

## INSTALLATION – PURLIN SYSTEMS

## 2.5.1

### GENERAL

The fixing of Dimond Structural Purlin Systems is generally carried out by steel fabricators and riggers who are familiar with installation of Dimond Structural Purlin Systems.

Dimond Structural Purlin Systems are not intended to be installed by builders, handymen, home owners etc. without appropriate experience.

## 2.5.2

### SAFETY CONSIDERATIONS

It is important to follow Health and Safety protocol established for the site as well as identifying on-site hazards and hazards during handling and installation of Dimond Structural Purlin Systems, which may include (but are not limited to) the following:

- Weather conditions can cause the steel purlin/girt/bracing surfaces to become slippery.
- Working at height requires suitable fall arrest and/or perimeter barriers, including barriers around open areas.
- Muscle or back strain from manual handling.
- Where required, timber used with Dimond Structural Purlin Systems can cause splinters.
- Inadequate fastening of Dimond Structural Purlin Systems to the support structure can result in collapse during construction.
- Handling of Dimond Structural Purlin Systems requires the use of gloves made from appropriate material to resist cuts from sharp steel edges and corners.
- Lifting of bundles of Dimond Structural Purlin Systems requires attention to correct lifting equipment and attention to hazards with bundles lifted overhead.
- DHS purlins and Top Notch purlins are not suitable for 'walking the purlins' during construction as manufacturing lubricant may be present.

Pre-installation safety checks must include (but are not limited to) the following:

- Ensure all personnel involved on site are aware of the potential hazards and appropriate safety equipment, and PPE is available and all personnel are trained in its use.
- PPE should include at least: safety boots, hard hat (with chin-strap), Hi viz vest, gloves (long sleeves and long pants are advised).
- If temporary structure is to be used, ensure this has been specifically designed and is installed securely prior to placement of Dimond Structural Purlin Systems.

## 2.5.3

### HANDLING AND STORAGE

Correct handling and storage is critical to ensure the Dimond Structural Purlin System is not damaged on site. The following points must be adhered to for maximum product durability and performance over the expected life of the product.

- When delivery is taken on site, a visual inspection of the materials supplied is required to ensure the product is free from damage and the galvanised coating is in good condition to protect the steel substrate.
- Replace any damaged product. Product with a distorted or buckled section shape must not be installed.
- Site storage must be clear of the ground on dunnage to allow the free movement of air around each bundle. When product is stored on site, it must be kept dry using covers over each product bundle. Any product showing white or red rust corrosion is required to be replaced and must not be used without Dimond Structural approval. Contact Dimond Structural on 0800 Roofspect (0800 766 377).
- Move product by lifting rather than dragging as damage to the galvanised coating will occur.
- Bundle labels should be checked to ensure the correct product and lengths are placed in the designated area.
- Bracing Systems must not be relied upon to act as lifting points during craneage of pre-assembled sections.

## GENERAL FIXING AND WORKMANSHIP

The following points provide guidance on general fixing and workmanship for Dimond Structural Purlin Systems,

