P can be approximated

$$P = q_{1/10} C_e k$$

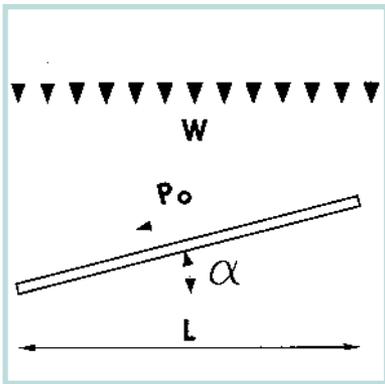
where:  $q_{1/10}$  = the 1 in 10 year reference wind pressure for a particular location

$C_e$  =  $[H/10]^{0.2}$ , where H is the building height.  $C_e$  should not be less than 0.9

k = a coefficient for the relationship between wind gust factor, shape factor and internal pressure coefficient;

= 5.8 for single skin Marquis

= 4.1 for insulated Marquis roof system



### SLIDING FORCES

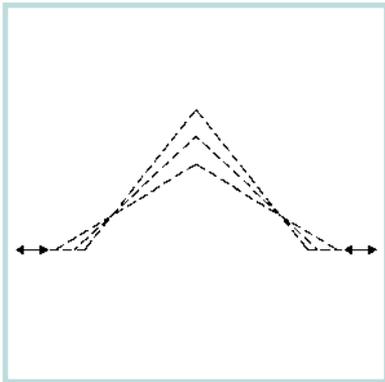
On a sloping metal roof, snow load exerts two forces. The force normal (or perpendicular) to the roof surface is resisted by the roof structure. However, the force acting parallel to the roof surface will tend to cause the roof sheet to slide off the roof. This force is resisted by the fasteners used at the eaves or ridge, to fix the Marquis roof sheet. The sliding force,  $P_o$  is a function of the roof slope, gravity load, and roof length.

$$P_o = L w \sin \alpha$$

where: L = maximum roof length in plan (m, ft.)

w = gravity load on Marquis panel (kPa, psf)

$\alpha$  = roof slope in degrees



### THERMAL MOVEMENT

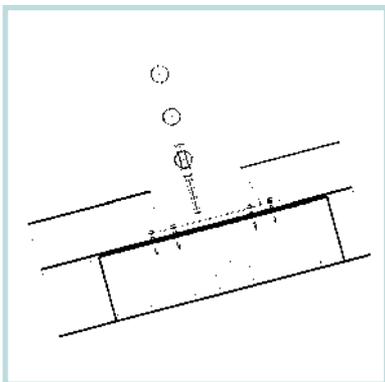
Metal roofing is subjected to thermal movement, due to the expansion and contraction of the sheet steel. Marquis is designed to accommodate this movement by incorporating a sliding mechanism in the thermal support clip. In order to ensure that ridge flashing can also accommodate the expanding and contracting forces of eave anchored sheets, it is necessary to determine the amount of thermal movement of eave anchored sheets and specify flashing performance accordingly.

$$\Delta_L = K L T$$

where: L = length of roof sheet (mm/ins)

T = temperature variation ( $^{\circ}\text{C}/^{\circ}\text{F}$ ) per N.B.C. latest edition.

