

## ANCHORING YOUR TENT SAFELY

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This is intended to be only a guideline to gather knowledge about anchoring tents. Each tent manufacturer will have more precise engineering information on the product you use.

### **Tent Anchoring. Simplified.**

This is a brief explanation of safety factors and engineering criteria that go into the design and anchoring of tents and structures. When tents are designed and engineered, they must use specified industry standards and safety factors set by standards organizations and model code authorities (i.e. IBC, IFC, ASCE, NFPA, ASTM, ANSI, UFC, S.B.C., BOCA, UBC, and California Title Codes). Local, state, county, city or port district authorities will determine which code is used in your area. Many officials adopt one of the major building codes and some add their own addendums that become the law we all must follow.

Tent engineering requirements are usually calculated in wind speed forces. The most common wind speed for most of the land mass in the U.S. and Canada is rated at 70mph under the old, Uniform Building Code (UBC). In recent years, code authorities have been changing over to the new International Building Code (IBC) and the International Fire Code (IFC) where tents are classified. The most common wind speed under the IFC is 85mph, which is similar to the UBC 70mph. The other factor is the exposure rating or multiplier used for given site conditions.

Designers and engineers refer to the term “pounds” to set the needed values when anchoring a tent. The best way to visualize pounds is as dead weight and/or how to achieve the equivalent with friction from anchors. You must know your anchor weight and/or how much holding power (in pounds) your anchor will develop. Anchoring safety factors at 1.5:1 or 2:1 are considered adequate, but this also makes it more important to know what region you are in when anchoring your tents.

### **A Simple Formula - Not Pure Science, but it Helps.**

Without using an involved equation and employing hours of engineering time at every tent job, an easy system was designed to find the necessary amount of stakes to hold a tent at approximately 85mph, exposure B. Simply multiply the square footage of your tent (plan view) by 15psf (pounds per square foot), a number known as the applied load. The result is the total number of anchor pounds needed. This is not pure science, but when checked against most tent specifications from major manufacturers, most sizes up to 60ft wide fell within these parameters.

***Sample formula for a 40'x100' tent:  $[40(w) \times 100(l) = 4,000sf] \times 15psf = 60,000$  anchor pounds needed***

There can be a wide range of holding power for tent stakes depending on the soil conditions. By testing a typical 1" diameter x 36" long stake, driven most of the way into the ground (average lawn), it has a holding power of about 1,000lbs. The same stake in aged dense soil or aged asphalt generally holds more, approximately 2,000lbs.

A 40'x100' tent installation on lawn requires about 60 stakes plus safety factors. Asphalt requires only about 30 stakes plus a safety factor. You will need to stake to the design of the tent.

### **All Tents Require Almost the Same Holding Power.**

Regardless of the tent style (pole, frame or structure), the required anchoring power will be similar in factors such as leg height, overall height, and basic slope of the roof.

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### **Pole Tents Require Anchors to Shape and Stand Up.**

Pole tents should be staked at every rope location on the tent. To meet load requirements in larger tents (40' wide and larger), one stake should be used at the leg bottom, preferably in the base plate and one or more stakes at the guy point. This point will be a minimum of two-thirds of the leg height to a maximum of the leg height away from the tent. On tension tents, follow the manufacturer's recommendation.

### **Driving Stakes.**

Increasing the holding power of anchors will become an important step in future tenting practices. The first item to tackle is getting proficient at driving and pulling tent stakes. If you look at the numbers, the only safe method to properly anchor your tent is to add more stakes in the ground. The following anchoring devices should also be explored: load distribution bars, anchor bars, screws, anchors and others.

### **Anchoring with Weights.**

When engineering specifies weight, they mean just that in dead weight that moves sideways. The best weights are large blocks of concrete, referred to as Lego Blocks, Ultra Blocks, or Mafia Blocks. They come in several standard sizes: 2,200lbs. and 4,400lbs. You will need to have lift trucks to handle them, and large semi trucks to transport them.

**Note.** Many rental companies use water barrels, but when filled with water, a 50-gallon barrel only weighs 400lbs. If you are using this method of anchoring, please be sure you understand the risk.

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It's the Law!**

Call 2-3 days prior to the date required to assure avoidance of hitting underground lines or utilities.

