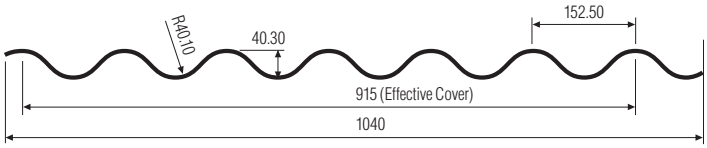
Profile Technical Summary

TRUE OAK® DEEP



Side lap

(All dimensions are nominal and in mm)

MINIMUM PITCH

The minimum roof pitch for True Oak® Deep is 3 degrees (approx.; 1:20).

At the above pitch maximum run length (or combination of lengths) without specific design is at least 40 metres dependent on rainfall intensity. For run lengths (or combination of lengths) in excess of 40 metres the ability of the profile to shed rainwater should be verified by specific calculation taking into account the rainfall intensity for the location, the pan capacity plus any discharge from adjacent surfaces acting as a catchment. Further information on the above can be obtained from the NZMRM Code of Practice.

Roof pitch design may need to be greater so as to take into account any cumulative deflections of the frame, purlin, roof sheeting and/ or penetrations. For curved roofing, the roof cladding must not terminate at a pitch lower than permitted above.

SHEET LENGTHS

- Manufactured custom cut to length subject to transport and site limitations.
- Sheet lengths in excess of 30 metres require specialised transportation. Refer to Roofing Industries
- Maximum recommended sheet lengths for **Aluminium** is 10-12 metres for dark colours and 12-15 metres for plain and light colours. Refer to Roof Expansions Provisions of this summary.
- As sheet lengths increase higher transportation costs may be applicable.
- Sheet lengths for pre-curved material are subject to handling and transport limitations. Contact Roofing Industries for further information on mechanical curved sheets.

Technical Helpline 0800 844 822

INFORMATION TABLE

Substrate Material	Steel	Aluminium
Thickness	**.55 mm BMT G300/G550 Mpa**	**.90 mm BMT 5052**
Approximate weight per lineal metre for substrate material (kg/lm)	5.48	3.07
Purlin Spacings - General	Refer to separate section	Refer to separate section
Unsupported Overhang (mm)[1]	250	200
Drape Curved Roof – min Radius (m)	Refer to Roofing Industries	Refer to Roofing Industries
Purlin Spacings for Curved Roofs – Maximum Radius (m)	Refer to Roofing Industries	Refer to Roofing Industries

[1] Not suitable for roof access without additional support)
This technical data sheet is for steel and aluminium based substrates. True Oak® Deep can also be manufactured in other metals such as Copper or Titanium Zinc. Refer to Roofing Industries.

SPECIFICATION

Refer to our Full Specification on Masterspec, Smartspec, or Eboss. Refer to links on our website and our Selection Guide.

BUILDING DESIGN / PERFORMANCE CRITERIA / PRODUCT SELECTION

During the design of buildings, it is necessary for the designer to take into account a number of issues to ensure that the most appropriate roofing and cladding product is chosen.

Whilst aesthetics and product availability do play a part, the chosen profile must meet certain performance criteria. These are centred around the profile's ability to shed water from the roof, the ability of the product to span purlin and girt spacings plus meet design criteria. The minimum pitch for this profile is outlined elsewhere within this literature.

In terms of purlin spans and girt spacing it is necessary to follow due process.

If a building is being designed and constructed in full accordance with E2/AS1 and roofing and cladding products as covered by that document are chosen, then it is necessary for the design spans and fixing methodology to comply with those of E2/AS1. However E2/AS1 states that the use of the manufacturer's information may provide a more optimum spacing of fixings and this is recommended by Roofing Industries.

Further, where a building is outside of the scope of E2/AS1 and the building or parts thereof are of specific design then it is necessary for the roofing and cladding to be suitable for the design and vice versa.

In most cases, to take advantage of the unique characteristics of True Oak® Deep the use of same will be outside the prescriptive requirements of E2/AS1. By designing and installing True Oak® Deep in accordance with the Profile Technical Summary True Oak® Deep will meet the requirements of NZBC E2.