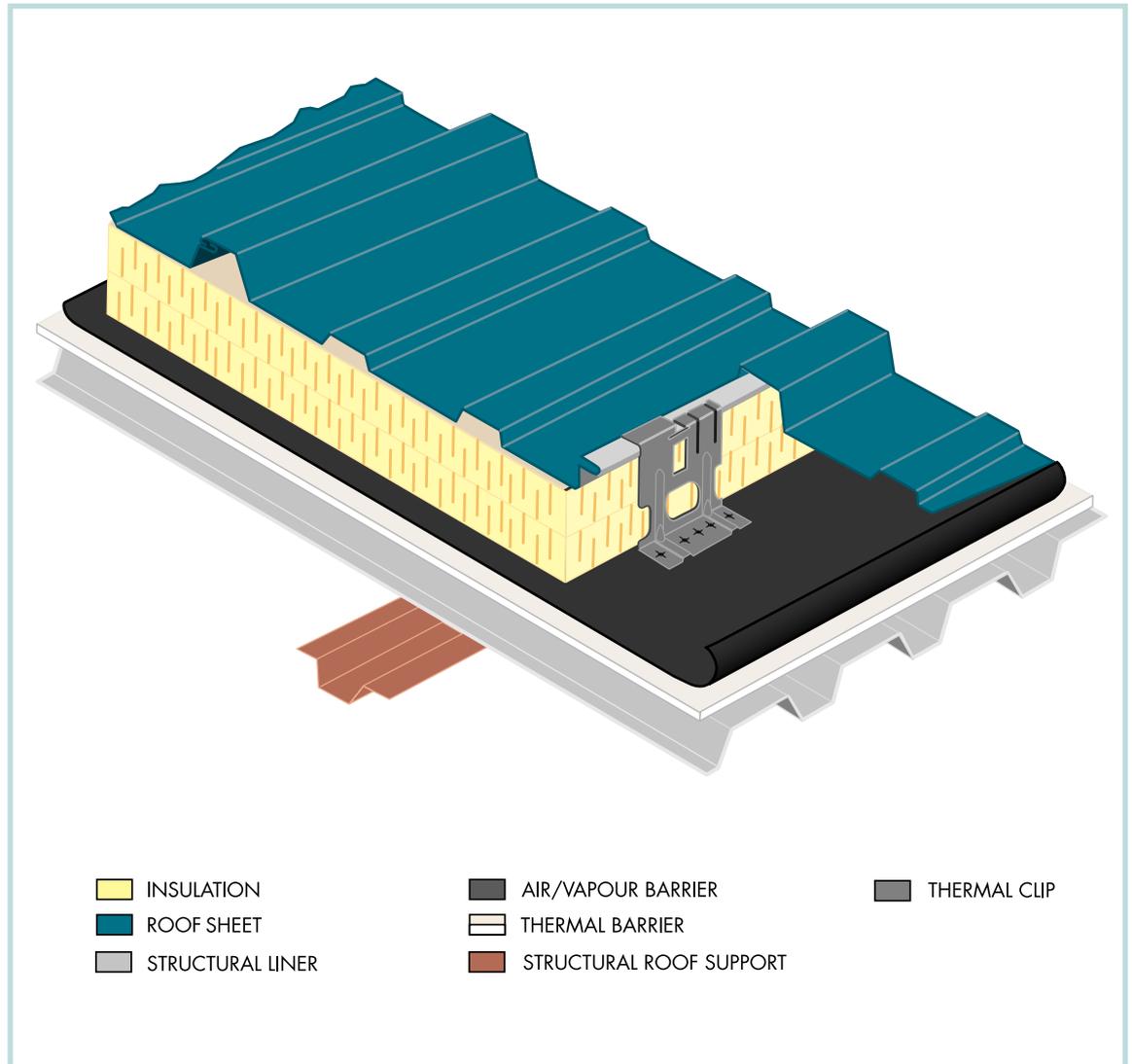
K =  $11.7 \times 10^{-6}$  (Metric) =  $6.5 \times 10^{-6}$  (Imperial). For steel only.



### SLIDING SNOW

The designer must be aware of the potential for snow sliding off the metal roof. This occurs because the metal offers little frictional resistance. Factors such as roof pitch, thermal bridging across the system, and the colour of the roof can have an impact. Snow begins to slide when the sliding force exceeds the frictional coefficient of the roof sheet. Slight melting under the snow will reduce the ability of the roof to retain any significant build-up. VICWEST offers a number of solutions, including snow fences that impede sliding snow, and minimizes hazards from falling snow. The design and installation of the structural supporting system for the snow fence must be incorporated as part of support system for the complete roof.

## THE ELEMENTS OF A MARQUIS ROOF SYSTEM



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#### STRUCTURAL LINER

The structural liner is the load carrying element. It can be selected from VICWEST's standard roof deck profiles. The liner is available in a (ZF75) galvanneal finish, ready for post-painting on the underside after installation, or as a galvanized (ZF275) finish where false ceilings are required. Improved acoustic performance can be achieved by specifying a VICWEST acoustic deck profile. Where the structural liner is exposed as the finished ceiling, a prefinished steel may be specified as an option.

