Tessolar Design Notes

General

This design guideline is provided as an overview of the materials and methods for installing Tesserack rooftop and ground mount hardware. It is not a comprehensive installation manual. When installing, please follow the detailed design and installation requirements of the installation manual provided for your specific hardware and application. Installation manuals are available in the Resources section of our website. As always, please also conform to the requirements of the module manufacturers.

Tessolar offers an optional design service for both rooftop and ground mounted systems – give us your system details and we will take care of the rest.

Tesserack Z for Metal Roofs

Tessolar recommends always positioning our mounts within the mounting zones identified by the module manufacturer with two mounts on each side of the module. For planning purposes, the number of mounts needed per module is 2 + 2/#rows. For example, with 5 rows of modules, you will need an average of 2.4 mounts/module. Positioning the mounts at the bolt holes in the module frame would be optimum. Tesserack Z mounts can be used in either landscape or portrait orientation. On a corrugated metal roof, this means that all you have to do is choose a ridge that is closest to the bolting point on the module flange. Allow for the recommended module spacing.

Mount spacing up/down slope is just as easy. Establish a line perpendicular to the corrugated ridges at the upper or lower edge of the array. Install a row of mounts along this line at the previously selected ridges and lock the mounts in place. Mount spacing is S + 94 mm (3.7 inches) where "S" is the measured distance between the inner flanges on the mount. Establish a line parallel to the first line and install a row of mounts. Do NOT lock these mounts. Repeat for each row of modules.

Module mounting can start at either the lower or upper end of the array. Simply slide the lower flange of the module frame into the clip on the locked mount. Slide the next two mounts onto the frame and push down to lock. Repeat for the rest of the modules in the rows and columns.

Tesserack Z includes an electrical bonding jumper that connects the modules in a given column together. Tessolar offers a separate bonding jumper to connect the columns

together along the rows. The jumper slides onto the lower flanges on the module frame to connect two adjacent modules together.

An optional skirt is available for the Tesserack Z. The skirt slides into the exposed clip on the lower edge of the array in the same manner as module mounting.

Tesserack Z for Shingled Roofs

The layout for installation on shingled roofs is slightly more complicated since most jurisdictions require lagging into the rafters and often require staggering the mounting points across the rafters. Up and down slope is the same as for metal roofs. Across slope with fixed rafter spacings means that you will sometimes encounter a mounting point at the corner of a module. Tessolar uses a mount offset plate to accommodate that situation. The galvanized steel plate mounts to the roof with two screws and a butyl rubber gasket (just like the mount) and the mount is attached to the end of the plate. Simple. We can do the layout for you or can supply hardware to your layout. Just let us know.

Tesserack Z mounts with two screws, which are shorter and smaller diameter than the screws used for single attachment point hardware. Therefore, you do not need to pre-drill. No need to lift shingles for flashing or to notch shingles, the butyl gasket is designed to seal across the overlap of the shingles.

The bonding jumpers and skirts available for Tesserack Z are also available for shingled roofs.

Tesserack GT

As with the Tesserack rooftop hardware, we will be happy to look at a system design for you. The following guidelines will help with preliminary array layouts.

The Tesserack GT system can be deployed as either a single fixed tilt or east-west rooftop configuration. We will usually recommend an E-W system for the following reasons:

1. Higher power density. In most cases, we can double the amount of power you install per acre. The low tilt angle and E-W orientation eliminate shading once the sun is above the horizon. Reduce the row-to-row gap to the minimum necessary for your site. The modules rest at over 1.1 meters off the ground, so O&M can be done from beneath the array.
2. Flatter daily power curve. Whether for time of day pricing or to minimize curtailment, shifting some of the array output to earlier or later in the day can be

a significant system benefit. Take a look at system DC:AC ratio and at the maximum interconnect power when you size your array.

3. Lower wind loads. If the array design is wind load dominated, the E-W configuration reduces the loads in the interior of the array significantly compared to a single fixed tilt system. That means we can design using less steel, reducing hardware cost and/or making the array more resilient to high wind load events.

We will be happy to discuss E-W vs single fixed tilt output modeling with you.

We have also applied our design philosophy to the GT system to minimize the number of parts and speed the assembly operations. The array is based on a standard 10 module bay – 5 modules wide and 2 modules high in portrait. Threaded fasteners (nuts and bolts) increase part count and require specific torque settings. High part count leads to possible logistics problems and those threaded fasteners all need to be inspected and may need periodic maintenance. Details of the quick connect GT system are in engineering and test for release in 2021.