THE INSTALLERS GUIDE

Dimond Roofing®

0800 DIMOND
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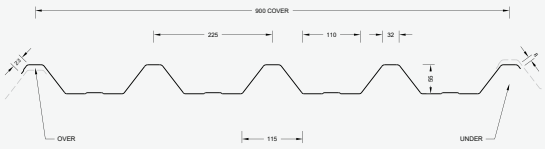
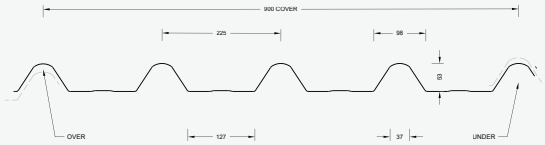
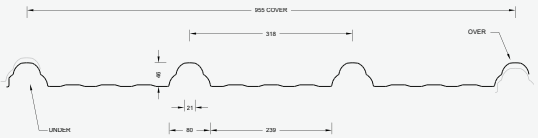
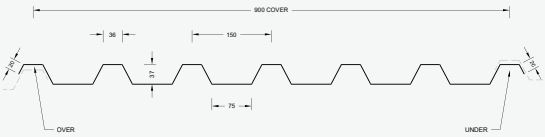
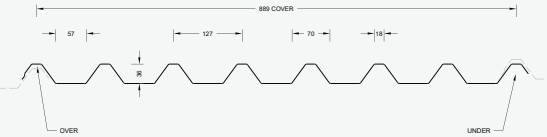
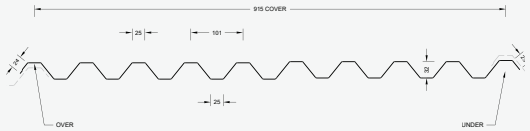
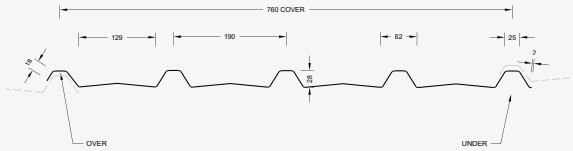
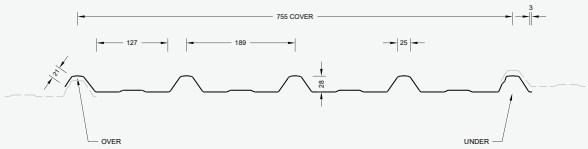
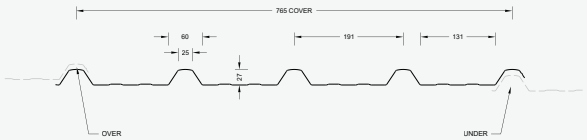
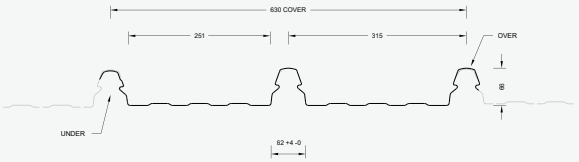
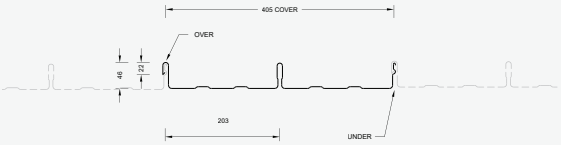
Contents

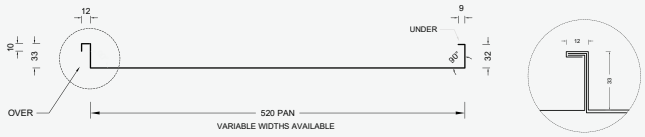
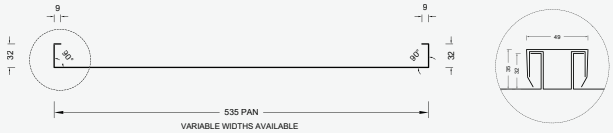
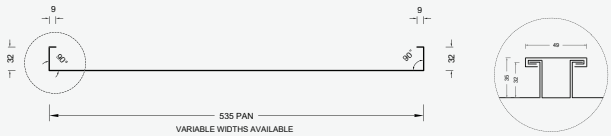
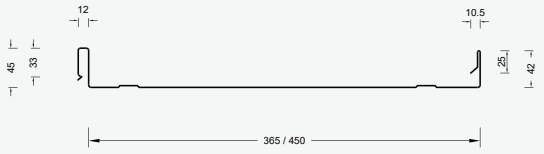
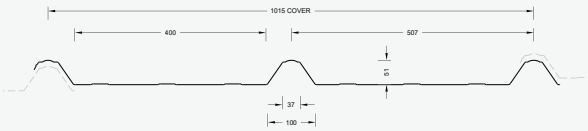
Dimond Roofing Profiles

Roof Profile	Steel BMT Thickness (mm)	
Steelspan 900 Manufactured in Hamilton	0.55 0.75	
Topspan Manufactured in Christchurch	0.40 0.55 0.75	
DP955® Manufactured in Auckland and Christchurch	0.40 0.55	
Brownbuilt 900 (BB 900) Manufactured in Auckland	0.40 0.55	
LT7® Manufactured in Wellington and Invercargill	0.40 0.55	
V-Rib Manufactured in Christchurch	0.55	
Corrugate Manufactured in Whangarei, Auckland, Hamilton, Wellington, Christchurch, Dunedin and Invercargill	0.40 0.55	

Dimond Roofing Profiles (cont'd)

Roof Profile	Thickness (mm)	
Veedek® Manufactured in Auckland, Hamilton, Wellington and Christchurch	0.40 0.55	
Styleline Manufactured in Whangarei, Auckland, Hamilton, Wellington, Dunedin and Christchurch	0.40 0.55	
HI Five Manufactured in Invercargill	0.40 0.55	
Dimondek® 630 Onsite roll form based in Hamilton	0.48 0.55	
Dimondek® 400 Manufactured in Auckland, Hamilton, Wellington and Christchurch	0.55 0.75	

Dimond Roofing Architectural Profiles

Roof Profile	Thickness (mm)	
Eurotray® Angle Seam	0.55 steel 0.9 al 0.7cu 0.7zn	
Eurotray® Roll Cap	0.55 steel 0.9 al	
Eurotray® Roll Seam	0.55 steel 0.9 al 0.7cu 0.7zn	
Heritage Tray®	0.55 steel 0.9 al	
Solar-Rib®	0.55 steel 0.9 al	

Profile span and curvature – quick guide

Product		Thickness BMT (mm)	Maximum Span				Minimum radius for drape curve (m)	Minimum radius for crimp or roll curve (mm)	Maximum overhang unsupported (mm)
			Restricted Access Roofing		Walls				
			End Span (m)	Internal (m)	End Span (m)	Internal (m)			
V-Rib Min pitch 4°	Steel (G550)	0.55	1.7	2.5	2.3	3.5	16	400	300
	Aluminium H36	0.9	1.4	2.1	1.9	2.9	16	N/A	250
	Duraclad®	1.7	0.8	1.2	1.2	1.8	20	N/A	150
Styleline/Hi Five Min pitch 3°	Steel (G550)	0.4	1.0	1.6	1.5	2.2	80	900	200
		0.55	1.5	2.2	2.0	3.0	40	400	250
	Aluminium H36	0.9	1.1	1.7	1.7	2.6	40	400	200
	Duraclad®	1.7	0.7	1.1	1.0	1.5	12	N/A	100
Veedek® Min pitch 3°	Steel (G550)	0.4	1.0	1.6	1.5	2.2	N/R	N/A	200
		0.55	1.5	2.2	2.0	3.0	N/R	N/A	250
	Aluminium H36	0.9	1.1	1.7	1.7	2.6	N/R	N/A	200
	Duraclad®	1.7	0.7	1.1	1.0	1.5	N/R	N/A	100
Six Rib Min pitch 4°	Steel (G550)	0.4	1.0	1.5	1.2	1.8	80	N/A	250
		0.55	1.5	2.2	1.6	2.4	40	N/A	250
Solar-Rib® Min pitch 3°	Steel (G550)	0.55	1.3	1.9	1.5	2.3	90	N/A	50
	Aluminium H36	0.90	0.8	1.2	1.0	1.5	90	N/A	50
Corrugate Min pitch 8°	Steel (G550)	0.4	0.8	1.2	1.0	1.5	12	450*	100
		0.55	1.0	1.5	1.2	1.9	10	450*	150
	Aluminium H36	0.9	0.8	1.2	1.2	1.8	10	450*	150
	Duraclad®	1.7	0.6	0.9	0.9	1.4	8	N/A	100
Dimondek® 630 Min pitch 3°**	Steel (G550)	0.55	2.4	3.6	N/A	N/A	250	N/A	250
Dimondek® 400 Min pitch 3°**	Steel (G300)	0.55	1.1	1.6	1.2	1.8	70	N/A	250
		0.75	1.5	2.2	1.3	1.9	70	N/A	300
	Aluminium H34	0.9	0.9	1.3	0.9	1.4	70	N/A	200
	Copper 1/2 Hard	0.55	0.9	1.4	1.0	1.5	70	N/A	200
Heritage Tray® Min pitch 3°	Steel (G300)	0.55	0.5	0.5	0.5	0.5	N/A	N/A	0
	Aluminium H34	0.90	0.5	0.5	0.5	0.5	N/A	N/A	0
Eurotray® Angle Seam Min pitch 3° Needs ply sub-strate	Steel (G300)	0.55	0.4	0.4	0.4	0.4	40	N/A	0
	Aluminium H34	0.9	0.4	0.4	0.4	0.4	70	N/A	0
	Copper 1/2 Hard	0.7	0.4	0.4	0.4	0.4	40	N/A	0
	Zinc	0.7	0.4	0.4	0.4	0.4	40	N/A	0
Eurotray® Roll Cap & Roll Seam Min pitch 5° Needs ply sub-strate	Steel (G300)	0.55	0.4	0.4	0.4	0.4	N/A	N/A	0
	Aluminium H34	0.9	0.4	0.4	0.4	0.4	N/A	N/A	0
	Copper 1/2 Hard	0.7	0.4	0.4	0.4	0.4	N/A	N/A	0
	Zinc	0.7	0.4	0.4	0.4	0.4	N/A	N/A	0
	Copper 1/2 Hard	0.7	N/R	N/R	500	500	N/R	N/R	N/R
Dimondclad Rib 20 & 50 Wall cladding only	Steel (G550)	0.4	N/R	N/R	0.9	1.4	N/R	N/A	100
	Aluminium H36	0.9	N/R	N/R	0.9	1.4	N/R	N/A	100

Product		Thickness BMT (mm)	Maximum Span				Minimum radius for drape curve (m)	Minimum radius for crimp or roll curve (mm)	Maximum overhang unsupported (mm)
			Restricted Access Roofing		Walls				
			End Span (m)	Internal (m)	End Span (m)	Internal (m)			
Steelspan 900 Min pitch 3°	Steel (G550)	0.55	2.9	4.3	3.3	5.0	120	N/A	450
		0.75+	4.0	6.0	N/A	N/A	120	N/A	600
	Aluminium H36	0.9	2.5	3.8	2.6	3.9	120	N/A	350
	Duraclad®	1.7	1.0	1.5	1.3	1.9	30	N/A	250
Topspan® Min pitch 3°	Steel (G550)	0.4+	2.0	3.0	2.3	3.5	N/A	N/A	250
		0.55	2.9	4.3	3.3	5.0	120	N/A	450
		0.75+	4.0	6.0	N/A	N/A	120	N/A	600
	Aluminium H36	0.9	2.5	3.8	2.6	3.9	120	N/A	350
	Duraclad®	1.7	1.0	1.5	1.3	1.9	30	N/A	250
DP955® Min pitch 3°	Steel (G550)	0.4	1.6	2.4	2.0	3.0	N/R	N/A	250
		0.55	2.7	4.0	2.9	4.3	70	N/A	350
BB900 Min pitch 3°	Steel (G550	0.40	1.5	2.2	1.9	2.9	N/R	N/A	250
		0.55	2.3	3.4	2.7	4.1	90	400	350
		0.75	2.7	4.0	N/A	N/A	90	N/A	500
	Aluminium H36	0.7	1.1	1.7	1.6	2.4	N/R	N/A	200
		0.9	1.9	2.8	2.8	3.7	90	400	300
	Duraclad®	1.7	0.8	1.2	1.4	2.1	24	N/A	200
LT7 Min pitch 3°	Steel (G550)	0.4	1.2	1.8	1.6	2.4	80	900	250
		0.55	1.9	2.9	2.3	3.4	50	400	350
	Aluminium H36	0.7	0.9	1.3	1.2	1.8	80	N/A	200
		0.9	1.5	2.3	1.9	2.9	50	400	300
	Duraclad®	1.7	0.8	1.2	1.3	2.0	24	N/A	200

This table is a quick reference guide on span and curvature limitations for all Dimond roofing and wall cladding profiles.

Crimp curved and roll curved roofing design

Combinations of curves and straight sections must be laid out on the roof to fit purlin locations where fastening and sheet end laps occur. Basic rules that govern the design are:

1. Straight tails on curves must span across at least two purlins.
2. Maximum length from curve to tail end is normally limited by transport and handling to 6m.
3. Roof Steps and laps must be in areas of roof pitch that meet the minimum pitch requirement for the profile.
4. A roof shape transition from convex to concave curves must have a straight section of at least 300mm located over a purlin to allow fixing.

Profiles and material available for crimp curved systems are

Profile	Material and BMT (mm)		Minimum Radius (mm)
BB900	Steel G300	0.55	400
	Aluminium H34	0.9	400
LT7	Steel G300	0.55	400
	Steel G550	0.40*	400
	Aluminium H34	0.9	400
V-Rib	Steel G300	0.55	400
	Steel G550	0.40*	400
Styleline/Hi Five	Steel G300	0.55	400
	Steel G550	0.40*	400
	Aluminium H34	0.9	400

*Note that 0.40mm LT7®, V-Rib, Styleline and Hi Five are not recommended for crimp curving to a radius greater than 900mm

Profiles and materials available for roll curved systems are

Profile	Material and BMT (mm)		Minimum Radius (mm)
Corrugate	Steel G300	0.55	450
	Aluminium H34	0.9	450

Recommended Curve Radius

Minimum Radius

The minimum curve radius for each profile is restricted by the appearance of the roof sheet. As the radius is reduced the "pan" of the profile will begin to exhibit compression ripples that will detract from a clean appearance, and eventually reach a level that is generally regarded as unacceptable.

The minimum radius given below for each profile, together with the purlin spacing recommended for use at the minimum radius, will ensure the clean appearance of the drape curved roof with minimal ripple effect. Specific aesthetic requirements for drape curved roofing must be discussed with Dimond at the design stage.

Maximum Radius

The maximum curve radius for each profile is restricted by the need to have the selected profile roof-sheeting reach its minimum recommended pitch at the gutter line for the profile used. This restriction ensures large radius "flat" roofs are not used. In addition, the maximum radius limitation and profiles given below for Corrugate profile ensures that water catchment on the low pitch area of the curve will not overfill the profile valleys due to inadequate run-off.

Profiles and material available for crimp curved systems are

Recommended Profile	Recommended Radius					
	Minimum (m)					Maximum (m)
	G550 Steel		H36 5052 Aluminium	Natural Lighting	Duraclad®	
	0.40mm	0.55mm	0.90mm	1.4mm	1.7mm	
Corrugate	12	10	10	5	8	Note 1
V-Rib	20	16	16	14	20	Note 2
Styleline/Hi Five	80	40	40	9	12	Note 2
LT7®	80	50	50	14	24	Note 2
Dimondek® 400	N/A	70	70	18	N/R	Note 2
BB900	N/R	90	90	14	24	Note 2
DP955®	N/R	70	N/A	70	70	Note 2
Steelspan 900	N/A	120	120	18	30	Note 2
Topspan®	N/R	120	120	18	30	Note 2
Dimondek® 630	N/A	250(Note 5)	(Note 6)	250(Note &)	N/A	Note 2
Super Six	N/A	N/A	N/A	18	30	Note 2
Six Rib	30	22	N/A	6	6	Note 2
Solar-Rib®	N/A	N/A	N/A	N/A	N/A	N/R
Heritage Tray®	N/A	N/A	N/A	N/A	N/A	N/R
Eurotray® Angle Seam	N/A	N/A	N/A	N/A	N/A	N/R
Eurotray® Roll Cap	N/A	N/A	N/A	N/A	N/A	N/R
Eurotray® Roll Seam	N/A	N/A	N/A	N/A	N/A	N/R

Note 1: Maximum radius for Corrugate is determined by the maximum run of roof that is below the minimum pitch, measured from the apex, shall not exceed 5m. Maximum radius may be further restricted by the criteria in Note 2.

Note 2: Maximum radius determined by the need for the roof pitch to reach the minimum requirement for the profile at the gutter line. Maximum radius will therefore depend on the building width.

Note 3: For the recommended maximum purlin spacing, the unrestricted access roof purlin spacing should be used to achieve a smooth curve.

Note 5: DD630 is also available in 0.48mm thick steel and will achieve the same radius as 0.55mm steel.

Note 6: For the radius on aluminium, please call Dimond to discuss.

Note 7: DD630 Natural lighting sheets are not intended for use by themselves and must have support on the side lap from the steel sheet.

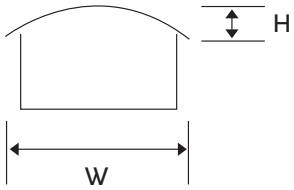
Note 8: Check suitability.

N/R = Not recommended; N/A = Not available

Radius of Curved Roofs

The formula to determine the radius of a curved roof is:

$$\frac{W2 + 4(H2)}{8H}$$



Pitch Calculations

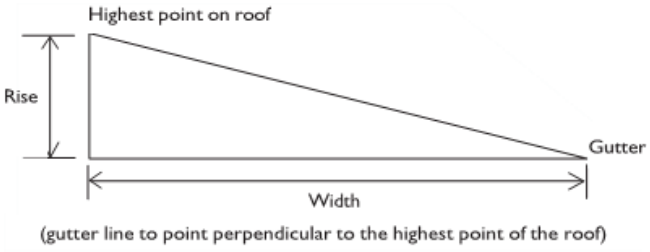
To determine pitch when building width and rise is known. Where the ridge is in the centre of the building:

Divide half the building width by the rise

E.g. Building width is 10m
Rise 0.882mm
Pitch = 5 ÷ 0.882 = 5.669m
= 6m (rounded)

Look at the ratio column in the Factors Table to determine the closest number e.g. 1:6, Pitch is 10º

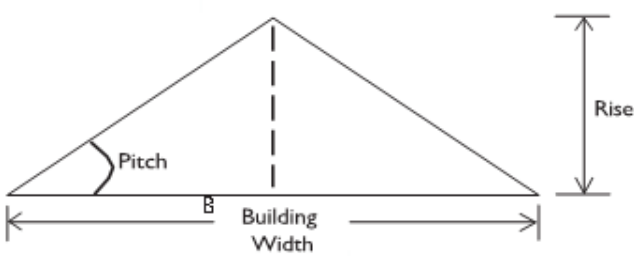
Where the ridge is not in the centre of the building width (e.g. monopitched or uneven pitched roofs) the number to be divided by the rise is the measurement from the gutter line to a point perpendicular to the highest point of the roof.



Factors Table	
Pitch (degree)	**Ratio**
1	1:60
1.5	1:40
2	1:30
2.5	1:25
3	1:20
4	1:15
5	1:12
8	1:7
10	1:6
12	1:5
15	1:4
20	1:3
25	1:2
30	1:1.75
35	1:1.5
40	1:1.25
45	1:1

Rafter and Rise Calculations

By using the Factors Table below you can determine the length of the rafter and the rise of the roof if you know the building width and pitch.



To determine rafter length, hip length or rise. Take half the building width and multiply it by the rafter, hip or rise factor from the table, for the given pitch.

E.g. Building width 10m (eaves gutter to eaves gutter), pitch is 10º

Rafter	=	5m x 1.0154 (factor)	=	5.077m
Hip	=	5m x 1.4252 (factor)	=	7.126m
Rise	=	5m x 0.1763 (factor)	=	0.8815m

Factors Table		Factors		
Pitch (degree)	Ratio	Rafter	Hip or Valley	Rise
1	1:60	1.001	1.4142	0.0175
1.5	1:40	1.003	1.4144	0.0262
2	1:30	1.006	1.4146	0.0349
2.5	1:25	1.009	1.4149	0.0437
3	1:20	1.0014	1.4152	0.0524
4	1:15	1.0024	1.4159	0.0699
5	1:12	1.0038	1.4169	0.0875
8	1:7	1.0098	1.4212	0.1405
10	1:6	1.0154	1.4252	0.1763
12	1:5	1.0223	1.4301	0.2126
15	1:4	1.0353	1.439	0.2679
20	1:3	1.064	1.460	0.364
25	1:2	1.104	1.489	0.466
30	1:1.75	1.154	1.528	0.577
35	1:1.5	1.221	1.578	0.700
40	1:1.25	1.305	1.644	0.839
45	1:1	1.414	1.731	1.0

Crimp curved sheets

- Machine crimped across the profile pans. Each crimp deforms the sheet to a fixed angle and the radius required for the curve is achieved by altering the crimp spacing.
- G300 steel is generally used for 0.55mm thickness.
- G550 steel is used for 0.40mm thickness in the Styleline, Hi Five, V-Rib and LT7® profiles to a maximum radius of 900mm. Larger radius curves have a risk of splitting the 0.40mm material due to fatigue at the crimps resulting from sheet deflection.
- H34 aluminium (5005 or 5052) in 0.90mm thickness is available for the Styleline, Hi Five, BB900 and LT7® profiles.

Roll curved sheets

- G300 steel or H34 aluminium (5005 and 5052 alloys) in Corrugate profile is available to a minimum radius of 450mm and a maximum radius of 12m.
- Roll curved sheets are limited to a 4.5m tail length for ease of handling and transportation.

Curved flashings

Two-piece lock-seamed flashings are recommended to finish curved edges in a smooth line. Crimped flashings are not recommended for aesthetic reasons.

Curved roofing installation

Installation recommendations for straight sheets apply together with the following additional requirements for all curved roofing systems.

Framing and fasteners

It is critical to the fitting and the final appearance of curved roofing that the purlin and/or girt framing is located true to line. The installer should not fit the sheeting to out-of-line members. A recommended tolerance from the true purlin alignment is ±5mm. The tighter the tolerance, the better the final appearance will be.

Dimond recommend fitting a trial crimped or roll curved sheet to the purlins before the order is run, to check the curve fits the framing. An allowance of an extra 2 weeks should be built into the lead time to allow for this.

For the Drape Curved Roof Systems the framing member stiffness and attachment to the primary structure and the sheet fasteners must be adequate to resist the loads induced by the force required to hold the sheets in place. All drape curved sheets should therefore be screw fixed. Fasteners for crimp curved as for straight sheets.

There shall not be any part of the curved roof section or any part of the roof that does not have fall, that could allow ponding to occur. This is critical at the top of curved sheets where the roof pitch is level. If necessary purlins may need to be closed up in this region to give support to the roof and avoid ponding. On areas of curved roof below the profile minimum pitch, an additional 3mm thick (min) side lap seal tape or bead of silicone sealant should be applied continuously on the top of the underlap rib, before the next sheet is laid over the underlap rib. Flashing must be fabricated and fitted to follow an even curve of the profile, without obvious humps.

Sheet termination

Ends of sheets that are under head flashings and stop-ended must not terminate at zero or negative pitch. To ensure this does not occur it is recommended that the design is based on sheet termination at a roof pitch at least to the minimum pitch for the profile used.

Roof profile flow capacity

Theoretical calculation has shown that apart from Corrugate and V-Rib, all other Dimond roofing profiles are capable of accommodating the water from the most intense downpours (200mm/hr), even where total roof runs (ridge to gutter) reach 200m. For more profiles, refer to the New Zealand Metal Roof and Wall Cladding Code of Practice, Section 7.

The lower rib, multi channel profiles Corrugate and V-Rib, have the following capacity restrictions for the total run of roof.

