

# SnowNews

WINTER 2011-2012

FOR OWNERS AND OPERATORS OF SNOWMAKING EQUIPMENT WORLD-WIDE

1: Editorial ■ 2: New Products ■ 3: Make More With Less ■ 4: Sochi 2014 Olympic Venue

## Editorial

*SMI continues to have very good business years thanks to our increasing global customer base. Our snowmaking market share has grown over the past three years.*

*The global snowmaking market has decreased in size over the past few years and there are now fewer companies. We believe this consolidation will continue as the market tightens.*

*As you look at your snowmaking choices in the future, we encourage you to consider SMI, one of the oldest and biggest snowmaking companies, with a complete lineup to choose from. Fans, sticks, automation, engineering, master planning, support and construction are all available from SMI.*

*Our continuing investment in new products and facilities confirms a commitment to the future. SMI's new SnowTower line with the patent pending Axis rotating head is our latest innovation. And the new fully automatic Puma Snowmaker has proven to be an excellent performer across the temperature range.*

*SMI recently added a new manufacturing wing to house a full CNC machine shop to control quality, delivery and cost on our technology parts. SMI recently upgraded both our pumping and air plants to allow us to test up to 8 snowguns at one time.*

*We invite you to visit our headquarters in Michigan which houses a state-of-the-art snowmaking testing facility on site.*

*Thank you for your support and confidence in SMI. We will continue to hustle, work smart, listen and adjust to meet your dynamic snowmaking requirements.*



+1.989.631.6091 USA  
mail@snowmakers.com



Puma on Tower Mount

## New Products

### Puma® Snowmaker

The new Puma Snowmaker was designed to interface with automation and control software for optimum performance in any snowmaking weather. It is equipped with an onboard aspirated weather station, air and water pressure monitoring, and automated flow control. The 15 flow steps deliver a smooth snowmaking curve, fine-tuning the water volume, air pressure and nucleation to best suit the existing conditions.

Each unit employs a convenient touch-screen panel at eye level for manual control when desired, and the Puma can be configured to communicate with a central computer via hard wire (copper, CAT 5 Ethernet or fiber optic), or by

radio. The machine is well-suited to central intelligence (a single computer or control room for all snow guns) or distributed intelligence (some type of computer to manage each snow gun, pod or ski trail).

The Puma's level of automation allows operators to raise and lower the barrel or adjust the oscillation arc up to 359° on any number of machines either at the Puma or using our SmartSnow™ software and control from a central command station, helping to deliver pinpoint control with minimal labor. The result is better snow distribution and reduced man-hours needed for grooming.

Described as SMI's most efficient design to date, the Puma delivers fast start-up and shutdown, with the option of true hands-free operation. With its low, compact center of gravity and ergonomic design, the Puma is easy to use and transport. The onboard aspirated weather station delivers accurate data to the controller for automatic adjustment to changing conditions, ensuring that each machine's settings are individually optimized for maximum snowmaking. Scan our snowcode below using your smartphone QR reader app to see the Puma in action.



SNOWCODE™



Puma on Carriage Mount

Puma Nozzles



## New Products (continued)

### **Viking V2 SnowTower™**

The low energy Viking V2 is designed for versatility and flexible performance across a full range of temperature and wind conditions. The V2 is a four step (2 valves) stick with 12 nozzles and 2 nucleators.

Features of the Viking V2 include: mounts in post for hill or vault, and in portable sled; on board compressor and central air feed options; light weight components that feature tool-less fasteners for easy portability; easy lift-off compressor and control panel; 15 to 25 foot (4.5 to 7.5 meter) mast lengths; manual, semi automatic and fully automated options; automated on-board or central weather options; and nucleator air flow ranges from 20 to 140 cfm (0.6 to 4.0 cmm).

The Viking V2 is well packaged and simple to install and operate. The custom nucleation and filter system are easy to maintain. The jack for raising and lowering the Viking V2 is safe and easy to operate. The optional automatic valving system is a custom design that allows the extra water to simply adjust to the changing temperatures.

### **Viking Kid SnowTower™**

The Viking Kid has been designed for the customer looking for easy portability on the mountain, simple set up, and low cost snowmaking.

Features of the Viking Kid include a single step (on / off) air water stick; simple fasteners for easy disassembly, removal and reinstallation on the mountain (no tools necessary); light weight components for easy transportation; and an easy lift off compressor and control panels.

