



NESSy

New Energy-efficient Snowgun System



Field testing at the SLF facilities in Davos



About NESSy

This innovative new snowgun is the result of 3 years intense research and development and joint collaboration between the following Swiss institutes and companies:

- Institute for Thermo- and Fluid- Engineering ITFE, University of Applied Sciences North-western Switzerland
- Swiss Federal Institute for Snow and Avalanche Research SLF, Davos
- MVT micro technologies AG, nozzle technology
- BÄCHLER TOP TRACK AG, snowmaking technology

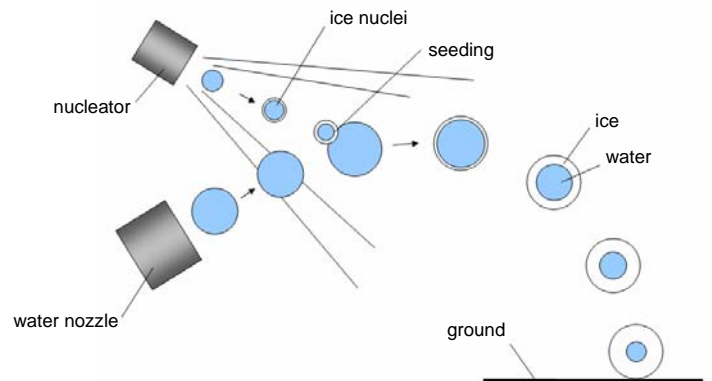
This project was supported by the Innovation Promotion Agency (CTI) of the Swiss Federal Office for Professional Education and Technology (OPET).

Field studies, experiments carried out in a climate controlled wind tunnel and a detailed simulation model of the snowmaking process provided detailed understanding and fundamental improvements to the process.

Droplet size measurement



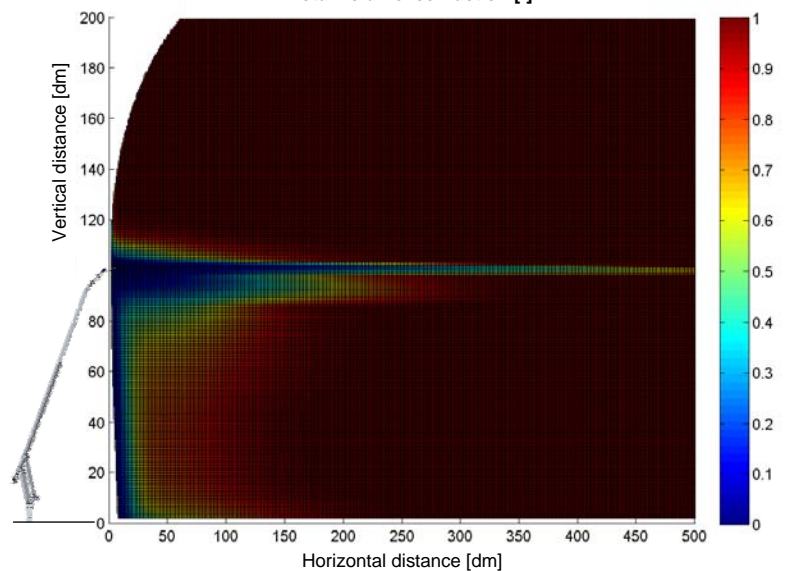
Simulation model



Snowmaking in the climate controlled wind tunnel of the ITFE



Total volume ice fraction [-]



Main Features of NESSy

The New Energy-efficient Snowgun System NESSy combines the latest scientific knowledge with well-established snowmaking technology. Several patents on the new nozzle technology are pending.