#### THERMAL BARRIER

A thermal barrier between the metal liner and metal roof prevents cold bridging through the roof assembly and increases thermal performance. Exterior grade Gypsum Board (minimum 12 mm) provides an

excellent thermal break, and also acts as a rigid surface for the application of the air/vapour barrier.

#### AIR/VAPOUR BARRIER

The air/vapour barrier is a key performance element within the Marquis roof system. To prevent moisture penetration and damage that might be caused by membrane flexing due to wind loading effects, it should be a continuous, airtight membrane, positively secured to the thermal barrier. Particular attention should be paid to roof penetrations, fascia transitions, and eaves and ridge conditions, to make sure the air/vapour barrier is continuous.

Employing RainScreen design principles, the air/vapour barrier also acts as a secondary drainage path, providing a watertight roof system.





There are numerous suitable, roofing membranes available. Selection is dependent on the type of project, its location, and anticipated loading as well as construction sequence and timing. VICWEST's technical representatives can assist in selecting the most appropriate air/vapour barrier.

#### **SUPPORT SYSTEM**

Marquis uses a unique thermal clip support system. The clip is designed to reduce thermal conductivity by minimizing the metal to metal contact area and the available metal surface area. The sliding rib mounting system allows for thermal expansion and contraction of the roof sheet. The thermal clip also has a lateral spring tensioning device that makes sure the side-lapping ribs are locked into place.

#### **INSULATION**

The Marquis roof system can accommodate up to 254 mm (10.0") of insulation, in single or multiple layers, providing superior insulating values. Only rigid insulation is recommended.

#### **ROOF SHEET**

The Marquis roof sheet is a sealed, side interlocking, roll-formed board and batten cladding profile. It provides a durable, low maintenance roof surface.

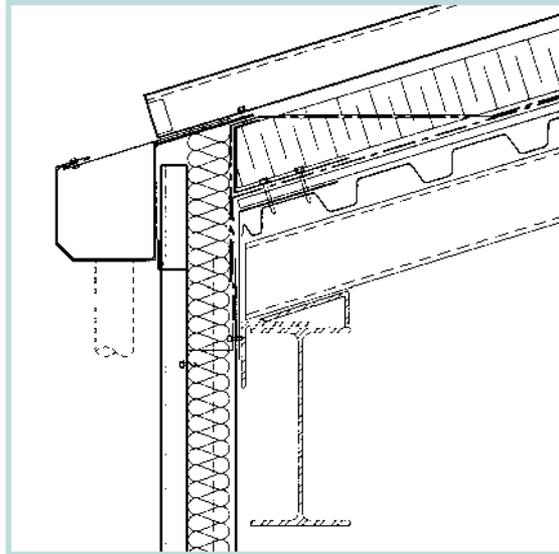
\* For availability of colours and finishes from stock or by special order, consult our Colour Combination Chart in the Colours & Coatings Section of the VICWEST Binder, or contact your local VICWEST office.

The distinctive design of this Marquis roof system enhances the traditional country look and charm of this Quebec chateau.

## Drainage Management

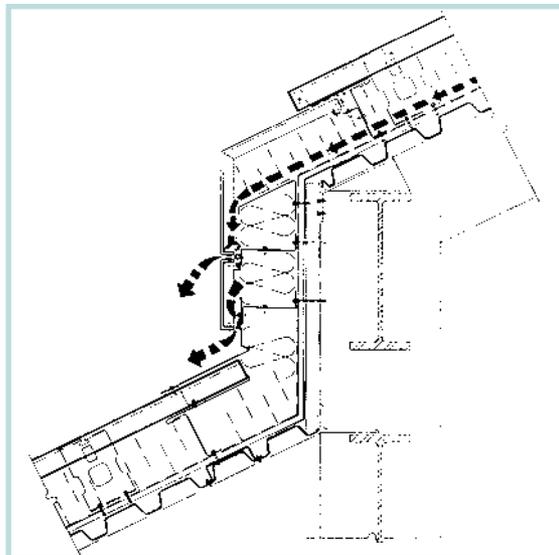
RainScreen design principles are applied to the Marquis roof system by incorporating proper drainage management within the roof assembly. In doing so, potential problems associated with water penetration, are virtually eliminated. The continuous air/vapour

barrier, required by the National Building Code of Canada, forms part of the Marquis roof system. This layer ensures that any moisture penetrating the system will be re-directed to the exterior of the system.