The Viking Kid is available in Standard (4 water nozzles and 2 nucleators) and Narrow Trail (2 water nozzles and 1 nucleator) models of 16 feet (5 meters) and 25 feet (7.6 meters). Nucleation is provided through either central air or on-board compressors feeding SMI custom nucleator nozzles.

The Viking is well packaged and simple to install and operate. The custom nucleation and filter system are easy to maintain. The jack for raising and lowering the Viking is

safe and easy to operate and can be used with other Vikings in the V series family to save costs.

### **Axis SnowTower™**

The SMI Axis SnowTower™ (patent pending) has a pivoting head that dramatically improves nucleation and nozzle mixing as wind conditions change, thus allowing for more hang time.

Low energy sticks have been successfully used in all snowmaking conditions for many years but have had certain disadvantages resulting from changing wind directions, especially wind not blowing from behind the head, and crosswinds. These challenges have prevented optimum hang time from occurring along with inconsistent nucleation and nozzle mixing, and have also resulted in wetter snow piles.

The Axis SnowTower™ solves these problems because it is designed with a head that can be rotated into infinite changing positions up or down the slope to better take advantage of the winds blowing with the gun and more easily allow you to keep making the snow quality and quantity you desire.

Call SMI or your local representative today for more information about our SnowTower products, or visit us at [snowmakers.com](http://snowmakers.com).

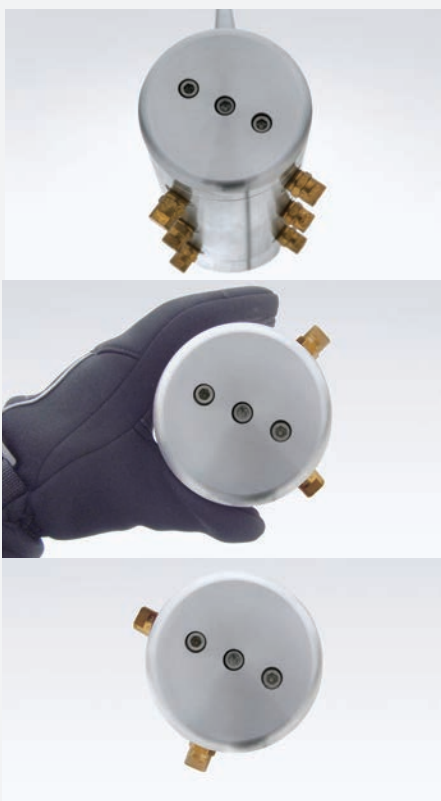


*V2 Viking SnowTower*



*Kid SnowTower*

*Axis Head is Easy to Rotate*



*Axis SnowTower - Head Rotated 90°*



# Make More With Less

Can you answer the following questions, with specific relevance to your snowmaking operation? (Hint: Your business success may depend on it):

- What is snow quality?
- Do we always make dry snow?
- Should we ever make base snow?
- Is tubing, racing or park snow different?
- Does time of year matter?

Let's start with that first question, because understanding it impacts all the others (and almost all aspects of snowmaking).

In general, snow quality is defined by snow density or percentage water content. Density is mass per volume in kg/m<sup>3</sup> or #/ft<sup>3</sup>. Water content is measured per snow depth or volume of melt water within a given volume. Here are some density examples:

MATERIAL	KG/M <sup>3</sup>
Sea Water	1030
Fresh Water	1000
Ice	920
Snow	50 – 600
Air	1.3

Ice floats on water due to being lower density. In snowmaking, we often think of snow quality in terms of the classic snowball test of squeezing water out, or the sleeve test on a cold jacket – does it splat or bounce?

## You Have Snow Quality Options

In SMI's automation programs we use 10 snow quality setting options with one being the driest setting. Wet bulb, water temperature, water pressure and water flows are all considered in the settings. Here is a density summary table with 5 general setting examples for water content relative to snow quality your resort might use.

QUALITY	WATER CONTENT	DESCRIPTION
5	> 50%	Wet snow that is slushy
4	42%-50%	Base snow, wet in marginal
3	35%-42%	Good skiable snow
2	25%-35%	Light & dry, snowballs flake off
1	< 25%	Very dry, can't make a snowball



R & D Facility, Midland MI USA

## Snow Quality Affects Volume

Snow quality definitely impacts snow volume, while nucleation and water droplet mixing, hang time and cure time also affect the snowmaking process.

As you know, there is a big difference in cost and productivity at 29°F (-1.5°C) and 0°F (-18°C). We suggest you discuss snow quality on a regular basis throughout the time of

**“More water through a snowgun does not directly result in more snow on the ground.”**

snow production. Understand the costs and capabilities within your snowmaking system and snowgun fleet for making dry snow or base snow at different wet bulb conditions.