Loadings referred to in Roofing Industries graphs are the result of testing to a serviceability limit state which is more conservative than an ultimate limit state as quoted by some manufacturers. Ultimate limit state loads will require a factor of 1.8 times the serviceability loadings. True Oak® Deep has been tested to comply with this ultimate limit state factor.

Our Design Graphs are presented in a form to allow the designer to select suitable products and purlin spacings, based on serviceability limit state.

For most roof installations the purlin spacings will be limited by the trafficable limitations of the profile or the structural design. It is then necessary for the designer to calculate the design wind load for the roofing and cladding in accordance with generally acceptable practice, by reference to AS/NZS 1170.2:2011 and amendments and/or NZS 3604:2011. For a fuller explanation of this refer to the NZ Metal Roof and Wall Cladding Code of Practice. This result should be referenced to the Wind Load Span Design Graphs.

The purlin spacings should be limited to the lower of the trafficable limitations and design wind load with the capacity of the structure being greater than the design load for the application. However for roofs that are not able to be walked on and for wall cladding applications, the trafficable limitations may be exceeded providing the design wind loading criteria is met. However this should be done with caution as it may require considerable extra secondary fasteners within the laps.

The designer should always take into account in areas of heavy roof traffic, snow loadings, or where the roofing supports such items as air conditioning units, purlin spacing should be reduced accordingly. Consideration also needs to be given to limitations of purlin spacings for any translucent sheeting.

Reference should be made to the notes in the graphs.

True Oak® Deep is manufactured from .55mm BMT steel or .90mm BMT Aluminium as both have more resilience to damage.

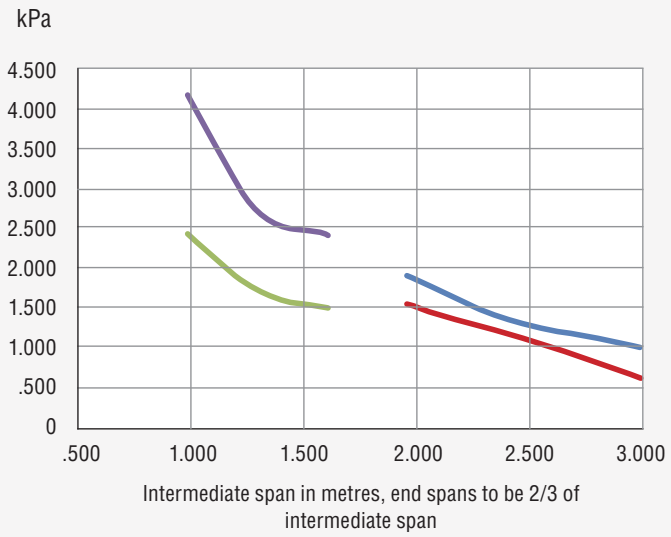
Underlay as per the project specifications should be used.

With an aluminium substrate, steel netting should not be used where it may be in contact (either directly or through underlay degradation) with the aluminium roofing or cladding. Alternative material such as polypropylene strapping should be used where support is required, or the cladding separated from the underlay by a high density polystyrene batten, or drainage Mat or similar, including the use of an aluminium gutter flashing. This is also applicable to coated metal and pure zinc roofing in severe marine applications. In all the above cases, self supporting underlay should be used including when support is required.

WIND LOAD DESIGN GRAPH

Roofing

Static Load



Legend and Fixing Method

G300 C2L
G300 C2
G550 C2L
G550 C2

Testing confirms that 0.90 BMT Aluminium has similar results to .55 BMT Steel and is adjusted for practical application. For compliance with NZ Metal Roof and Wall Cladding Code of Practice, Aluminium requires load spreading washers and EPDM washers to be used at all times.

In the above graph in part which includes G300 grade steel test results it can be assumed that G550 grade steel will perform to at least the results given for G300 grade steel.

PRIMARY FIXING METHODS*

Roofing Application

C2L Fix side laps and miss 1, hit 1, miss 1 etc; with approved screws and load spreading profiled metal washers and EPDM washers. End purlins and periphery of roof to be fixed every crest.

C2 Fix side laps and miss 1, hit 1, miss 1 etc; with approved fasteners alone. End purlins and periphery of roof to be fixed every crest.