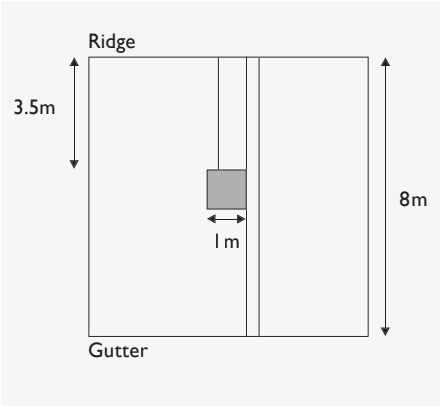
	Max Channel length (m)	Channel width (mm)
Corrugate	25	76
V-rib	80	101.6

(These are the recommended maximum lengths (from ridge to gutter) of the water channels to avoid side lap leakage.)

Where water flows are interrupted (e.g. penetrations, or where water is accumulated and deposited from an upper roof onto a lower roof), care must be taken to calculate the total length of channel within the catchment area that will be diverted to one roofing channel. This calculated length must then be added to the length of channel (ridge to gutter) the water will be diverted into. The total length must not exceed the calculated capacity (maximum channel length) of the profile used. Where it is anticipated that the profile capacity will be exceeded (thereby causing a risk of water flowing under the side flashing), steps must be taken to divert the water flow to a greater number of channels, or select a profile that can better handle the anticipated water flow.

When using all other Dimond profiles, please contact Dimond if the anticipated catchment area (channel length) exceeds 200m.

E.g. where a penetration interrupts the water flow on Dimond Corrugate.



Width of penetration.	1m
Divided by the width of a Corrugate channel.	76mm
	1 ÷ .076mm =13.15 channels

Take half this number as only 1/2 the catchment area will be diverted into the channel beside the penetration.	7 channels
Multiplied by the run of roof from ridge to the back of the penetration.	7x 3.5m = 24.5m
Add the length of one full channel (ridge to gutter), as this channel will carry the water collected from behind the penetration to the gutter.	+ 8
	= 32.5m

As the total amount of channel behind the penetration plus one channel from ridge to gutter exceeds the recommended maximum length of Corrugate channel, the water behind the penetration will need to be diverted into more than one channel to avoid the possibility of side lap leakage, or an alternative profile chosen.

Lineal Metre Conversion (m)

Width x Thickness (BMT) (mm)	ZinaCore™	MagnaFlow™	AlumiGard™	ZINCALUME®	MAXAM™
1221 x 0.55	180	175	N/A	183	178
1221 x 0.40	242	234	N/A	248	240
1200 x 0.55	182	178	N/A	186	181
940 x 0.55	233	227	N/A	238	231
940 x 0.40	313	304	N/A	322	311
610 x 0.55	359	350	N/A	365	356
380 x 0.55	630	613	N/A	586	572
375 x 0.55	583	569	N/A	795	769
1220 x 0.90	N/A	N/A	338	N/A	N/A
1220 x 0.70	N/A	N/A	434	N/A	N/A
1220 x 0.90	N/A	N/A	343	N/A	N/A
940x 0.90	N/A	N/A	438	N/A	N/A
940 x 0.70	N/A	N/A	563	N/A	N/A
610 x 0.90	N/A	N/A	675	N/A	N/A
375 x 0.90	N/A	N/A	1098	N/A	N/A

*Note: All yields are approximate only. No allowance is made for BMT or metallic coating tolerances. BMT= Base metal thickness

Purpose of use

The following is made as guidelines to be used when inspecting Dimond® Roofing and wall cladding systems during the installation process and the Installation is consistent with the NZMRM Code of Practice.

Refer NZMRM Code of Practice for additional information.

Dimond® Metal roof and wall cladding should be installed as explained in this section to comply with the NZBC and to satisfy warranties.

Installers need to check that they are using the most up-to- date version of the Guide before you start construction.

This installation guide satisfies New Zealand Building Code compliance requirements regarding Installation of metal roofing and cladding.

Product selection

The profile must be suitable for the strength requirements of the building, and appropriate for the minimum pitch, and the material selected must be suitable for the environment and be compatible with adjacent building materials.

As paint formulations from different suppliers may have different performance characteristics, it is important that cladding and accessories are supplied from the same manufacturer as differing weathering characteristics may result in visible variance in appearance.

Aluminium requires special installation details to achieve durability.

Pre- installation

The roofing contractor or supervisor must inspect a set of consent drawings and specifications for fixing the cladding, before starting to install metal roof or wall cladding. Any decisions departing from it should be agreed on and written confirmation signed before work begins.

Where specific details are not drawn, the roofer and the main contractor should agree on the execution of these details before commencement.

The roofing contractor is required to have safety provisions in place that satisfy the Health and Safety at Work Act 2015 before work is commenced.

The supporting structure should be inspected; the purlins and girts should be checked to see they are in a true plane (NZS3604 HB 1.3 Tolerance) and securely fixed, all trimming completed for penetrations, and any work by other trades is completed.

Where roof and wall cladding intersect with other materials, the sequencing of work and responsibilities for weatherproofing must be agreed with the main contractor prior to installation.

Roofing and Cladding Sheets Supporting Structure

Roofing and wall cladding sheets should not be installed until the roofing contractor is satisfied that the support structure is complete, sound, and correctly aligned. This includes support around penetrations and openings.

Purlin and girt spans both end and internal spacings must be in accordance with Dimond recommendations for profile, metal type and thickness, as well as the expected level of foot traffic. If in doubt, check.

Curved roofs (whether draped/rolled or crimped) require purlin alignment within ±5mm to minimise the risk of unacceptable finished appearance.

Spacers must be fixed to steel purlins to allow insulation to fit between and to create a 25mm air gap between underlay and insulation. Do compress the insulation.

Where the building is under the scope of E2/AS1 there is a requirement to install horizontal wall cladding onto a cavity batten system to achieve a 20mm air space between the back of the cladding and wall framing on all walls in accordance with NZBC E2/AS1. Dimond profiles that come within the scope of E2/AS1 are: Corrugate, Styleline, Veedek®, DD400 and V-Rib.

Vertical run cladding does require a cavity batten system on all insulated walls and where the cladding is installed over RAB board or sheet panel products to allow ventilation to the back side of the profile.

Sheet Layout

Firstly, the sheet should show no signs or evidence of transport damage or storage damage including wet storage effects. If the sheets are damaged they must not be fixed down, and the Dimond supplying branch should be informed as soon as possible.

Care should be taken to ensure sheets are laid parallel to the lines of building ends, and perpendicular to ridges and gutters. If possible, the direction of laying should be such that the sheet side laps face away from the prevailing wind direction, or, in the case of wall cladding, away from the most common line of sight.

Side laps must be properly engaged such that the overlap rib fits correctly over the underlay without obvious gaps or insufficient cover.

Roofing sheets should run continuously from ridge to gutter, avoiding end laps. Long lengths separated for thermal expansion or handling reasons should join at a step in the roof. Where end lapping of straight and curved sheets cannot be avoided, a correctly formed 150mm minimum sealed lap is required, with a bead of neutral curing silicone sealant each end of the lapped sheets.

Sheet ends should form an even line (within a workable tolerance) and roof sheeting should overhang into gutters by at least 50mm and must allow clearance to enable ease of gutter cleaning.

Fastener selection

All cladding fasteners must be compatible with the material, suitable for the environment and a durability equivalent to that of the cladding material. All exposed fasteners must have a minimum durability of Class 4.

Only aluminium or stainless steel screws and washers should be used on pre-painted aluminium roof and wall cladding.

Stainless steel fasteners must not be allowed to come into contact with the cladding and should be installed through oversize holes.

Measuring

Measuring should take place once sufficient structure is in place to enable accurate calculation of lengths required. It is beneficial to make more than one measurement of any run to identify discrepancies and avoid errors.

Ordering

Cladding materials should be ordered with enough time to allow for manufacture and transport. Profile, thickness, colour, grade, and any requirements for labelling of bundles should all be clearly identified.

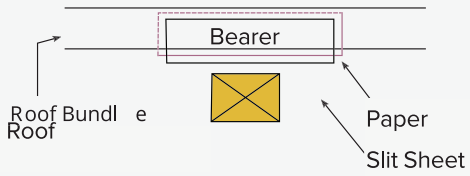
Transportation

Load safety and protection is primarily the driver's responsibility.

Short sheets should be packed on top of longer ones, which should have end and edge protection to avoid cut-end damage to the sheets below them. Dunnage should be evenly spaced in vertical alignment. Bundles must be placed and secured to protect against damage from other materials.

For sheets that are exposed on the underside in situ, such as for unlined wall cladding applications, or have double-sided or fleece-lined coatings, protection must be given to prevent the dunnage from damaging the bottom sheet. This is normally achieved by the application of a short slip sheet with paper overlay.

Slip sheet with paper overlay



On longer distances, extra protection or packaging may be required to protect the material from fretting during transport.

For longer lengths, when a long boom is required for off- loading, a suitable boom should accompany the load unless otherwise arranged.

Accepting delivery

Check the delivery to make sure you have the right product, delivered in prime condition. Do not mix products, because different manufacturers use different paint formulations.

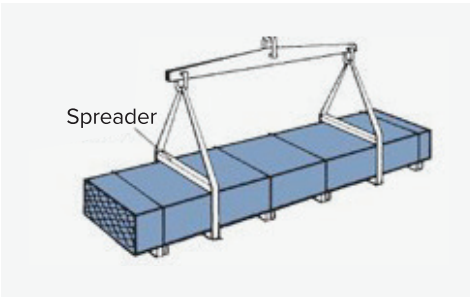
Where different brands of pre-painted material are used on the same building, differences in colour, gloss, and weathering performance may appear clearly visible within a short time.

Ensure all components needed to complete the installation, including fasteners and accessories, are onsite before commencing installation.

Unloading

Set out a flat area and supporting dunnage to ensure sheets will not be damaged by site debris.

When unloading by crane, ensure the lifting boom has a spreader bar and that tightening strops do not damage sheet laps. Slings or strops should be nylon with sleeves to prevent fraying or cutting and damaging slings. Single slings and chains should not be used to lift packs of cladding.



Sling with spreader bar

When unloading by hand, lift each sheet off the stack without sliding over under sheets, as that may cause damage to the paint.

The person receiving the roof is responsible for identifying a safe and convenient landing point for the load, in association with the main contractor. The mobile or truck mounted crane operator has the duty of declining any loading instruction which he deems unsafe.

Bundles or packs of roof cladding must remain banded when being lifted by a crane.

They must be placed adjacent to the portal frame and not mid-span on the purlins. Bundles must be placed so that their weight is spread over the entire area of the roof and should be positioned with the laps in the direction of laying.

Workers receiving a bundle of roof cladding on the roof must have sufficient mobility to avoid the load, and use tag lines to control the swinging of the load while it is out of reach.

Packs must be securely fixed to the structure, and part-packs must be re-fixed at the end of every day.

Wet storage damage

Close stacked sheets may deteriorate quickly if water enters the pack. This happens because the metal exposed to moisture without air forms bulky, unstable, and loosely adherent, hygroscopic compounds.

When wet sheets are delivered or they get wet in storage, they must be used immediately or dried. Sheets can be dried by filleting sheets or cross stacking them on a slope to allow water to drain and air to circulate between the sheets.

Only use a dry, well-ventilated environment for long term storage.

Failure to follow these handling and storage precautions could result in spoiling the surface appearance of the products and severely reducing their service life. On galvanised material this will appear as a white corrosion product (white rust); on Aluminium/Zinc steel the corrosion shows up black. On pre-painted steel, the result of wet storage damage could be a bubbling of the paint surface. Damage resulting from such failure invalidates the warranty.

The extent and severity of wet storage stain is usually proportional to the length of time the sheeting has been wet. In the case of superficial attack, exposure to the atmosphere and careful cleaning will sufficiently reduce surface imperfections, but heavier deposits can damage the sheets enough that they require replacement.

Where it is likely that the roof or wall cladding will be stored on site for more than one week before installation, the contractor (or person responsible for doing ordering material) should consider including waterproof packaging from the manufacturer in the order.

Site safety

Installation of roofs presents many hazards including laceration, electrocution, puncture, and falling from a height. Prudent Personal Protective Equipment (PPE) and installation practices must be employed, and the guidelines of Worksafe: Working at Height in New Zealand must be followed.

Refer NZMRM Code of Practice.

Handling

Don’t handle any roofing products roughly or carelessly; roofing products perform best when handled correctly.

Don’t drag or slide new sheets over other sheets or rough surfaces.

All equipment and materials taken on to the roof should be clean and care taken to prevent damaging the surface.

Walking on roofs

It must not be assumed that it is safe or permissible to stand on any roof structure or roof cladding.

The manufacturer of the roof sheeting must provide technical literature stating the point load limitations of the profile. The information must indicate the positions on the sheet where persons may safely walk or stand without causing damage or, alternatively, indicate the necessity to provide temporary walkways.

For roofs tested in accordance with NZMRM testing standards refer NZMRM Code of Pratice.

Restricted Access roof will withstand a 100 kg point load applied to the rib or over two pans.

Unrestricted Access roof will withstand a 100 kg point load to a single rib at mid span.

It must be taken into account that a worker laden with tools may weigh more than 100 kg, and impact loads can also contribute to exceeding this limit.

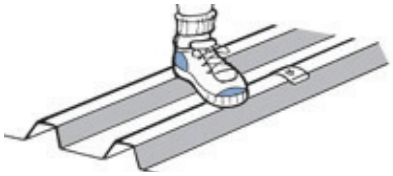
When access to the roof is necessary after construction, it is best practice to in the pan of the profile when walking up the roof, and follow purlin lines when traversing roofs.

Walking in the pan

if ribs are too close together, so workers cannot place their feet in the pan, their weight must be spread evenly over at least two ribs when walking up the roof.

Spreading weight over two ribs

Translucent sheeting must not be walked on unless it is designed specifically for that purpose.



Footwear

Anyone walking on the roof should wear flat rubber-soled footwear to prevent marking.

Put an old mat or piece of carpet at the base of the ladder so that shoes can be cleaned before going up on the roof, or dirty shoes should be removed and replaced at base of the ladder.

Care should be taken walking on roofs as they may be slippery at times.

Strippable films

Strippable film is a clear pressure sensitive polyethylene plastic film that is applied to some roofing products to assist in protecting the surface from damage and scratching during forming, transportation, handling, storage, and erection.

Strippable film is designed to provide some protection to the product before and during installation on the building. It is not designed to protect against corrosion, humidity, or chemicals.

Once removed from the sheet for installation, strippable film must be collected and removed from the site.

Storing product with strippable film

Product with film applied must be stored at temperatures of less than 50°C and out of direct sunlight to avoid prolonged UV exposure.

The product needs to be kept dry to prevent moisture ingress between the film and the painted surface. In the long term moisture ingress may cause issues to the painted surface; and in the shorter term cause the film adhesive to whiten and breakdown, leaving residue on the painted surface when the film is removed.

Double lapping

Sheets should not be laid with a double lap, as this can cause accelerated corrosion in the lap area. If the remaining area of a roof or wall section to be covered is less than a standard sheet width, the sheet should be cut lengthwise to fit the gap. Similarly, when replacing a roof without removing existing flashings, for example apron or chimney flashings behind cladding, the area of the retained flashing should be reduced by cutting back to the minimum practically achievable.

If a roof sheet lap requires extra protection, for instance when over the apex of a barrel curved roof where pitch is less than the minimum stipulated for the product, laps should be sealed rather than double-lapped. Lap tape is preferred over gunned sealant for this purpose, as it is less likely to become displaced while positioning the sheet.

The line and first sheet then become locators for quick placing and aligning of subsequent sheets. However, periodic checks should be made during installation of each roof area, by measuring across the width of the fastened sheeting, at the top and again at the bottom of the sheet run. If the building is not square, then tapered flashing is required. Fanning or stretching of the sheet is not permitted to allow for building that is not square.

Marking and cutting

Black lead pencils must never be used for marking aluminium/ zinc unpainted or pre- painted steel products. The carbon in the pencil promotes corrosion which will etch the surface of the material, leaving a permanent mark. Use a pencil of any colour other than black, a marker pen, or crayon.

Cut pre-painted steel material with care to avoid marring the high-quality finish. Cut by shear only – use nibblers or hand shears.

Friction blades and high-speed saw blades must not be used on metal cladding. These blades will damage both the metallic coating and the pre-painted steel surface by creating excessive heat, and generate large amounts of hot swarf which will get embedded into the coating surface.

All debris must be swept off the job at the end of each day. Prevention of swarf damage is far easier than its cure.

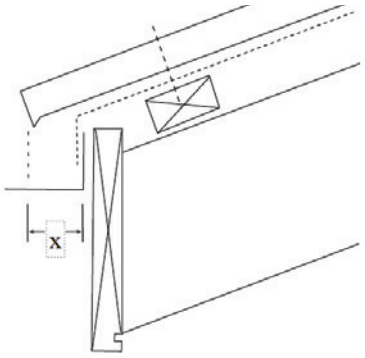
Refer NZMRM Code of Practice.

Overhang

The length of the overhang of sheeting into a gutter or spouting depends on the pitch of the roof and the site exposure to wind and rain.

The minimum overhang for roof cladding with a pitch between 10° and 35° is 50 mm, and 40 mm is regarded as suitable for a roof above 35°. When the ends of the ribs are baffled by a spouting and the pitch is below 10°, the overhang should be increased to 60mm minimum.

When the ends of the ribs are not baffled by a spouting and the pitch is below 10°, the overhang should be increased to 70mm to avoid blow-back.



Minimum overhang
x = 50 mm @ 10–35°
x = 40 mm @ >35°

x = 60 mm @ <10° and where ends of ribs baffled by gutter
X = 70 mm @ <10° and where ends of ribs not baffled by gutter

Underlay must not overhang the gutter line by more than 20 mm, or if eaves flashings are used, terminate on the upper side of the flashing.

Apply two beads of sealant close to each edge of the joint. Align pieces together and fasten with rivets at 50 mm centres.

Sealing and joining

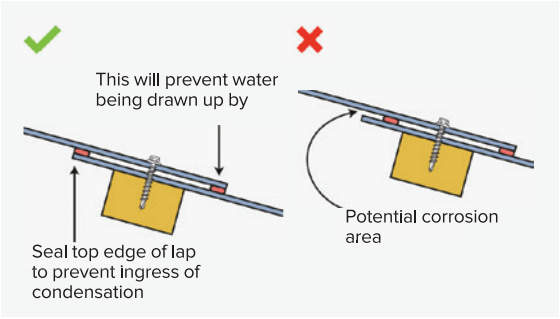
Soldering cannot be used on aluminium-zinc materials; use only neutral cure silicone rubber or MS polymer sealants. Pre-align the pieces to be joined and pre-drill if possible. Thoroughly clean off surplus sealant and swarf using a dry, lint-free cloth or plastic scraper.

Sealing end laps

End laps in profiled metal roofing should be avoided where possible. When unavoidable, the end lap of should be sealed with a double bead of sealant as in the illustration below.

Alternatively, self- adhesive closed cell tape can be used in the same position.

Sealed end lap



Side laps

Side laps should be fitted evenly and snugly without excessive gaps or tension. Sheets exhibiting edge wave should be reported to the supplier immediately. Where a sheet width exceeds the distance to the next architectural feature, it should be slit to width; not given multiple overlaps to decrease its effective cover width.

Fasteners

The durability of fasteners should equal or exceed that of the material being fastened, and the fastener metal or coating must be compatible with the cladding material if in contact. Fasteners used pre-painted steel products should be factory colour matched before installation.

Screws

Screw fasteners should be long enough to give adequate penetration into the supporting structure. Generally, 30 mm embedment is required for screws into timber or three threads engagement for screws into steel.

Refer to roofing manufacturers for recommendations.

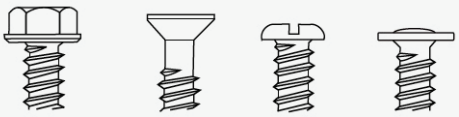
FASTENERS SHOULD BE:

A minimum of Class 4 for Severe Environments, Class 5 for Very Severe Environments;
Manufactured and coated with materials compatible with the material being fastened;
Fitted with low carbon, non-conducting sealing washers; Profiled washers should have an EPDM sealing washer

Screw types:

Type 17 Drill Self Piercing Self threading

Screw heads:



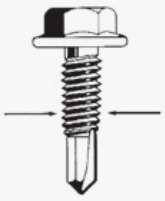
Hexagon Countersunk Pan Wafer

Screw thread types

Gauge Nominal Shank Diameters mm

6	2.5
8	3
10	3.5
12	4.1
14	4.8

Screw gauge



Threads per inch (tpi).

Screw fasteners are identified by their length, gauge pitch (threads per inch) and their drill point. The drill point may be type 17 for driving into timber or drill point for driving into steel. Reduced diameter drill points, which can be used for either function, are also available.

Clip fasteners

Secret-fixed roofs will be attached to the primary structure by a proprietary clip that is screwed or nailed to the purlins. These profiles offer the advantages of fewer penetrations through the cladding, and thermal expansion is unimpeded.

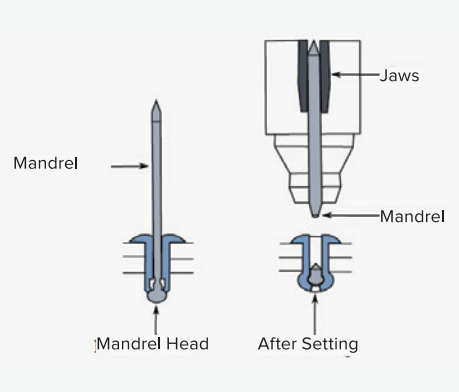
Clip and bracket fasteners can be purpose made to provide the same attributes to most flashings.

Rivets

Rivets should have a minimum diameter of 4 mm.

Use aluminium rivets for galvanised sheets and aluminium/ zinc-coated steel products; monel rivets are incompatible with aluminium and zinc products.

Sealed rivets are preferred over unsealed rivets, as they do not require adding sealant on the face to achieve weatherproofing.

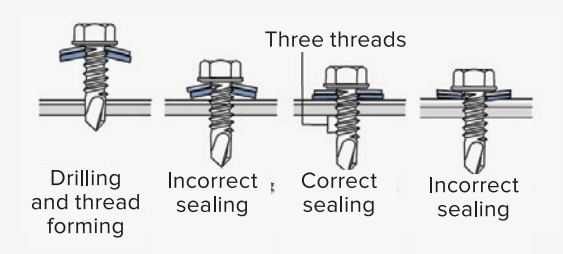


Rivet setting

Blind rivets are placed through a pre-drilled hole then are set by rivet tool withdrawing the mandrel. This expands the rivet pin, clamping the material between the rivet pin and the rivet head. The pin eventually snaps free.

Fastener installation

The correct depth setting on a screw gun is provided either by the depth gauge or by a clutch torque adjustment, and an adjustment should be made every time a different screw or material thickness is to be drilled. Resilient washers under fastener heads will only seal properly with the right adjustment.



Experienced operators can, in most instances, drive screws correctly by using a variable speed screw gun; however, a depth set gun will give more consistent results.

Type 17 screws driven into timber will 'part' the fibres rather than cutting them which provides a self-locking action against withdrawal. Screws driven completely through timber will, therefore, not have the same pull-out resistance as screws with embedded tips.

Impact drivers and poorly fitting nut drivers can both damage the protective coating on the screw head which will affect durability. It is the roofer's responsibility to ensure the method of installing screws does not cause damage.

Screw points, method of driving, and thread design all have an impact on pull-out capacity; so in critical situations, the specific screw and method of installation must be specified.

Sheet must be fastened to every purlin (or girt) to transfer outward loads evenly to every structural member. The screw and washer system used should meet specification requirements and have a durability to at least match that of the sheeting, and be in accordance with Dimond literature for that profile.

Concealed clips used to fasten Dimondek® 400, Dimondek® 630 and Eurotray® profiles must not exhibit screw or nail head protrusion such that damage to the roof sheet and coating may result.

Whenever oversize holes are required to accommodate expansion, profiled washers and seals must be used.

