



# Marshall Industries Ltd

## "Best in the Long Run"

# HI - LINE

### PITCH:

Wide pans and high ribs allow pitches as low as 3° to be laid. Hi-Line can be used for lower pitches subject to specific design considerations. Contact Marshall Industries for further information.

### FASTENERS

Fasteners must comply with AS3566 Class 4 and have a durability compatible with the roof material else staining or early failure may occur.

The use of cadmium or zinc plated screws without additional protection is not recommended.

### FIXING

Hiline roofing can be fixed by a plumber, builder or roofing specialist. Spiral shanked or annularly grooved fasteners are to be fixed to every rib at every Purlin. Fastener length must be a minimum of 80mm for steel and a minimum of 100mm for fixing to timber. In certain conditions, or where spans exceed 2m in .40 BMT or 2.5m in .55 BMT material, a side lap fastener is recommended at mid span.

### HANDLING CHARACTERISTICS

Inspect deliveries on arrival. If moisture is present, individual sheets should be dried with a clean cloth and then stacked to allow air to circulate. Sheets should be stored off the ground under ventilated cover. Cross-stack or fillet sheets where outside storage is unavoidable. Sheets should be lifted into position on the roof wherever possible and not dragged or slid over rough surfaces or other sheets. Flat soled rubber footwear must be worn when walking on the roof. Roofs and gutters must be swept clear of all construction debris on completion of fixing.

### FINISHING

It is recommended that a protective paint covering be specified if the product is to be installed in a severe marine or industrial location. An approved primer must be used if the surface is to be painted. Under no circumstances should air drying, water based acrylic paints be applied directly onto the surface. Specialist advice is available from the manufacturer.

### MAINTENANCE

All buildings suffer from the accumulation of dirt, dust and other contaminants, dependent on the severity of the environment. It therefore makes economic sense to maintain the metal roofing or cladding similarly as windows are, i.e. where they are protected from being naturally cleaned by rainwater they should be washed down periodically. This is especially important in marine or industrial environments where the build-up of salt and dirt can occur very rapidly.

Warranty requirements and durability compliance will only be met if maintenance requirements specified by the coil coating manufacturers are followed. The buildings owner should be made aware of the requirements.

### DISCLAIMER

The information provided in this publication to the best of our knowledge is correct at the time of publication. The information is not a guarantee of performance or suitability for a particular application. We are happy to provide advice on specific applications. Marshall Industries Ltd reserve the right to alter and revise the published information without notice.



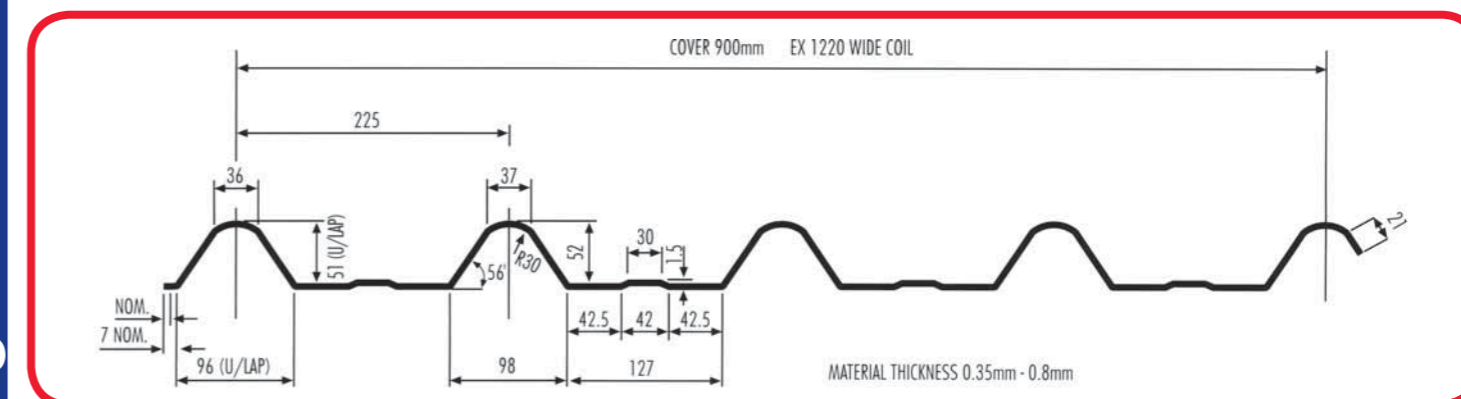
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### ECONOMY:

Hi-Line will meet all your requirements for both strength and material efficiency. The high rib design allows wider purlin spacing which makes for faster laying and saves on material costs.