Wall Cladding Application

Fixed in the pan every rib and every girt.

* Note - Compliance with E2/AS1 is dependent on girt spacing and gauge of cladding. See section on Purlin/Girt Spacing Limitations and recommendations available from the True Oak® Deep Profile Technical Summary at www.roof.co.nz. Side lap fasteners are optional when using fasteners across the sheet.

Drape Curved Roofing

The first two purlins at each end of the sheet in drape curving situations should, in all cases, be fixed using profile metal washers and EPDM washers with the balance of the roof fixed as above.

For drape curved roofing, the roofing material must not terminate at a pitch lower than minimum roof pitch requirement in this document.

Side laps of curved sheets must be sealed to any areas below the minimum roof pitch.

PURLIN/GIRT SPACING LIMITATIONS AND RECOMMENDATIONS

(Dimensions in metres)
For Compliance with E2/ASI. E2/AS1 by specific design allow the use of manufacturer's recommendations for fixing spacing. True Oak® Deep has been fully tested and the manufacturer's recommendations as per the graph below should be used. However reference should be made to E2/AS1 for purlin spacing

Manufacturer's recommendation in accordance with NZ Metal Roof and Wall Cladding Code of Practice and compliance with NZBC E2.

		Steel Based Material		Aluminium H36
		.55 mm BMT G300	.55 mm BMT G550	.90 mm BMT 5052
Unrestricted Access Roof (Type A) (Where walking is permitted anywhere on the roof cladding for normal maintenance)	Intermediate End	1.000 0.670	1.200 0.800	1.000 0.670
Restricted access (Type B) (where walking is permitted anywhere on the roof cladding within 300mm of a purlin, otherwise over 2 crests)	Intermediate End	1.600 1.100	3.000 2.000	2.400 1.600
Non Accessible Roof and Wall Cladding (Type C)	Intermediate End	1.600 1.100	3.000 2.000	2.700 1.800
Maximum Recommended Purlin Spacing for standard roof (see notes below)	Intermediate End	1.600 1.100	2.000 1.350	1.800 1.200
Wind Design Load using fixing method C2L as an example at these purlin spacings from the Wind Load Span Design Graphs	Intermediate End	2.4kPa 3.7kPa	1.8kPa 2.7kPa	1.8kPa 2.7kPa

Classification Types are from the New Zealand Metal Roof and Wall Cladding Code of Practice. Purlin spacing limitations to be read in conjunction with Wind Load Span Design Graphs. In areas of heavy traffic, purlin spacing should be reduced accordingly. For curved roofing refer to the Information Table. When self supporting underlay is preferred to be used (without any support) purlin spacings must be limited to a maximum of 1.200 mtr centres for vertically run underlay and 1.150 mtr centres for horizontally run underlay. This is particularly relevant with aluminium and / or severe marine environments for the reasons designated under Building Design/Performance/Product Selection part of this document.

SNOW LOADS

When the possibility of snow exists it is necessary to allow for the extra imposed snow loads by increasing the strength of the structure, and/ or minimising the build up of snow, and this is generally achieved by increasing the roof pitch by allowing easier shedding of the snow or otherwise as the designer determines.

The objective is to simplify rather complex loading patterns while remaining adequately cautious. The design loads should take account of drifting snow due to wind,but wind loads are not required to be combined with snow loads.

As snow loads are uniformly distributed loads they are similar to wind loads.

Snow loadings are not required to be taken into account for the North Island of New Zealand north of a line drawn from Opotiki to Turangi and New Plymouth.

However for other areas snow loadings may need to be taken into account dependent on the area and altitude of the proposed project.

A fuller reference including a map and chart is available from the NZ Metal Roof and Wall Cladding Code of Practice.

