Corrugated sheet roofing

Corrugated sheet roofing material is widely available and easy to use.

- 1. Corrugations should run in a straight line between the highest and lowest points, and at a right angle to the purlins (the intermediate supports).
- 2. The overlaps (ends and sides) depends upon the sloop of the roof (see below).
- 3. Purlin spacing should suit the end laps required for the size of sheet to be used.
- 4. Sheets should be laid so that the side overlaps are directed away from the prevailing wind.
- 5. All purlins should be in one plane and parallel to each other. They should be properly anchored to the supporting superstructure.
- 6. Ends of all sheets should be supported by purlins. The free overhang at the eaves should not exceed 300 mm.
- 7. 8 mm diameter (min) hook bolts, crank bolts or coach screws, should be inserted through 10 mm diameter drilled holes.- NEVER PUNCHED in the crown of the corrugations.

Nuts or screws should be tightened lightly at first, and then tightened again when a dozen or more sheets have been laid. At intermediate purlins, they should not be tightened in an attempt to make the sheet rest on the purlins.

A cat-ladder or roof board should always be used when working on a roof for safety of the person and to avoid damage to the roofing material.

Installation of corrugated roof sheeting These notes are intended to cover the use and installation of corrugated roof sheets such as PVC, other plastics and bitumen fibre sheets. Although very different as materials and where they are used, they do have similar properties regarding flexibility and weight. One advantage of these corrugated materials is that it is far more rigid than a flat sheet of a similar type and thickness. This enables considerable savings in both weight and cost, it also makes the sheet relatively easy to handle. Generally all these types of material can be used either as roofing or vertical cladding.

Most of these sheeting tends to be susceptible to condensation when used as cladding for outhouses etc. - being relatively thin they tend to have low thermal insulation properties. Condensation will be reduced if the interior of the structure is well ventilated.

Being thin sheeting, most types will act as a 'drum skin' when it rains. The sheets can also become heated by direct sunlight and this heating can be radiated into the building making it very uncomfortable in hot weather. A false ceiling suspended under the roof can reduce both of these problems, the void between the roofing and ceiling must be adequately ventilated to avoid excessive temperatures (especially important where plastic roof sheeting is used) and to minimise condensation. Choosing light colour sheets (or, where the material allows this, painting them white/silver) will reduce the internal heating effect.

PVC has a service temperature range of -20° C - $+60^{\circ}$ C. Care must be taken to ensure that it is not used in situations where the maximum service temperature could be exceeded. As such it is not recommended for use in situations where a false ceiling is to be erected below the rooflight, as this will cause heat build up in the sheet, exceeding the maximum temperature of $+60^{\circ}$ C which may lead to discoloration or distortion of the sheet.

Storing before use

Plastic and bitumen sheets must not be stored in a stack in direct sunlight, as solar heating will cause the sheets in the centre of the stack to distort. If sheets have to be left outside prior to installation, they should be covered completely by an opaque, light-coloured tarpaulin.



Avoid working with sheet in windy conditions, even in light it may he necessary to temporarily weight the sheets while working with them - this is especially relevant to light

weight plastic sheets.

The underlying roof structure

The roof structure will comprise rafters and purlins. The rafters take the full weight of the roof material plus any 'environmental build-up' (such as snow) and anyone working on the roof.

The pitch of the roof will determine the amount of end overlap necessary. In order to ensure that this can be achieved and to leave a neat appearance, the sheets should first be arranged loose on the roof. The end and side overlaps are a 'minimum', to avoid unnecessary cutting of sheets, the overlaps can be increased to hide any excess. At the same time, the positions of fixing screws and any saw cuts which may be needed can be marked on the sheets.