Profiled washers and seals should be used whenever specified to provide extra wind uplift capacity.

Note should be made to ensure there are sufficient fasteners, evenly distributed. In particular the perimeter zones of roofs, where maximum wind uplift occurs, must have sufficient fasteners.

No areas on the roof should hold water that will cause ponding long term. The structure may require realignment and if the profile is damaged, this should be replaced.

Fastener spacing

Fasteners should be of grade and type suitable for the application, installed at spacings required by design loads and manufacturer's recommendations.

On buildings constructed to NZS 3604, a consistent fixing pattern should be used on all fastener rows; for other buildings, higher fastener density may be required around the periphery. All purlins must be fastened to so that they each contribute to resisting uplift loads.

Rivets on flashings should be placed at 50 mm centres.

Flashing should be fastened at a point between 25mm and 50mm from the edge of the flashing and the maximum primary fastener spacing should be 600 mm. When this is not possible because there is no structure member provided, they should be fixed at a maximum 200 mm centres.

Refer NZMRM Code of Practice.

Fastener placement

Roof fasteners should be placed at the crest of the profile. Wall cladding fasteners can be placed at the crest or the pan. Pan fixing of wall cladding is more popular as the screw lines are less visible.

N.B. The pullover design values established by testing for pan fixing are more than twice those for crest fixing.

Fastener seating

Fasteners should be seated snugly to give a good seal, without distorting the roofing profile.

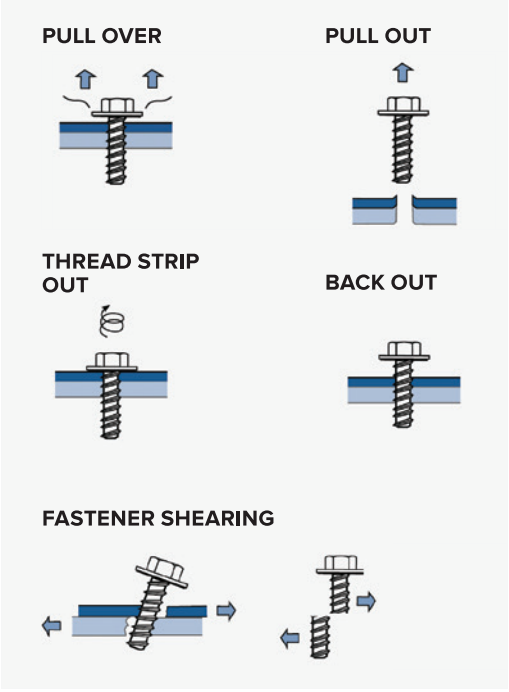
Any "pigtails" created by the drilling process must be removed before seating the screw.

Fastener allowance for expansion

Modes of fastener failure

On most pierce fixed roofs, mode of failure is likely to be pull- over. Where profiled load spreading washers are required to eliminate this, it is important that the specified washer is used. When fastening to light gauge steel purlins, thread strip out may be the lower failure point.

The pull-out failure point is very dependent on drill point, thread shape, and pitch; it is essential in such cases to use a correctly specified fastener.



Washers

Profiled washers match the rib shape and fit over the ribs of the roofing profile. They are used for two purposes.

1. To provide an acceptable area of seal around the oversize holes drilled in the sheet material to allow for thermal expansion of the sheet.
2. To provide load-spreading capability at the fastener point when sheet material is used under high load or long span conditions that cause the load per fastener point to exceed guidelines.

To fulfil either or both of these functions the recommended washer components are:

- Dimond profiled metal washer – pressed from 0.95mm Zincalume® or 1.2mm aluminium and painted for colour match and corrosion resistance if required. Each sheet profile has a specific profiled washer.
- EPDM (ethylene propylene diene monomer) seal washer – round seal used to fit all sheet profiles. Available in 19mm, 25mm and 36mm diameters for use under profiled washers. Manufactured from EPDM type rubber. It is important for the long term durability of the Zincalume® substrate that the carbon black fillers in the sealing washers and neo seals contain less than 15% by volume or 25% by weight of carbon. All washers and neo seals supplied by Dimond meet this requirement.

Use of other washer components may be satisfactory, but their suitability for use must be checked against the two criteria above.

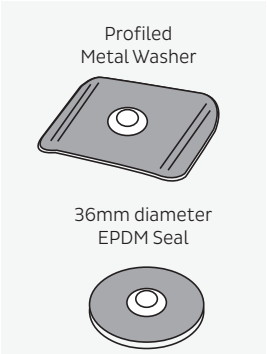
Round washers

Dekfast round embossed washers (with the seal incorporated with the washer) are primarily used on wall cladding to provide:

An acceptable area of seal around the fixing screw to allow for thermal expansion of the sheet where fixed in the cladding pin.

Load spreading capability at the fastener point of the cladding material when fixed in the pan under high load.

Available in 19mm and 25mm diameter.



Decking clips – double

Used to secure decking profiles such as Dimondek® 400 by pushing the profile down onto it until it clicks into place. The clip is fixed onto the roof structure with 2 wafer head screws.

The double clip is designed to fix over the previously laid male under rib and centre rib of the sheet to be laid.

Clip material

Usually manufactured from either

1. As standard unpainted 1.15mm thick coil with galvanised coating to 275 g/m^2.

   or

2. Coated for increased durability. Nylon coated over galvanised. Colour may vary between Bright blue or light grey depending on supply. During a salt fog test after 2000 hours this coat showed no sign of degradation. Must be used with Aluminum roofing. When a nylon coating has been applied to a clip the head of the screw fastener is to be painted with PA10 or similar after the clip is installed.

   or

3. Other material, such as brass clips to suit a copper roof, can be manufactured to customer order. The brass is 1.2mm thick and is 1/2 hard brass.

Continuous clips

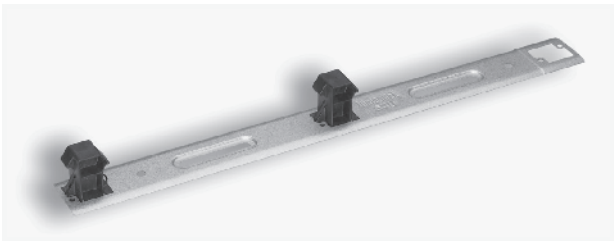
The innovative continuous metal strip with plastic clip is 1 sheet wide and holds 3 ribs of Dimondek® 630 down.

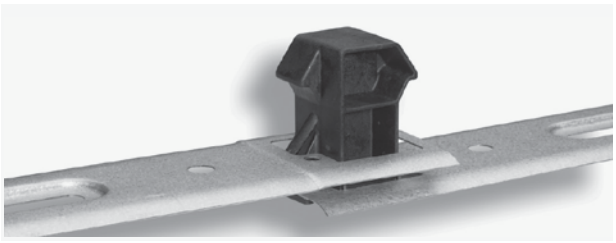
It is interlocked with the previously laid clip, thereby controlling the sheet creep and avoiding an increase in profile cover width.

The Dimondek® 630 perimeter clip must always be used over the last rib and clip on the last laid sheet, or on any part of the roof where wind loads exceed 1.6 kPa.

Used only with the Dimondek® 630 profile, the clip is screw fixed onto the roof structure after laying and interlocking with the previous clip. This also allows the building paper to be secured, prior to the laying of the roof. The roof profile is then fully pushed down and locked on to the clip and previously laid sheet.

Available as standard: unpainted AZ150g/m^2 Zincalume® coated steel base with black glass reinforced nylon plastic clip.





NZ Patent Appln No. 539212/539694

Wind clamps

For clip-on roofing profiles Dimondek® 400 and Dimondek® 630, Wind Clamps can be installed over profile ribs at purlin locations where higher loads are required than those given in the Load/ Span table to increase profile load capability, contact Dimond Technical Team for specific advice on 0800 766377 or rooftech@dimond.co.nz

Dimondek® 400

Dimondek® 630

Stop-ends

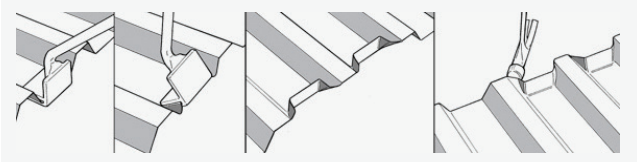
Stop-ends are required at the upper end of all sheets, on horizontal metal wall cladding and at the lower edge of penetrations.

Stop-ends for trapezoidal profiles are known as 'pull-up'.

Stop-ending tools should be in good condition so that they do not mark the coating. This is particularly important when using pre-painted material.

Stop ending can cause distortion of the pan adjacent to the turn-up, which can cause contact and mark the turndown of the cover flashing onto the pan of the cladding. This can be avoided by technique and experiment, often standing in the pan adjacent to the end being stopped will prevent the pan from becoming convex at this point.

Pull- up stopends



A 'pull-up' stop-end is not cut back but pulled up to the maximum allowable height without tearing the metal. No extra material allowance is required for a 'pull-up' stop-end.

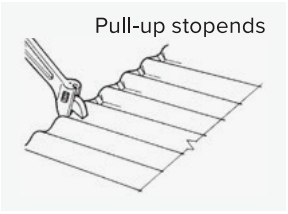
To create pull-up stopends:

1. Place stopend tool centrally in the pan.
2. Lift up steadily until the end is vertical.
3. Remove tool.

Corrugate stopends

Stop-ends for corrugate should be pulled up to the full height of the profile, and on low pitches at exposed sites, additional weathering may be provided by the use of filler blocks.

Refer NZMRM Code of Practice.



Turndowns (drip forming or drip edging)

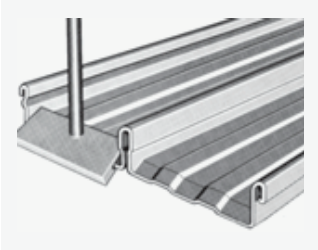
All roof cladding with a pitch of less than 8° must be provided with turn-downs after the roof is fixed, using special tools to ensure water flows directly into the gutter.

As corrugated profiles cannot be satisfactorily turned down, it is not permissible to terminate this profile below 8°. However for acceptable corrugated profiles where the crease height is greater than 21 mm; used below 8° and cannot be provided with a turn- down, an eave flashing is required at the gutter line.

Refer NZMRM Code of Practice.

Profile turndown

Providing a profile with a downturn will provide a positive



Soft edging and flashing

The periphery of all roof planes should be sealed with a flashing.

Longitudinal flashings must cover one or two crests according to requirements. There should be a gap between the downturn and the adjacent rib to prevent capillary action and to allow for pressure equalisation. Both vertical and horizontal faces of the flashing should be fastened to other cladding or preferably, through the cladding to the structure.

Transverse flashings may be notched over the ribs of the profile, or for lower trapezoidal profiles or corrugate they can be fitted with a soft edging which is dressed into the pan of the profile. All soft edging must be colour matched to the roof before installation.

Soft edging can be solid aluminium, solidly backed, or perforated to allow ventilation. The leading edge of transverse flashings must be through fastened to the primary structure, not riveted to the cladding.

Roof cladding damage

Excessive downforce on a rib or corrugate crest can cause a compression fold, or “ding” in the apex of the crest.

Most roofs designed to Restricted Access criteria will incur some damage during installation or by subsequent traffic. If this is unacceptable, roofs should be designed to Unrestricted Access criteria and roof access and usage by other trades must be strongly managed and supervised.

A small ding in a sheet will not normally cause any structural problems and may be aesthetically acceptable, however deeper dings can cause cracking of the sheet and lead to leaks.

To restore a damaged rib load capability to the original levels all damage must be repaired with a cap flashing.

For aesthetic reasons, any damage may be unacceptable. However, if the roof cladding is not visible, ribs can be repaired by using a sealed and riveted saddle cap.

Sealed and riveted saddle

It is technically acceptable to have two dings or creases on one sheet within one purlin spacing, providing two adjacent ribs are not damaged. Any greater level of damage requires the sheets to be replaced, and the person who causes the damage must report it and be responsible for its repair.

Water ponding

Ponding will create a prolonged time of wetness and increased build-up of debris. Ponding will detract from a coated steel product's life and will invalidate the product warranty.

The installation of penetrations must be done in such a way that they do not cause ponding.

On low pitched roofs, careless or excessive foot traffic may cause rib damage and localised ponding. This can be minimised by installing temporary protection in critical areas, such as entry points, where the roof is accessed by other trades, or there is a step-down in the roof.

It is the main contractor's responsibility to ensure that other trades do not damage the roof.

It is recommended to design to Unrestricted Access-criteria or better if roofs are highly visible or need to be regularly accessed by maintenance personnel.

Refer NZMRM Code of Practice.

Correctly installed gutters

Gutters must be installed with adequate fall to ensure all water is transported to appropriately located downpipes. The installation and downpipe construction should allow the gutter to drain completely. Regular gutter cleaning and maintenance is required to remove leaves and other debris that may restrict water flow to downpipes.

A gutter protection system (or any other product) that entraps debris or water between itself and any steel product surfaces, restricting coated steel's ability to dry, is not recommended and is an exclusion in the product warranty.

Incorrectly installed gutter protection system

Drilling and Cutting

When metal sheets require cutting, only shears, powered nibblers or hand snips should be used to leave a cleanly cut sheared edge. Any form of disc cut will nullify the material warranty.

Cutting of Duraclad® sheets can be with an abrasive disc or a fine tooth saw. Breathing protection should be worn to prevent inhalation of dust.

Cutting and drilling should be carried out clear of other sheeting material, and the drilling swarf immediately removed from the surrounding sheet surface.

Coil on cut edge protection lacquer may be required to be painted on all cut edges in severe marine areas to meet warranty requirements. Check with Dimond.

Swarf damage

Swarf is the term given to the metal debris arising from cutting or piercing operations when using friction saws, drills, or other tools on roofing and cladding products. In this context, swarf may also include any other discarded steel objects such as rivet shanks, nails, screws, and nuts which may come into contact with cladding products.

Steel swarf particles left on the surface will corrode and cause rust stains which will detract from the finished appearance of a project. These stains are often mistaken for early deterioration of the roofing and cladding itself.

Preventing swarf damage

Cutting:
Cut only by shear; power shears or hand snips produce the least amount of debris. Power nibblers give a clean cut but generate debris which if left is prone to corrosion.

Do not use metal friction blades or reciprocating saws which produce fine hot particles which can embed deeply into the coating surface and corrode rapidly.

If metal grinding is taking place near the surface of an installed or uninstalled roof, careful masking of nearby coated steel surfaces must be executed.

Clean-Up:
Swarf should be swept or hosed from the job progressively and certainly no less than at the end of each day. Swarf that has become stuck must be removed carefully, avoiding action which is likely to remove or change the appearance of the paint or metal coatings.

When sweeping or hosing into a gutter, clean out the gutter before leaving the job to prevent premature corrosion. On completion of the job, give a final wash or sweep down.

Severe or extensive swarf staining

If the coating is severely damaged by swarf corrosion, the area should be painted or replaced. The whole visible area should be repaired, as air drying paints weather more rapidly and in a different manner to pre-painted roofing and cladding products. If swarf particles are painted over, rust bleed-through is likely to occur.

Supervising other trades

A common cause of swarf complaints arises because other trades have used grinding equipment in the vicinity of a newly completed roof. Wind carried swarf can contaminate large areas some distance from the cutting site. Main contractors should be aware of the likelihood of such damage, and project planning should include scheduling of all cutting or grinding work to be completed before laying the roof cladding.

Colour matching paint

Colour match paint is designed for matching accessories to the pre-painted material; it is not designed for repairing marks or blemishes. The term touch-up paint should never be used. Fasteners and accessories requiring colour matching should be painted before installation.

Air-dried paints used to disguise marks weather at a rate different from that of pre-painted material, sometimes dramatically so, and will often become more apparent than the mark they are intended to disguise. Minor scratches are best left alone, and they will not affect the performance of the pre-painted product due to the self-healing qualities of the primer and metallic coating. They become less evident as the coating weathers.

Minor scratches may be described as scratches that do not extend to the metallic coating, are less than 3 mm in width, and are not visually noticeable from a distance of 3 m. This characterisation will, however, vary with the concentration of the scratches, and the visibility of the area affected.

Extensive coating damage to any pre-painted steel product can only be rectified by replacement or repainting of the affected sheets.

Field painting

Profiled metal roofing and wall cladding are readily paintable using good quality primers and water-based acrylic topcoats. Metallic coated roofs can be painted immediately after installation; however, dirt, grease, and any loose materials must be cleaned off, so the surface is clean and dry before applying the first coat.

An effective method for painting metallic coated roofing is to apply a good quality galvanised iron primer and two water-based acrylic topcoats, following the manufacturer's recommendations.

Pre-painted products can be painted after exposure to weather. Normally, 6–12 months of exposure is required to achieve surface modification of the surface to allow the new coating to adhere. Edge laps of unpainted metallic coated sheets steel do not require lap priming.

Sunscreen

Sunscreen containing titanium dioxide or zinc oxide can accelerate the degradation of organic materials including auto finishes and pre-painted cladding surfaces. This damage is irreparable, so prevention of its occurrence is the only defence. For more information contact the material supplier.

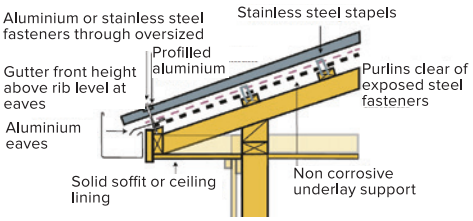
Removing lichen

Temperature dust and rainfall can create a good environment for lichens to establish and flourish, and this can occur on almost any surface. For more information contact the material supplier.

Fixing aluminium sheeting

Aluminium is a naturally durable material with proven performance over a long period.

Most metals compatible with Galvanised and Aluminium/Zinc coatings are compatible with aluminium. However, to acquire the required fastener durability, use aluminium or stainless screws rather than painted steel screws.



Aluminium has approximately twice the thermal expansion of steel, therefore, expansion provisions must be executed Installers must adhere to coil manufacture published data.s for steel of twice the length.

Being soft and frequently requiring oversize holes for expansion, aluminium is typically fastened with fasteners equipped with load spreading washers, as is reflected in published span tables. Installers must adhere to published fastening systems to meet design load/span expectations.

Painted aluminium

Painted aluminium products perform differently than uncoated aluminium as the paint coating affects reactions with the atmosphere, and reduces the aluminium surface area that can be sacrificed to defend against localised corrosion.

Pit corrosion can result from damage to the paint coating and exposure to corrosive substances. It is necessary to protect against wet contact with concrete, treated timber, steel, stainless steel, and butyl rubber.

Recommendations for fixing aluminium

The front edge of the spouting or gutter must be higher than the crest of the roofing profile. Eaves flashings of painted or unpainted aluminium must be used. Underlay should terminate on the top of the eaves flashing. When re-roofing with aluminium, the existing support members must be inspected to ensure all staples, wire netting, nails, or other materials likely to damage the aluminium have been removed. Galvanised netting or mesh must not be in contact with the underside of aluminium roofs. If present, it must be separated by a 5 mm barrier of inert non-absorbent, non-reactive material. Alternatively, self-supporting underlays may be used. Plastic strapping can be used for supporting underlays, stapled with stainless steel staples to the vertical face of the purlins. In a wet environment, aluminium must be separated from a corrosive surface such as concrete, butyl rubber, or CCA treated timber by using a 5 mm rigid strip of an inert non-absorbent material, an open woven geotextile layer, or PVC netting. Plastic coated steel netting is not recommended under aluminium sheeting. The design of the ceiling cavity must prevent the saturation of support members from internal or ground moisture. (See 10 Internal Moisture.) All screws should be fitted with a profiled or bonded washer. Fixing screws shall be aluminium or Grade 304 stainless steel. Stainless steel screws must be fitted centrally through pre-drilled oversized holes (9 mm) for roofing and walls, regardless of sheet length. For sheet lengths over 10 m.

Completion

The roofing contractor should notify the main contractor, architects or owner when he has completed the scheduled work. It is prudent if he records any damage to the sheets (or lack thereof) at this point, particularly if subsequent trades accessing the roof. Damage of any sort caused by other trades is not the responsibility of the roofer. All gutters, valleys, roof channels and the roof cladding should be left clean and free from debris on completion of the work, and any roofing related debris on site should be safely removed.

Netting

Netting should be run across purlins and be tensioned to remove unnecessary sag. Fastening to timber should be with either galvanised staples or 25mm clouts avoiding contact with the roofing, and to steel with flat head screws.

Fixings should be at 150mm centres on end purlins in such a way that the netting cannot pull past the fixing. Edges of the netting should be tied together or twitched at 300mm centres and fixed to each purlin.

Safety mesh should be installed to manufacturers recommendations.

Roofing Underlay

Horizontal Application: underlay is unrolled across the roof parallel with purlins and secured as necessary. Joins should be lapped by a minimum of 75mm and supported on netting if roof pitch is below 8 degrees for self supporting and have the side edges supported on purlins.

Vertical Application: underlay is unrolled vertically down the slope of the roof from ridge to gutter and secured to the purlins as necessary before laying the roof sheet and fixing down. Joins should be lapped by a minimum of 150mm. Support such as netting or safety mesh must be used on pitches below 8 degrees, or when using self supporting underlays on purlin spacings greater than 1200 mm.

When used under roofing, all underlays must be supported on wire netting or strapping at 300mm maximum spacings. Self support underlays can be used on purlins spacing up to 1200mm without support.

Underlay should overlay into the gutter at least 20mm and not more than 50mm, and avoid lapping into the water flow.

Maximum single underlay sheet lengths shall be 10m for bituminous and fire retarded kraft papers. Longer runs are to be end lapped 150mm. Synthetic underlays have no limit on their run length.

In general it is recommended that prolonged exposure of the underlay to the weather is avoided by fixing the roofing over the same day. Always follow underlay manufacturers recommendations.

Sheet Layout

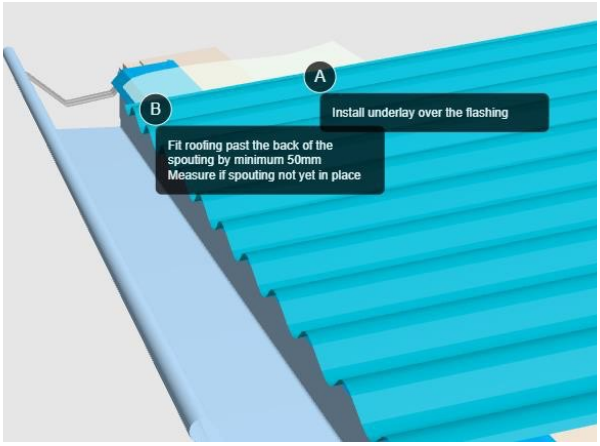
Firstly, the sheet should show no signs or evidence of transport damage or storage damage including wet storage effects. If the sheets are damaged they must not be fixed down, and the Dimond supplying branch should be informed as soon as possible.

Care should be taken to ensure sheets are laid parallel to the lines of building ends, and perpendicular to ridges and gutters. If possible, the direction of laying should be such that the sheet side laps face away from the prevailing wind direction, or, in the case of wall cladding, away from the most common line of sight.

Side laps must be properly engaged such that the overlap rib fits correctly over the underlay without obvious gaps or insufficient cover.

Roofing sheets should run continuously from ridge to gutter, avoiding end laps. Long lengths separated for thermal expansion or handling reasons should join at a step in the roof. Where end lapping of straight and curved sheets cannot be avoided, a correctly formed 150mm minimum sealed lap is required, with a bead of neutral curing silicone sealant each end of the lapped sheets.

Sheet ends should form an even line (within a workable tolerance) and roof sheeting should overhang into gutters by at least 50mm and must allow clearance to enable ease of gutter cleaning.



Wall Cladding Underlay

Can be laid either horizontally on steel girts or vertically on timber studs. When run horizontally lap upper sheet over lower sheet a minimum of 75mm.

Adequately secure to framing at 300mm centres. When installed in high wind areas fix through a reinforced tape such as Danband branded polypropylene tape.

Run lengths to be no greater than 10m. End laps to be no less than 150mm over studs of vertical joints. The underlay should be pulled taut as possible.