- Bundle labels should be checked to ensure the correct size and type is used for the designated area.
- DHS Purlins/girts are placed on the upside of the portal cleat (or at premarked centres for Top Notch purlins), and fixed onto the cleat or rafter.
- Installation of DHS Purlin Systems relies on the correct bolt type, diameter and washer being located through each cleat hole and tightened.
- Washers are to be used, placed against each side of the DHS purlin/girt under the nut and bolt head.
- Bolts are tightened using the part turn tightening method, commonly termed snug fit. There are two stages, the first involves bringing the mating surfaces of the joint into effective contact by initially tightening the bolt. The second stage involves marking the bolt and nut relative to each other and then completing a further half turn.
- Self-drilling fasteners are installed as per the engineer's specification, and tightened with mechanical drivers set to a preset torque setting. Avoid overtightening as this may damage the galvanised coating.
- Lapped Purlin/Girt Systems require additional fasteners to be installed in the lapped region. Refer CAD Details on-line, for the DHS Purlin System ([www.dimondstructural.co.nz/products/dhs-purlins](http://www.dimondstructural.co.nz/products/dhs-purlins)) or for the Top Notch Purlin System ([www.dimondstructural.co.nz/products/top-notch-purlins](http://www.dimondstructural.co.nz/products/top-notch-purlins)).
- Additional support straps for Top Notch purlins may be required as specified by the design engineer. Refer Support Strap 2.4.8.1.
- The purlin system must not be subject to or installed on spans that are excessive for the construction loads. All construction loads must have the design engineer's approval, prior to loading.
- All connections including those between the purlin system and primary structural framework must be fully fixed and tightened before any loads are applied. Similarly bracing members must be correctly positioned and fastened prior to installation of the roofing or cladding.
- Gas cutting of holes, or welding of members or connections is not recommended, as these may cause an unacceptable loss of member strength capacity. In addition, gas cutting or welding will remove the galvanised coating locally around the welded area, reducing the product's durability.
- The recommended method for cutting Top Notch purlins is either by hacksaw or shear cut such as tin snips. If using an abrasive disc blade, care must be taken to ensure the swarf doesn't fall on other products causing rust stains. After cutting, the burred cut edge must be cleaned off and primed with a zinc rich primer.
- Roofing and wall cladding sheets can 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.
- Curved roofs (whether draped/rolled or crimped) require purlin alignment within  $\pm 5\text{mm}$  to minimise the risk of unacceptable finished appearance.
- Suspended loads (such as ducting and piping) must not be hung from DHS purlin lips. Suspended loads are connected to the DHS purlin web or, if this is not possible, to the DHS purlin bottom flange within 25mm of the web. DHS Bracing Systems are not suitable for hanging suspended loads. For Top Notch purlins, suspended loads must be connected to both Top Notch bottom flanges or with straps tied over the Top Notch top flange. Hanging of suspended loads from Dimond Structural Purlin Systems requires specific design by the design engineer.
- Dimond Structural Purlin Systems are not intended to be used as members to which fall arrest anchor points are attached.

## BRACING SYSTEM INSTALLATION

Prior to the DHS purlin/girt system being fully installed and loads applied, the bracing system must be installed. Bracing systems are either Fastbrace or Bolted Brace Channel systems which run in continuous lines between all purlins/girts.

Practically, to avoid pulling the weight of all the purlins up the roof slope (or girts up the wall), the bracing system should be installed from the ridge down for DHS purlins (or from the eaves down for DHS girts).

Bolted Brace Channels rely on placing and tightening one bolt/washer/nut assembly through each of the top and bottom bracing holes through the brace cleats each side of the purlin.

Purpose-made cranked sag rods are installed at each bracing line in the lower holes on the DHS ridge purlins, to tie the bracing lines on each side of the rafter together at the ridge (or at a step in the roof). These rods are fitted with washers and double nuts and fully tightened up upon installing purlin bracing.

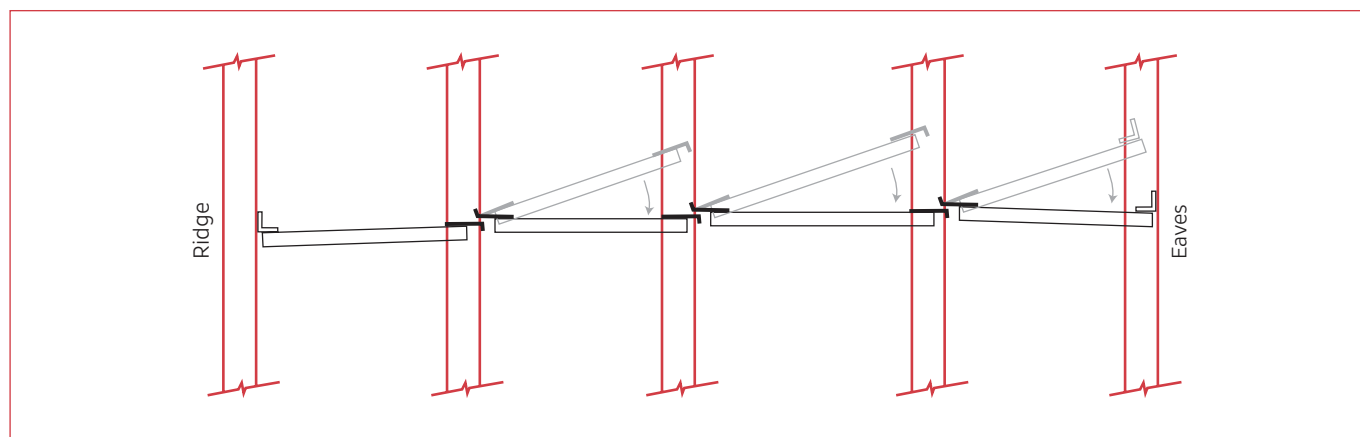
Adjustable Brace channels allow up to 20mm adjustment to be made anywhere in the bracing system, simply by installing this adjustable brace and fully tightening the hexagonal flange bolts. Refer Fastbrace 2.3.8.1 and Bolted Brace Channel 2.3.8.2.