### GREATER HEIGHT IN PROFILE:

As the "profile" is higher we achieve a greater strength, again helping to minimise costs.

### PAN PROFILE:

The inflexible pan profile reduces "oil canning" and purlin crease marks, this increases product strength improved appearance.



## MATERIAL MANUFACTURE

### ZINC ALUMINIUM COATED STEEL

#### Marshall Hi-Line

Manufactured from Hot-dipped, 45% Zinc, 55% Aluminium alloy coated steel. Standard AS1397: 1993

### COLORSTEEL®:

Colorsteel® is manufactured under strictly controlled conditions to provide optimal corrosion protection and very good resistance to fading. Colorsteel® coatings are highly decorative and generally exceed the life of traditional postpainted systems. There are several types of paint systems specifically designed for the variety of moderate, severe, very severe and special conditions found throughout New Zealand. Selection of the suitable system is important, as are installation and maintenance procedures. Reference should be made to the environmental categories guide and technical brochures, or contact your local Marshalls sales and technical office for assistance.

### MATERIAL SPECIFICATION:

| Material              | B.M.T. | Coating | Yield Stress |
|-----------------------|--------|---------|--------------|
| Zinc Aluminium Coated | .40    | AZ150   | G550         |
|                       | .55    |         |              |
|                       | .75    |         |              |
| Colorsteel®           | .40    | AZ150   | G550         |
|                       | .55    |         |              |
|                       | .75    |         |              |

**Marshall Industries Ltd, 189 Bond Street, PO Box 846, Invercargill. Phone 03-218 2579 Fax 03-214 9168**

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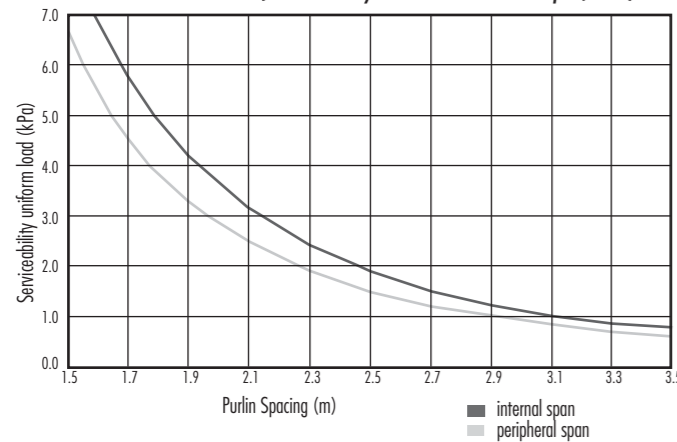


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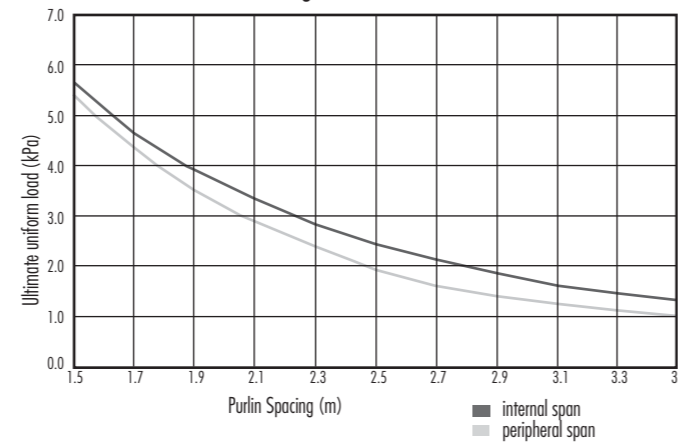
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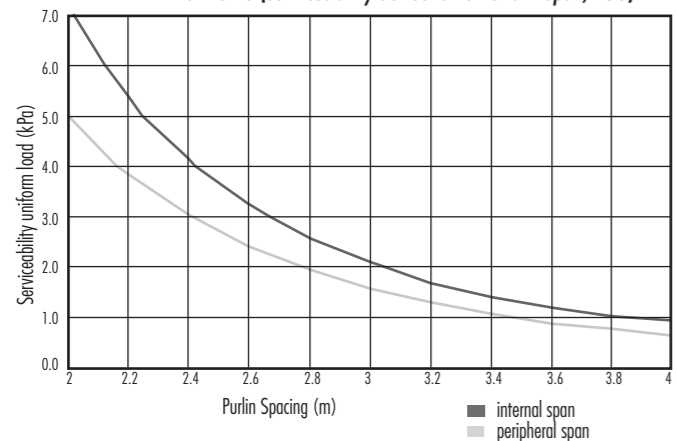
Serviceability Load Curves for 0.40mm BMT  
Hi Line Profile (serviceability deflection criteria = span/150)



