

AB Fence Tech Sheet

Wind Speeds and Pressures

The major design element for any fencing system is withstanding the lateral forces applied by wind, and this is no different for the AB Fence System. There are several factors that determine how much pressure is applied by wind. These include wind speed, fence geometry and the exposure of the fence to wind. In this Tech Sheet we will be taking a closer look at the wind speed and determining how appropriate wind speeds can be determined.

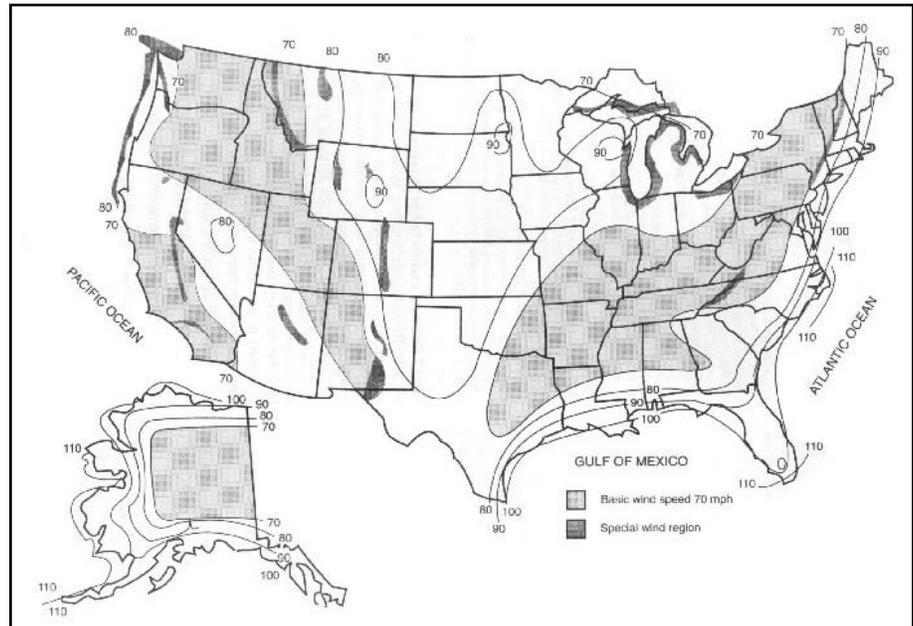
As with any weather condition, wind speed is very difficult to predict. Therefore the average wind speeds over a period of years are examined to predict the likelihood of them occurring again. This is referred to as a “return period”, which is the average wind speed that would be equaled or exceeded during that period. It should be noted that the higher the return period, the more conservative the associated wind speed will be. For example, a 10 year

return period would have a lower average wind speed than the one associated with a 100 year return period. For the design of the AB Fence a conservative wind speed would be that of a 50-year return period.

The Uniform Building Code (UBC) has a good reference for wind speed. The following figure provides the 1/50 average wind speed for all regions in the United States.

The International Building Code (IBC) uses a slightly different approach and reports the wind speeds associated with a 3-second gust. A gust of 3-seconds is, essentially, a maximum wind speed and will be significant higher than an average hourly speed. However, the gust speeds are multiplied by gust factors that will bring the values more in line with average speeds.

