

Bigtopmania; Wind Load Statement; Tents / Marquees / Temporary Demountable Structures;

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Main References:

Institute of Structural Engineers	"Temporary Demountable Structures, Guidance on procurement, design and use." 3 rd ed 2007
Made Up Textiles Association. (MUTA)	"A Code of Practice for Marquee Hirers" 1998
Made Up Textiles Association. (MUTA)	"Marquee hire Do it right Make it Safe". 2000
	"MutaMarq, Accreditation for Safe Use and Operation of Marquees and Temporary Structures, a Best Practice Guide" 2016

Tent Manufacture Design Statement and Notes.

- Our tents and marquees are classified as "Small Marquees" "having a span of 12m /40ft or less"
- As such "an independent design check is not needed." TDS p29 sect 5.1.4
- An independent erection check is needed. (I.e. Sign Off /completion sheet) TDS p30 sect 5.1.5, 5.2.6
- Dynamic Site-specific site surveys and an anchorage survey is good practice.
- Dynamic Risk benefit assessments are essential good practice
- All tents manufactured to EU and BS13782:2015 at 36m/sec 82mph wind rating by MUTA member companies.
- Built with fire retardant and other suitable materials.
- Tents should be erected with full complement of walling or no walling. Partial walling according to weather.

"Tents designed empirically and used successfully for generations of marquee contractors; i.e. traditional marquees with a span of 12m or less can be continued to be used without the necessity to produce stability calculations" p 97 TDS. 12.5

"Experience in the use over long term indicates that small marquees erected to comply with the Performance Textiles Association Code of Practice may be used in winds up to;

- Beaufort range 5 when single guyed (gust wind speed equivalent 18m/s)
- Beaufort range 7 when double guyed (gust wind speed equivalent 27 m/s)
- Small marquees may be used anywhere in the United Kingdom provided they are erected and operated in accordance with sections 12.3 and 12.4." of T.D.S. ie according to P.T.A codes. p 58 TDS. 8.3.2.2

"Active Safety Management"

- Allows the erection of marquees at sites where the maximum service gust wind speed exceed the rated value for the marquee provided that the active safety management procedures are properly defined and enforced." 8.3.2.3
- "Sheltered sites are preferred, bearing in mind south westerly to north westerly prevailing winds". 8.3.2.4
- "Crew should be adequately trained". 8.3.2.4
- "Weather forecasts should be available and constantly referred to." 8.3.2.4
- "If the maximum service gust speed for the site requires the marquee to be double guyed, the marquee may be single guyed until strong winds are forecast, providing provisions for double guying are provided." p58, TDS. 8.2.3.4
- "Active Safety management procedures should be initiated as soon as wind speeds approaching 90% of the maximum service gust speed are forecast.... single guying increased to double guying..."

i.e.:

If the marquee cannot be strengthened sufficiently to withstand the forecast wind speeds before they arrive then:

The marquee and its immediate area should be cleared of the public.

The marquee should be partially dismantled by lowering to the ground." p58 TDS 8.3.2.4

In practice this means that "In Adverse Weather Conditions":

- It is recommended that all open fronted tentage is enclosed or walled off when not in use or when extreme weather is forecast.
- It is recommended that the open frontage does not face into the prevailing wind
- It is the client's responsibility to take appropriate action."

Gusting and High Winds/ Exposed Sites.

- Most modern tents have a wind/load capacity rating for 60mph. if the wind is forecast to within 90% of this figure then it will be necessary to evacuate and close down the tent.
- Where no formal calculations exist, both pole tents and frame tents should be closed down when wind gusting of 40mph is expected, (if strengthening measures have taken place then it may be possible to increase this figure to 50 mph).
- When the tent is situated on an exposed site it is recommended that, particularly in winter months, that expert tent maintenance teams should be available/in touch at all times.
- All wind speeds are indicative and the contractor should be consulted for further information.""
MUTA. P5: "marquee hire doing it right".

Bigtopmania WIND MANAGEMENT PLAN

- All Actions will depend on whether our staff are on site, available for call out or off site advice.
- It is preferable to take preventative action than reactive action.
- Contractual and payment liabilities remain in all cases.

Pre-erection or during build or dismantling / break periods:

ACTION PLAN:

Action;

- High winds during these times may delay or prevent safe work.
- We will do our best ensure safe erection or dismantling in time frame for events.
- Contractual and payment liabilities remain for all parties.

When severe weather is forecast for event period, before or during erection / build period:

ACTION PLAN:

Action:

- Client and supplier should consider refusing to build structures.
- Consider moving structures to more sheltered locations.
- Consider event postponement or cancellation.
- Contractual and payment liabilities remain for all parties

Current weather or forecast weather once structures are erected or in use:

ACTION PLAN:

At wind speeds of 0-20mph, force 0-4, calm to gentle breeze.

