MARQUEESTRUCTURES
FRAME & PVC SALES · SUB HIRE · LAUNDRY & PVC CLEANING
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Wind Loading Capabilities

The following information summarises the design criteria for marquee structures marquees and the basic anchoring requirements. There are three main ways of holding a tent down, stakes, ground anchors, weights or bolts. Staking forces are dependent on the cohesiveness of the soil. High clay content soils give a very good holding whereas sandy or rocky soils do not have as much grip. It is important for the installer to assess the soil grip and add stakes as required.

3, 6 & 9 metre Marquee

The Design wind loading capability of the 6 & 9m marquee is calculated for 28-Metres per second or 62 mile per hour winds (approx. Beaufort force 10). This generates an uplift of approximately 1 tonne per leg that is resisted by the friction of the stake in the soil. In normal weather condition one 3ft stake should suffice depending upon the condition of the soil. Fitting extra stakes through the footplate and driving the stakes at a crossing angle can achieve additional holding.

12 metre Marquee

The maximum wind loading capability of the 12-metre marquee is 36-meters per second or 80 mile per hour winds (approx. Beaufort force 12). This generates an uplift of approximately 1.5 tonne per leg that is resisted by the friction of the stakes in the soil. In normal weather condition two 3ft stakes should suffice depending upon the condition of the soil. Fitting extra stakes through the footplate and driving the stakes at a crossing angle can achieve additional holding.

15 metre Marquee

The maximum wind loading capability of the 15-metre marquee is 28-meters per second or 62 mile per hour winds (approx. Beaufort force 10). This generates an uplift of approximately 1.5 tonne per leg that is resisted by the friction of the stakes in the soil. In normal weather condition two 3ft stakes should suffice depending upon the condition of the soil. Fitting extra stakes through the footplate and driving the stakes at a crossing angle can achieve additional holding.

Other Measures

It is also necessary to close all walls during strong winds. This will stop pressure from building up in the marquee during adverse condition (the pressure in a marquee causes lift, this works on the same principle as the air flowing over an aeroplane wing).

Guy ropes, manufactured from 8mm cable, can increase the wind load by 16 miles per hour, these cables are attached to the eave knuckle & secured to a base plate with two 3ft stakes the cable need to be set at a 45° angle giving the maximum down force, with a breaking strength of up to three tons

An alternative for extra anchoring support is to use 50mm webbing with a ratchet attached. Once again, the webbing will be attached to a base plate & secured with three 3 ft stakes

If faced with the prospect of extreme weather conditions the marquee should be dismantled. If this is not possible, removal of the PVC roof and gable panels will significantly reduce any imposed loads on the frame.

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Installation where staking not possible

To remain safe, marquee structures require to be firmly attached to the ground. When a structure is to be installed on a surface that will not permit tent stakes to be used then other alternatives may be possible. They will not necessarily give the same level of support and the operators judgment is required with regard the appropriateness of the fix.

Fixing by bolt. The design calculations demonstrate that provided a good fixing for the rawl bolt is achievable, an M12 x 100 bolt per leg, with an effective depth of 80mm, would provide sufficient anchorage. This should be a minimum of 200mm from any concrete edge. A Large washer should be fitted under the bolt head to spread the load into the footplate.

Chemical bolts can be used but great care is required to ensure a clean dust free hole that allows a good chemical fix to the supporting structure.

Fixing by weight. It is possible to use weight to anchor the Marquee. The weight per leg should equate to the uplift figures quoted above and be securely fixed to the base of the leg or the eave knuckle. The weight system should also provide some friction against the ground. The weight itself will resist the uplift whilst the friction will stop the structure being pushed sideways. If it is not possible then the weight should be strapped to the eave with a heavy-duty strap. See the tables below re minimum weights at below design wind speeds.

The gable end legs are predominantly resisting the lateral forces and will also require weights. Assuming a friction factor of 0.45 then structures 6 & 9m wide will require a weight of 450kg per leg whilst 12 & 15m structures require 600kg per leg.

Note: these are basic guide lines to follow and your discretion will be needed from site to site and the particular prevailing weather conditions for the week of your event. Please refer to the MUTA guidelines regarding risk assessment and site responsibilities.

Min Weight Requirements per Marquee Upright for Wind Loading

Holding down forces vary according to the wind speed. The tables below detail a reduction in the design uplift forces for lower wind speeds. The forces refer to each individual upright and the appropriate weight must be secured to each and every one. The tables are produced for guidance only. They are based on idealised conditions and need to be applied with regard to the type of ground and the predicted weather. Operators must continue to monitor the actual conditions and ensure that the weights are positively attached to the frame. It is always preferable to have a positive ground fixing rather than a weight. It must also be noted that the structural calculations for the frame are based on the maximum figure.