Compared with conventional snowguns NESSy features

- up to 80% less air consumption
- up to 2°C / 3.6°F higher start-up temperature
- up to 5 times less noise emission

NESSy is based on reliable BÄCHLER Snowmaking technology

- Modular design
- Single- or multi-stage water flow
- High-quality nozzles from MVT micro technologies AG
- No additives
- Existing BÄCHLER snowguns can be upgraded easily

BÄCHLER is pleased to give you all of the facts

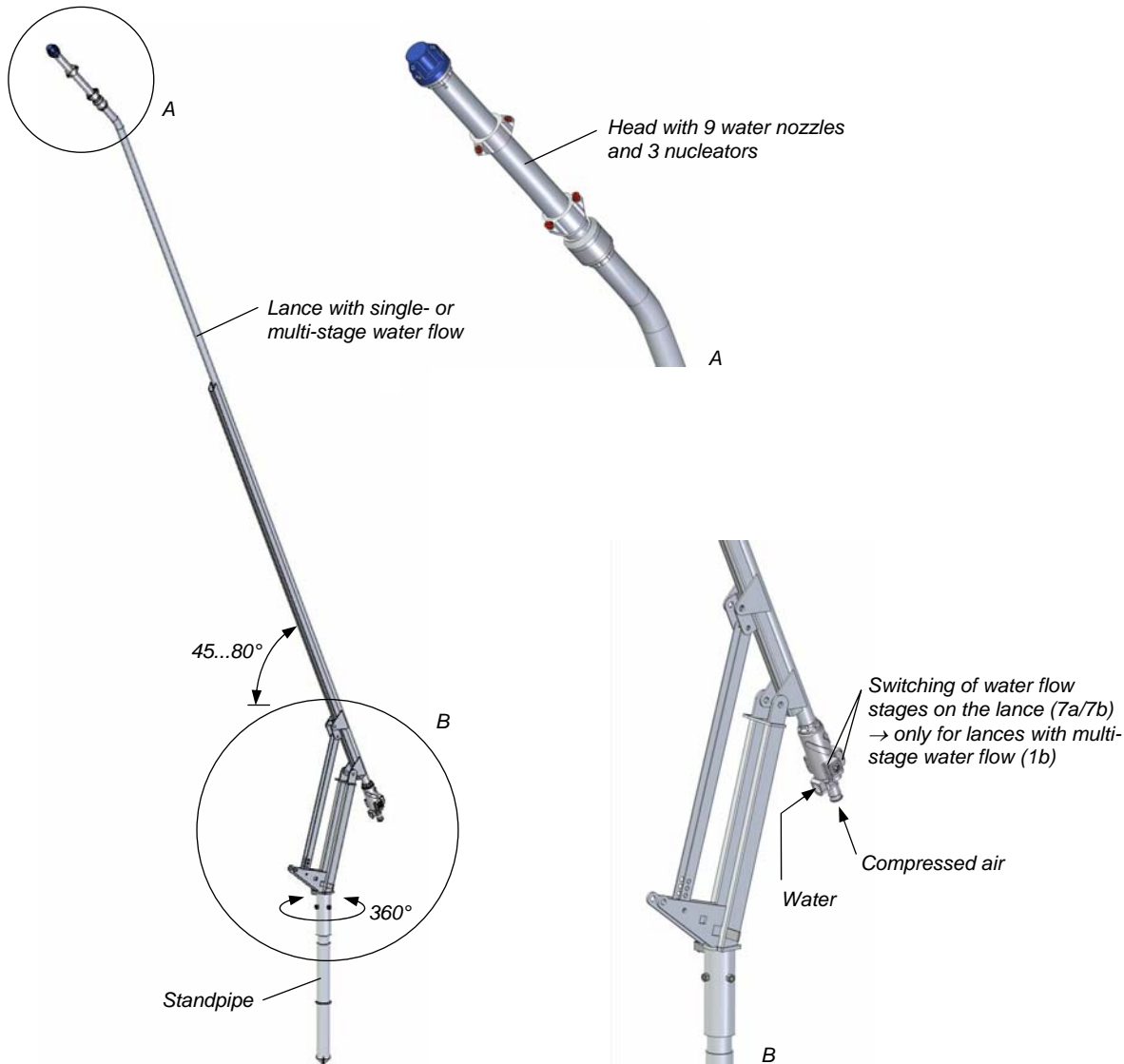
In this brochure you find detailed information about air consumption, water consumption (amount of snow) and the snow quality depending on the ambient conditions.