(From smoke rising vertically to light drifts, wind felt on face, leaves rustle, leaves in motions light flags extending to dust and pieces of paper rising and small branches moving)

Action:

- There should be nothing to worry about.

At wind speed of 20mph (force 5) fresh breeze and above;

(i.e. small trees in leaf begin to sway, crested wavelets on inland waters)

Action:

- There should still be nothing to worry about but consider checking flags, advertising scrim, and any attachments, wall flaps.
- Add extra weights and ties downs to pop up gazebos and picnic tents.

At wind speed or gust speed of 25-38mph, force 6-7, strong breeze;

(i.e. large branches in motion, whistling in telegraph wire, to whole trees in motion)

Action:

- Contact our staff. On or off site.
- Preventative action should be taken and closing of doors/ wall flaps, securing of walls should be considered.
- If higher winds are forecast and it is safe to do so consideration of dismantling empty structures should be made.
- Consider strengthening tents with suitable extra anchorage.
- Consider taking down pop-up gazebos before winds rise to Force 7

At wind speed or gust speed of 40mph, higher force 7, high wind approaching force 8, Gale and higher.

(ie from Whole trees in motion, difficulty walking into wind to twigs breaking off trees.);

Action

- Contact our staff.
- CLOSE TENTS. Evacuate staff and public. (Unless previously strengthened)
- If structures previously strengthened using further anchorage and reckoned to be safe after structural and anchorage checks made, **perhaps raise the closure speed to 50mph, top gale force 8 / low gale force 9**, (Chimney pots and slates blown off some houses.)
- Take down gazebos. / smaller vulnerable structures and tents.

At Wind speeds or gust speeds of 50 mph and above, force 9-10-11, strong gale, whole gale and storm.

Action:

- Though our marquees are manufactured to 82 mph they should be considered dangerous and liable to collapse the higher the wind and the weaker the anchorage becomes. This is due to site conditions being different to factory design specs.
- Beware of collapse, over turn, flying debris. Breakage, incomplete structures.

In essence:

- Tents and marquees should not be used as refuges in severe weather.
- It is advisable to have a severe weather plan.

The same as above but in table form.

BIGTOPMANIA	WIND Management	Active Safety Plan	Summary/Table form
<i>ONSITE-work</i>	<i>Build / Break period</i>		
Wind Speed-Beaufort	Mph/ KpH / m.s/	Land observations	ACTION
5+ fresh breeze	>20mph/ 30Kph/ 8 m.s	Branches of a moderate size move. Small trees in leaf begin to sway.	Take care. Consider delaying.
<i>ONSITE-work</i>	<i>Heavy Winds Forecast for Build or Event period</i>		
Wind Speed-Beaufort	Mph/ KpH / m.s/	Land observations	ACTION
6+ strong breeze up to 12 Hurricane force	Greater than >25mph / 40 kph / 11m.s rising to >70pmh /118 kph / 32m.s and above.	Diverse. From large branches in motion To severe widespread damage.	<ul style="list-style-type: none"> Client and supplier should consider refusing to build structures. Consider moving structures to more sheltered locations. Strengthen (or dismantle) existing structures with increased anchorage and secure walls and doors etc. Consider event postponement or cancellation. Contractual and payment liabilities remain for all parties
<i>EVENT</i>	<i>Current or forecast weather once structures erected or in use.</i>		
Wind Speed-Beaufort	Mph/ KpH / m.s/	Land observations	ACTION
0-4 calm to gentle breeze.	0-20mph / 0-30 kph /0 to 8 m.s-	Calm to dust / loose paper raised, small branches begin to move,	No action generally required.
5 fresh breeze	Greater than > 20mph/ 30 pkh/ 8m.s	Small trees begin to sway	<ul style="list-style-type: none"> There should still be nothing to worry about but consider checking flags, advertising scrim, and any attachments, wall flaps. Add extra weights and ties downs to pop up gazebos and picnic tents.
6-7 strong breeze	Greater than >25mph / 40kph/11m.s	Large branches in motion to whole trees inmotion	<ul style="list-style-type: none"> Contact our staff. On or off site. Preventative action should be taken and closing of doors/ wall flaps, securing of walls should be considered. If higher winds are forecast and it is safe to do so consideration of dismantling empty structures should be made. Consider strengthening tents with suitable extra anchorage. Consider taking down pop-up gazebos before winds rise to Force 7
7 -8, high wind rising to Gale	Greater than >32mph / 50kph /14 m.s	Whole trees in motion TO	<ul style="list-style-type: none"> Contact our staff. CLOSE TENTS. Evacuate staff and public. (Unless previously strengthened) If structures previously

		seriously impeded	<p>further anchorage and reckoned to be safe after structural and anchorage checks made, perhaps raise the closure speed to 50mph, top gale force 8 / low gale force 9, (Chimney pots and slates blown off some houses.)</p> <ul style="list-style-type: none"> • Take down gazebos. / smaller vulnerable structures and tents.
9 and above high winds to hurricane	Greater than >47 mph /75 kph / 21 m.s	Branches break off trees to Severe widespread damage.	<ul style="list-style-type: none"> • Though our marquees are manufactured to 82 mph they should be considered dangerous and liable to collapse the higher the wind and the weaker the anchorage becomes. This is due to site conditions being different to factory design specs. • Beware of collapse, over turn, flying debris. Breakage, incomplete structures.