PRIMARY FIXING CHART

Roofing - Crest fixed (To be read in conjunction with Roof Expansion Provisions and Load Span Design Graph)

	Wood Purlins	Steel Purlins or girts up to 1.5mm	Steel Purlins or girts 1.5-4.5mm	Steel Purlins or girts 4.5-12mm	Washers (When required)
Steel Based Material	14-10x75 Class 4/5 Type 17 Woodteks with neos, or 14-10x100 Woodteks	12-14x65 Class 4/5 Steelteks with neos	12-14x65 Class 4/5 Steelteks with neos	12-24x65 Class 4/5 Series 500 Steelteks with neos	True Oak® Deep load spreading profile Steel Head stamped (RI-TOD) and 36mm EPDM washer with neos
Aluminium Based Material	Stainless Steel grade 304, 14-10 x 100mm Type 17 with neos through a 10mm dia. clearance hole with purpose designed True Oak Deep (RI-TOD head stamped), 0.9 Stainless Steel load spreading washer & 36mm EPDM washer	Stainless Steel grade 304, 14 -10 x 100mm Type 17 with neos through a 10mm dia. clearance hole with purpose designed True Oak Deep (RI-TOD head stamped), 0.9 Stainless Steel load spreading washer & 36mm EPDM washer	Stainless Steel grade 304, 14 -10 x 100mm Type 17 with neos through a 10mm dia. clearance hole with purpose designed True Oak Deep (RI-TOD head stamped), 0.9 Stainless Steel load spreading washer & 36mm EPDM washer	Stainless Steel grade 304, 14 -10 x 100mm Type 17 with neos through a 10mm dia. clearance hole with purpose designed True Oak Deep (RI-TOD head stamped), 0.9 Stainless Steel load spreading washer & 36mm EPDM washer	True Oak® Deep .9 Stainless Steel load spreading profile washer 304 Head stamped (RI-TOD) and 36mm EPDM washer

Wall Cladding - Pan fixed

	Wood Purlins	Steel Purlins or girts up to 1.5mm	Steel Purlins or girts 1.5-4.5mm	Steel Purlins or girts 4.5-12mm	Washers (When required)
Steel Based Material Direct fixed	12-11x40 Class 4/5 Type 17 Woodteks with neos	12-14x20 Class 4/5 Steelteks with neos	12-14x20 Class 4/5 Steelteks with neos	12-24x32 Class 4/5 Steelteks Series 500 with neos	
Steel Based Material 20mm Cavity	12-11x50 Class 4/5 Type 17 Woodteks or Roofzips with neos	12-14x45 Class 4/5 Steelteks with neos or 12 x 50 Roofzips Class 4/5 with neos	12-14x45 Class 4/5 Steelteks with neos	12-24x50 Class 4/5 Steelteks Series 500 with neos	
Aluminium Based Material Direct Fixed	12-11x35 Alutite with bonded washer	Stainless steel grade 304, 14-14x25 Steelteks and bonded washer through a 10mm diameter clearance hole with 25mm embossed Ali washer	Stainless steel grade 304, 14-14x25 Steelteks and bonded washer through a 10mm diameter clearance hole with 25mm embossed Ali washer	Fabco stainless steel grade 304, 14-14x20 Type B screw and bonded washer through a 10mm diameter clearance hole with 25mm embossed Ali washer	25mm embossed Ali washer
Aluminium Based Material 20mm Cavity	14-11x55 Alutite with bonded washer	Stainless steel grade 304, 14-14x70 Steelteks and bonded washer through a 10mm diameter clearance hole with 25mm embossed Ali washer	Stainless steel grade 304, 14-14x70 Steelteks and bonded washer through a 10mm diameter clearance hole with 25mm embossed Ali washer	Fabco stainless steel grade 304, 14-14x70 Type B screw and bonded washer through a 10mm diameter clearance hole with 25mm embossed Ali washer	25mm embossed Ali washer

Note: All primary fasteners to have a minimum embedment into structural timber of 30mm. Adjust fastener length for both timber and steel fixings when necessary for battens etc. When using load spreading profile washers for roofing fix ridging, roof flashings etc. using a 25mm Aluminium embossed washer and appropriate screw.

RI-TOD head stamped and purpose designed load spreading washers are developed as part of the over all True Oak Deep system and accordingly must be used to avoid voiding the warranty.