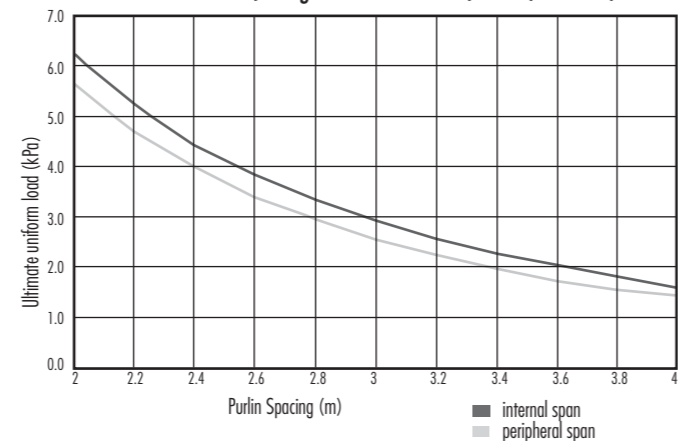
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Hi Line Profile (strength reduction factor  $\phi=0.9$  included)



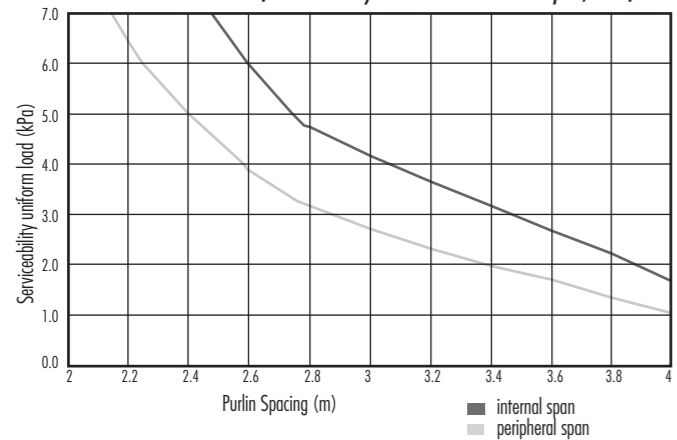
Serviceability Load Curves for 0.55mm BMT  
Hi Line Profile (serviceability deflection criteria = span/150)



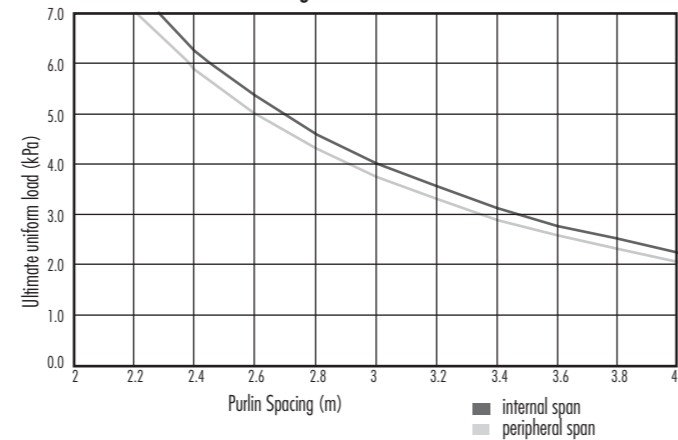
Ultimate Load Design Curves for 0.55mm BMT  
Hi Line Profile (strength reduction factor  $\phi=0.9$  included)