Other Weather hazards:

Bear in mind hazards associated with weather are not just related to wind.

Consider and risk assess the effects of:

Lightening, (Events should have a lightening safety plan)

Hail. (It can collect on structures too)

Hard rain or continuous rain. And the effects of wet clothing on people.

Cold or heat.

Pressure drops.

Mud and mud-slides. Increased Slip and trip.

Flooding. (And Riverbanks bursting,)

Snow (it can collect on structures)

Tornado. We have plenty in the UK.

Sewage and bio-hazards.

Vehicular movements or stoppages.

Power outages.

Human reaction, seeking shelter, bodily functions and reactions etc.

Remember the weather can also severely affect ground anchorage qualities meaning structures can be severely weakened.

HOW SAFE DO YOU WANT TO BE?

At small cost for recommended safety measures BIGTOPMANIA can:

- **Take localised wind speed, gust and temperature readings when on site using hand held devices at ground level or height.**
- **Arrange periodic recording of wind data.**
- **Install weather station / vane wind speed measuring devices at altitude / top of structures / tripod mount with blue tooth links to onsite phone or email. And record data.**
- **Arrange a system of on or off site monitoring via data stream and wireless data loggers.**
- **Arrange complete event coverage via a specialist company.**
- **Undertake structural anchorage pull tests and record data.**
- **Add to anchorage when onsite, called out, in advance or especially on risky sites.**

To monitor general current wind speeds on-line we recommend services such as www.weatherfile.com

Nb; THIS IS ONLY A GUIDE FOR REFERENCE AND RESPONSIBILITY REMAINS WITH CLIENT/ OPERATOR

Bigtopmania undertakes to maintain safe marquee /structural operations in accordance with national guidelines.

Lots of assimilated event safety information, as well as our own documentation, can be found at:

<http://bigtopmania.co.uk/Marquee-Hire-Health-And-Safety.html>

Further information regarding severe weather plans for events.

See items such as the Purple Guide (UK) and HSE and industry guidance for temporary structures.

Also:

<https://www.fema.gov/blog/2013-03-07/linkin-park-has-emergency-plan-severe-weather-strikes>
(related. https://noisey.vice.com/en_us/article/breaking-the-habit-of-bad-disaster-planning-with-linkin-parks-production-manager)

The Event Safety Alliance. (usa bias) who now present a magazine:

<http://eventsafetyinsights.com>

<https://www.joomag.com/magazine/mag/0999103001473528557?feature=archive>

has a good article including a weather matrix for production (live events) and also a feature on lightening plans.

3 x 3m Easy Up /Pop-up Gazebos. Manufacturer's wind management plan.

Our ones are red and white in colour and manufactured by Nicholl Industries and are called Instaframe 50's.

We tend to use a system of guy ropes and staking to secure rather than weights.

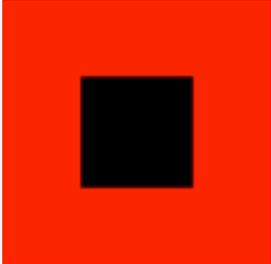
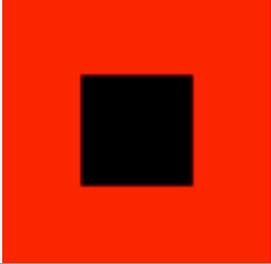
<https://www.nicoll-industries.co.uk/images/Instaframe.pdf>

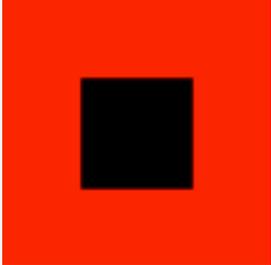
Beaufort Scale	Wind Speed	Weights and Tie Downs
0	Less than 1 Km/Hr	No staying needed
1	1 – 5 Km/Hr	1 x 13Kg weight on each leg
2	6 – 11 Km/Hr	1 x 13Kg weight on each leg
3	12 – 19 Km/Hr	2 x 13Kg weights on each leg
4	20 – 28 Km/Hr	2 x 13Kg weights on each leg
5	29 – 38 Km/Hr	2 x 13Kg weights on each leg and Extra Tie Downs
6	39 – 49 Km/Hr	2 x 13Kg weights on each leg and Extra Tie Downs
7	50 – 61 Km/Hr	Take Gazebo Down
8	62 – 74 Km/Hr	Take Gazebo Down
9	75 – 88 Km/Hr	Take Gazebo Down
10	89 – 102 Km/Hr	Take Gazebo Down