## More Water Does Not Always Equal More Volume

One of the areas that we all need to be reminded about is that more water through a snowgun does not directly result in more snow on the ground.

Over the past few winters SMI has been testing new nucleation technologies and nozzle types and positions. We have tested in conditions between 29°F (-1.5°C) and -2°F (-19°C) with water temperatures of 34-35°F (2°C) and frozen water content between 24% and 55%. More than 100 tests have been completed.

## THEORETICAL EXAMPLE

### Snowgun #1:

33.3 gpm (125 lpm) water flow into snowgun at 400 psi (27 bar)  
 This is 2000 gallons per hour (7560 liters per hour)  
 =268ft<sup>3</sup> water per hour (7.56 cubic meters per hour)  
 @25% water content, the snow volume = 1068ft<sup>3</sup>/hour (30.24m<sup>3</sup>/hour)  
 @50% water content, the snow volume = 534ft<sup>3</sup>/hour (15.12m<sup>3</sup>/hour)

### Snowgun #2:

66 gpm (250 lpm) water flow into snowgun at 400 psi (27 bar)  
 This is 4000 gallons per hour (15120 liters per hour)  
 =534ft<sup>3</sup> water per hour (15.12 cubic meters per hour)  
 @50% water content, the snow volume = 1068ft<sup>3</sup>/hour (30.24m<sup>3</sup>/hour)

## Find Your Answers / Share Your Insights

It goes without saying that we all strive to make the best snow possible, so snow quality should be considered in all snowmaking discussions. But what about costs? The pressure to get open? Tubing snow? Park snow? Stockpiled snow? The list goes on – and we can all leverage our real-world experience to help each other find the best answers for our specific snowmaking needs. Join in the discussion today at [facebook.com/snowmakers](https://facebook.com/snowmakers).



R & D Facility, Midland MI USA



Snow Machines, Inc.  
1512 North Rockwell Dr.  
Midland, MI 48642

PAGE 4

## Sochi 2014 Olympic Alpine Venue

Rosa Khutor is a new Russian resort opened to the public in January 2011. The resort location was selected in the Caucasus Mountain Range near Sochi Russia at 42° latitude and in close proximity to the Black Sea. The resort elevation is between 2300 and 950 meters. This resort will host the Alpine events at the 2014 Winter Olympic Games.

The snowmaking design and owner objectives were extremely challenging due to the big vertical, marginal temperatures, wide slopes, environmental aspects, energy and logistics. The broader project objectives were to include the best technology in a very powerful system with good value. Significant Olympic experience and a strong local Russian partner like Skado were also requested. Below are some of the most interesting facts and highlights surrounding this major installation. Scan our snowcode above using your smartphone QR reader app to see a snowmaking video at Rosa Khutor.



SNOWCODE™

### 2011 SLOPES COVERED

- Downhill (men, women)
- Super giant slalom (men, women)
- Giant slalom (men, women)
- Slalom (men, women)
- Combined (men, women)

### SYSTEM HIGHLIGHTS

- 46m³/min (12,000 gpm) water capacity
- 23m³/min water cooling capacity
- 139 full Auto Super PoleCat Towers
- 10 full Auto Super PoleCat Swing Arms
- 4 full Auto Puma Swing Arms
- 7 full Auto Puma Carriages
- 190 snowmaking stations
- Fully automatic system

### WATER SUMMARY

- Beautiful clean mountain fed river water supply gravity feed
- 2 large lakes for storage of ≈ 120,000m³ (32 million gallons)
- 46m³/min main pumping capacity 14 x 450 Kw pumps
- 15m³/min D Lift booster pumping with 5 x 225 Kw (4,000 gpm)
- 6.5m³/min upper downhill booster pumping with 2 x 225 Kw pumps
- 23m³/min (6,000 gpm) water cooling

### COVERAGE SUMMARY

#### AT BUILDOUT

- 25 Km (86,000 feet) slopes
- 100 hectares (250 acres)
- 1150m (3,772 feet) vertical snowmaking
- 310,000m³ (80 million gallons) water to open

### WEATHER AND TERRAIN

- Proximity close to Black Sea
- 42° Latitude
- 900m to 2050m Elevation
- Marginal conditions
- Wide slopes
- Big winds

### SMARTSNOW™ SUMMARY

- Fiber optic communications backbone
- Hardwire to all fixed towers
- Radio communications to all portables