Technical data

Geometry, weight, versions

1) Lance	a) Single-stage water flow	50kg / 110lb (10m / 32.8ft)
	b) Multi-stage water flow	55kg / 121lb (10m / 32.8ft)
	Lance lengths	2m, 3m, 5m, 7m, 10m / 6.6ft, 9.8ft, 16.4ft, 23.0ft, 32.8ft (other lengths on request)
	Pivoting angle	360°
	Tilt angle	45...80°
2) Lifting Device	a) with spindle	35kg / 77lb
	b) with hydraulic cylinder	45kg / 99lb
	c) with safety barrier	38kg / 84lb
3) Standpipe	Standpipe with adjustment wheel	1.5m / 4.9ft height, 30kg / 66lb
4) Fixing of standpipe	a) with valve block in pit	
	b) on concrete foundation or satellite	
	c) on sled "Smart"	
5) Hose connections	1.5" or 2" Kamlok- Couplings	
6) Compressor (optional)	a) rotary compressor	1.5kW / 2.0hp
	b) oil-free piston compressor	1.8kW / 2.4hp
7) Switching of water flow stages	a) manually on the lance	
	b) with electronic control on the lance	
	c) with valve block in pit	
8) Water nozzles	a) multi-stage lance	9 pcs
	b) single-stage lance	3, 6 or 9 pcs
	water flow with standard nozzles	up to 250 l/min / 66 gpm (details see page 5)
	standard nozzle assembly	6 x 15 and 3 x 20-nozzles
	choice of nozzles	10, 15, 20, 30
	1 l/min = 0.26 gpm	Number = l/min at 20 bar (290 psi)
9) Nucleators	a) type H	for high pressure ratios
	b) type L	for low pressure ratios
	number	3
	maximum air consumption	
	at 10 bar abs. / 145 psi	155NI/min / 200g/min / 5.47scfm / 0.442 gpm
	at 8 bar abs. / 116 psi	120NI/min / 155g/min / 4.23scfm / 0.342 gpm (details see page 5)



Stages of water flow

Snow quality and range of use of the different stages see page 6.

Marginal stage	is configured for marginal conditions	3 water nozzles
Basic stage	standard configuration (also recommended for single-stage lances)	6 water nozzles
Extra stage	for colder conditions	9 water nozzles
Cross wind stage	for use with strong side winds	6 water nozzles

Noise emission

Sound level dB(A)*	20m / 66ft	40m / 131ft distance from snow gun
Marginal stage	60.0	52.0
Extra stage	61.2	53.2

*Energy-weighted average of the sound levels ahead, aside and behind of the snowgun

The measurements were conducted by the Environmental Agency of Graubünden (Switzerland) with central air supply at 8 bar (116 psi) and 27 bar (395 psi) water pressure.