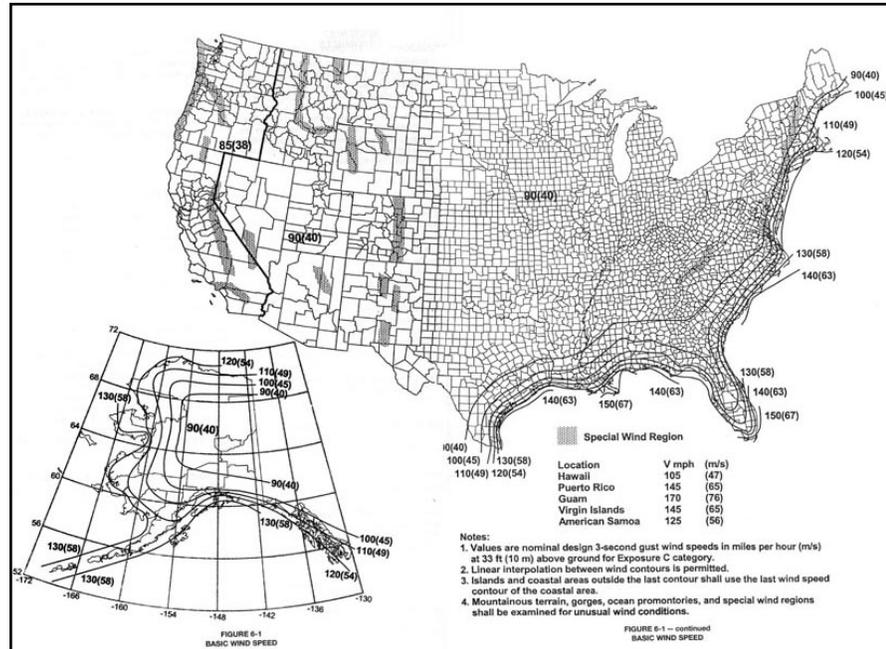
Section 1609.3 of the IBC outlines how basic wind speeds are calculated, and it identifies that the basic wind speeds used in design should not be less than the wind speed associated with an annual probability of 0.02 (50-year mean recurrence interval). The analysis for comparing hourly wind speeds to 3-second gust equivalence is outlined in Section 6.5.4.2 of ASCE 7.



UBC Figure 16-1: Minimum Basic Wind Speeds in Miles per Hour (x 1.61 for km/h)

For reference only, the 3-second gust values are presented in the adjacent figure, which is from the IBC Figure 1609. These values are then multiplied by gust, exposure, importance and directional factors to obtain a wind pressure.

Generally, when comparing wind pressure values calculated using the IBC to the stagnation pressures identified by the UBC, the 50-year return pressures from the UBC are more conservative. Again, this is why 50-year return period is a conservative wind speed for an AB Fence design.



IBC Figure 1609: Basic Wind Speeds (3-second Gust) in MPH (x 1.61 for km/h)

For projects in Canada, Appendix C of the National Building Code provides hourly wind pressures that can be used. Typically, the 1/30 hourly wind pressure is used for the calculations as per the building code. The following is an example page from the National Building Code of Canada, Appendix C.

Appendix C

Design Data for Selected Locations in Canada

Province and Location	Elev., m	Design Temperature				Degree-Days Below 18°C	15 Min. Rain, mm	One Day Rain, mm	Ann. Tot. Ppn., mm	Ground Snow Load, kPa		Hourly Wind Pressures			Seismic Data		
		January		July 2.5%						S _s	S _r	1/10 kPa	1/30 kPa	1/100 kPa	Z _a	Z _v	Zonal Velocity Ratio, v
		2.5% °C	1% °C	Dry °C	Wet °C												
British Columbia																	
100 Mile House	1040	-28	-31	30	18	5150	10	45	425	2.4	0.3	0.30	0.36	0.43	1	1	0.05
Abbotsford	10	-10	-11	29	20	3100	10	105	1800	1.8	0.3	0.42	0.55	0.71	4	4	0.20
Agassiz	15	-13	-15	31	20	2950	8	120	1700	2.2	0.6	0.57	0.69	0.84	3	3	0.15
Alberni	12	-5	-7	31	18	3400	10	135	2000	2.7	0.4	0.47	0.58	0.70	5	5	0.30
Ashcroft	305	-25	-28	34	20	3700	10	35	300	1.5	0.1	0.28	0.35	0.43	1	2	0.10

Determining the proper wind speed is important for an accurate design. However, this is only one aspect to consider. Please see additional design considerations outlined in the AB Fence Engineering Manual at www.allanblock.com.