Best practice is to clad on the same day as installation provided the product is kept dry and undamaged. Maximum period that the underlays are exposed to the weather is contained in the underlay manufacturers literature.

Side Lap Fastening

All metal profiles must have side laps fastened (either by primary fasteners through to the purlins, or by stitching the top sheet to the underlay sheet) to comply with the following maximum spacings.

Wall Cladding Side Lap

Side lap stitching on pan fixed wall cladding is recommended to improve the lap weather tightness, when the distance between fixings is greater than 1.5m. Side lap fixings should not exceed 750mm centre to centre.

Flashings / Penetrations

The following comments are made as guidelines to be used when inspecting Dimond® Roofing and wall cladding systems during and after installation.

Material

Must be the same material and coating as the roof or wall cladding to give a similar durability and compatibility to the roof/wall system.

Fabrication

Flashings should be fabricated to achieve sufficient cover width and to maintain falls to avoid water ponding.

They must be without noticeable micro-cracking and be fixed without damage such as dings or crushing, and should be free of scratches and swarf the same as for roofing.

Flashing joins must be sealed at both ends of the lap, and the fasteners must pass through the sealant at the leading edge. Spacing of fasteners should be no greater than 50mm apart. Laps to be 150mm min.

Fastening

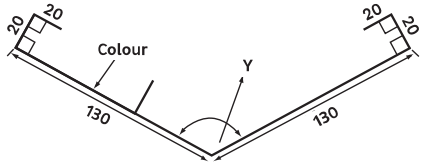
Wherever possible, flashings should be screw fixed through to the supporting structure, with sufficient slope or fall to ensure ponding does not occur. Stitch screws should be the

Flashing systems metal flashings

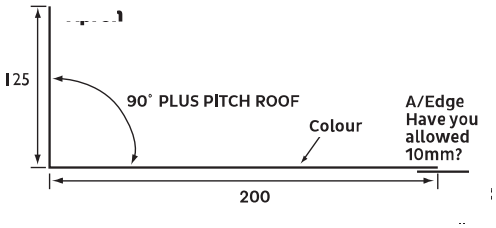
The following range of flashings have proven to be universally popular and suitable for most applications. Minor local variations may exist from that shown. Dimensions are nominal and may vary with changes in material.

For guidance on detailing specific flashings, please refer to General Systems Design – refer to Dimond CAD details for each profile on-line at www.dimond.co.nz & RANZ Roofing Guide online at www.roofguide.co.nz

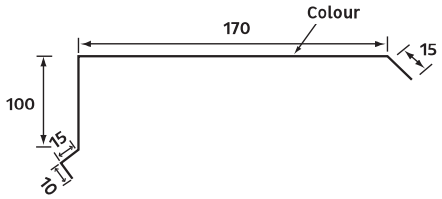
Valley



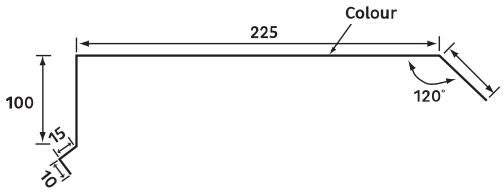
Apron



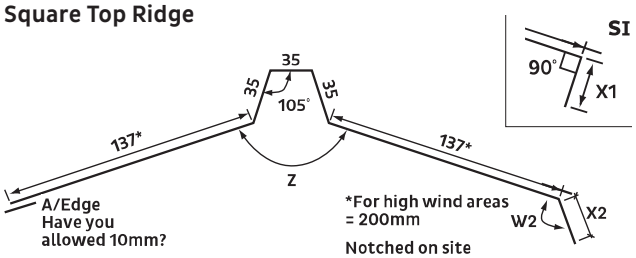
Barge Side - Birds Beak (Corrugate)



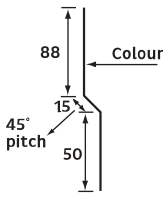
Barge Side - Birds Beak (Veedek/Styline/Hi Five)



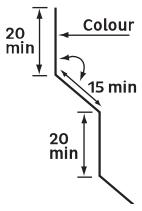
Square Top Ridge



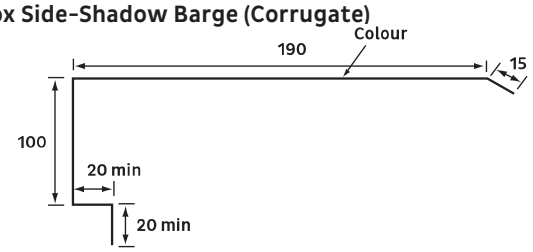
Z Flashing



Window Flashing



Box Side-Shadow Barge (Corrugate)

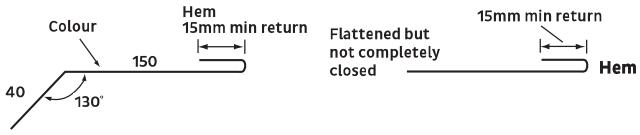


Box Side-Shadow Barge (Veedek/Styleline/Hi Five)

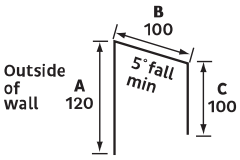
Many common flashing solutions are expanded on with step-by-step, interactive 3D instructions in the RANZ Roofing Guide, developed by the Roofing Association of New Zealand in association with the NZMRM.

Works on desktops, laptops, tablets and phones.

Gutter Eave Flashing

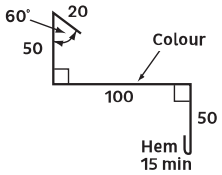


Cap Flashings



Whatever the B measurement is, one side cannot be greater than this measurement (it can be equal).

Example of Hem & Angles Required



Dektite flashings

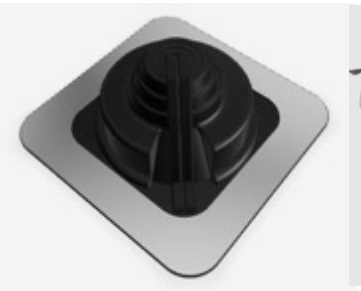
Product Description
Dektite Flashings are a range of EPDM or silicone polymer flashings. The Dektite range has been specifically designed to withstand UV exposure and heat, preventing ingress of water and dust at service pipes, flues and ducts that penetrate roofs or walls.

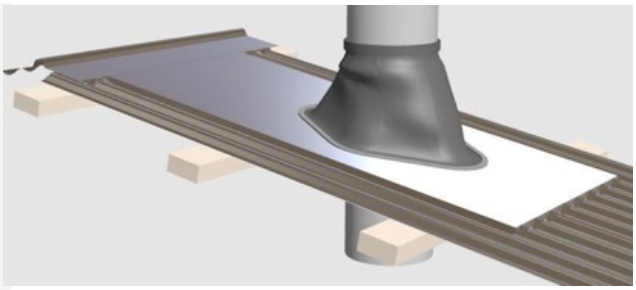
Features
Dektite Flashings are flexible and easy to install using fasteners and sealant, with a flexible base easily adapted to roofing shape. They are low maintenance with periodic wash down and warranted for 15 years.

Dektite sizes are available to accommodate pipe/flue diameters from 1.0mm to 610mm depending on configuration, available in a wide range of configurations/diameters to suit pipe flashings, retrofit flashings, soaker and retrofit soaker flashings.

Compatibility
Dektite EPDM and silicone is compatible with Zincalume®, galvanised steel, coated steel, aluminium, copper, lead, asbestos cement, and timber.

Full technical information on Dektite Flashings can be found on-line at www.dimond.co.nz





As a guide, the fastener frequency for fixing flashings should be:

Wind Zone*	Fasteners Per Metre
Low (32m/s and below)	1
Medium (37m/s)	2
High (44m/s)	3
Very High (50m/s)	4
Extra High (55m/s)	5
SED (55m/s and above)	Contact Dimond Technical (0800 766 377) rooftech@dimond.co.nz

*in accordance with NZS 3604

Sensible allowance should be made to allow relative thermal expansion between flashings and sheeting if sheet lengths exceed 12m.

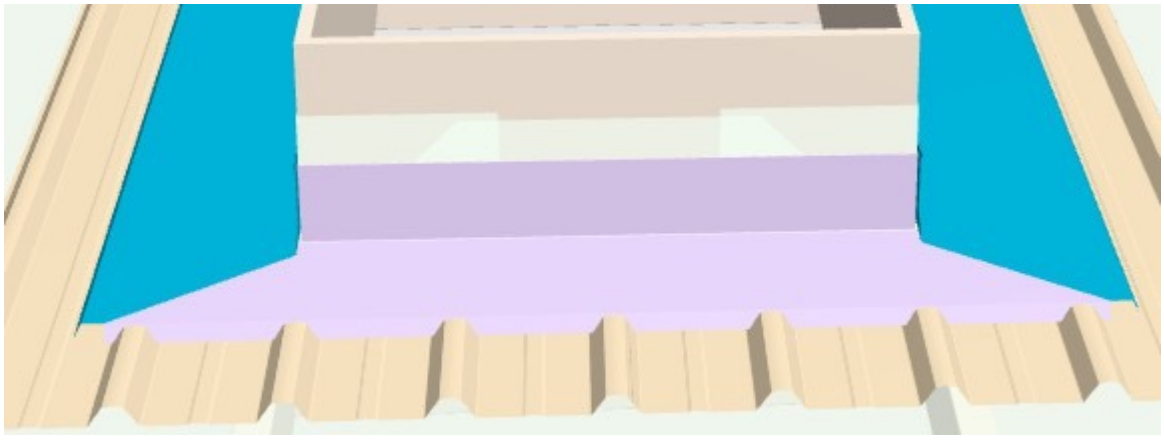
Expansion joints in the flashings should be considered for steel flashings greater than 18m and aluminium flashings greater than 12m in length.

Flashing lapping over roofing should be in accordance with NZ Metal Roofing Code of Practice. Where barges meet the gutter, this must be closed off to ensure wind driven moisture and birds cannot enter the building.

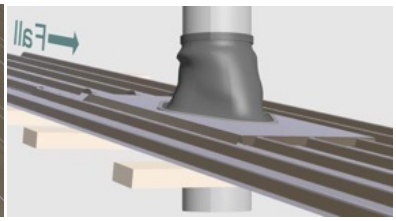
Notching

Best practice to notch flashing downturns around sheet profiles is to mark in-situ and use a rib-shaped template. Clearance gaps around the rib should be just sufficient to prevent cut edge contact with the sheet surface. Gaps between 1mm and 3mm are generally considered satisfactory.

Soft edging can be used on corrugate and low rib profiles with rib heights up to 30mm and should be neatly pushed down and formed in to the profile pans to achieve a neat-tight fit.



Proprietary Boot Pipe Flashings

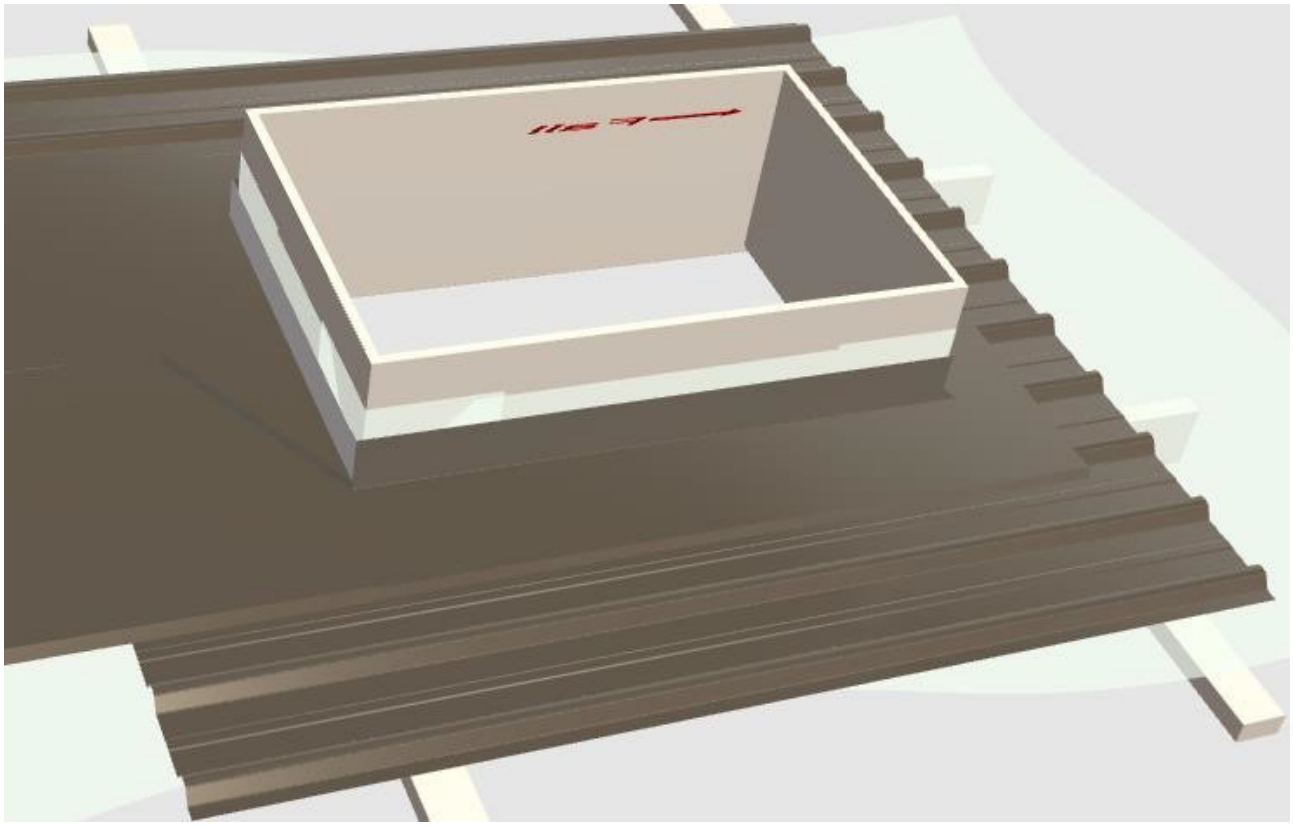


Proprietary boot pipe flashings must not be positioned in such a way that a dam is formed across a water channel. It is preferred that proprietary boot pipe flashings are positioned on the 'bias' rather than square across the sheet. If the pipe and proprietary boot pipe flashing dam up the pan or restrict more than 50% of the water flow around the pipe and flashing, an additional cover over flashing to the ridge and sealing of the proprietary boot pipe flashing to this flashing should be considered. Excess silicone sealant should be avoided, as it will add to the risk of water ponding.

Penetrations

Penetration holes with their major dimension or diameter greater than 150mm must have support framing placed around the perimeter of the penetration holes.

Water diversion around the penetration must not cause an overload of the receiving channel such as the pans that the water has been diverted into, which may cause flooding. Penetration flashing shall not rely solely on the silicone sealant to achieve weather tightness of the flashing.



Dimondek® 630

Building Code Compliance

The product will, if employed in accordance with the supplier's installation and maintenance requirements, assist with meeting the following provisions of the building code for a period of 15 years:

- Clause B2 Durability: Performance B2.3.1
- Clause E2 External moisture: Performance E2.3.1, E2.3.2
- Clause F2 Hazardous building materials: Performance F2.3.1

Additional Profile Information

Available in the following materials:

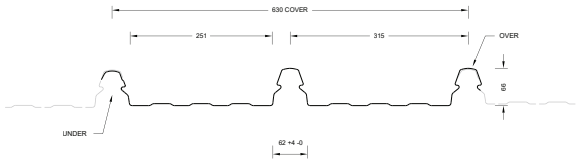
- Unpainted Zincalume®, Galvanised or Aluminium
- Pre-painted ColorCote® – ZinaCore™, MagnaFlow™, AlumiGard™

Notes: Please consult with a Dimond® Representative before ordering for:

1. The correct coat to suit your roof to match the environment.
2. Availability of any nonstandard colours, materials, or thicknesses.

Maintenance must be carried out on your new roof to ensure the roof meets the required durability according to the New Zealand Building Code and material warranty.

Profile Drawing



Cover width (mm)	Sheet width (mm)	Minimum pitch
630	675	3º(approx 1:20)

Specifications

BMT	Min Pitch	Roofing Max Span End Span (m)*	Roofing Max Span Internal (m)*	Walls Max Span End Span (m)	Walls Max Span Internal (m)
0.48mm	3º	2.20	3.30	N/A	N/A
0.55mm	3º	2.40	3.60	N/A	N/A

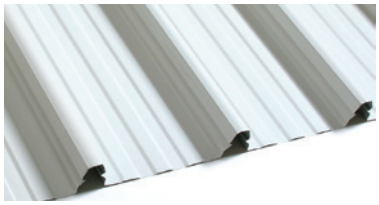
Spans for roofing where the ultimate wind uplift load does not exceed 1.5 kPa.

Spans for walls are limited by an acceptable appearance or an ultimate wind uplift load of 2kPa.

*Restricted Access Roofing

Product Reference Guide

Profile



Continuous Clip

Flashing Bracket

Perimeter Clip

Wind Clamp

Item Code	BPCS DESCRIPTION
Profile Material	
	DIMONDEK® 630 X .55 ZINACORE
	DIMONDEK® 630 X .55 MAGNAFLOW
	DIMONDEK® 630 X .55 MAXAM
Fixings	
3048787	EPDM SEALING WASHER 36MM (100)
Natural Light Products	
3005158	DUROLITE HG4 DD630ER 1.4MM
3005159	DUROLITE HG4 DD630ER 1.7MM
3005163	DUROLITE FG3 DD630ER 1.7MM
3005168	DUROLITE FG3 DD630ER 2.2MM
3005171	DUROLITE FG3 DD630ER 1.4MM
3006299	WEBGLASS HG4 DD630ER
3006534	WEBGLASS FG3 DD630ER
3006568	WEBGLASS FG3 DD630ER COL
Accessories	
3049015	DIMONDEK® 630 NYLON WIND CLAMP
3049086	DIMONDEK® 630 CONTINUOUS CLIP
3049087	DIMONDEK® 630 STARTING POST
3049088	DIMONDEK® 630 PERIMETER CLIP
3218494	DIMONDEK® 630 FLASHING BKT HD
3234267	TURN DOWN TOOL DD630 3PC
3234657	MIDSPAN SUPPORT DD630 NEW

Health & Safety

a) Before work Commences, checks must be made on the Site requirements for Health & Safety.

b) A diary should be kept to record your Safety Plan and Actions through the course of the Project.

c) Be aware of Safety Requirements under the Health & safety Act.

d) Ensure there is a safety plan for the site and your operations.

e) Identify Hazards and eliminate were possible or Isolate.

f) Erect safety barriers around the site storage and work areas.

g) Check Safety equipment to ensure it meets all Standards.

h) Access to the roof areas must be secured.

i) Electrical gear must have current tags for the period to indicate they have been check as required by the Health and safety Act. Isolation safety equipment installed correctly before electrical equipment used.

j) Check all construction work required for the roof structure on the Project has been completed prior to accessing the roof areas.

k) Ensure Weather conditions such as Wind or rain do not become a Hazard affecting Health & Safety.

l) Correct Footwear to be always worn on work site areas.

m) Identify Site First Aid Stations and those notices indicating their position are clearly visible.

Note:

i) While it is the responsibility of the Employer to ensure Safety equipment is available, the Employee is equally responsible to ensure they use the equipment correctly and observe Safe Working Practices.

ii) Safety requirements may vary depending on site specific or task specific safety plans. This document does not classify as a health and safety plan.

Site Handling

a) Ensure the Site is ready to receive the Material. That access has been checked, ground condition such that will not hinder the loading of materials.

b) Crane, lifting boom and Strops are ready for use when the material arrives.

c) Structure has been checked to ensure that purlins are on the right plane with all structural work complete, including all Flashing and trim supports.

Note:

i) Once the Roofing contractor has started to install the Roof, this generally means his acceptance of the surface, any defects that show through the surface would be the Roofers responsibility. Defects should be notified in writing to the Main Contractor for his action prior to commencement of the Roofing.

d) Ensure that product on the ground or stored on the Roof Structure is adequately secured. Do Not rely on the Banding straps installed around the bundles in the factory or when site run to act as securing straps. Roof Bundles need to be fixed independently to the structure.

e) If product is stored for any length of time, on site to low pitch roof slopes a method of protection needs to be taken to prevent damage occurring to the finish surface from weather while being stored.

f) Aluminium products must not be stored on site without cover. If dampness gets between the sheets of Aluminium Electrolyses will occur. Generally, when this happens the sheets need to be replaced.

Site Handling (cont'd)

g) Removal of an existing roof must be treated with Caution. The old material when removed must be stacked and secured to prevent being blown off the roof area causing a Safety Hazard to you and others. Once lowered to the ground material should be stacked and secured until removal from site and disposal. Do not leave loose sheets on the roof without securing.

h) Select an area where rubbish can be stored without danger to site personnel. Always ensure that Rubbish cannot blow about and cause a hazard.

i) Ensure when walking on existing roof materials, prior to their removal, that damage does not occur to the profile that would enable water to leak into the property below in the event of inclement weather.

j) When carrying roof sheets across a roof area, hold the sheets so the wind will blow them away from your body rather than blow into the body. This will prevent the sheet from taking your legs from under you and knocking you over.

k) Walking on new or old roofs can cause damage to the profile unless care is taken. With corrugated or Trapezoidal Profiles, it is important to walk along the purlin line. Access areas to the work face should have protection from foot traffic to avoid damage. With trough section products do not walk on the ribs. This is the strength of the profile. If the ribs are damaged the strength will go from the profile. Foot traffic within the pans will not normally damage the profile.

Installation

a) Generally, Safety netting or wire netting is installed over the whole Roof structure prior to lifting of roofing bundles. Salf safety netting is installed the provision for safety systems over the roof area is eliminated once installed. Safety barriers will only be a requirement to the edges of the structure. If standard wire netting is not used to support the substrate papers etc, installation of the roof will require the use of safety harnesses or other safety system that will comply with the Worksafe: Best Practice Guidelines, Safe use of Safety Nets

b) Ensure the product being used will meet the spanning requirements and comply with the Building Code.

c) Don't Assume that the structure is square. Check before starting to fix the Roofing. Decide on the Sequence of installation prior to commencement, taking visual appearance of the laps and wind direction into consideration.

d) The 1st sheet should be positioned square to the structure, or in such a position that the barge flashings at either end appear the same when the roof has been completed.

e) Alignment of the sheets should be checked every three or four sheets to ensure the straight line is maintained.

f) Ensure the fixings meet manufacturers requirements and that they are installed to a straight line. The use of a string line will make this easy to achieve. Be careful if the roof purlins are staggered as care will be needed, if this is the case, so as to prevent holes in the roof that will need to be repaired or sheets replaced.

g) The use of self drill screws will cause swarfwhich is inclined to stick to the sheet surface. This can be removed as you go sweeping the roof surface with a stiff broom. This needs to be done at the end of each day so that the majority of swarfis not left to cause staining.

h) Ensure the Top end of the sheet is turned up as recommended and at the gutter end turned down if the pitch so requires preventing water flowing back under the roof. It is important to use the correct tools for turn up and turn down to match the profile being used.

i) At the end of each day check the site to see that all materials are secured and tied down. Again it is important that the manufacturing straps are not used as the only method of securing the bundles.

Accessories

a) Ensure that all accessories are available prior to the delivery of the roof.

b) Screws, Rivets, Bolts etc need to be compatible with the Roofing material. Stainless Steel and Monel fixings are not recommended for the use with Zincalume base products. Class 4 screws and 4.00mm Aluminum rivets must be used. In extreme wind zones it would be advisable to use 4.8mm rivets for fixing flashings if screws cannot be used.

c) Roof Profiles over 12 1m in length need to have provision for expansion and contraction. This can be achieved with over size holes and EPDM and Profile washers.

d) Aluminum sheets should not exceed 8 1m in length.

e) The minimum cover for Barge flashings and Apron Flashings is 200 mm. This is subject to the degree of roof pitch.

f) Flashings around penetrations need to be adequately supported to prevent distortion of the roof profile.

