

# Flipper

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The most economical frost protection method for vineyards

- Spreads water in a very long and narrow strip, targeting the vine rows only
- Saves up to 70% of water compared to conventional overhead systems
- Large droplets minimize the cooling effect when starting the system
- Safe operation under frost conditions
- Low flow rates (25-45 l/h) and operating pressures(2.0-2.5 bar)
- Optional flow regulator for hilly terrain or long rows
- Low installation and pumping costs
- Dry pathways reduce waterlogging and allow access for equipment and workers soon after operation



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## Practical Advice

- Ensure that the water stream is in line with the vine rows.
- Firm anchoring of the Flipper to the post is essential.
- Start the system before the critical damaging temperature is reached. Consider dew point to decide on start-up temperature (see chart).
- Stop the system only when the outside temperature is steady above 1 °C.

Operating pressure: 2.0-3.0 bar

Filtration requirement: 120 mesh/130 microns

## Performance table

Nozzle colour	Flipper colour	Flow rate (l/h at 2 bar)*	Maximal recommended spacing (m) between Flippers**
Black	Black	25*	6.0
Violet	Black	35*	7.0
Brown	Brown	43	9.0

\* For regulated unit: 2.5-4.0 bar

\*\* When Flippers mounted 1.0 m above the target

## Amount of water (m<sup>3</sup>/ha/hr) required by Flipper frost protection system\*, and water saving compared to conventional 40 m<sup>3</sup>/ha/hr system

Nozzle colour	3.0 m. row spacing vineyard	% of water saving	2.5 m. row spacing vineyard	% of water saving
Black	14.0	65	16.0	58
Violet	16.6	58	20.0	50
Brown	16.0	60	19.0	52

\* When Flippers are at maximal spacing, at 2 bar pressure

## Recommended start-up temperatures for frost protection at various dew points

Dew point temp. (°C)	-9.5	-9.0	-8.5	-8.0	-7.5	-6.5	-6.0	-5.5	-5.0	-4.5	-4.0	-3.5	-3.0	-2.0	-1.5
Start-up temp. (°C)	+4.0	+4.0	+3.5	+3.5	+3.0	+3.0	+3.0	+2.0	+2.0	+1.5	+1.5	+1.0	+1.0	+0.5	+0.5

## Components

