



The triple-head Bachler SnoTek TRIDUSA proves its worth in terms of coverage and at medium temperature ranges on the vast "family run" on the Maiskogel at Kaprun. Photos: Bachler (all)

Bachler impresses in Kaprun

Systematic in efficiency

In light of increasingly difficult to forecast snowmaking windows, modern snow guns need to deliver high efficiency at marginal temperatures and reliable maximum output across a wide range of temperatures. The Swiss snow lance specialist Bachler relies on his variable SnoTek technology, which has also proven its worth in the expansion of snowmaking facilities at the Maiskogel Family Mountain in Kaprun (Austria).

From the beginning, the focus of development of our basic NESSy technology has been on early start temperatures with a low energy demand", explains Klaus Weisl, client advisor and operations specialist at Bachler Austria, who has been managing the Swiss lance specialist's programme together with Harry Schulze, Gregor Breitfuss and Franz Schlemmer in Austria since 2009. "Nothing has changed to this day, and we have consistently optimised our multi-patented processes in terms of defined range and yield for area snowmaking!"

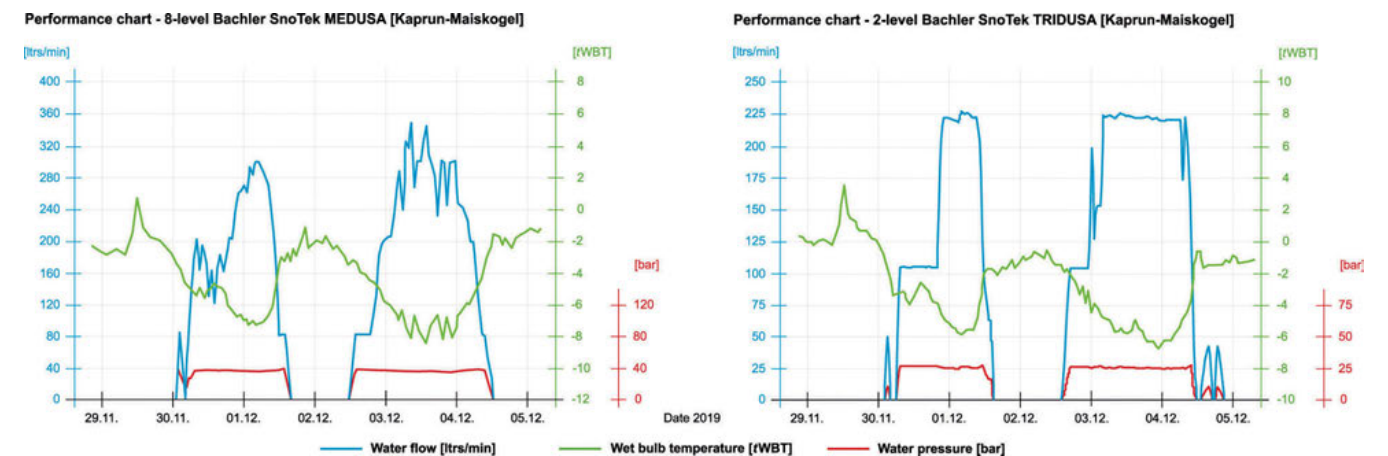
According to Bachler, the multi-head SnoTek models MEDUSA and TRIDUSA in particular set standards in terms of profitability and snow output today. With low connection values they produce large volumes of snow from -2° WBT per kWh of ad-

ditional power (energy demand per snow gun without local water supply). In ideal conditions and when the 2nd snow level (TRIDUSA from -4° WBT) and up to 8 output levels (MEDUSA from -8° WBT) are acti-

vated, according to Bachler the SnoTek models even exceed, e.g. energy-intensive propeller machines – not only in a pure kWh comparison, but also in overall snow volume per hour (see table).



Happy partners (from left): Mario Koch, from Bachler, Hans Lechner with son Vincent, Albert Rattensperger, Gletscherbahnen Kaprun, and the Bachler team with Claus Dangel, Klaus Weisl, Gregor Breitfuss, Adrian Bachmann and Bruno Koch.