Modern scale source https://en.wikipedia.org/wiki/Beaufort_scale

Beaufort number	Description	Wind speed	Wave height	Sea conditions	Land conditions	Associated warning flag
0	Calm	< 1 km/h	0 m	Sea like a mirror	Calm. Smoke rises vertically.	
		< 1 mph				
		< 1 knot	0 ft			
		< 0.3 m/s				
1	Light air	1–5 km/h	0–0.2 m	Ripples with the appearance of scales are formed, but without foam crests	Smoke drift indicates wind direction. Leaves and wind vanes are stationary.	
		1–3 mph				
		1–3 knots	0–1 ft			
		0.3–1.5 m/s				
2	Light breeze	6–11 km/h	0.2–0.5 m	Small wavelets, still short but more pronounced; crests have a glassy appearance and do not break	Wind felt on exposed skin. Leaves rustle. Wind vanes begin to move.	
		4–7 mph				
		4–6 knots	1–2 ft			
		1.6–3.3 m/s				
3	Gentle breeze	12–19 km/h	0.5–1 m	Large wavelets. Crests begin to break; scattered whitecaps	Leaves and small twigs constantly moving, light flags extended.	
		8–12 mph				
		7–10 knots	2–3.5 ft			
		3.4–5.5 m/s				
4	Moderate breeze	20–28 km/h	1–2 m	Small waves with breaking crests. Fairly frequent whitecaps.	Dust and loose paper raised. Small branches begin to move.	
		13–18 mph				
		11–16 knots	3.5–6 ft			
		5.5–7.9 m/s				
5	Fresh breeze	29–38 km/h	2–3 m	Moderate waves of some length. Many whitecaps. Small amounts of spray.	Branches of a moderate size move. Small trees in leaf begin to sway.	
		19–24 mph				
		17–21 knots	6–9 ft			
		8–10.7 m/s				
6	Strong breeze	39–49 km/h	3–4 m	Long waves begin to form. White foam crests are very frequent. Some airborne spray is present.	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult. Empty plastic bins tip over.	
		25–31 mph				
		22–27 knots	9–13 ft			
		10.8–13.8 m/s				
7	High wind, moderate gale, near gale	50–61 km/h	4–5.5 m	Sea heaps up. Some foam from breaking waves is blown into streaks along wind direction. Moderate amounts of airborne spray.	Whole trees in motion. Effort needed to walk against the wind.	
		32–38 mph				
		28–33 knots	13–19 ft			
		13.9–17.1 m/s				
8	Gale, fresh gale	62–74 km/h	5.5–7.5 m	Moderately high waves with breaking crests forming spindrift. Well-marked streaks of foam are blown along wind direction. Considerable airborne spray.	Some twigs broken from trees. Cars veer on road. Progress on foot is seriously impeded.	
		39–46 mph				
		34–40 knots				
		17.2–20.7 m/s				

9	Strong/severe gale	75–88 km/h	7–10 m	High waves whose crests sometimes roll over. Dense foam is blown along wind direction. Large amounts of airborne spray may begin to reduce visibility.	Some branches break off trees, and some small trees blow over. Construction/temporary signs and barricades blow over.	
		47–54 mph				
		41–47 knots				
		20.8–24.4 m/s	23–32 ft			

10	Storm, ^[7] whole gale	89–102 km/h	9–12.5 m	Very high waves with overhanging crests. Large patches of foam from wave crests give the sea a white appearance. Considerable tumbling of waves with heavy impact. Large amounts of airborne spray reduce visibility.	Trees are broken off or uprooted, structural damage likely.	
		55–63 mph				
		48–55 knots	29–41 ft			
		24.5–28.4 m/s				
11	Violent storm	103–117 km/h	11.5–16 m	Exceptionally high waves. Very large patches of foam, driven before the wind, cover much of the sea surface. Very large amounts of airborne spray severely reduce visibility.	Widespread vegetation and structural damage likely.	
		64–72 mph				
		56–63 knots	37–52 ft			
		28.5–32.6 m/s				

12	Hurricane force ^[7]	\geq 118 km/h	\geq 14 m	Huge waves. Sea is completely white with foam and spray. Air is filled with driving spray, greatly reducing visibility.	Severe widespread damage to vegetation and structures. Debris and unsecured objects are hurled about.	
		\geq 73 mph				
		\geq 64 knots	\geq 46 ft			
		\geq 32.7 m/s				