

How a Hot Air Balloon Works and Its Major Parts

Hot air balloons are based on a very basic scientific principle: warmer air rises in cooler air. Essentially, hot air is lighter than cool air, because it has less mass per unit of volume. A cubic foot of air weighs roughly 28 grams (about an ounce). If you heat that air by 100 degrees F, it weighs about 7 grams less. Therefore, each cubic foot of air contained in a hot air balloon can lift about 7 grams. That's not much, and this is why hot air balloons are so huge -- to lift 1,000 pounds, you need about 65,000 cubic feet of hot air.

The "Ideal Gas Law" governs and all gases (air is a gas). This law is a mathematical relationship between the volume, pressure and temperature of a gas. For a given quantity of gas, the pressure, P , multiplied by the volume, V , divided by the temperature, T , remains a constant. ($PV = nRT$).

A hot air balloon is made up of 3 main parts:

The Envelope

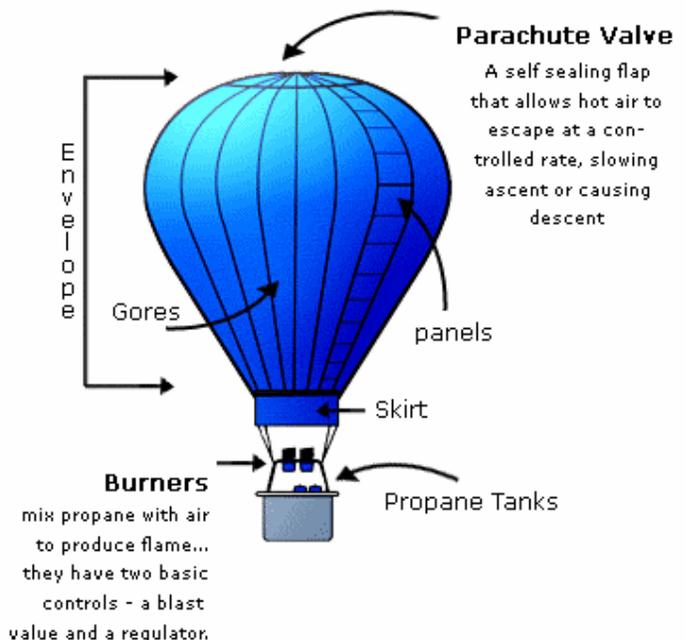
The actual balloon which holds the air is made of reinforced fabric called rip-stop nylon.

The Burner

The unit which heats the air inside the envelope.

The Basket

Where the passengers and pilot stand. The baskets are made from rattan or wicker and each one is individually woven by hand.



To inflate a balloon, the envelope is stretched out on the ground and attached to the basket and burner all of which are laying on their side. A small gasoline-powered fan blows air into the balloon. Then the burner is turned on, and the air in the envelope is heated. The hot air rises, lifting the balloon upright. Modern hot air balloons heat the air by burning propane, the same substance commonly used in outdoor cooking grills

As winds at varying altitudes blow in different directions and at different speeds all you have to do to steer a balloon is to climb or descend to an altitude where the wind is blowing in the direction you want to go. To make a balloon rise the air inside the envelope is heated. To descend, the pilot allows the air to cool.

The average duration of the flight by air balloon is one hour, even though technically it could fly 2-3 and more hours.