The spacing of the purlins needs to be arranged to suit the roofing while the rafters can be spaced as appropriate to take into account the overall weight. The spacing of the purlins, the end and side overlaps of the sheets depends on the angle of the roof - for most types of sheet, the following are good guidelines but check with the manufacturers of any particular type of sheet:

Roof pitch	Support	End overlap	Side overlap
1 in 12 to 1 in 6 (5 to 10 degrees)	Decking or close boarding	300mm	2 corrugations
1 in 6 to 1 in 4 (10 to 15 degrees)	Purlins at 450mm spacing	200mm	1 corrugation
1 in 4 or less (over 15 degrees)	Purlins at 600mm spacing	170mm	1 corrugation

Purlins must be at the correct centres and size for the material and slope of the roof. The position of purlins at the upper and lower ends of the roof and at the sheet overlaps are the critical points, there must be purlin where you need to nail. Having determined the upper, lower and overlap purlins, evenly space the remaining purlins in between. As an aid to setting out the purlins, use a timber spacer to keep the purlins square to the eaves. It is important that the maximum support centres given for the type of corrugated sheet being used are not exceeded between purlins.

Laying

the Commence fixing sheets at the lower edge of the roof at the opposite end to the prevailing winds. Stagger the sheets using a half sheet to start the second row.

Fixing

Commence fixing ridges at the opposite end of the roof to the prevailing winds. Overlaps should be about 125mm.

ridges

sheets





To prevent the ingress of water from driving rain, the sheets should be arranged to overhang the verge (the ends of the roof) by approximately one corrugation. Do not overhang the fascia by more than 70mm. If larger verge or fascia overlaps are used, the wind will tend to catch this area and wind damage to the roof may result.

Verges should be formed by either nailing the final corrugation over a raised barge board or using a ridge piece to lay over the verge.

Fixing

gutters

Do not overhang the fascia by more than 70mm. Draughts may be reduced by using foam filler pieces at the eves, but don't exclude all ventilation.

Cutting

Always follow the manufacturers guidelines for cutting the sheets. If cutting PVC is necessary, use a fine toothed hand saw or circular power saw - practice on a scrap piece of material to ensure that the material can be successfully cut. Lubricate with a general purpose lubricating oil to prevent binding.

Corrugated material is supplied in various lengths, so cutting can often be avoided by selecting the appropriate size (or a number of sizes) at the planning stage - you will probably need to cut alternative ends sheets lengthways so that the vertical joins are staggered. Where cutting across a sheet is necessary, lay one sheet on top of the sheet to be cut to mark the cutting line. If it has to be cut, to fit around projections for example, use a fine toothed hand saw at a shallow angle, supporting the sheet to minimise vibration. The sheet may be cut by sandwiching it between the others, leaving the part to be removed projecting from the stack.

Some plastics may crack or split if sawn or drilled in cold weather, so leave the sheets in a warm room for 2 or 3 hours prior to sawing or drilling.

Try to arrange that cut edges are concealed by the overlap of adjacent sheets.

Drilling

It is generally best (although more awkward) to drill sheets in-stitu so that holes line up with the purlins and holes in overlapping sheets line up. To accommodate thermal movement, the fixing holes should be drilled about 5mm greater in diameter than the fixing shank for sheet lengths up to 2m and an additional 2mm per additional metre length of sheet. Fixings should only be positioned on the crown of ridges when mounted and should always be used with a sealing washer which will normally eliminate rainwater seepage. Specially designed spacers which prevent profile distortion are available to remove the chance of inadvertent overtightening.

Drill over a firm support using light pressure with a hand drill or slow speed power drill fitted with a suitable drill bit. Make sure the drill bit does the cutting, this should avoid splitting of the material.

Fixing

Nail through the crown of the corrugations into the purlins or decking. Nail every corrugation at the sheet overlaps and at the top and bottom of the slope. Nail centres may be reduced to alternative corrugation at immediate purlins. So you don't 'lose' the purlins on opaque sheeting, mark the position of them on the top side of each sheet as you lay it, use a straight edge or taut line to position the fixings across the sheet. Do not nail the top row or underlapping side fixings until the overlapping sheets are in place.

Lap sheets away from the prevailing wind and use Sealing Tape to prevent ingress of dust and dirt. Use Wall Flashing at the top of the slope in lean-to situations or a ridge piece as appropriate. Use Foam Filler at the bottom of the slope to prevent draughts but don't forget to ensure adequate ventilation. Eaves fillers used at other purlin positions are useful in preventing 'roof-chatter', a common problem with lightweight roof coverings. The cladding should be supported at maximum centres as specified by the manufacturer - and fixings should be a minimum of 50mm from sheet ends.