Serviceability Load Curves for 0.75mm BMT  
Hi Line Profile (serviceability deflection criteria = span/150)



Ultimate Load Design Curves for 0.75mm BMT  
Hi Line Profile (strength reduction factor  $\phi=0.9$  included)



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### FEATURES

#### STANDARDS:

##### NZS3402:1978

Hot-dip Galvanised Steel Sheet for Building Purposes.

##### NZ/AS1397:1993

Steel Sheet and Strip Hot-dipped Zinc-coated or Aluminium/Zinc Coated.

##### AS/NZS1170:2002

Code of practice for General Structural Design and Design Loadings for Buildings.

##### AS1562.1: 1992

Design and installation of sheet roof and wall cladding metal.

##### AS4040:1992

Methods of testing sheet roof and wall cladding.

NZ Metal Roof and Wall Cladding Code of Practice.

#### DESIGN DATA

Hi-Line has been developed to provide the most economical roofing system, especially when used in conjunction with high strength continuous span purlins. Contact Marshall Industries for information on economical roofing systems. Hi-Line has been designed, tested and analysed in accordance with "Profiled Metal Roofing Design and Installation Handbook", "American Iron and Steel Institute Cold Formed Steel Design Manual", AS 1562.1: 1992 and AS4040: 1992 to produce the design load curves provided.

#### PURLIN SPACINGS

The latest design technology has been utilised to produce a product with the attributes of high tensile steel and high rib profile combined with an unprecedented load/span capability.

#### ALLOWABLE PURLIN SPACINGS

The Purlin Spacings given in the following tables are applicable to buildings as described.

Specific considerations should be given for all buildings. For your most economical roofing system contact Marshall Industries.

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Allowable Purlin Spacings for Hi-Line Roofing  
(Serviceability Design Criteria)

|                  | Design Load<br>(kPa) | 0.4mm<br>B.M.T. | 0.55mm<br>B.M.T. | 0.75mm<br>B.M.T. |
|------------------|----------------------|-----------------|------------------|------------------|
| Peripheral Spans | 2.44                 | 2100            | 2550             | 3200             |
| Internal Spans   | 1.22                 | 2900            | 3600             | >4000            |

Allowable Purlin Spacings for Hi-Line Roofing  
(Ultimate Load Design Criteria)

|                  | Design Load<br>(kPa) | 0.4mm<br>B.M.T. | 0.55mm<br>B.M.T. | 0.75mm<br>B.M.T. |
|------------------|----------------------|-----------------|------------------|------------------|
| Peripheral Spans | 2.44                 | 2200            | 3100             | 3800             |
| Internal Spans   | 1.22                 | 3100            | >4000            | >4000            |

These tables are applicable up to the design loads indicated and are for buildings that fall within the following criteria.

- ◆ The general surrounding terrain is relatively flat with few obstructions (Terrain and Topographic Multipliers assumed to be 1.0).
- ◆ Peripheral Design Wind Load is twice the internal ( $K_1=2.0$ ).
- ◆ The building is at least twice as wide as high with no dominant openings (Pressure coefficient assumed to be 1.0).
- ◆ The roof pitch is less than 10 degrees.
- ◆ Buildings do not contain people in crowds.

If the building does not fall within the above criteria then contact Marshall Industries as allowable purlin spacings may differ. Peripheral loads/spans do not apply to hips and ridges if pitch is  $>10^\circ$ . The tables of allowable purlin spacings indicate the design load calculated in accordance with the above building envelopes. The design loads include allowance for local pressure factors for end spans within a distance of "x" from the eaves and ends of buildings is defined as the lesser of "1/10th of the least plan dimension". Note that the "Peripheral spans" given in the tables must cover a minimum length of "x".

Spans greater than 4 metres are practical, however contact Marshall Industries prior to proceeding with these spans. Marshall Industries are happy to advise on economic roof profiles and purlin spacings/types.