Completion of Contract

a) When all work has been completed, the roof finally swept down, all rubbish removed from site, it is advisable to check all aspects of the installation to ensure nothing has been missed. It cost more to go back to site to carry out remedial work than to finish the project correctly in the 1 st instance.

b) A final inspection with the owner is often a good practice. This shows that you have pride in what has been achieved and reflects on the Customer with you having a real interest in the completed work. The Customer will react in a positive manner with a final sign of his approval.

c) If there is a material fault, rather than proceed with installation, this should be brought to the attention of the supplier who would need to address the problem. To point out a fault after the Project has been complete may cause additional cost to rectify that may be declined.

d) Applications for Material Warranties should have been made prior to completion. These warranties should be in place and handed to the owner to fulfill your contractual obligations. Do not leave these until the Project has been complete as this may cause delays in the final sign off.

Dimondek® 630

1. Introduction

The previous remarks about Health & Safety, Site Handling, Installation etc, apply equally to Dimondek® 630.

When a Dimondek® 630 profile has been selected for a project, the Contract confirmed, Dimond Project Manager in Conjunction with the Roofing Contractor and Site Construction Manager, develop the Dimondek® 630 Site Manufacture management plan for the Project. This incorporates the Program for delivery of the Dimondek® 630 machine containers, coil ordering, and site drawing for placement of the machine, product coils and Finish product stacking area. All power and Site safety requirements are checked out including the ground Stability to handle coils and fork lift.

2. Site Manufacture, Bundles and Loading.

a) When the containers arrive on the Project Site the area should be isolated from the rest of the Building site. Notification submitted to the Project Site Manager that the Area is a Hazard that has been Isolated in terms of the Manufacturing unit.

b) The Dimondek® 630 machine Commissioned for each Project by Dimond Engineers from Auckland. The only constraints are the area required for the Containers that house the machine, the de-coiler, the length of the Rollout table based on the sheet length, the ground conditions [which need to be capable of carrying the weight of the fork lift and 5 tonne coils].

c) It is also important there is sufficient area for storage of Coils for Roll forming and the storage of the Dimondek® 630 profile once manufactured, close to the machine and lifting point to load onto the Project Roof Structure.

d) It is also important that the Dimondek® 630 is stacked as planned, safe and orderly manner to enable easy access on to the Project Roof when ready.

e) The labour for handling the product from machine to stack must be aware of the site safety requirements of the Contract and Dimond Operational unit. Gloves must be worn at all times during this procedure. The Dimond Engineering team will direct the Labour as to how the sheets shall be handled and stacked.

f) The bundles must be of a weight that the Lifting Boom and Crane can handle. Care must be taken to ensure when lifting on to the Roof that the Area on the Structure can take the weight. Dimond will calculate the number of sheets and the weight that will be in each Bundle to meet the lifting capability.

g) The lifting boom is provided by Dimond and must be handled in a safe manner ensuring that all the chains and connecting pieces are installed were they are labeled. Care must be taken when connecting strops to boom and bundles to ensure the balance is correct. The Roofing Contractor is responsible for the supply of the strops required to go with the Dimond lifting boom.

h) Bundles must be loaded over trusses not over the middle of a purlin span between trusses. This is so the weight can be carried over the strongest support of the roof area. If there is a requirement to move the Dimondek® 630 along the roof from the lifting point, on the Dimond Trolley system, the weights of the bundles need to take into consideration the structure that the trolleys will need to transverse. If there is a doubt about weight then advice should be sort from the Project Site Engineer.

i) Before Dimondek® 630 is loaded on to the Roof Structure ensure it has been completed, including all supports required for flashings and penetrations, and is ready to take the Roofing. Don't Assume that all is OK. Check to see that the purlins and sage rods have been completely installed and that they are to a true line. Once the Roof has been installed any defects in the steel that need to be rectified will become a problem for the Roofing contractor

j) Install all safety equipment before loading the Roofing includes safety mesh and safety Barriers.

k) When craning the roof up care must be taken to avoid being knocked over by the Bundles as they are being craned. Your personal safety is imperative. Caution must be observed especially with weather that can be changeable. Wind would have a big factor in the ability to load a roof. There is no point in taking a risk and create an un-safe environment for yourself and others on the site.

l) If the site configuration is such that the Roof can only be loaded from one point then the Dimond Trolley system may have to be used. Take care that you position the trolleys correctly so they can be loaded directly from the crane and then moved into position. This system will be explained during your course of Dimondek® 630 Training.

m) Once the Bundles have been located in their correct area, securing these bundles to the structure is essential. While the bundles will have manufacturing ties, these ties are not sufficient to secure the load to the Roof Structure against movement. Strips of sheet metal straps or adjustable ties can be used across the bundle, fixed into the purlins on each side of the Bundles. These straps will prevent the Bundles sliding down or across the Roof Frame.

n) It is advisable that a check be done at the end of each day to ensure the tie downs are in place and that items not anchored are removed from the roof area or secured for the night. While working at heights it is unwise to leave flashings or sheets unsecured, as in the event of a wind gust safety could be compromised and damage occur.

o) On the completion of the Dimondek® 630 manufacture assist Dimond site Engineer with the removal of the Rollout Table and help pack up the containers ready for shipment off site.

3. Dimondek® 630 Set Out

a) The set out for the I st run of Dimondek® 630 is very important. It is essential that the sheet length be measured correctly with sufficient material to discharge into the gutter by 80mm minimum. This sheet will control the complete line of the roof. Care must be taken to ensure square with the structure. As mentioned before, Don't Assume the Structure is Square, check it out. It will not be so bad if the head and the gutter line are slightly out but if the Roof runs out from the side barges it can be seen at all points.

b) Use a string line to set up the I st clips. Set the top clip and bottom clip and in correct position. Install the clips down the row keeping to the string line, which should align across the hole in the centre of the middle rib of the clip. The clip line should be checked every 3 clips to ensure that the line of clips does not creep.

c) When handling sheets that are long, to prevent damage to the sheets and those installed, ensure there is sufficient labour to position the sheets without dragging or dropping them.

d) As a step to reduce damage to the finish surface have a system in place that will prevent access to the roof areas by other trades as a working platform. Ensure adequate protection is in place and that the Site Construction Manager is informed in writing of the situation.

4. Dimondek® 630 Clips and Screws

a) It is essential that the clips are installed to the purlins at right angles to the line of the sheets not to the line of the purlins. If the clips move off a 90 degree angle problems will occur between the clip screws and the Dimondek® 630 profile.

b) The screws which hold the clips to the purlin must be installed vertically and as close to the clip rib as possible so they fit into the space in the profile that is designed to take the screw.

c) Clips can be installed ahead of the Dimondek® 630

5. Stop Ending

a) The Turn up at the head of the Dimondek® 630 trough is created by a two piece tool. The I st tool straightens the curve to each side of the Rib of the profile. The 2nd tool is used to dress up the stop end to the head of the trough. The stop end will not form to the full height of the rib but only to the height governed by the depth of the Tool. The material is generally roll formed from G550 coil which is high tensile sheet. It will not form easily as flashing coil. Flashing coil for a Dimondek® 630 project needs to be ordered separately.

b) It is essential that the upturn be as vertical as possible to gain maximum height. If a stop end splits it should be repaired with a gusset and sealant immediately so that it is not missed and causes problems at a latter date.

c) A turn down into a gutter is required when the roof is less than 8 degrees. There is a turndown tool which is used and only breaks the pan to form a lip to stop backflow of water run off.

6. Dimondek® 630 Accessories

a) Flashing clips are used to attach all Ridges, Aprons and Barge flashings. This is to allow for movement of the Roofing profile with out distortion of the flashings. The clips allow movement independent of each component. This method frees the roof from any direct penetration through the profile which eliminates a source of leakage that can occur with piece fixing. The clips at the head of the roof are fixed at every 2nd trough and clip over the roof profile. The flashing then fix to these clips.

b) Perimeter clips are required in exposed wind areas to the edge of skylight openings and last Dimondek® 630 sheet edge turn up

c) Flashings shall be made from .55 gauges Zincalume based material or .9mm Aluminum. Any other gauge less will not comply with the NZBC.

d) Clips for Barge flashings should be fitted every 800 mm max apart. Attention needs to given to Barge flashing design as with the ribs 300 mm apart the barge flashing may have to be made in two pieces as it would exceed the recommended with for flashings.

e) Apron and Ridge flashings need to be profile cut over the ribs. A 3 mm gap should be allowed between the flashing edges, the profile ribs and pan. This is to prevent the surface finish from being damaged by any movement with in the Roof profile.

f) When installing flashing there will be the need to sweep the roof with a stiff broom to loosen and remove swarf that is created by drilling fixings into the flashings and support clips. In some occasions the swarfmay not be evident for some weeks as it will take time to work out from under the flashings. The stain that can be seen will be easily removed with a soft cloth and a non abrasive cleaner.

g) Echofaom is used to reduce the wind pressure and help create a negative pressure zone outside the building line. This should be installed behind the turn down of the ridge and apron flashing within 300 mm of the front edge of the flashing. To hold in place while the flashing is installed a smear of silaflex will act as an adhesive.

h) Fixings of the flashing should be by class 4 steeltite fixings with neoprene washers. These fixings are compatible with Zincalume base materials. Ensure the fixings do not penetrate the Rib of the Roofing profile.

i) Sealants that should be used with Zincalume base material are generally Silaflex N which is a neutral cure sealant.

j) End closure pieces are available for installation to the underside of the rib at the bottom of the sheet. These end caps are shaped to the rib and are fixed to the fascia board. Their purpose is similar to Echofoam, to break down the wind velocity and stop birds from entering the profile.

7. Dimondek® 630 Final Inspection

a) Check all Roof areas and accessories to ensure project is complete.

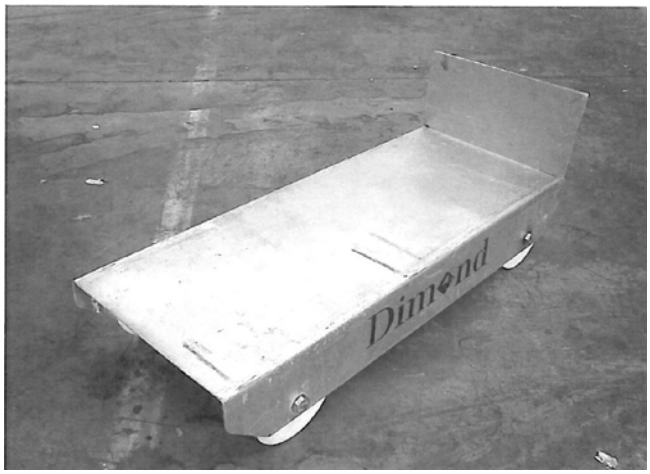
b) Remove any rubbish, paper, loose fixings and off cuts of metal that may still be on the Roof areas.

c) Attend to swarfmarks that may have appeared from flashing lines.

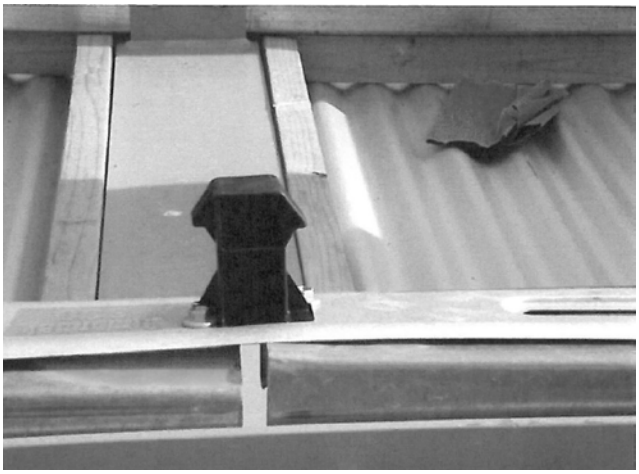
d) Touch up any areas of Painted surface as per the Coil Coaters Recommendations. Minor scratches should be left un-treated.

e) Be satisfied that the Project is complete and every thing removed from site and invite the Site Construction Manager to carry out an inspection of the finished roof.

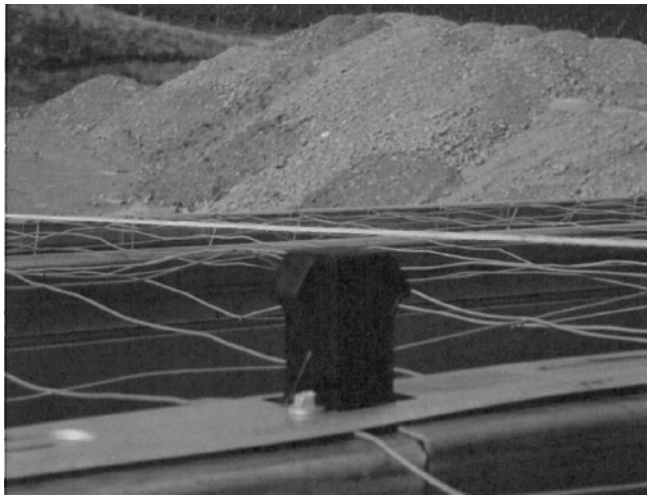
f) Ensure that Completion of Warranties have occurred to prevent delays in sign off of the project.



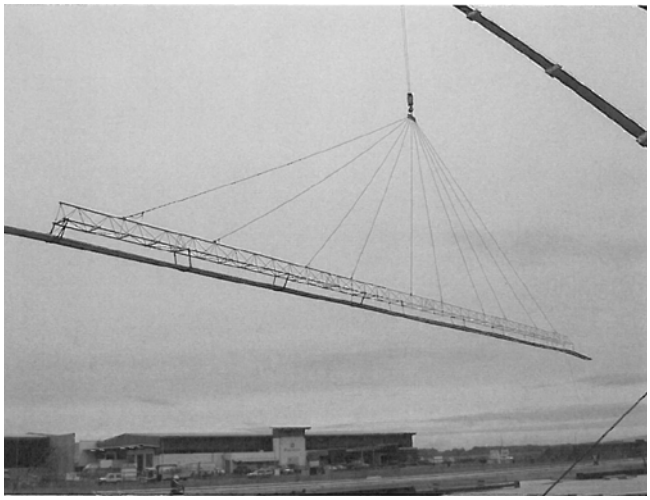
Dimondek® 630 Roof trolley



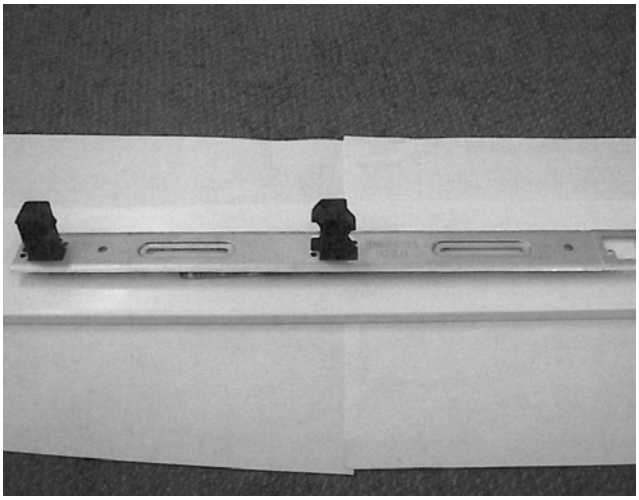
Dimondek® 630 clip installed to Purlins out of Alignment



Dimondek® 630 clip installed on purlins that are not aligned Dimondek® 630 Trolleys and Lifting Bar



Dimondek® 630 65 1m sheets on Lifting Boom



Dimondek® 630 Roofing clip with Plastic Posts

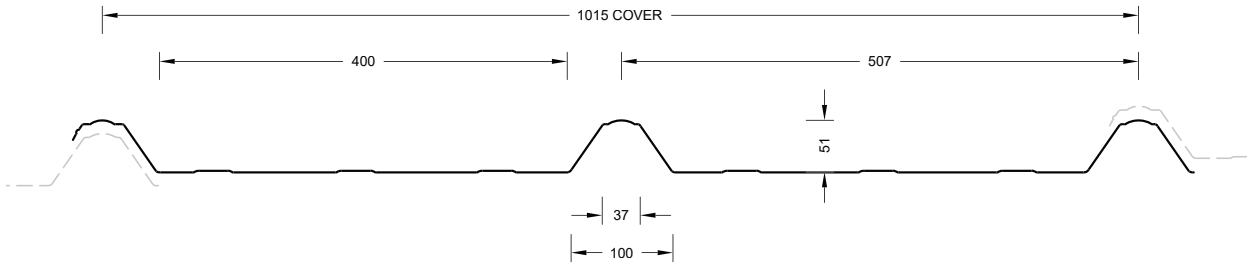
Dimondek® 630 Durolite GC Skylight

Dimondek® 630 Turn up & Down Tools

Dimondek® 630 Boom Section

Dimond Solar-Rib®

Profile Information: - Solar-Rib®



Solar Rib® Material Spec – KEY FACTS							
Minimum Pitch 3 Degrees		Cover 1015 mm			Profile Height 52 mm		
Material	**Steel G550[134]**	**Aluminium H36[4]**		**GRP[134]**			
Thickness (mm)	0.55	0.70	0.90	1800[1]	2200[1]	2800[1]	3660
Weight/linear metre (kg/m)	5.55	2.31	2.96	n/a	2.2	2.8	3.7
Drape curve min. radius (m)	90	90	90	90	90	90	90
Purlin spacing for drape curve[2] (m)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Crimp curve min. radius (m)	n/a	n/a	n/a	n/a	n/a	n/a	n/a

1. Based on weight per sq. metre and excludes twin skin profile. Purlin spacing's can be increased by installing span breakers. Order Mega 5 (915mm cover clear sheet)
2. Internal purlin spacing is based on 'Restricted Access' roof in 'High' wind zone.
3. Drill 12mm holes through cladding to allow EPDM to sit flat
4. 30mm BRA washers may be used in low to medium wind zones, with roof pitch greater than 10º and with a sheet length under 7mtrs

Solar-Rib® Span Table

TYPE	WIND	PURLIN	0.55mm Steel	0.7mm Aluminium Not recommended for use when installing PVL's	0.9mm Alumium
Roof[1]	High	Internal	1.2	1.0	1.0
		End	2 x 0.6[2]	0.6[3]	0.6[2 3]
	Med	Internal	1.5	1.2	1.2
		End	1.0[3]	0.8[3]	0.8[2 3]
	Low	Internal	2.0	1.5	1.3
		End	1.3[3]	1.0[3]	0.8[2 3]

1. Restricted Access Roof means that only occasional foot traffic is encountered and is restricted to walking on purlin lines only in pans or carefully across 2 or more crests. Walkways are to be installed where regular foot traffic is encountered, and "Restricted Access" signs placed at roof access positions.
2. Two end span purlins 0.600mm centres around the perimeter of roof

Notes:

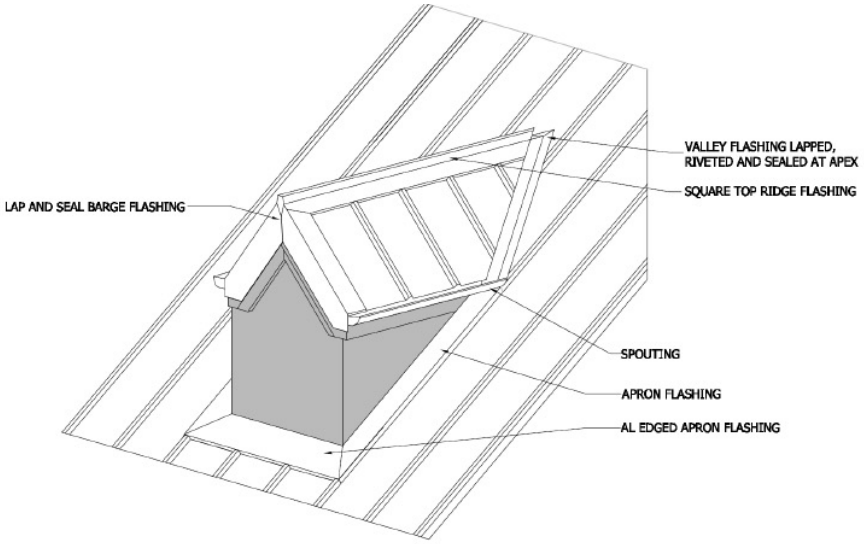
- For low pitch roofs (below 8º) aluminium should be avoided due to the high risk of foot traffic damage.
- Where foot traffic is likely to be encountered reduce all roof spans by 10% and for post construction traffic install walkways.
- Side stitching is required for all spans over 1200mm centres
- 0.70mm Aluminium is not recommended if laminates are to be installed

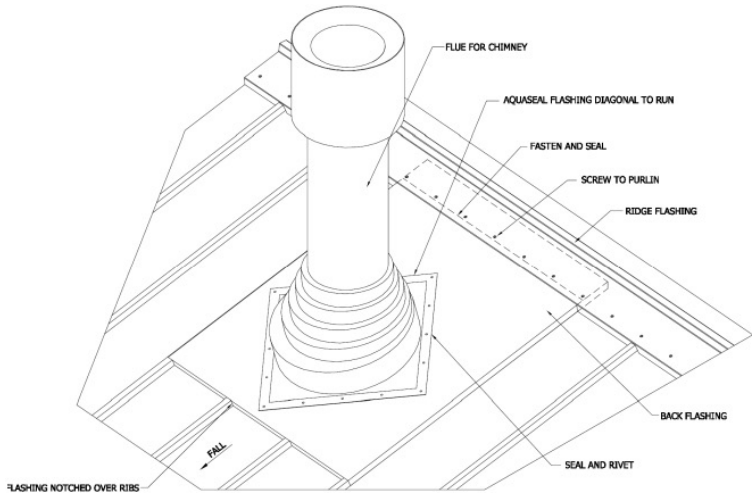
Lengths

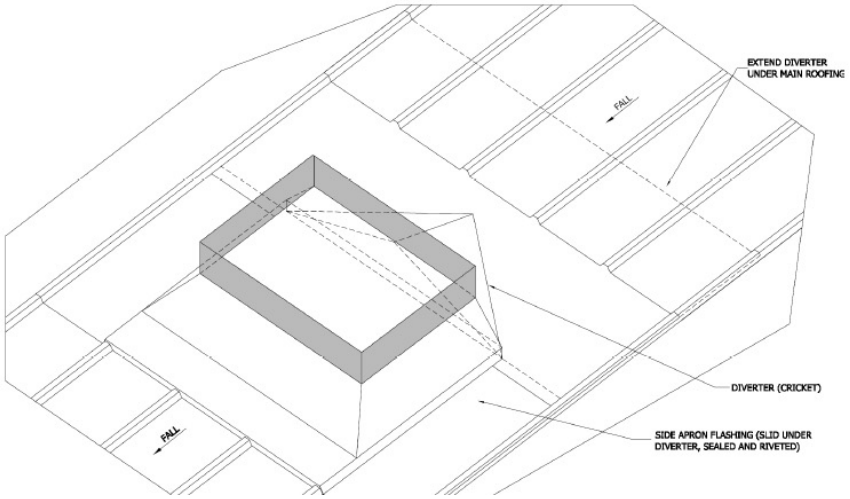
Solar-Rib® roofing is made to custom long run lengths. Where these exceed 12 metres, they may require special transport and handling facilities and Dimond Roofing can provide special lifting harnesses where necessary. For lengths over 24m specific requirements for design, consent, installation and handling exist, please refer to Dimond Roofing Technical rooftech@dimond.co.nz. All pans at the lower ends of Solar-Rib® are required to be turned downward, regardless of wind zone or roof pitch.