### Roof Eave Drainage

Special flashing designs incorporated at roof to wall connections allow moisture, trapped within the roof system, to be directed to the exterior of the wall surface.



### High/Low Roof Drainage

Where circumstances prevent direct egress at the eaves, such as in this high/low roof application, moisture can be directed into the wall drainage system and released onto the lower roof.

### RainScreen Principles

VICWEST has always been at the leading edge in the research and development of Pressure Equalized Wall and Roof Systems, or RainScreen. Rather than rely on caulking to keep rain out, RainScreen equalizes the pressure on both sides of the exterior metal sheet, actually preventing rain from entering. Air circulation within the wall, or roof cavity and proper drainage management are important characteristics of RainScreen. These characteristics played a significant role in the development of the Marquis roof system. For complete information on RainScreen, ask a VICWEST representative for a copy of our RainScreen brochure.

VICWEST has assisted in the design of hundreds of Marquis projects. Proper detailing solutions, for virtually any drainage application, have been developed by VICWEST. To help architects and builders with their detailing, VICWEST's technical representatives would be pleased to provide CAD detailed proposals that respond to the current project conditions.

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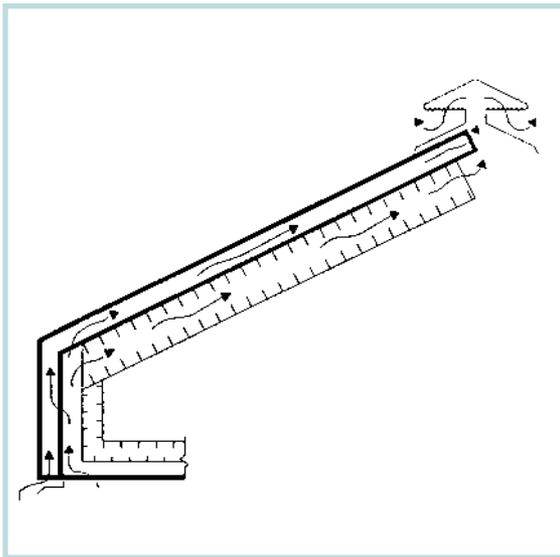
## VENTILATION CONTROL

When adapting RainScreen technology to the management of roof assembly drainage, the same principles apply to roof ventilation.

Natural ventilation of the roof occurs because of the rib design and the openings provided for drainage. Wind, acting on the roof, as well as stack effects produced by rising hot air, produce air pressure

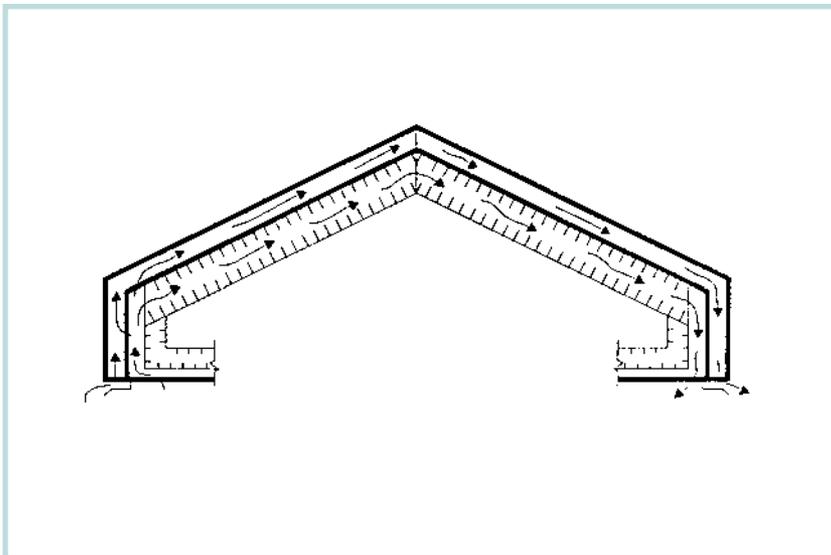
differentials. Differences in air pressure or vapour pressure provide the force needed to move air through the roof system.

