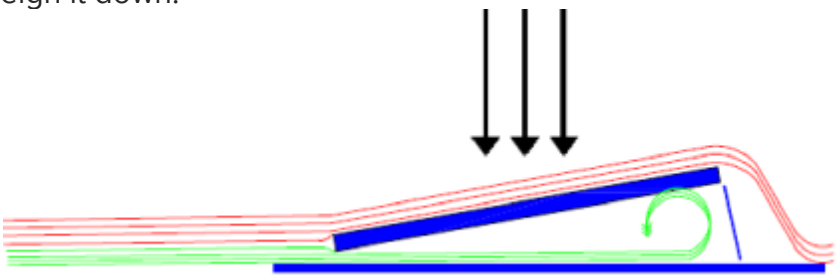
1. Introduction

Low ballasted systems are designed around Bernoulli's principle, which involves the use of wind velocities and wind pressures to create suction between the system and the roof. The more wind pressure there is within the system, the more suction is created and therefore this dramatically reduces the amount of additional ballast needed to weigh it down.



Within the Light Tegra system and consequently the East West Tegra alternative, there's a small gap between the front of the module and the roof, which is created when the modules are connected to the supports via the module claw clamps. This gap allows the wind to funnel underneath the module, where it's then forced throughout the array until the wind reaches the last module. The wind deflector installed on the last module then forces the wind to turn over and finally downwards by the underside of the module. This helps to force the system against the roof.

The Light Tegra system is calculated using a mixture of Eurocodes, British Annexes and wind tunnel testing results. There're several influencing factors that can affect the snow and wind loading results of a project, such as:

- Height above sea level;
- Distance to the coast;
- Height of the building;
- Height of the parapet (if the building has a parapet);
- Width of the parapet;
- Whether the project is in a town or countryside location;
- Distance of the project to the town boundary;
- Dimensions of the roof;
- Angle of the roof;
- Type of roof covering.

We undertake each calculation using the above listed information to determine the amount of additional ballast that's required as a minimum to avoid the system from sliding or moving on the roof.

To make lowering the ballast achievable, the module array needs the correct amount of wind pressure and therefore suction. To achieve this, the following design guidelines need to be considered and included in your project.

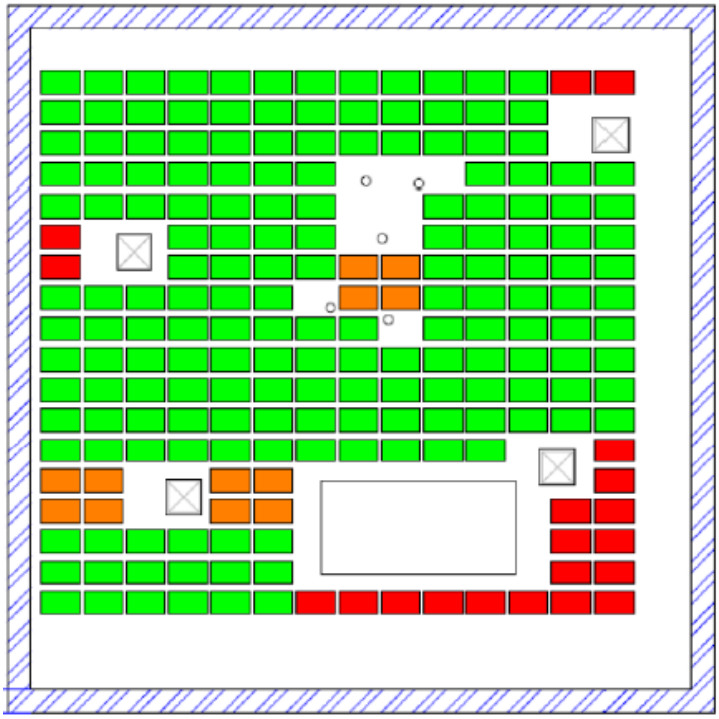
2. Design Guidelines

In order to create high wind velocity, which lends itself to creating more wind pressure, the area of the modules needs to be maximised as much as possible. In other words, the bigger the area, the more wind pressure there is, therefore the less additional ballast is required.

If there are a lot of breaks in the module array, perhaps because the roof has a lot of vents, skylights or other roofing equipment, then the overall area of the modules reduces, which in turn reduces the wind pressure and suction between the roof and the system. So here the additional ballast would increase to make up for this shortfall.

The diagram below shows how the layout can affect the effectiveness of the Light Tegra system.

Green modules: these modules work effectively with reduced additional ballast.
Orange modules: these modules work but will need more ballast than the green modules.
Red modules: These modules will still work but you dramatically lose the effectiveness of a low ballasted system due to the small area covered by the modules.



The recommended minimum size of system array is 3 modules by 3 modules. This is because it allows enough area to start building up the wind pressure and therefore allows the system to reduce the amount of additional ballast.

3. Additional Information

All flat roofs have a slight angle, whether this is as low as 1° or as much as 10°. This is to allow rainwater to run safely into the gutters and avoid standing water occurring.

We strongly advise against using a ballasted system on a roof that exceeds 5° because there are greater risks of the ballast sliding. Our Light Tegra system is suitable for most PVC, membrane and felt flat roofs that fall below 5°. It can also be built over existing ridges within the roof, as long as they don't exceed the 5° angle.

The spacing between the rows of modules is 600mm, measuring from the back of the first module to the front of the second module.

While it's not a requirement, it is recommended that you keep the modules at least 1.0m away from the edge of the roof. This allows for a maintenance walkway and may also be a local planning regulation.

Parapets help to shelter the modules from direct wind forces, so if the building has a parapet it's important to tell us the height and width so we can factor this into our calculations, as it can significantly help to reduce the overall ballast. However, Light Tegra is still suitable for flat roofs without a parapet.

4. Summary

To help reduce the amount of ballast on your project, try to:

- Design the modules as a block, with the block being as large as possible;
- Design the distance between the module rows using 600mm from the back of the first module to the front of the second module;
- Design the system with a minimum of 3 modules by 3 modules;
- Allow for a 10°-12° module angle;
- Use on membrane, PVC, felt, small gravelled, concrete roofs that don't exceed 5° in angle;
- Keep at least 1.0m away from the edge of the building;
- Design the array to be as close to the middle of the roof as possible.