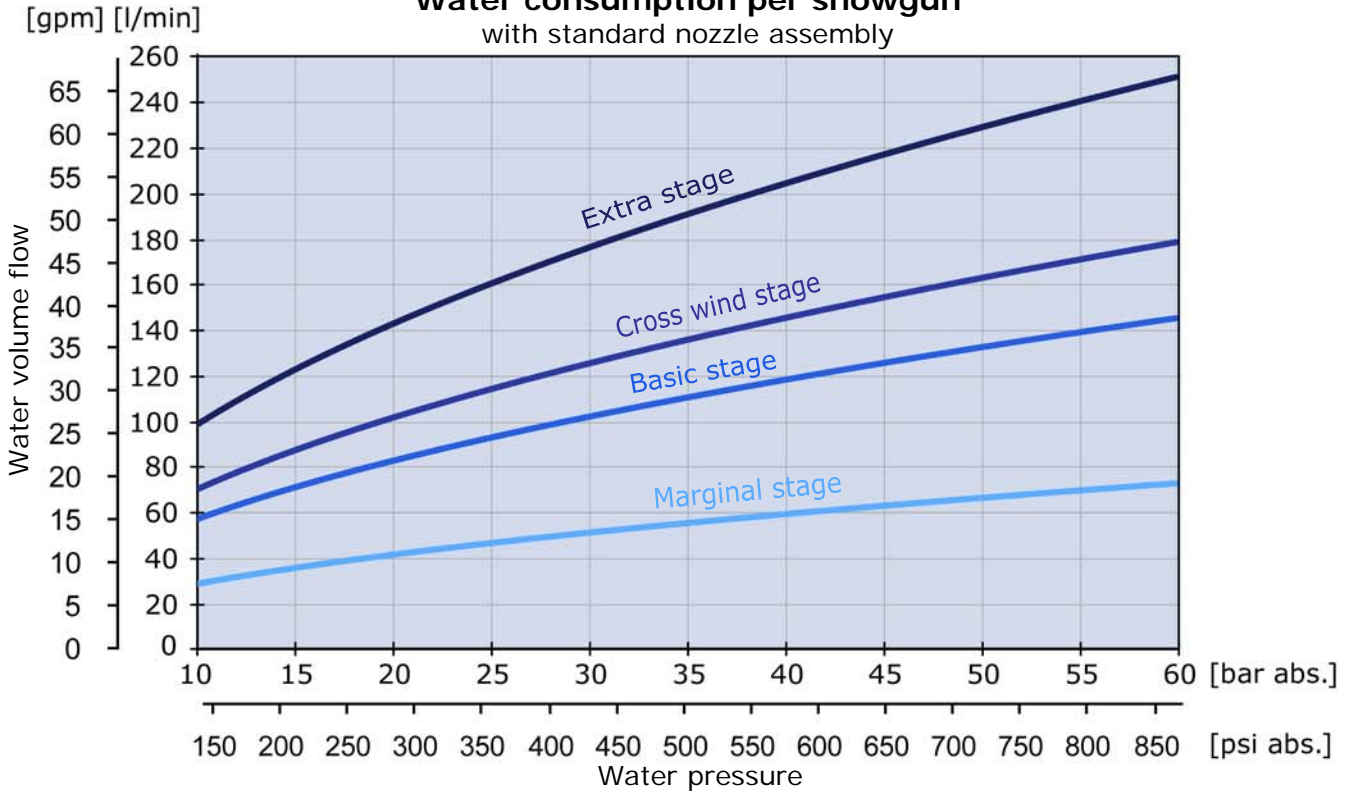
Signification of the sound level in dB(A):

A reduction of the sound level of 3 dB(A) corresponds to a noise reduction of 50%.