Ventilation is essential to good roof performance and ensures that any moisture that might be trapped in the system will be dried out in the air flow.



### AIR EXHAUST VENTS

Marquis can be designed to accommodate ridge mounted exhaust vents, as shown at left, or through-flow ventilation, as shown below. In each case, inlet and outlet ventilators must be properly sized. CSA Standard CAN3-A93-M82 sets out the minimum requirements for ventilators relying on natural air flow.



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## MARQUIS ROOF SELECTION

Marquis is ideally suited to a number of applications, from single skin to complete composite roof systems. For all residential, commercial, institutional, and industrial roofing, whether it be new construction or

retrofit, there is no better choice than Marquis. Simply select the application best suited to meet your design needs.

### Specifying a Marquis Roof

For information on selecting and specifying a Marquis Roof, see the Marquis System 3000 Load Tables and Guide Specification brochure in the Roof Systems Section of the VICWEST binder.

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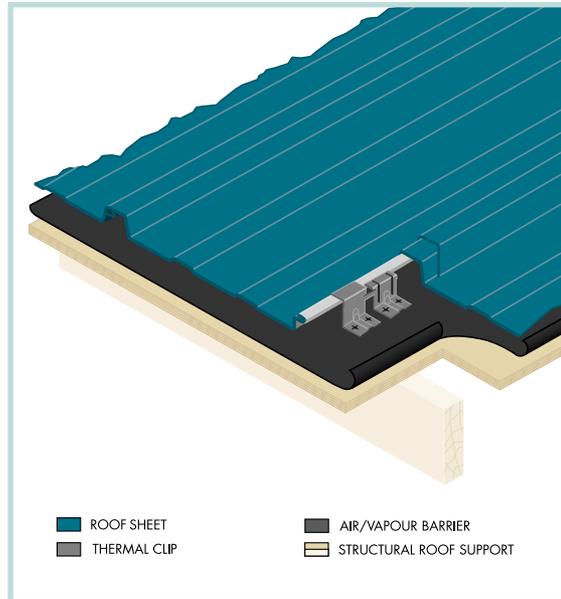
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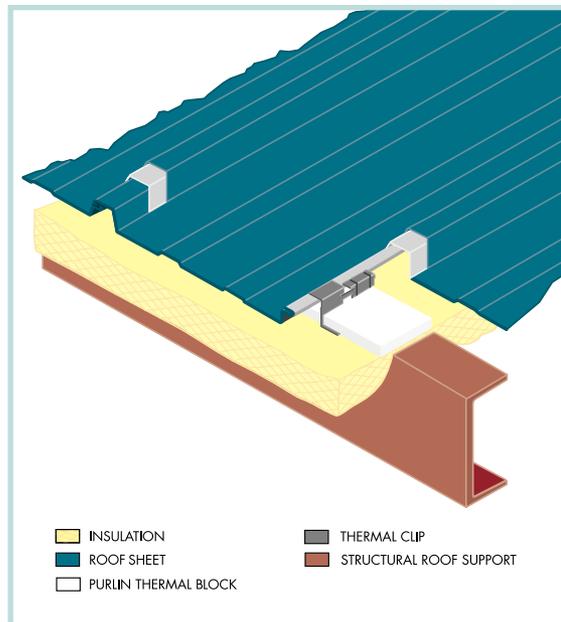
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### SINGLE SKIN ON RIGID DECKING

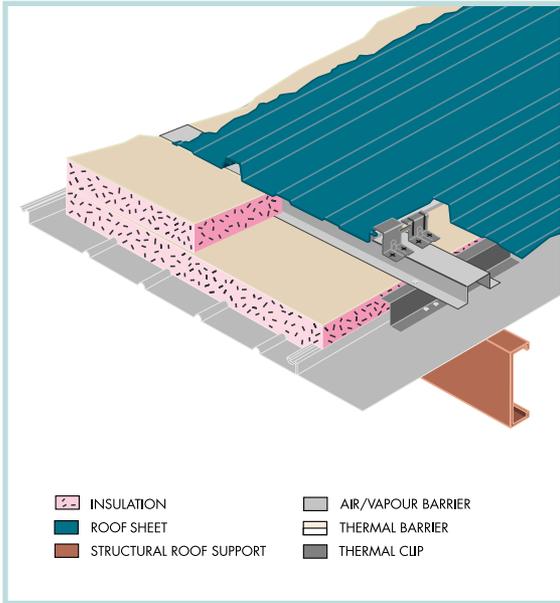
Marquis is ideal in applications where a solid deck is available for support. The decking may be plywood, wood planking, or concrete. Marquis is adaptable to any solid base material. This single skin application is perfect for both new construction and retrofits. To prevent internal air leakage, which can cause condensation problems, VICWEST recommends the use of a good air barrier over the decking material.