Secondary Fasteners (To be used in accordance with the NZ Metal Roof and Wall Cladding Code of Practice.)
These should be:

- Aluminium Blind Rivets AS5-3 x 4mm minimum (Residential)
- Aluminium Blind Rivets AS 6-3 x 4.8mm minimum (Commercial)
- Aluminium Bulb-tite Rivets
- 12-11x35 Alutites
- 12-11x25 Class 4/5 Type 17 Woodteks (Steel based material only)

ROOF EXPANSION PROVISIONS

Fix with recommended fasteners and systems from the Primary Fixing Chart and additionally allow for the following where applicable.

Steel Based Material

E2/AS1 Compliance

Sheet Lengths	Up to 8 metres	>8-12 metres >12-18 metres	>18 metres
	No special provision	Lower 50 % of the roof should be fixed using oversize holes at fastening points with approved load spreading profile washer, and 36mm EPDM washers	Not Applicable

NZ Metal Roof and Wall Cladding Code of Practice Compliance

Sheet Lengths	Up to 15 metres	>15-18 metres	>18-25 metres	>25-30 metres
Zincalume and light colours	No special provision	No special provision	Solid fix from the ridge down 18 metres. Oversize holes should be used for the remainder of the sheet with approved load spreading washers and a 36mm EPDM	Solid fix from the ridge down 12 metres. Oversize holes should be used for the remainder of the sheet with approved load spreading profile, washers and 36mm EPDM washers
Dark Colours	No special provision	Solid fix from the ridge down 12 metres. Oversize holes should be used for the remainder of the sheet with approved load spreading washers and a 36mm EPDM washer		Not recommended*

For sheet lengths in excess of the above refer to Roofing Industries Ltd.

Aluminium Based Material

NZ Metal Roof and Wall Cladding Code of Practice Compliance

Sheet Lengths	Up to 12 mtrs	>12-15 mtrs	>15 mtrs
Plain and Light Coloured	No special provision	No special provision	Not recommended*
Dark Coloured	No special provision	Not recommended*	Not recommended*

For sheet lengths in excess of the above refer to Roofing Industries Ltd.

POTENTIAL ROOF NOISE

It is impossible to prevent expansion and contraction, however it can be controlled by reducing the surface heat of the roof cladding by using lighter colours and ventilating the roof space.

Transverse expansion is accommodated by the concertina action of True Oak® Deep corrugated metal cladding and does not usually give rise to any noise. However, because flashings are stiffened at 90° to the cladding, there is differential movement between them, which requires expansion provisions for fastening and to minimise noise associated with this movement.

All materials expand or contract and those with a greater mass usually move less or more slowly than thinner sheet materials. Metals expand more than other building materials, except plastics which can expand more than steel. Green or wet timber contracts on drying, producing shrinkage and is subject to expansion and contraction with temperature fluctuations.

Before any True Oak® Deep is installed, the framing timber must have a maximum moisture content of 18%.

UNDERLAYS

When a self supporting underlay is preferred to be used for a roof pitch greater than 10 degrees this is self supporting. For roof pitch equal to or less than 10 degrees, self support underlay is to be used with support (i.e. netting). Kraft based roofing underlay should be run horizontally on supports and synthetic roof underlay may be run horizontally or vertically on supports

Purlin spacings must be limited to a maximum of 1200mm centres for vertically run underlay and 1150mm centres for horizontally run underlay. This is particularly relevant with aluminium and/or severe marine environments for the reasons designated under the Building Design/ Performance part of this document.

FRAMING TIMBER MOISTURE CONTENT

Before any True Oak® Deep product is to fixed to timber support, the timber must have a maximum moisture content 18% - with test results documented.

PURLIN/GIRT ALIGNMENT

Purlins and girts should be checked using string lines to see they are in a true plane and securely fixed, all trimming completed for penetrations, and any work by other trades completed. There can be a tolerance of +/- 5 mm deviation to the frames where the Roofing Industries profile is to be fixed.

RIDGING AND SOFT EDGE

Roofing Industries patented variable pitch ridging (Vari Pitch™) can be supplied incorporating a colour-matched 63mm soft edge which is to be uniformly and neatly dressed into the True Oak® Deep Profile. Alternatively, a purpose supplied flashing can be provided which is to be scribed to fit the profile and sealed, thereby preventing water penetration.

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