Flashings

Flashings for Solar-Rib® are generally in accordance with E2/ AS1 (Third Edition) or the Roofing Code of Practice. In addition, specific flashings have been designed for the system and have been tested to ensure that the electrical systems are not compromised by thermal or wind induced movement or water ingress. It is vital that Dimond Roofing specific flashings are supplied to prevent warranty issues or system performance problems. Consideration for specific requirements in environmental conditions and or wildlife i.e. Kea may be required


VALLEY FLASHING LAPPED,
RIVETED AND SEALED AT APEX
SQUARE TOP RIDGE FLASHING
LAP AND SEAL BARGE FLASHING
SPOUTING
APRON FLASHING
AL EDGED APRON FLASHING


FLUE FOR CHIMNEY
AQUASEAL FLASHING DIAGONAL TO RUN
FASTEN AND SEAL
SCREW TO PURLIN
RIDGE FLASHING
BACK FLASHING
SEAL AND RIVET
FALL
FLASHING NOTCHED OVER RIBS


EXTEND DIVERTER
UNDER MAIN ROOFING
FALL
DIVERTER (CRICKET)
SIDE APRON FLASHING (SLID UNDER
DIVERTER, SEALED AND RIVETED)
FALL

END CAP SOAKER

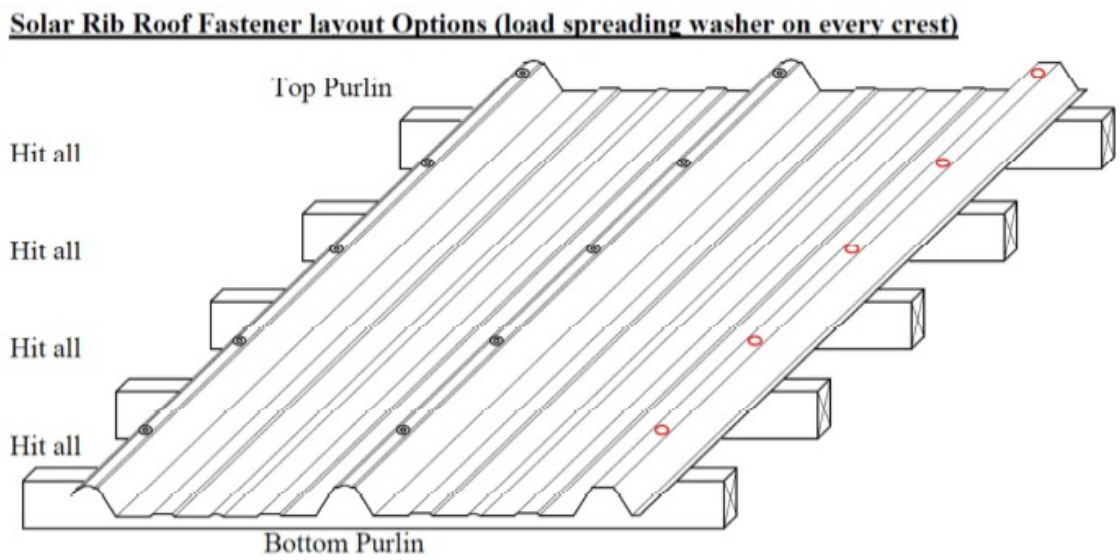
VALLEY/HIP CAP SOAKER

Soakers to be installed on open ends of cladding, to prevent vermin, birds and excess air-flow, replacement for seal-foam and formed from 0.7mm aluminium

Solar-Rib® Fixing Type Table

Purlin Material	Fixing Type / Roofing Material			Notes
	Steel[1 2]	Aluminium[2 3]	GRP[1 2 3]	
Steel (Roof)	14g x 75mm Steelite c/w neoprene washer, 36mm EPDM and LSW[2 3]	14g x 75mm Stainless Steelite c/w neoprene washer, 36mm EPDM and LSW[2 3]	14g x 75mm Steelite c/w with neoprene washer, 36mm EPDM and LSW[2 3]	Crest fix only pre-drill with 12mm dia hole for GRP applications up to 18mtrs
	- 14g x 75mm Steelite no neo, with [4]25mm embossed washer[3]	14g x 75mm Stainless Steelite no neo with [4]25mm embossed washer[3]	14g x 75mm Steelite c/w with neoprene washer, 36mm EPDM and LSW[2 3]	Crest fix only pre-drill with 12mm dia hole for GRP applications up to 18mtrs
Timber (Roof)	14g x 100mm Timberite c/w neoprene washer, 36mm EPDM and LSW[2 3]	14g x 100mm Stainless Timberite c/w neoprene washer, 36mm EPDM and LSW[2 3]	14g x 100mm Timberite c/w neoprene washer, 36mm EPDM and LSW[2 3]	Crest fix only pre-drill with 12mm dia hole for GRP applications up to 18mtrs
	14g x 100mm Steelite no neo, with [4]25mm BRA washer[3]	14g x 100mm Stainless Steelite no neo with [4]25mm BRA washer[3]	14g x 100mm Timberite c/w neoprene washer, 36mm EPDM and LSW[2 3]	Crest fix only pre-drill with 12mm dia hole for GRP applications up to 18mtrs

Fixing Details- Solar-Rib®



Oil canning, flatness or waviness

This condition may naturally occur during the roll forming process, with thermal expansion of the material or possibly during the installation process, it may be more noticeable when using wide panned profiles like Solar Rib® and on softer type materials like aluminium. This does not cause any damage to the product, however the owner, and/or the designer needs to be aware that this may affect the desired aesthetic look of the end project

DimondClad Interlock - Wall Cladding

Installer Guide

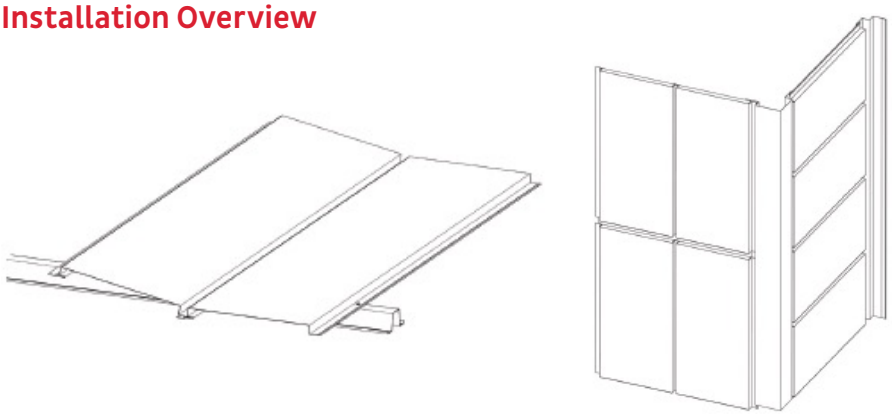
Product Overview
DimondClad Interlock is a visually striking architectural wall cladding solution designed for commercial, industrial, and residential facades. Panels feature a 25mm rib height with a 15mm groove joint between each panel, through which fasteners are installed. The profile offers horizontal or vertical installation flexibility and is available in a range of finishes, including ColorCote, COLORSTEEL® and Unicote® Lux.

Materials
- Manufactured from G300 Colorcote, COLORSTEEL®, UnitCote Lux or aluminum-zinc alloy coated steel
- Coatings conform to AS/NZS 2728 and AS 1397
- Non-combustible materials in accordance with NCC requirements

Design Limitations
- Not suitable for spring curving applications
- Maximum standard length: 9.0m
- Longer lengths may be available on request, but require special handling

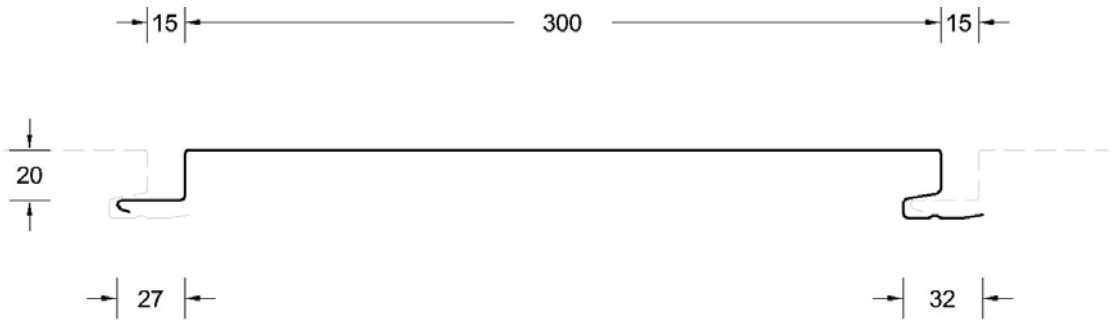
Performance Summary
- Rib height: 25mm
- Panel cover width: 300mm
- Groove joint width: 15mm
- Typical mass: 5.93 kg/m²
- Designed for non-cyclonic wind zones (AS 4055 / AS/NZS 1170.2 compliant)
- Tested in accordance with AS 1562.1 and AS 4040 parts 0 & 2

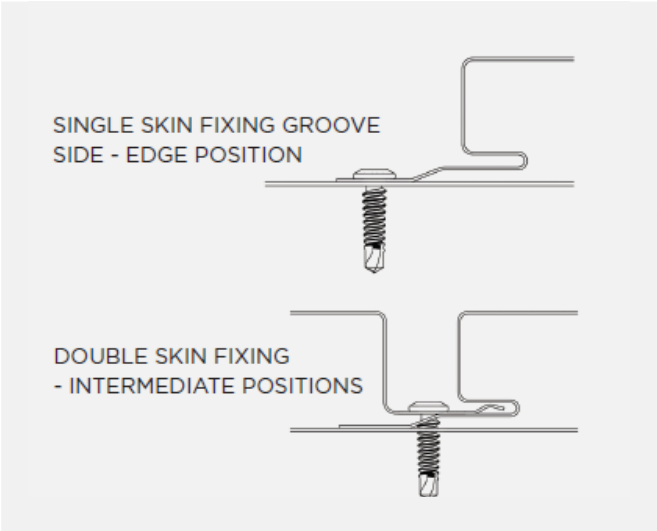
Installation Overview



DimondClad Interlock panels are direct fixed with screws driven through the double skin of the lap joint. They are compatible with both timber and steel substructures.

Profile Information: - DimondClad Interlock Wall Cladding



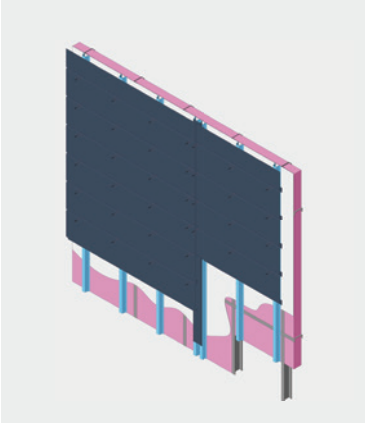
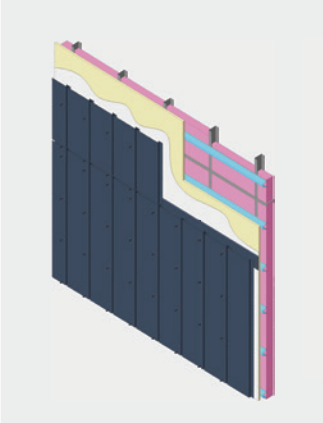
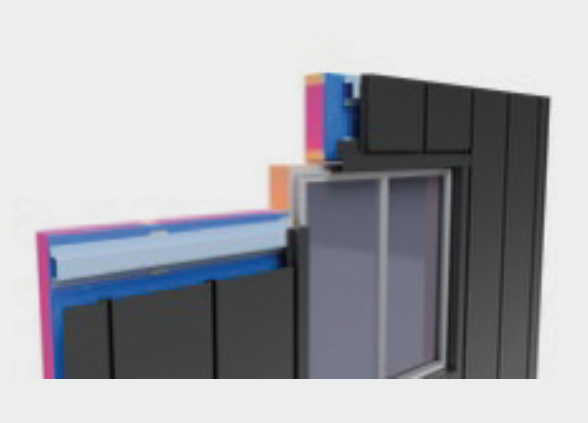
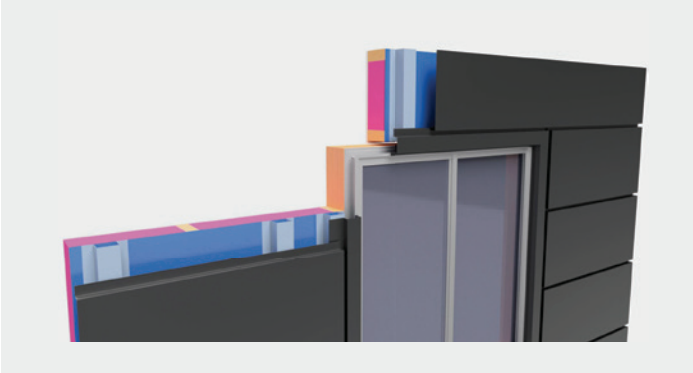


NZS3604	
Wind Zone	SLS Design Load
High	1.32kPa
Medium	0.93kPa
Low	0.6kPa

NZS3604	
Wind Zone	SLS Design Load
Extra High	2.09kPa
Very High	1.72kPa

Recommended Fasteners

Substrate	Fastener Type
Timber battens	10 x 25mm wafer head Type 17 screws
Steel battens (0.48mm)	10 x 25mm wafer head Type 17 screws
Steel battens (0.55mm or greater)	10 x 16mm wafer head self-drilling screws


Handling & Storage

- Store above ground and keep dry
- If wet, separate sheets and allow to dry
- Use gloves when handling panels
- Avoid dragging sheets to prevent coating damage

Maintenance

- Wash unwashed areas (under eaves, behind screens) periodically
- Remove metal shavings, swarf, and debris daily to prevent corrosion

Notes

- End laps are not recommended
- Panels can be supplied with closed ends for clean termination
- Refer to Dimond Roofing's flashing detail guide for junction and corner detailing
- Refer to NZBC and NZMRM COP for full installation standards

Natural Lighting

Layout and fastening

The following comments are made as guidelines to be used when inspecting Dimond® Roofing and wall cladding systems during and after installation.

Profiled foam strip – ecofoam

Product Description
Ecofoam is a polyethylene closed cell foam produced by Tetral® Industries Ltd (Christchurch) for use in providing long life seals against water, draughts and pests, and is commonly used between the underside of flashings and roof or wall sheet profiles.

Features
High tensile and tear strength.

Resistant to most chemicals and biologically and physically inert. Resists embrittlement due to UV exposure.

Profiled to fit under all the Dimond® Roofing profiles. 20mm wide with dovetailed interlocking ends.

Compatibility
Ecofoam is suitable for use with any metal roofing or cladding materials and with translucent sheeting.

The carbon black contained in Ecofoam is less than 0.065% by weight and it is therefore suitable for use with Zincalume®, Colorsteel® and ColorCote® products.

Block foam – 30 x 30mm polyethylene closed cell foam. Usually ordered in for specific jobs. Allow a 14 working day lead time, for date of order to supply.

Full technical information on Ecofoam can be found on-line at -Tetral

Profiled Foam
Profiled foam sealing strips should be installed when specified at the top end of the sheet, adjacent to the stop end. To help keep the strips in place it is good practice to position them on a bead of silicone sealant.

Preferred means of attaching flashings to sheeting ribs. If aluminium rivets are used, the minimum size should be 4.8mm diameter.

All fasteners should be of sufficient size and frequency to withstand the loads that may be applied through wind uplift or thermal expansion, throughout the life of the roofing material. As a guide, where flashings cover the roof, use the same fastener that has been used to fasten the roof.

Dimond Natural Lighting Systems

Handling and storage
Dimond Natural Lighting sheets are delivered to the site in bundles which should remain strapped together and stored where damage will not occur. Ensure the product remains clean and dry. Edges of bundles must be protected during cranage. Sheets must be lifted into place, not dragged.

Durolite® has a 100 micron integral gel coat top surface which is less likely to suffer damage during handling that will affect long term performance. The underside however does have a thin plastic film laminate and care must be taken to avoid damaging it.

Sheet layout and fasteners

Supporting Structure
Before installation is commenced, the supporting structure must be free of sharp protrusions, or abrasive surfaces that may come into contact with the sheets. Ensure the purlin spacing is not greater than the span limitations for the selected profile. A pliable, non-abrasive separation layer must be placed between the sheet underside and the wire netting/purlin surface.

Mid Span Support
In instances where single Dimond Natural Lighting sheets are to be used as skylights and placed between adjacent metal sheets, they may be installed on purlin spacings that exceeds the maximum span limitation for the sheet thickness chosen provided a mid-span support member is incorporated to enable extra fastening to reduce sheet flutter in high winds.

See Fig 10 for typically installed view. Where two or more Dimond Natural Lighting sheets are laid side by side purlin spacings must be reduced to suit the maximum span of the Natural Lighting material. (For decking profile refer to paragraph (e) below.)

Layout
Sidelaps are designed for both edges of the Natural Lighting sheets to overlap the adjoining metal sheets. All sidelaps must lap over the profile rib of the sheet. It is preferred that the sheets are run from ridges to eaves without end laps. Where end laps are necessary, they should be a minimum of 200mm and fully sealed at both edges of the lap with a neutral cure silicone sealant. Laps must be positioned on a purlin in such a manner that the overlapping sheet edge is firmly fastened against the underlapping sheet.

Fastening
Dimond Natural Lighting sheets will undergo movement at the fastener position. To correctly allow for this, the sheets should be pre-drilled through the crest of the rib or corrugation with a hole diameter at least 2mm greater than the screw. Larger pre-drilled holes will be required if the sheet length is greater than 6m and allowance for thermal expansion is required.

Screw fasteners must be tightened sufficiently to prevent the sheet lifting from the framing but not overtight so as to cause rib deformation. To control sheet flutter in high winds side lap stitching through the rib top is required similar to the primary fasteners and should be completed at spacings that achieve the side lap fastening required in Table 2.4M. Use profiled washers with 36mm diameter EPDM seals into 12mm diameter oversized holes in the natural lighting sheets.

Profile Rib Height	Max. Side Lap Fixing Centres (mm)
30mm or less	450
Greater than 30mm	600
Dimondek® 630	900

DD400 Decking Profile

Where one sheet of Natural Lighting DD400 or decking profile is used in conjunction with the metal decking, the sheets are laid using the under/over method. The sheets are held in position by galvanised bolts, which are located through each rib. The bolts must also pass through the rib of the metal decking and the deck clip to ensure correct hold down is achieved. If purlin spacings are greater than 1200mm centres or in high wind areas additional bolts must be placed through the sheet edge laps at 600mm centres. Where two or more Natural Lighting sheets are laid side by side, deck clips are replaced by Dimond Tee Rails manufactured from .55mm G550 Z450 Galvanised Steel or AZ150 Zincalume.® These are located at every side lap. Fixings are placed through ribs and Tee Rails at 600mm centres ensuring that a fastener is immediately adjacent to the purlin. The Tee Rail must be fixed to the purlin through both flanges.

Dimondek® 630 Profile

It is intended to fix one natural lighting sheet between adjacent steel Dimondek® 630 sheets for sheet support.

Multiple natural lighting sheets can not be side lapped and fixed down as adacent sheets as the profile rib shape does not allow this. We recommend laying a steel sheet then natural lighting sheet, then another steel sheet and so on, if this effect is required.

Span breakers are used to reduce the purlin spacing of the natural lighting sheets only and are installed from the top side of the roof. They can only be installed one way around with the larger rib on the span breaker clipping and snapping up into the underside of the steel overlap rib.

The middle rib clip fixing post must be removed before the Durolite sheet is placed in position.

The outer side ribs of the natural lighting must not be fixed down. They fit over the steel sheet ribs allowing differential movement between Durolite and steel Dimondek® 630 sheets.

Self drilling fixings are used on the inner three ribs only. A 12mm diameter clearance hole must be drilled through each of the inner three 3 ribs and 14g x 115mm Steeltites with BB900 profiled washers and 36mm diameter EPDM seals screwed into each clearance hole on every purlin and/or span breaker.

Where end lapping of sheets to form runs of over 25m is required, we recommend overlapping 200mm minimum, applying 4 beads (2 beads each end) of neutral curing silicone sealant approx. 10mm diameter in size. Allow these to tack off for 20 minutes before screwing down. This will allow the beads of silicone to roll and not shear under thermal expansion, and continue to provide a seal.

Refer Fig 8 for further detail.

General workmanship
in addition to normal requirements note the following:

1. Sheeting Cutting
   Natural Lighting sheets can be supplied cut to custom lengths. Where onsite cutting is necessary a fine tooth handsaw or an electric saw fitted with a fibre disc must be used. Breathing protection must be worn to prevent inhalation of glass fibres and resin dust. To resist cracking, the sheets must be firmly supported during cutting operations.
2. Water Run-Off
   Dimond Natural Lighting sheets, as with any other plastic or prepainted metal roofing materials, act as inert catchment areas for rainwater, and run-off from these areas onto unpainted galvanised surfaces may cause accelerated corrosion ofthe galvanised steel.

Duraclad®

The above comments for roofing and cladding sheets generally apply. Additional attention should be given to:

- Stop ends should be correctly formed by attaching a metal (usually aluminium) folded angle to the sheet end and sealing it in place.
- The supporting structure must be free of abrasive surfaces or irregularities. If used over netting or safety mesh, a barrier strip must be installed to prevent abrasive damage to the sheet surface.
- Fastening of Duraclad® requires pre-drilling of the sheet with a hole size that is at least 2mm greater than the fastener diameter. Additional hole size may be required to accommodate thermal expansion of the sheeting.
- Provision should be made during installation to enable foot traffic movement across the roof without applying point loads to the Duraclad® sheeting. Planks or temporary walkways are recommended.
- Safety Mesh must be installed underneath Duraclad®. (If general foot traffic is expected, consult Dimond for the use of products specifically designed for the purpose.)

Mid Span Support

Whenever the span capability of the Dimond Natural Lighting product does not match the purlin spacing used for the adjoining metal sheets, a mid span support must be used. The sheets must be fastened to the mid span support in the same manner as they are fastened to the purlins. Mid span supports are required to reduce sheet flutter due to wind loads and are not intended to support concentrated loads.

Half Sheet Widths Spans

The use of profiled half sheet widths, lapping over the side of the steel sheets, allow the spans of the selected profile Natural Lighting sheet to be increased by up to 40%, while still achieving the same ultimate limit state capacity, before needing mid supports. Half width sheets must have side lap stitching as shown in Table 2.4M, Section 2.4.1.3.2.

Condensation Control & Insulation

Condensation can occur on the underside of Natural Lighting sheet when the building is not sufficiently ventilated or moisture is generated within the building space.

The following three methods are recommended options to help reduce the effect of condensation that may form on Natural Lighting.

Install a system that incorporates Dimond Skylight film as a translucent underlay. Refer below Detailed Drawings Fig. 1. This is a low performance system which in the extreme cases of low exterior temperatures, condensation may still form on the underside of the skylight film. Otherwise the skylight film is intended to carry condensation moisture dripping from the underside of the Natural Lighting sheet to the outside of the building, similar to building paper.

Install a system that incorporates a double skin of Natural Lighting sheeting with an air gap between. In colder climates the air gap provides additional insulation and reduces the likelihood of condensation forming on the underside of the inner surface.

Fire Resistance

The fire resistance properties of the Natural Lighting products have been evaluated by recognised Fire Safety Consultants, resulting in the opinion that Durolite® can be used within the New Zealand Building Code requirements for fire safety given the following guidelines.

Durolite® is manufactured with fire retardant polyester resin and has been tested by BRANZ.

Durolite® achieves a Group Number 3 classification to the NZBC verification method C/VM2 Appendix A. Durolite® uses a bromine free formulation.

BRANZ Test Reports for Durolite® Group Number classifications are available upon request. Contact Dimond Technical on 0800 766 377 or rooftech@dimond.co.nz Durolite® is available in all profiles and standard colour tint options, e.g. HG4.