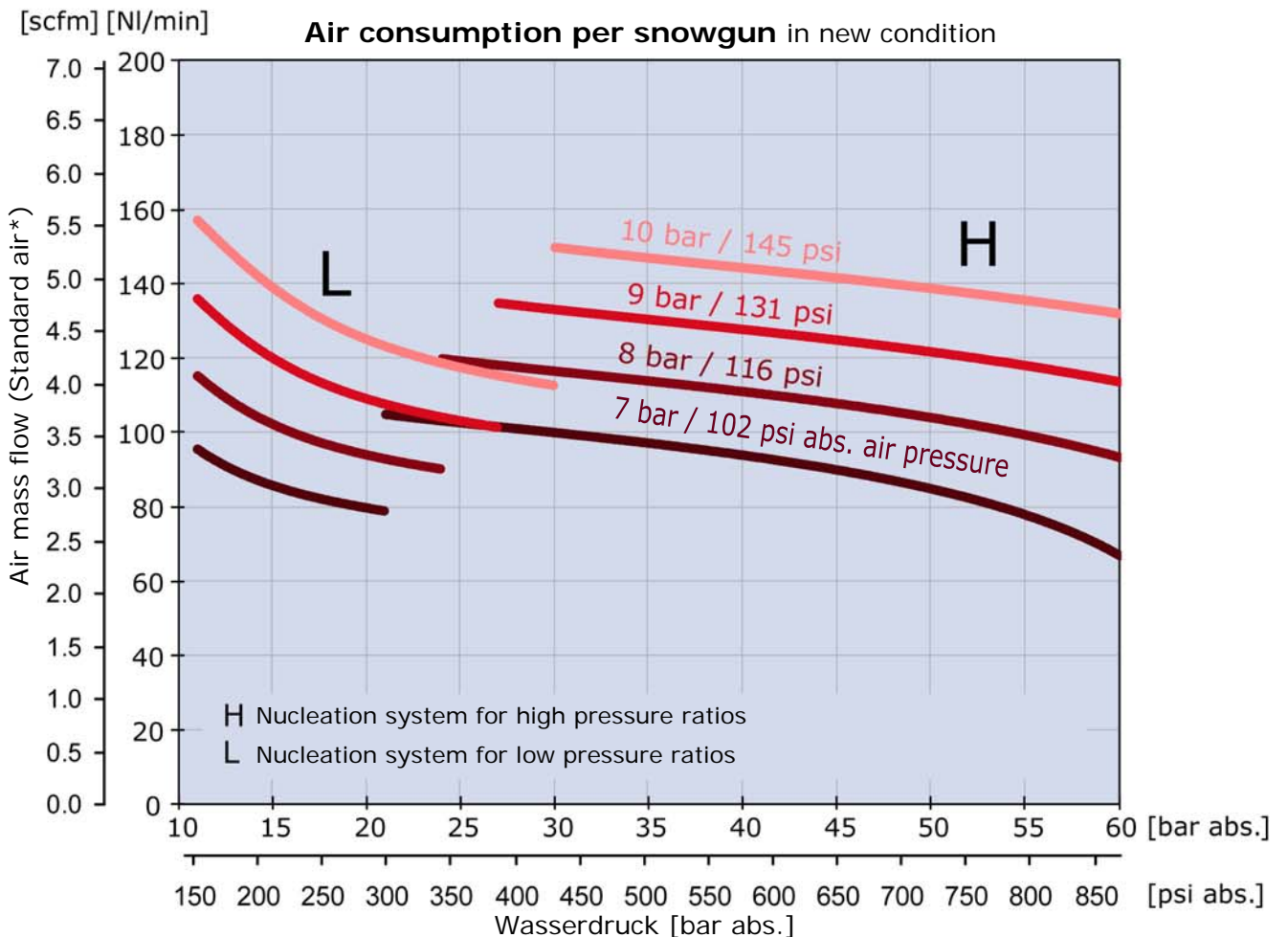
Water and air consumption

Water consumption per snowgun
with standard nozzle assembly



100 l/min / 26.4gpm water consumption corresponds to 12...15m³/h / 53...66gpm snow production
abs. → absolute pressure = ambient pressure + relative pressure

Air consumption per snowgun in new condition

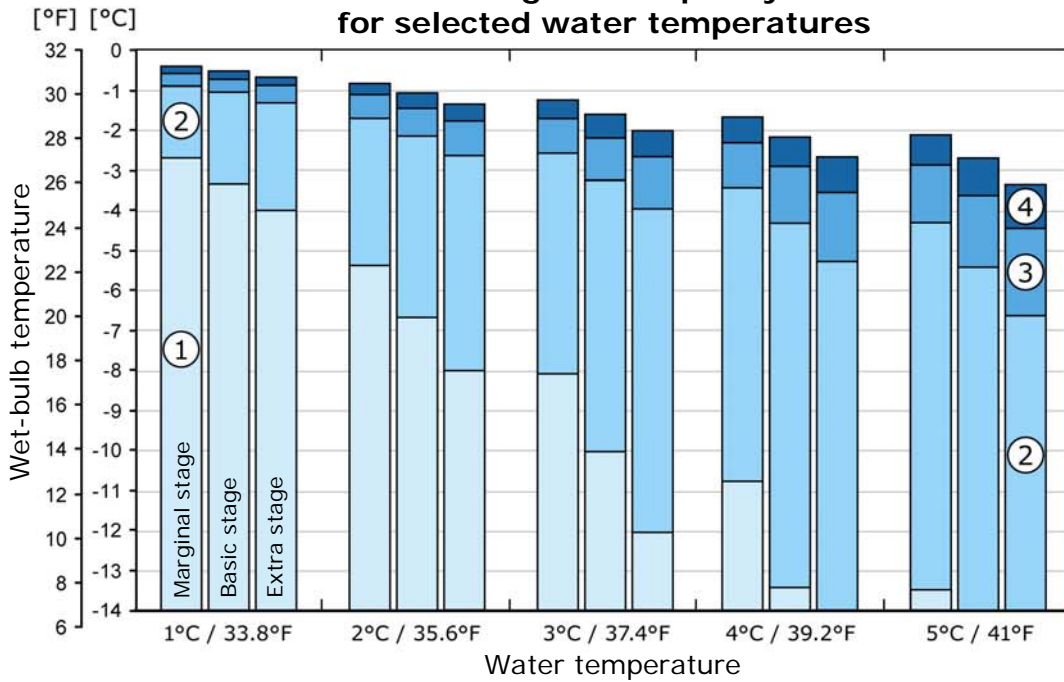


H Nucleation system for high pressure ratios
L Nucleation system for low pressure ratios