Note, alternating brace channel and sag rods have been superseded by the use of Fastbrace and/or Bolted Brace Channel systems which run in continuous lines between all purlins/girts.

## FASTBRACE INSTALLATION

Installation of Fastbrace starts from the ridge and works down the roof slope, but the first row of Fastbrace must be bolted off on the top purlin before beginning the next row. For clarity, the procedure is illustrated for DHS purlins (girts are similar except the procedure starts at the eave and works down the wall).

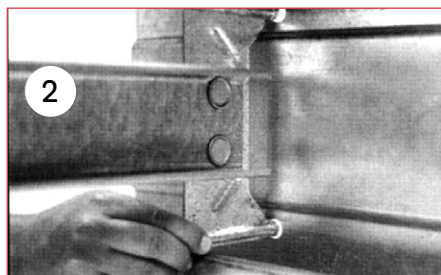
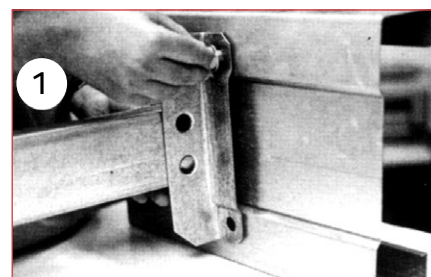
### Standard Installation Procedure



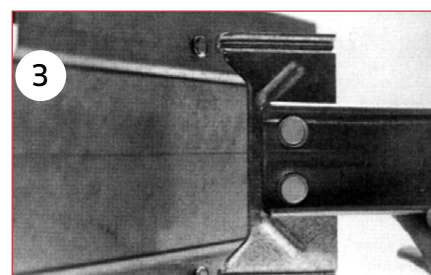
**Note:** As the eaves and ridge braces are bolted, there is a 25mm offset to the bracing line. This offset can be aligned, refer Fastbrace 2.3.8.1.

1. The end cleat is bolted to the purlin at the ridge.

It is critical to ensure that the bolted cleat at the ridge is on the left of the channel component (looking from the ridge down).

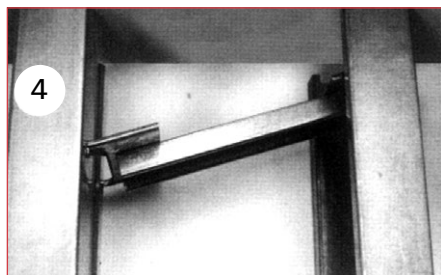


2. The locking tabs at the other end of the brace are then fitted into the second DHS purlin down the rafter and pushed to the right to lock half of the hole (looking from the ridge down).



3. The second brace is then inserted at a 45 degree angle into the other side of the second purlin. The Fastbrace is rotated until square to the purlin, locking the second half of the hole, fully engaging the locking tabs.

**Ensure all locking tabs are fitted into the purlin holes.**



4. Fit the other end of the brace into the next purlin. Repeat steps 3 and 4 of the process until the End Brace is bolted to the eave purlin.