Detail Drawings

Fig 1 Dimond Skylight Film Detail

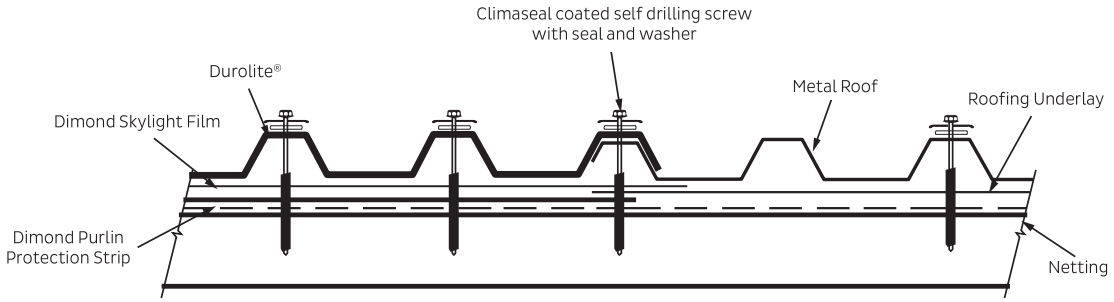


Fig 2 Ridge Detail

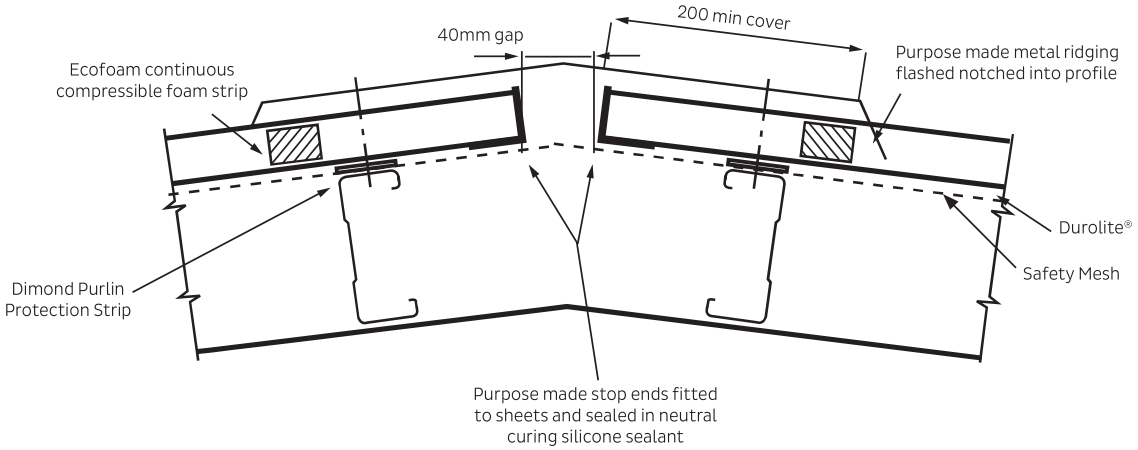


Fig 3 End Lap Durolite® to Durolite® & Durolite® to Steel

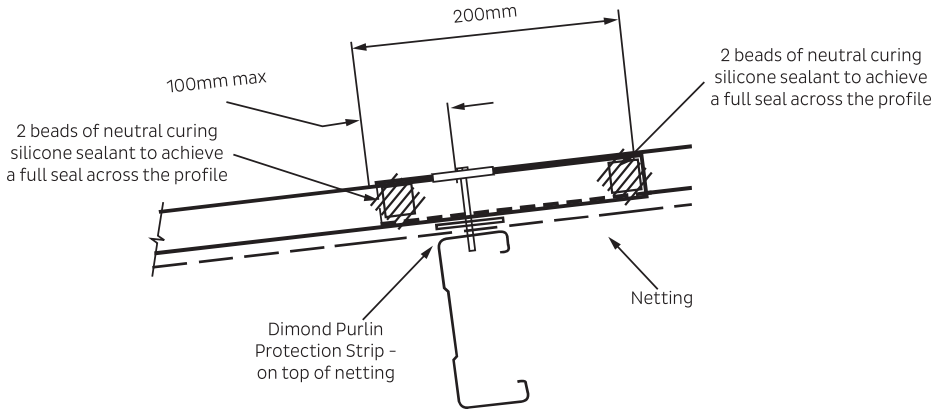


Fig 4 Stop End Detail

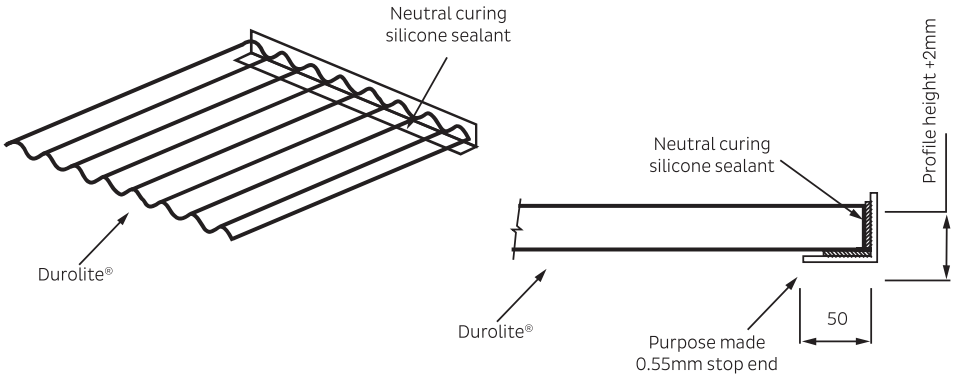


Fig 5 Side Lap Detail of Durolite® With Metal Roofing (Over/Over Process)

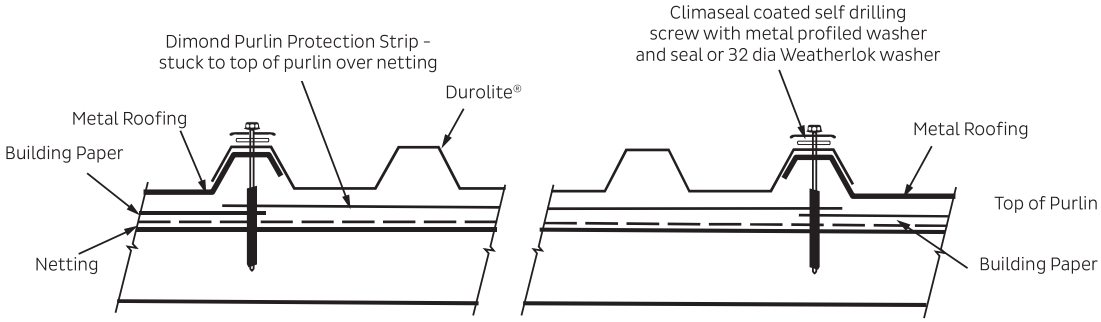


Fig 6 Detail For Single Durolite® Sheet With Dimondek® 400

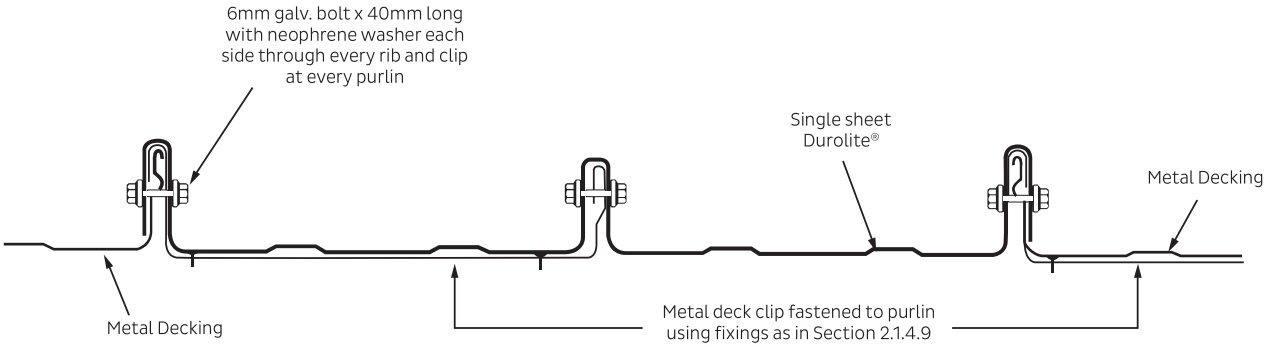


Fig 7 Multiple Durolite® Sheet Detail With Dimondek® 400

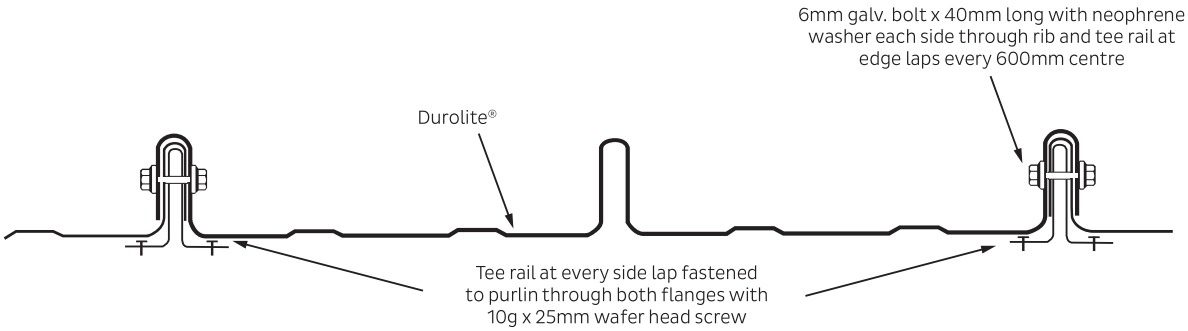


Fig 8 Durolite® Dimondek® 630 Side Lap Detail With Metal Roofing (Over/Over Process)

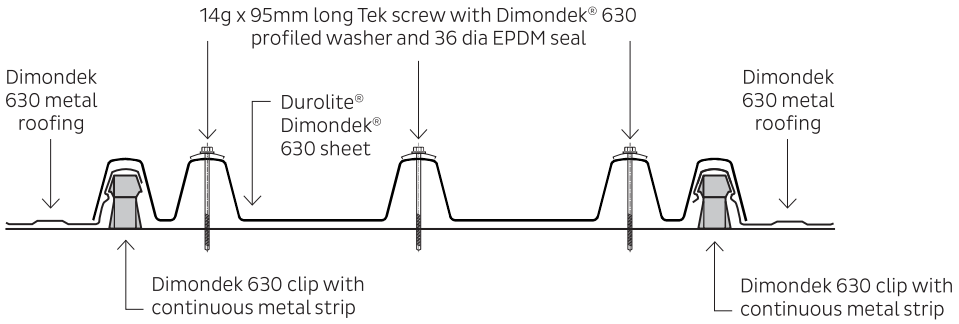


Fig 9 DSR5 Skylight Detail

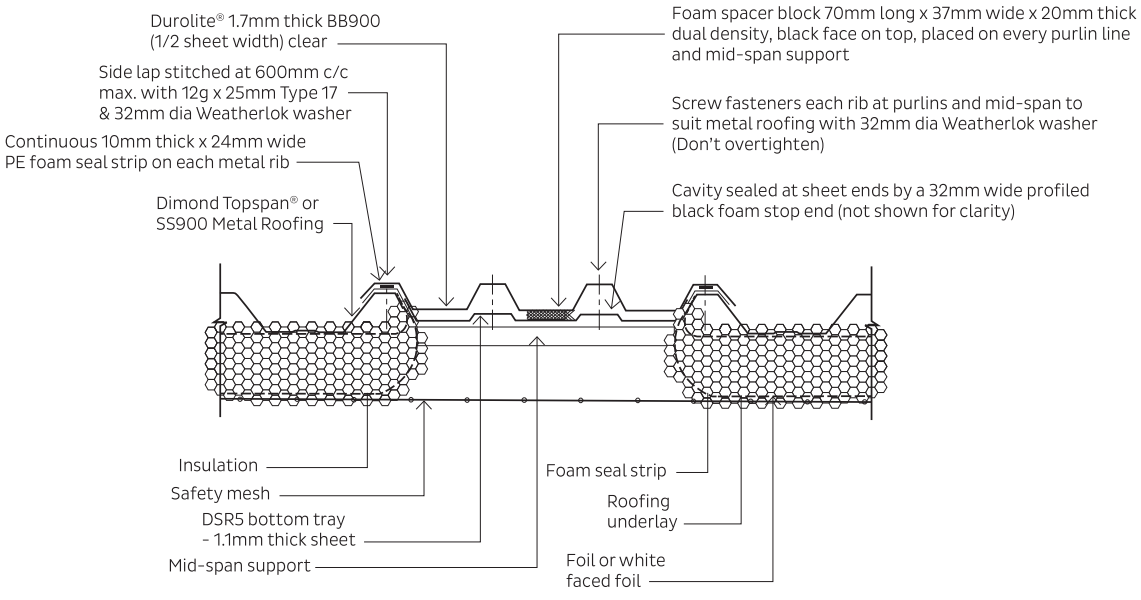
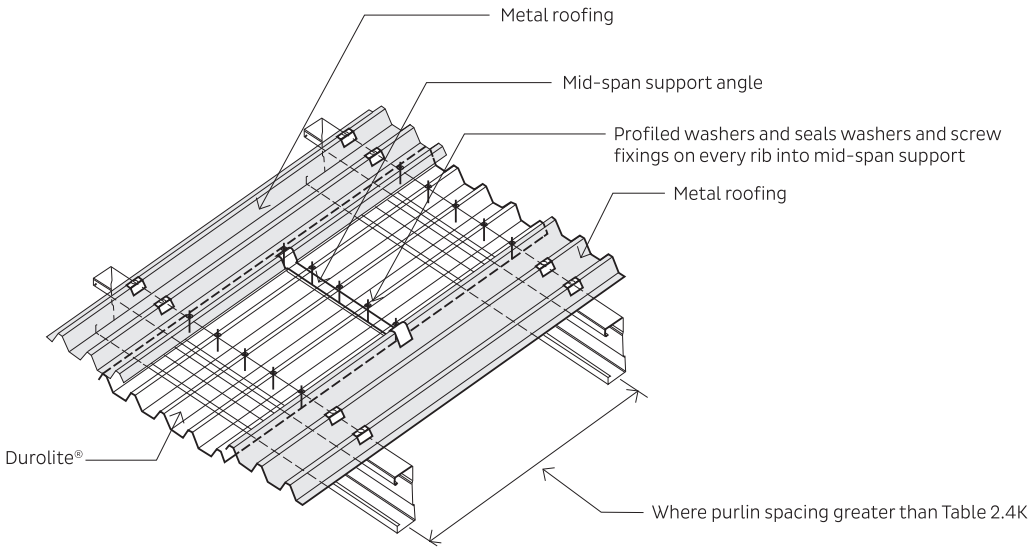


Fig 10 Mid-Span Support Detail (All Profiles Except Decking)



Dimond purlin protection strip

The recommended strip to use as a barrier between the purlin/mesh and Natural Lighting sheets is Purlin Protection Strip (PPS). These flat sheet strips of GPP are provided with double sided tape on one side for attachment onto the purlin over the netting or safety mesh before the Natural Lighting sheets are fixed down. They are supplied in either 70mm or 90mm wide strips to best suit the purlin flange width.

Fasteners

1. Primary Natural Lighting sheet fasteners should be the correct length gauge and grade of screw fastener for the profile and will therefore be specified as the same fastener as for the adjoining metal sheeting. Clearfix 12g x 65mm long hex head self- drilling screws, drill both an oversized clearance hole in the Natural Lighting sheet and self-drill into timber or steel purlins. Suitable for Corrugate, Styleline/Veedek®/Hi Five/Six Rib, Dimondclad into timber or steel purlins and DP955®, BB900, LT7® and V-Rib profiles into steel purlins only.
2. Washers, metal profiled shaped washers used with a 36mm diameter EPDM seal.
3. Lap stitching fasteners Stitching to metal

   Stitching to fibreglass sheet – gutter bolt with compressible rubber sleeve

Dimond skylight film

Low-cost condensation carrier/barrier beneath Dimond Natural Lighting products. The film is manufactured from a mix of virgin polymers to give a high tear resistance, and has additives for protection against rapid UV degradation. The film carries a durability period of 10 years. Genuine Dimond Skylight Film is branded on the film and has a thickness of 125 microns. Available in widths of 1000mm or 1300mm and roll sizes of 50 lineal metres or 100 lineal metres.

Flashings

Natural Lighting Stop End – purpose made angle to suit profile rib height and to extend at least 50mm under the sheet to allow fixing and silicone sealant.

Mid Span Support

Purpose made angle with folded end profiles to fit over adjoining metal sheeting ribs. For Dimondek® 630 the end profiles fit under and snap into the rib. Manufactured from 0.95mm G250 Z450 galvanised steel unless otherwise specified. The mid span support is not intended to support point loads from foot traffic.

Dimond Rainwater Systems

Scope of Use
Dimond Rainwater Disposal Systems are intended to collect and channel water that runs off a roof. It is intended that the metal gutters be placed at the perimeter of the building, and not in an internal situation. Use of the products is subject to the limitations listed below.

Requirements
Attention to the following details is required to ensure the expected system performance is achieved.

- The selection of the type and grade of gutter and bracket material and fasteners must be based on the life expectancy required and the severity of the external and internal environments.
- Site storage that keeps the product dry and protected from damage.
- Product handling that prevents surface damage.
- Correct installation of the brackets and gutter and snow straps.
- Allowance for thermal expansion and contraction.
- Sufficient fall to permit complete surface water drainage, allowing the gutter to completely dry out and not hold water.
- Control of allowable contact with dissimilar materials.
- Awareness and implementation of maintenance requirements, particularly for surfaces not washed by natural rainfall.

Use Outside the Stated Guidelines
If the need arises to use Dimond Rainwater Disposal Systems outside the limitations and procedures given in this or other referenced literature, or, if any doubt exists on product handling or use, written approval for use must be obtained from Dimond, before the project commences.

Rainwater Installation Handling & Storage

Correct handling of rainwater disposal products is critical to ensure damage does not occur during transportation and storage of the material. The following comments are made as guidelines to use when inspecting Dimond rainwater disposal systems during the installation process.

Visual inspection of materials when they are delivered to the site should be carried out to ensure they are in a dry condition, free from damage and are the correct material grade for the environment they are being installed in.

All components stored on site must be kept dry. Site storage should be out of direct sunlight and if outside, must be protected by covers that remain clear of the material surface at all times. Strippable film applied to rainwater goods must be removed within half a day of delivery to site. Prolonged UV exposure to strippable film will make removal difficult and when exposed to sunlight, film must be removed immediately upon gutter installation.

The need to keep the products dry applies to all metal types. If aluminium is stored wet it will suffer black staining that detracts from appearance. If prepainted Zincalume® or MagnaFlow™ products are stored wet, the paint finish will blister due to moisture absorption and eventual under-film corrosion. If unpainted Zincalume® products are stored wet the surface will stain and can suffer loss of protection that will show up in time as premature corrosion.

Layout & fixing

The following comments are made as guidelines to use when inspecting Dimond rainwater disposal systems during and after installation.

The gutter will be delivered to site in custom run lengths up to 6 metres maximum.

Brackets shall be fixed to the outside face of the fascia panel at specified centres to a line to provide sufficient fall to the outlet position to avoid ponding in the gutter. To achieve this, a minimum fall of 1:500 is recommended. The levelness of the structure shall not be relied upon to determine fall. String lines or laser lines are recommended.

Any exposed metal foot on the brackets should be protected with a suitable paint system.

Fixings can be screws or nails depending on the substrate and gutter size, and shall have a durability equal to or better than the anticipated durability of the bracket or gutter making sure the materials are compatible. Large gutter sizes above Box 125 will require fixings to also resist wind uplift loads.

Where possible, gutter runs shall be continuous from corner to corner within the 6 metre standard length limitation.

Laps shall be formed to suit water flow direction and where possible away from the line of sight. All laps shall be positioned away from doorways and access ways. All laps must be sealed and rivetted with no sealant build-up on the inside lap edge. For gutters supported by external brackets, it is good practice to position laps such that they are covered by a gutter bracket.

Internal brackets should be positioned and fixed under roof profile rib and not the pan or trough, to allow unobstructed discharge into the gutter.

Stop ends shall be formed wherever gutter runs are terminated, except where the termination occurs at a rainhead.

Placement of downpipes must be to suit the roof catchment area for the flow capacity of that gutter size. Droppers must be positioned at the lowest point of the gutter run.

There should always be an overflow outlet provided as a secondary means to allow water to discharge to the building outside, should a blockage occur or in heavy rainfall conditions beyond the scope of design. This must eliminate water from the gutter entering the building. Overflows cross sectional area should be at least the same cross-section area as the primary outlet size.

General Workmanship

The following comments are made as guidelines for designers to use when inspecting Dimond rainwater disposal systems during and after installation.

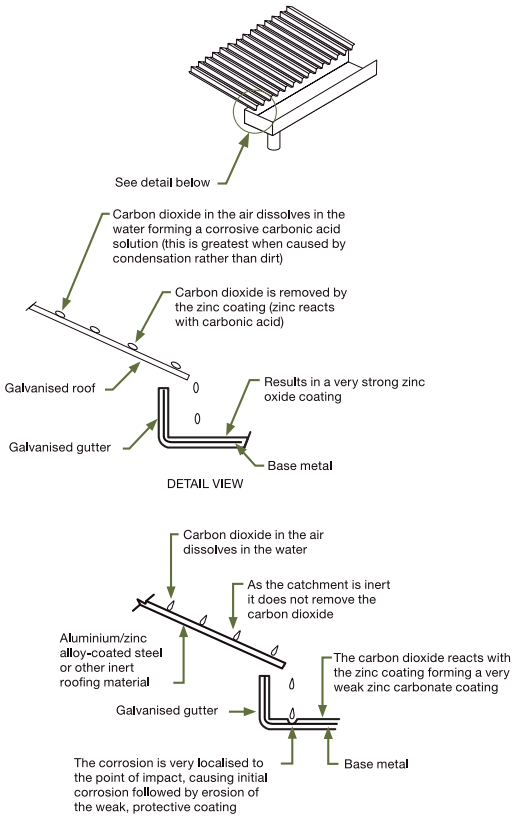
Dissimilar Materials

Care should be taken to ensure that incompatible materials have not been used. Where necessary, water run-off from dissimilar materials should be contained and discharged using compatible materials.

Drilling and Cutting

Where gutter lengths require cutting, only shears, powered nibblers or hand shears should be used to leave a cleanly cut edge.

Any drilling should be carried out well clear of other lengths of gutter. All drilling swarf should be removed from the surface of the gutter immediately.



Ponding
Gutters shall be laid with a positive fall to the outlet to avoid ponding. Any ponding that occurs should drain or dry away within hours otherwise it may affect any material warranty.

General Appearance
Laps shall be formed to avoid the water flow entering them and where possible to suit the line of sight.

Sealants
Only neutral cure silicone sealants should be used.

Where outlets (droppers) are fitted to the sole of the gutter, sealant must not restrict the flow of water to the downpipe or hold unnecessary dirt.

All sealed joints must be mechanically fastened, and excessive sealant removed to prevent unnecessary dirt build-up.

Strippable Film
Strippable film must be removed within half a day of delivery to site. Prolonged UV exposure to strippable film will make removal difficult. Film must be removed from laps and difficult to access areas prior to final fixing in place and the balance removed immediately upon gutter installation.

Scratches and Touch-up
Scratches that have not penetrated to the base metal (on prepainted material) and minor surface abrasions should be left alone, as touch-up painting will become obvious in time.

Any product with heavy scratch damage (e.g. scratches readily visible from a 3-4 metre distance and that exposes the base metal) needs to be replaced.

Copper and Zinc Joints
Copper and Zinc joints are to be riveted and soldered together, sealant is not to be used. Care must be taken to remove all trace of spirits of salts by washing the joint thoroughly. Providing for expansion and contraction should be allowed for as detailed in the New Zealand Metal Roof and Wall Cladding Code of Practice.

Maintenance requirements

Regular washing of all surfaces not normally washed by rainfall (called ‘unwashed areas’) especially around the soffit area needs to be done with clean fresh water. Regular washing may be anything from 3 monthly to 12 monthly periods. Washing should either be with a stiff soft bristled brush or water blasting at a pressure of 1500-2000 psi.

Care needs to be taken to avoid driving water into the soffit ends and roof space, by working away from soffit joints.

Should the fascia panel or parts of it become corroded over time, it must be repaired when it is first noticed. We recommend the corrosion is neutralised, then corrosion cleaned off, fascia washed down to remove dirt, oils and any grease or silicone, before priming and applying two coats of acrylic roof paint to the paint manufacturer’s recommendation.