### MARQUIS SYSTEM 1000

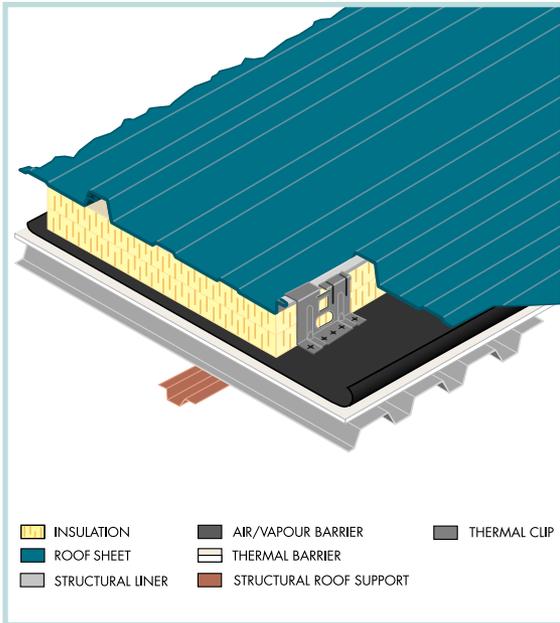
For light industrial applications, choose Marquis System 1000 as an economical and attractive roof. Marquis can be used as a single skin, with or without metal building insulation, as required. The snap-cap batten is required to provide additional rigidity to the system.





### MARQUIS SYSTEM 2000

The Marquis 2000 roof provides an upgraded system, with an L800 Liner sheet air/vapour barrier and a wider range of insulation values from which to choose. As with the System 1000, the Snap-Cap Batten is required to provide additional rigidity to the system.

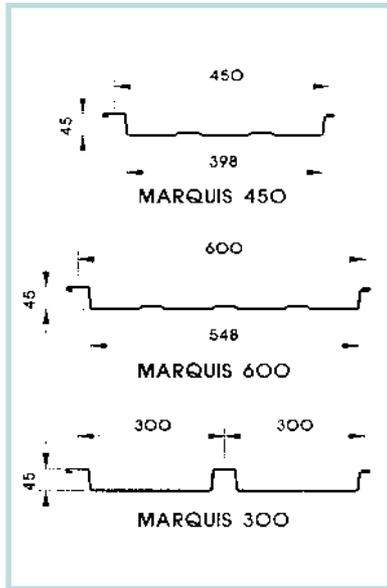


### MARQUIS SYSTEM 3000

Marquis System 3000 Roof is designed for almost all roofing applications. It combines all the elements needed for a high performance, weather tight roof. It integrates all necessary roofing components and provides a single source of responsibility for the roof design and construction.

For a more economical approach, where the interior humidity of the building is less than 35%, the Thermal barrier may be eliminated and deck fillers installed to support the side and end laps of the air/vapour barrier. Caution must be exercised, to ensure humidity conditions during construction also remain below this level.

# MARQUIS ROOF COMPONENTS



## MARQUIS ROOF SHEET

Marquis is available in 300 mm (11.81"), 450 mm (17.71") and 600 mm (23.62") batten spacing. It is also available in a complete range of pre-painted colours and finishes. For harsh environmental conditions, it is available in Barrier Coating. For more information on the availability of colours and finishes refer to the Colours & Coatings Section in our VICWEST binder.

