Home
Snowmaking
101

This is a FREE e-book, feel free to pass it on to friends, family or anyone else who might be interested in making their own snow!

Second Nature Snowmaking
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How Does a Snowmaker Work?

A basic snowmaker is simply a system that combines compressed air and water together and then squeezes it through a nozzle to create a special mist that freezes and becomes snow. Let’s talk about a few aspects of each part.

First, the water and compressed air can be combined in a variety of ways. The most common is illustrated below.

In this basic design, the compressed air enters in the left side of the snowmaker, the water through the bottom. The mixture is squeezed through a nozzle on the right where the mist exits.
NUCLEATION

The snow is made through a process which many call “nucleation.” As air compresses it heats up and the molecules get very excited, so much so that at the point of greatest pressure, when it leaves the nozzle, it blows apart the water into tiny particles. Because air heats up as it is compressed it also does the inverse; it cools as it expands.

By the time the compressed air reaches the snowmaker it has cooled to near outside temperature so when it expands it cools well below the outside temperature. The quickly expanding air cools and freezes (with the help of below freezing outside air) the small particles it forms as it exits the nozzle. These frozen particles of water fall to the ground as white, clean, fresh snow!

COLD AIR

The outside air temperature in order to make snow must be below 27 degrees Fahrenheit. Why? There are a variety of reasons that cause this.

First, let us picture a cup full of water. And let’s say we have a special machine that can remove energy from imaginary cups of water. In our example, energy is
removed from the water so that it cools at a rate of 1
degree a minute. If we start cooling the water when it is at
50 degrees it will take us 18 minutes to get to 32 degrees,
right? Now let’s keep on using with our super-fancy energy
removing machine to now freeze the water. It’s at 32
degrees so it should take just another minute right?
Wrong! It will take nearly two and a half hours to freeze
the water – 140 minutes!

The energy required to freeze water is 140 times
greater than the energy required to cool it one degree! So
32, 31, and even 30 degree outside air temperatures don’t
do a whole lot, it still takes a long time even with the help
of the compressed air from the snowmaker to freeze all
those droplets. It’s at about 27 degrees is where it
becomes cold enough to start making real, good, fully-
frozen snow.
**Making Even More Snow**

A fine water mist, alone, without compressed air, will not make snow. It either needs compressed air or ice particles to freeze onto. So if you already have some ice particles from a basic snowmaker and don’t have any more compressed to use what can you do? Well, add a fine mist into the mix as the diagram below indicates.

![Diagram of mist, air, snow, and water]

Home snowmakers use a pressure washer (like you use to wash your car) to create this additional mist. These particles, mix with the ice particles created by the bottom nozzle, freeze together, and multiply the output.
Example Systems

At Second Nature Snowmaking we feature three snowmaking machines. The SNS Basic which uses the first design we discussed here (just compressed air and water). The SNS Combo which uses the second design and features two upper nozzles to create multiply snowmaking output. The last snowmaker is the SNS ComboPLUS which adds one extra nozzle for even more snow.

SNS Basic

For the SNS Basic all you need is the snowmaker and air compressor like the Coleman 5hp CTA or Hitachi 129. Remember, more air = more snow.

SNS Combo

For the SNS Combo you will need two things. First, a small pressure washer like the electric Nieko PW or gasoline powered B&S Clean Shot and an air compressor such as the Coleman 5hp CTA or Hitachi 129.

SNS ComboPLUS

For the SNS ComboPLUS you will also need two units. First, a larger pressure washer like the gas powered Northstar 2600 and an air compressor such as the Coleman 5hp CTA or Hitachi 129.
All of these snowmakers can be found and viewed at www.snow-maker.com with the option of purchasing a fully assembled unit which is ready to use. A more inexpensive option for those who are handy with a few basic tools is the complete plans for each of the snowmakers. Most of the parts can be found locally while the plans provide websites, company contact information, as well as the necessary part numbers for the rest so they may be quickly and inexpensively ordered.

We wish you the best of luck with your snowmaking adventures! And in the words of Warren Miller, if you don’t make snow this year…you’ll be one year older when you do!