The snowmaking logs from Kaprun verify the specific characteristics of the increasingly powerful SnoTek MEDUSA with falling WBT values and the truly high-performance SnoTek TRIDUSA even at medium temperatures.

Successful in practice

In the expansion of the snowmaking facilities on Kaprun's local mountain, the Maiskogel, Bachler has once again proven that the SnoTek models' outstanding performance on paper also transfers to the mountain and that their specific performance characteristics are the perfect complement to one another. From April to December 2019, the company installed for Gletscherbahnen Kaprun a completely new string with 56 hybrid ducts (water + electricity) along the existing "family run", covering a total length of 2,500 m. This runs from the top exit of the six-seater Almbahn chairlift (1,726 m) past the top and middle station of the 10-MGD MK Maiskogelbahn back to the Almbahn entry at 1,176 m. About half way up, there is a new pump station connected to a water supply line from the nearby Kaprun-Hauptstufe hydropower station, which now delivers 385 l/s together with existing capacities. The central air is provided by a slimline 160-kW central compressor in the pump station.

"The project was certainly a challenge for us", says Klaus Weisl looking back. Indeed, the extension fully integrated in the central snowmaking control, could only "go live" after official final approval of the new pump station on 20th November. This fact heavily restricted the potential snowmaking

window for the initial coverage from the outset with 13 single-head SnoTek guns and 14 each of the SnoTek MEDUSA and SnoTek TRIDUSA. From 30th November to 7th December it was then full speed ahead with WBT values from -2° to -6.3°: The SnoTek models produced snow for 70 to 75 hours at alternating locations according to their performance characteristics and in consultation with the Maiskogel team. "Despite the fine tuning required, we not only managed to complete the basic layer in the short time available, securing the start to the season, but even produced the snow for the whole season. The snow guns were then dismantled and stored", summarises Klaus Weisl.

The SnoTek MEDUSA – designed for high maximum output at low temperatures with eight snowing levels – and SnoTek TRIDUSA – highly efficient in the middle temperature range – demonstrated their full potential as shown by the Bachler control system's performance logs (see graphic). The triple-head version with high flow rate proved its worth particularly on the Maiskogel family mountain: For a TRIDUSA at 1,400 m, the system registered a total flow of around 800 m³ water over 75 hours, which corresponds (factor 2.2) to a snow volume of almost 1,800 m³ and a real measured snow depth of over 70 cm. This in a temperature range from al-

most -2° to -6° WBT and water pressure of just 25 bar. "With a working pressure of 40 bar we would have even been able to achieve 1.100 m³ water / approx. 2,400 m³ snow under the same conditions", says Klaus Weisl, assessing the performance of the high-capacity Bachler solution.

Course set

Accordingly, the triple-head solution also featured at the top of the wishlist for the final configuration: 32 SnoTek TRIDUSA (+18), 14 MEDUSA (+/- 0) and 10 SnoTek (-3). "In the end, the Bachler concept completely won us round", say the Maiskogel snow team with Head of Technical Services Albert Rattensperger. "The different SnoTek models have met our expectations at all locations, some even far exceeding them. The new system is seamlessly integrated with our existing infrastructure and represents a very profitable, sustainable and energy-efficient solution with its flexible design." With an average of around 3 kWh per unit, the Bachler system requires just 168 kW even with full configuration – in comparison, a single propeller machine requires between 18 and 24 kW. tb



www.bachler.ch

Efficiency comparison reg. Additional power

		Water flow ltrs/sec	Water pressure bar	Additional Power kWh	Snow volume* m ³ /h	Snow volume* m ³ per kWh
SnoTek MEDUSA	Marg. temperature (-2° WBT)	1,0	20	2,2	7,92	3,60
	Max. performance (≤ -8° WBT)	15,0	60	2,2	118,80	54,00
SnoTek TRIDUSA	Marg. temperature (-2° WBT)	1,5	20	4,0	11,88	2,97
	Max. performance (≤ -4.5° WBT)	8,5	60	4,0	67,32	16,83

*Conversion factor Water/Snow: 2,2

The efficiency comparison shows the complete performance range in which Bachler snow lances can be configured to meet customers' specific needs.