Alternatively, badly corroded lengths should be replaced, but expect colour variations due to paint fade that may not be acceptable or aesthetically pleasing for the end user.

Installation and maintenance guidelines installation checklist

Gutter installation

Gutter or spouting blockages can cause flooding because of the build-up of debris. Regular inspection and maintenance must be carried out to ensure that gutters are free-draining, overflow outlets can also prevent damage. The Installation Guide does not recommend permanent gutter leaf guards. Although they do prevent large pieces of debris from obstructing the outlets, they allow finer particles to collect on the sole of the guttering.

Without regular maintenance, the prolonged wetting of the interface between any debris and the metal can lead to early corrosion of the roof or gutter. The decay of organic matter such as leaves can produce organic acids, which will also accelerate corrosion.

The build-up of matter on the upper surface of the leaf guard can also form a poultice, which increases the time of wetness and acidity and can accelerate corrosion of the roof sheet ends.

Gutters

- Materials compatible with environment and roofing material used Laps sealed and correctly fastened
- Sufficient fall provided to avoid ponding
- Thermal expansion accommodated where necessary
- Secondary means of water discharge to eliminate water overflow from gutter entering the building

Brackets

- Correct type and size to suit the gutter chosen Snow straps installed if in Snowfall Region

Fasteners

- Correct type and size to suit bracket and environment Fixings to resist wind uplift of gutter

Droppers and Downpipes

- Droppers to be positioned at lowest point of gutter run
- Correct downpipe size and placement to handle flow load of roof and gutter chosen

Maintenance

Dimond rainwater disposal systems require at least the following maintenance as a minimum to ensure reasonable performance is achieved. Additional regular maintenance can extend the useful life of the products. We define “regular” as often as is needed to avoid dirt build up on the gutter surface.

- Keep surfaces clean and free from continuous contact with moisture and debris. The use of a proprietary leaf build-up protection system does not remove the need for regular gutter cleaning to remove any accumulated dirt and debris build-up on the roof or gutter.
- Ensure that areas that are not washed by rainfall are cleaned regularly with water spray and/or if necessary by scrubbing with a soft nylon brush. This includes the foot of the internal brackets.
- At the first sign of corrosion, the affected areas should be cleaned down, spot primed and then repainted to an appropriate paint manufacturer’s recommendations.
- Some fading of the surface coating will occur over time, making repainting necessary to retain aesthetic value.

Gutter brackets in snowfall areas

When installing gutters in areas subjected to snow fall in New Zealand, the gutter bracket spacings must be reduced and snow straps installed to take the increased snow weight that may be experienced during periods of snow fall to avoid damage to the gutter system.

This is a guide to the snow fall regions. Please refer to the standard AS/NZS 1170.3 for full details, available for purchase from www.standards.govt.nz

	Sub Alpine Snow Region	Height above sea level (m)	Region description
North Island	N1	400 to 1200	South of a line from Opotiki to Turangi and across to New Plymouth
South Island	N2	200 to 900	West of Southern Alps from Nelson to Milford Sound
	N3	150 to 900	Nelson East to Cheviot
	N4	0 to 900	East of Southern Alps Cheviot to Moeraki into Omarama
	N5	0 to 900	South of Moeraki around to Milford Sound

Note: Regions with a height above sea level great than shown above require specific design and are outside Dimond recommendations.

Dimond Gutter shape type	Gutter Bracket	Maximum gutter bracket and snow strap spacing (mm) by Snow Region									
		N1		N2		N3		N4		N5	
		Gutter Brackets	Snow Straps	Gutter Brackets	Snow Straps	Gutter Brackets	Snow Straps	Gutter Brackets	Snow Straps	Gutter Brackets	Snow Straps
125 Quad	Internal	600	900	600	600	600	600	600	500	600	600
Deep Quad	Internal	600	900	600	600	600	600	600	500	600	600
Quad SI	Internal	600	900	600	600	600	600	600	500	600	600
Box 125	Internal	600	900	600	600	600	600	450	500	450	600
Box 125	External	900	900	600	600	600	600	450	500	600	600
Box 175	External	900	900	600	600	600	600	450	500	600	600
Box 200	External	600	900	600	600	600	600	450	500	600	600
150 Half Round	External	900	900	600	600	600	600	450	500	600	600
200 Half Round	External	900	900	600	600	600	600	450	500	600	600

Notes:

1. Based on an 8m maximum single roof run.
2. Situations where upper roofs allow snow to fall onto lower roofs are excluded and require specific design.
3. Each Snow strap is fixed to roof and into purlins using 2 x 12 gauge self drilling screws.
4. Each Snow strap is fixed to the gutter using 2 x 4.8mm diameter aluminium rivets minimum.
5. Snow strap min sizing to be 0.55mm x 25mm.
6. Formed snow straps are available for 125 Quad, 150 Half Round & 200 Half Round.
7. Box 175 can only be used with External Brackets in Regions subject to snowfall.
8. Internal brackets are not recommended for use in areas that are subject to snow fall and or wind above medium velocity (as determined by NZS 3604).

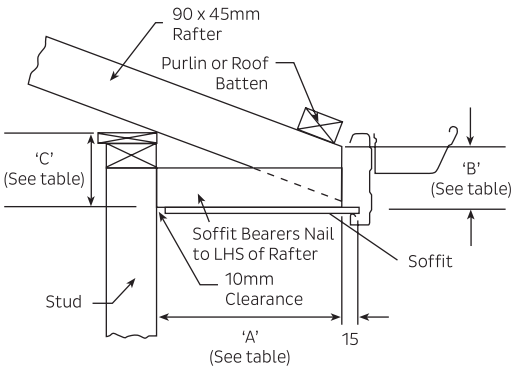
Dimond Fascia

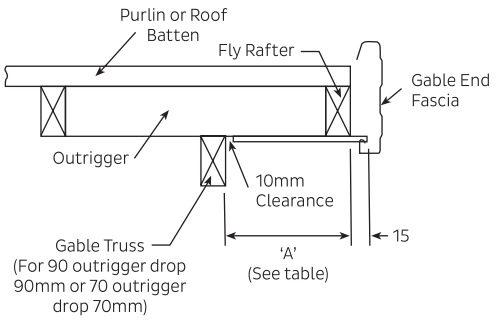
Construction instructions
Selection of metal fascias needs to be made before the trusses are manufactured as the set-out dimension may vary between the different systems available.

- Builders must ensure the timber soffit bearers are correctly set out using the published guidelines for the roof type being used prior to the fascia installation.
- Fascia brackets are nailed or screwed onto the soffit bearers to a level and true alignment using a string line.
- 6m maximum length of fascia are then fitted to the fascia brackets, cut back in length where necessary, and lengths joined together using normal roofing practice with silicone sealant and 4mm diameter rivets at 150mm maximum centres. Corner soaker caps are fitted over the fascias and rivetted on to cover corner joints or can be mitred cut.
- Metal fascia systems are required to be installed by specialist rainwater installers. Metal roofers do not normally install fascia.
- We do not recommend, support or approve DIY installations. Specialist companies throughout New Zealand install Dimond fascia. Contact Dimond for a list of installers in your area. Phone 0800 DIMOND (0800 346 663).

147mm Fascia:

Guideline - Metal Tiles and Metal Long Run





Hip & Gable Roof - Eaves Detail

Soffit Width (mm)	300	450	600	750	900
Dimension 'A' (mm)	295	445	595	745	895

Notes:

- A 10mm soffit clearance has been allowed for:
- Soffit bearers fixed to LEFT hand side of rafter (viewed from outside).
- Based on minimum Purlin/Roof batten thickness of 45mm.

Gable End Detail

Soffit Width (mm)	300	450	600
Dimension 'A' (mm)	295	445	595

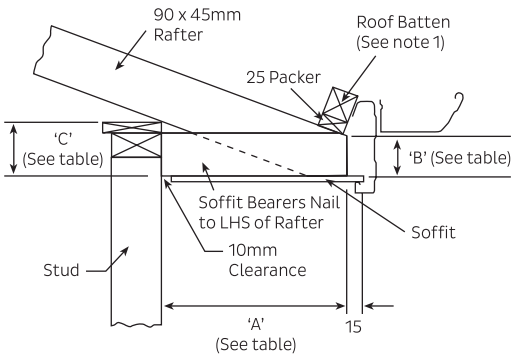
Roof Pitch (Degrees)	Drop Height – Dimensions 'C' (mm) *See note 8 Soffit Width (mm)					
	300	450	600	750	900	B" Toe Cut
10	60	86	113	139	165	95
12.5	72	105	138	171	205	95
15	87	127	167	208	248	96
17.5	98	145	192	240	287	96
20	113	167	222	277	331	97
22.5	129	191	253	315	377	101
25	142	212	282	352	422	105
30	170	257	344	430	516	109
35	206	311	416	521	626	116
40	247	373	499	625	751	122
45	280	420	580	730	880	129

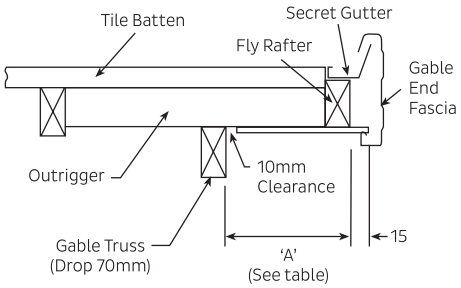
Notes for Installers

1. To ensure birds cannot enter the roof space, there should be no gap between the bottom purlin and the back face of the gutter after the system has been installed.
2. The 147 small panel fascia system is suitable for use with metal tiles and roofs with sloping soffits up to 22.5o roof pitch.
3. Over 25o roof pitch, a kickout may be required on all gable ends.
4. As an alternative to note 3, for gable end roofs, outriggers to be from finished timber sizes 70mm x 45mm i.e. gable end truss drop 70mm, avoiding kickouts up to 40° roof pitch.
5. NOTE: Soffit bearers are required on all hip corners and should be cut back 20mm to all free movement of the spouting.
6. Zincalume® coated gutters should have a minimum fall of at least 1:500 and should not have permanent ponding.
7. Where loose fill insulation is used, the soffit must be blocked off at the top plate to prevent the insulation coming into contact with the metal fascia. Check with your nearest distributor for further details.
8. Allows for a 16-18mm gap for easy fascia panel removal. If gap is not required dimensions will need to be altered

Guideline - Concrete Tile Roofs

Hip & Gable Roof - Eaves Detail





Hip & Gable Roof - Eaves Detail

Soffit Width (mm)	300	450	600
Dimension 'A' (mm)	295	445	595

Notes:

- A 10mm soffit clearance has been allowed for:
- Soffit bearers fixed to LEFT hand side of rafter (viewed from outside).
- Based on minimum Purlin/Roof batten thickness of 47mm.

Gable End Detail

Soffit Width (mm)	300	450	600
Dimension 'A' (mm)	295	445	595

Finished timber sizes

- Outriggers 70mm x 45mm
- Fly rafter 90mm x 45mm

Roof Pitch (Degrees)	Drop Height - Dimensions 'C' (mm) *See note 8 Soffit Width (mm)					
	300	450	600	750	900	B" Toe Cut
17.5	72	119	166	213	261	85
20	84	141	195	250	305	88
22.5	101	163	226	288	350	91
25	117	187	257	327	397	95
30	150	237	323	410	497	100
35	187	292	397	502	607	112
40	227	353	479	605	731	124
45	275	425	575	725	875	135

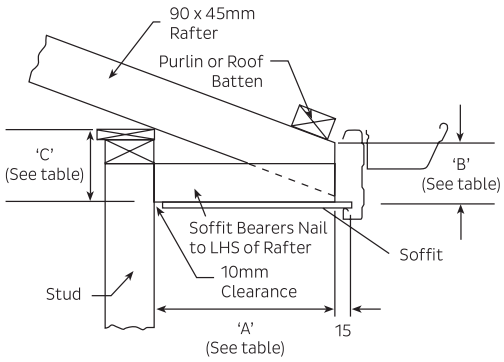
Notes for Installers

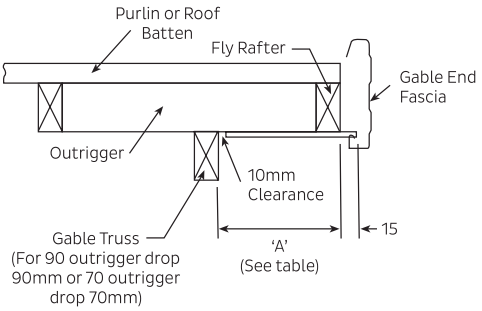
1. To ensure birds cannot enter the roof space, there should be no gap between the bottom purlin and the back face of the gutter after the system has been installed.
2. The 147 small panel fascia is not suitable on concrete tile roofs with sloping soffits.
3. For concrete tile gable end roofs, outriggers to be from finished timber sizes 70mm x 45mm i.e. gable end truss drop 70mm.
4. Over 25o roof pitch, a kickout is required on all gable ends.
5. NOTE: Soffit bearers are required on all hip corners and should be cut back 20mm to allow free movement of the spouting.
6. The use of concrete tiles on the barge ends is not a recommended practice as highlighted in the New Zealand Metal Roof and Wall Cladding Code of Practice Section 4.9 Compatibility. No warranty is offered by Pacific Coil Coaters or New Zealand Steel for corrosion if this method is used. A barrier is required to isolate between the concrete tile and fascia and all installations require a bottom batten around the edge of the roof line to support the concrete tile independently, so the concrete tile does not rest on the fascia.
7. Zincalume® coated gutters should have a minimum fall of at least 1:500 and should not have permanent ponding.
8. Where loose fill insulation is used, the soffit must be blocked off at the top plate to prevent the insulation coming into contact with the metal fascia. Check with your nearest distributor for further details.
9. Allows for a 16-18mm gap for easy fascia panel removal. If gap is not required dimensions will need to be altered.

165mm PALTEC Fascia:

Guideline - Metal Tiles and Metal Long Run

Hip & Gable Roof - Eaves Detail





Hip & Gable Roof - Eaves Detail

Soffit Width (mm)	300	450	600	750	900
Dimension 'A' (mm)	295	445	595	745	895

Notes:

- A 10mm soffit clearance has been allowed for:
- Soffit bearers fixed to LEFT hand side of rafter (viewed from outside).
- Based on minimum Purlin/Roof batten thickness of 45mm.

Gable End Detail

Soffit Width (mm)	300	450	600
Dimension 'A' (mm)	295	445	595

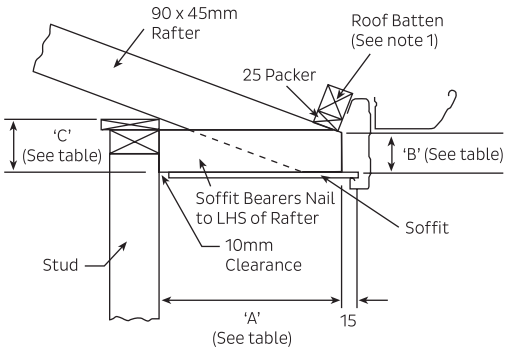
Roof Pitch (Degrees)	Drop Height - Dimensions 'C' (mm) *See note 8 Soffit Width (mm)					
	300	450	600	750	900	B" Toe Cut
10	73	100	127	154	184	92
12.5	87	121	155	189	223	93
15	101	142	183	224	265	96
17.5	115	163	211	259	307	94
20	129	184	239	294	349	96
22.5	145	205	265	325	385	96
25	155	225	295	365	435	100
30	189	275	361	447	533	104
35	220	325	430	535	640	112
40	253	380	507	635	762	118
45	293	442	591	740	889	125

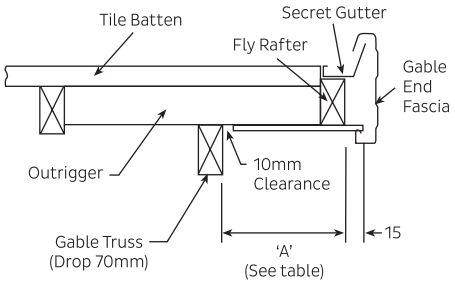
Notes for Installers

1. To ensure birds cannot enter the roof space, there should be no gap between the bottom purlin and the back face of the gutter after the system has been installed.
2. The 147 small panel fascia system is suitable for use with metal tiles and roofs with sloping soffits up to 22.5o roof pitch.
3. Over 25o roof pitch, a kickout may be required on all gable ends.
4. As an alternative to note 3, for gable end roofs, outriggers to be from finished timber sizes 70mm x 45mm i.e. gable end truss drop 70mm, avoiding kickouts up to 40° roof pitch.
5. NOTE: Soffit bearers are required on all hip corners and should be cut back 20mm to all free movement of the spouting.
6. Zincalume® coated gutters should have a minimum fall of at least 1:500 and should not have permanent ponding.
7. Where loose fill insulation is used, the soffit must be blocked off at the top plate to prevent the insulation coming into contact with the metal fascia. Check with your nearest distributor for further details.
8. Allows for a 16-18mm gap for easy fascia panel removal. If gap is not required dimensions will need to be altered.

Guideline - Concrete Tile Roofs

Hip & Gable Roof - Eaves Detail





Hip & Gable Roof - Eaves Detail

Soffit Width (mm)	300	450	600
Dimension 'A' (mm)	295	445	595

Notes:

- A 10mm soffit clearance has been allowed for:
- Soffit bearers fixed to LEFT hand side of rafter (viewed from outside).
- Based on minimum Purlin/Roof batten thickness of 47mm.

Gable End Detail

Soffit Width (mm)	300	450	600
Dimension 'A' (mm)	295	445	595

Finished timber sizes

- Outriggers 70mm x 45mm
- Fly rafter 90mm x 45mm

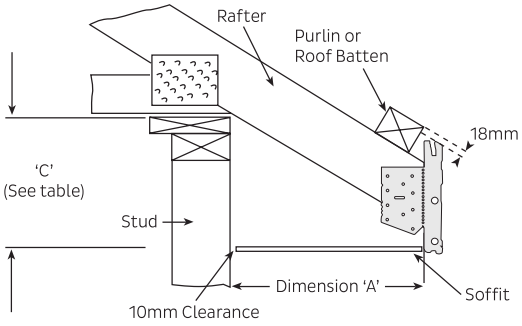
Roof Pitch (Degrees)	Drop Height - Dimensions 'C' (mm) *See note 8 Soffit Width (mm)					
	300	450	600	750	900	B" Toe Cut
17.5	109	162	209	260	309	95
20	125	185	238	295	352	96
22.5	138	202	267	332	396	99
25	155	227	300	373	445	100
30	181	268	355	441	528	104
35	220	327	435	544	651	111
40	251	378	502	628	756	118
45	285	430	574	719	836	125

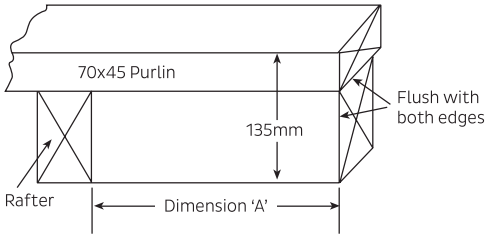
Notes for Installers

1. To ensure birds cannot enter the roof space, there should be no gap between the bottom purlin and the back face of the gutter after the system has been installed.
2. The 147 small panel fascia is not suitable on concrete tile roofs with sloping soffits.
3. For concrete tile gable end roofs, outriggers to be from finished timber sizes 70mm x 45mm i.e. gable end truss drop 70mm.
4. Over 25o roof pitch, a kickout is required on all gable ends.
5. NOTE: Soffit bearers are required on all hip corners and should be cut back 20mm to allow free movement of the spouting.
6. The use of concrete tiles on the barge ends is not a recommended practice as highlighted in the New Zealand Metal Roof and Wall Cladding Code of Practice Section 4.9 Compatibility. No warranty is offered by Pacific Coil Coaters or New Zealand Steel for corrosion if this method is used. A barrier is required to isolate between the concrete tile and fascia and all installations require a bottom batten around the edge of the roof line to support the concrete tile independently, so the concrete tile does not rest on the fascia.
7. Zincalume® coated gutters should have a minimum fall of at least 1:500 and should not have permanent ponding.
8. Where loose fill insulation is used, the soffit must be blocked off at the top plate to prevent the insulation coming into contact with the metal fascia. Check with your nearest distributor for further details.
9. Allows for a 16-18mm gap for easy fascia panel removal. If gap is not required dimensions will need to be altered.

185mm Fascia:

Guideline - Metal Tiles and Metal Long Run





Hip & Gable Roof - Eaves Detail

Soffit Width (mm)	300	450	600
Dimension 'A' (mm)	295	445	595

Notes:

- 90x45 soffit bearer used unless stated.
- Soffit bearers fixed to right or left hand side of rafter.
- 10mm clearance allowed for soffit.

Gable End Detail

Soffit Width (mm)	300	450	600
Dimension 'A' (mm)	295	445	595

Roof Pitch (Degrees)	Drop Height - Dimensions 'C' (mm) Soffit Width (mm)			
	300	450	600	750
10	95	123	151	179
12.5	107	140	173	206
15	120	160	200	240
17.5	133	180	227	274
20	145	200	254	309
22.5	160	222	284	346
25	173	243	313	383
27.5	188	266	344	422
30	202	289	376	463
35	233	338	443	548
40	268	394	520	646
45	306	456	606	756
50	350	529	708	887

Notes for Installers

1. To ensure birds cannot enter the roof space, there should be no gap between the bottom purlin and the back face of the gutter after the system has been installed.
2. NOTE: Soffit bearers are required on all hip corners and should be cut back 10mm.
3. Where loose fill insulation is used, the soffit must be blocked off at the top plate to prevent the insulation coming into contact with the metal fascia.
4. Zincalume® coated gutters should have a minimum fall of at least 1:500 and should not have permanent ponding. Check with your nearest distributor for further details.

Guideline - Concrete Tile Roofs

Hip & Gable Roof - Eaves Detail

Soffit Width (mm)	300	450	600
Dimension 'A' (mm)	295	445	595

Notes:

- 90x45 soffit bearer used unless stated.
- Soffit bearers fixed to right or left hand side of rafter.
- 10mm clearance allowed for soffit.

Gable End Detail

Soffit Width (mm)	300	450	600
Dimension 'A' (mm)	295	445	595

Finished timber sizes

- Outriggers 70mm x 45mm
- Fly rafter 90mm x 45mm

Roof Pitch (Degrees)	Drop Height - Dimensions 'C' (mm) *See note 8 Soffit Width (mm)			
	300	450	600	750
17.5	107	154	201	248
20	118	173	227	282
22.5	133	195	257	319
25	145	215	285	355
27.5	160	238	316	394
30	173	260	347	434
35	202	307	412	517
40	235	361	487	613
45	271	421	571	721

Notes for Installers

1. To ensure birds cannot enter the roof space, there should be no gap between the bottom purlin and the back face of the gutter after the system has been installed.
2. 185mm External Fascia and Gutter is not suitable on concrete tile roofs with sloping soffits.
3. NOTE: Soffit bearers are required on all hip corners and should be cut back 10 mm.
4. The use of concrete tiles on the barge ends is not a recommended practice as highlighted in the New Zealand Metal Roof and Wall Cladding Code of Practice Section 4.9 Compatibility. No warranty is offered by Pacific Coil Coaters or New Zealand Steel for corrosion if this method is used. A barrier is required to isolate between the concrete tile and fascia and all installations require a bottom batten around the edge of the roof line to support the concrete tile independently, so the concrete tile does not rest on the fascia.
5. The use of concrete tiles on the barge ends is not a recommended practice as highlighted in the New Zealand Metal Roof and Wall Cladding Code of Practice Section 2 under Compatibility 2.7.2. Should people continue to use this method then there should be some sort of barrier between the two and there is no warranty offered by Pacific Coil Coaters or New Zealand Steel for corrosion if this method is used. This means that all installations should have a bottom batten around the edge of the roof line rather than let the concrete tile rest on the fascia.
6. Where loose fill insulation is used, the soffit must be blocked off at the top plate to prevent the insulation coming into contact with the metal fascia.
7. Zincalume® coated gutters should have a minimum fall of at least 1:500 and should not have permanent ponding. Check with your nearest distributor for further details.

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