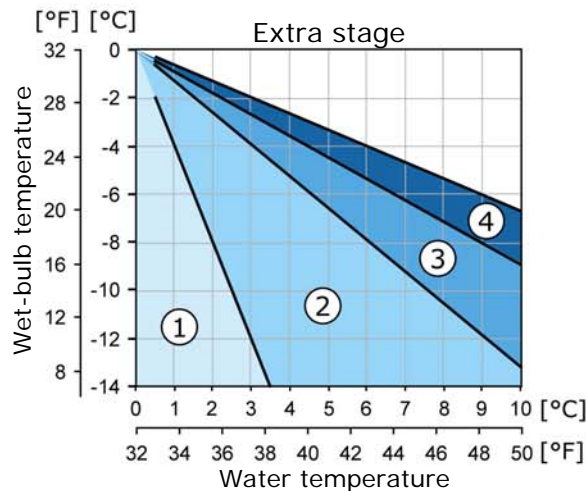
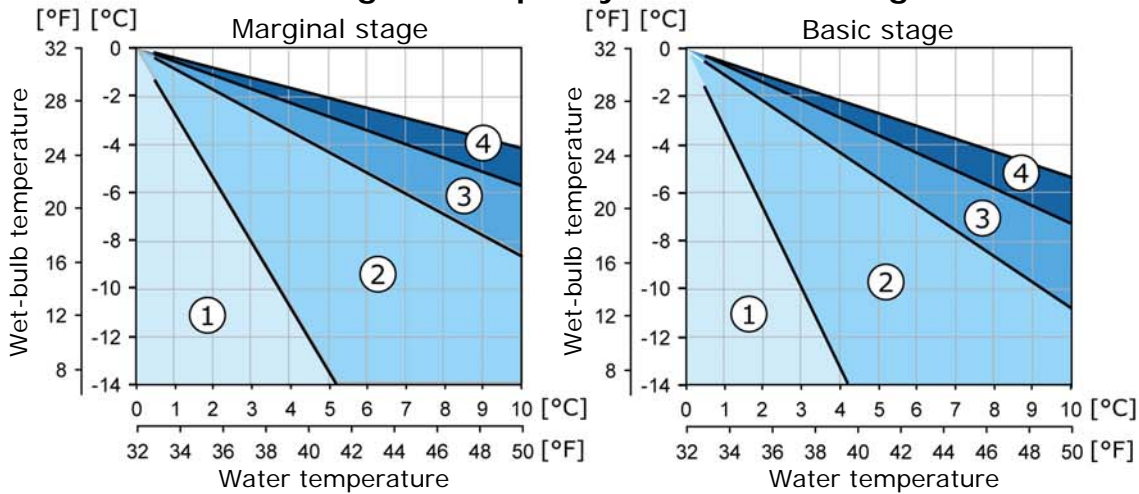
*Density for standard air: 1.293 kg/m³ / 0.0807 lb/ft³

Snow quality

Average snow quality for selected water temperatures



Average snow quality for different stages



Snow quality classification

- | Class | Snowball test (during snowing) |
|-------|---|
| ① | A snowball cannot be formed. |
| ② | A snowball can be formed and it stays white while pushing it together.
Best for immediate grooming! |
| ③ | The snowball turns slightly into grey while pushing but no water comes out. |
| ④ | The snowball turns grey and there is water coming out. |

The specified snow qualities are averages taken over the entire length of the snow deposition area.

The qualities were determined at the following conditions:

- Wind velocities: 0.5...2m/s / 1.8...7.2 km/h / 1.1...4.5mph
- Water pressure: 30...35bar / 435...508psi
- Air pressure: 8...10bar / 116...145psi
- Lance length: 10m / 32.8ft



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