Wind Force to the balloon

DE[Windkräfte am Ballon](#) - FR[Les forces du vent sur l'enveloppe](#)

The amount of the wind force to the balloon depends on the wind speed, and the air drag of the balloon. And the air drag depends on the drag coefficient Cd and the cross-section area. The cross-section area of a balloon is nearly constant, but the drag coefficient changes due of the form of the balloon.

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Calculated for a balloon with a volume of 3000m³

Windspeed (m/s)	round balloon cw=0.4 Force (kg)	dented balloon cw=1.6 Force (kg)
1	7	
2	28	
3	63	
4	112	
5	175	
6	252	1008
7	343	1372
8		1782
9		2268
10		2800
15		6300
20		11200
25		17500

If the windspeed doubled from 5 to 10 m/s, the force to the balloon raised 16x.

Flight Practice

The conclusion for the filling of the balloon is, that to raise the balloon, a very temperature difference between the air in the envelope and the ambient temperature is needed. Dependend on the weight and the volume of the envelope, about 10°C to 20°C. At this low temperature there is nearly no pressure in the envelope. So the wind can easily dent the balloon. To avoid this, the air in the envelope should be heated up fast. But to do so, you need weight in the basket. For this the passengers should be ready to enter quickly the basket after the get the order for it.