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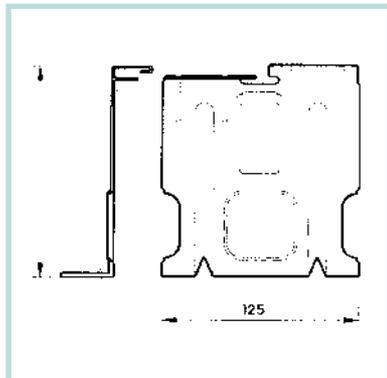
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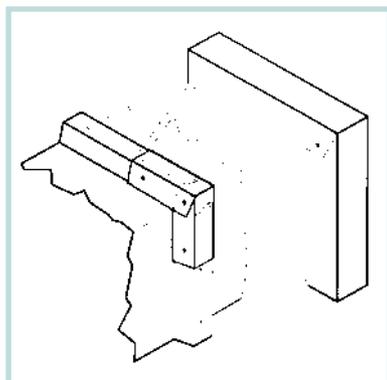
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## THERMAL CLIPS

VICWEST's Thermal Clip mounting system is available in a variety of depths, to accommodate varying insulation depths, from zero or flush mounted up to 254 mm (10.0") of insulation.

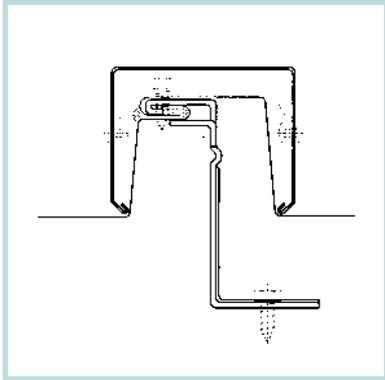
AVAILABLE THICKNESS (mm)	Z275 GALVANIZED FINISH	BARRIER COATED (HARSH CONDITIONS)
1.26	•	•
1.56	•	
1.95	•	



## TRANSITIONS

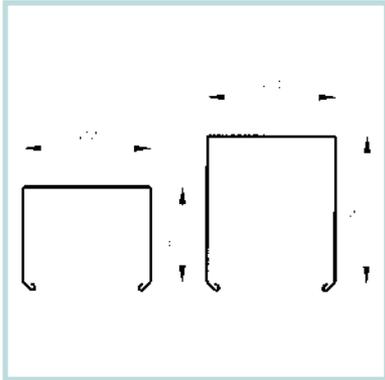
With the optional snap-cap batten, Marquis provides a perfect transition from roof to fascia, and even from fascia to soffit.



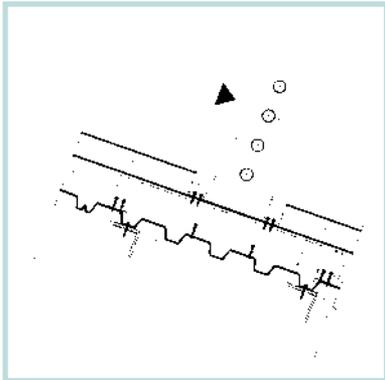


### OPTIONAL "SNAP-CAP" BATTEN

The optional Marquis snap-cap batten provides a distinctive architectural feature, creating bolder shadow lines. With single skin applications, the snap-cap batten provides increased rigidity. It is also used to provide perfect transitions from roof to fascia. Available in two sizes.

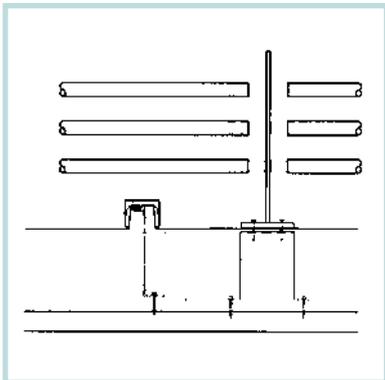


Simplicity of profile design complete with the durability of a Marquis roof system adds to the grace of this B.C. college walkway roof.



### SNOW FENCES

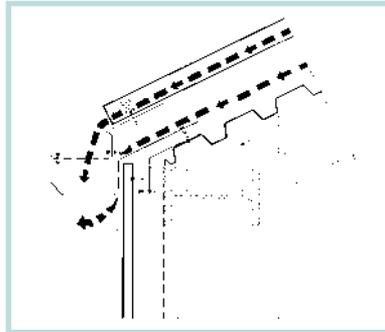
Serious design consideration must be given to the potential for snow sliding off a metal roof. Where snow sliding is a concern, VICWEST would be pleased to recommend appropriate security measures and where appropriate, assist in the design of snow fences.



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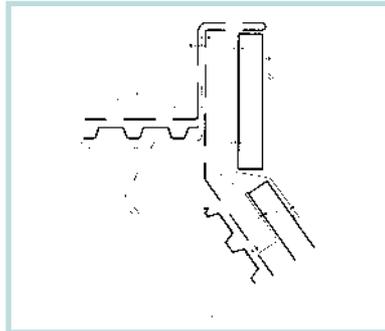
When it comes to designing a good roof system, attention to the detailing of the roof components will help ensure trouble-free performance for many years. VICWEST has a resource library of hundreds of

Marquis details, covering numerous applications, and would be pleased to assist with your next roof design. Listed below are potential trouble spots:



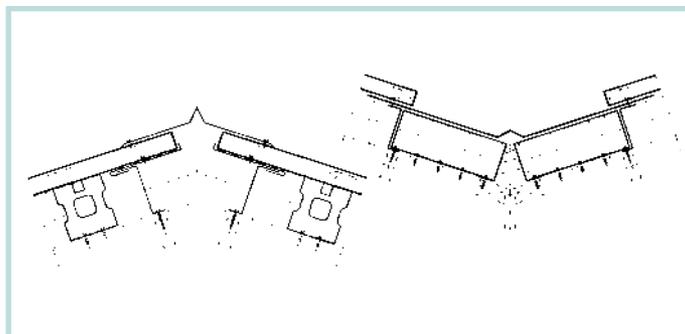
### PROPER DRAINAGE DETAILING

It is essential that the designer give thorough consideration to the roof drainage, both externally and internally. Areas of transition, such as this high roof to wall cladding detail, should be carefully planned, to ensure a trouble free, weather tight construction.



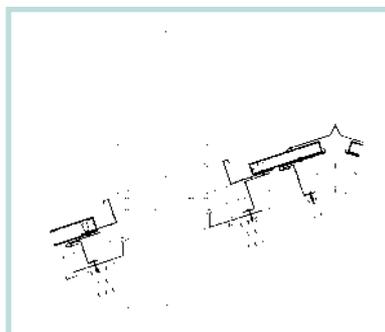
### CONTINUITY OF THE AIR BARRIER

A continuous air barrier means no condensation problems due to air leakage into the roof cavity. A properly installed and sealed membrane means no potential water penetration through the roof. Attention to the detailing is required to make sure the air/vapour barrier is continuous at all transition points.



### RIDGES AND VALLEYS

Ridges and valleys can often be weak points in a metal roof, unless proper consideration is given to their detailing. Ensure ridge and valley flashing is designed for expansion and contraction of the roof sheet, in order to prevent bending or fatigue damage to the flashing.



### OPENINGS

Considerable attention should be given to the detailing of roof openings, in order to ensure the continuity of the air/vapour barrier and the proper closure of Marquis roof sheets. This will prevent the possibility of water ingress, at the opening.

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## ROOF SYSTEMS BY VICWEST

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In addition to Marquis, ask for brochures on our other roof systems:

### WEATHER-LOC

This economical, site seamed, single skin roof sheet is designed for residential and light commercial applications. Weather-Loc is available in western Canada only.

### TSR

VICWEST's TSR system is designed for extreme low slope applications and used extensively in large commercial and industrial applications as a single skin or full system roof.

Also from VICWEST:

- Roof and Floor Decking
- Composite Hi-Bond Floor Systems
- Wall Cladding Systems
- Contour-Clad
- Plate Walls
- Flat Wall Systems

### CUSTOMER SERVICE

A VICWEST Technical Representative would be pleased to meet with you and discuss your needs, and help you choose the right roof system for your next project. Our technically qualified and fully experienced engineering staff is available to custom design a solution that is just right for your building.

VICWEST offices are conveniently located across Canada. Call us for more information on the VICWEST family of Building Products and Building Envelope Systems.

The Marquis roof on this building displays the ongoing trend by the architectural community in providing a unique, distinctive crown to set each structure apart from the rest of the crowd.

