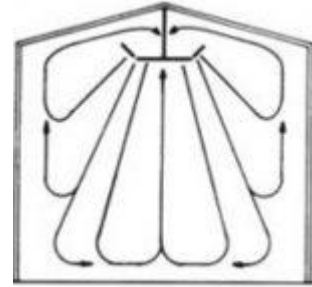


## Nivolator V9 Greenhouse

*Especially designed for the greenhouses.*

The trend towards higher and larger greenhouse complexes is continuing. Optimising the climate in these greenhouses requires a different approach. How do you get a homogeneous climate everywhere in these high greenhouses? It's a matter of air movement!

The sophisticated design of the nine-leaved Nivolator V9 creates a unique air pattern. The air is sucked in from the floor up and brought back down in a cone-shaped airflow, creating an optimal mixing of the air without draughts. The temperature distribution in the crop is more even, there is an exchange of air above and below the screen cloth, there is no draught and there are fewer risks of crop condensation. The Nivolator V9 is successfully used in many different crops. These include tomatoes, peppers, roses, gerberas and other flowers, cucumbers, strawberries, etc.



### Advantages

- Improved microclimate
- Homogeneous temperature and CO<sub>2</sub> distribution throughout the greenhouse.
- Homogeneous air distribution
- Exchange of air above and below the screen cloth.
- Energy efficient.
- Small vertical temperature gradient between roof and ground.
- No draughts, no dead climate.
- Ingenious air pattern.
- Speed controllable.
- Low-noise
- No draughts
- Maintenance free
- Small vertical gradient
- Adjustable blades
- Thermal protection



## Technical specifications

- 1 on 250 m<sup>2</sup>
- Motor power of 180 Wat

## Technical specifications Greenhouse Nivolator 110V

- Type: TVE-7 with V-9 fan
- Color: White cup and motor, aluminum fans
- Plug: American plug Revolutions: 800 RPM
- Motor power: 380 W / 110 V – 1 fase
- Ampere: 3 Amp.
- Frequency: 60 Hz

## Technical specifications Greenhouse Nivolator 230V

- Type: TVE-7 with V-9 fan
- Color: White cup and motor, aluminum fans
- Plug: European plug
- Revolutions: 700 RPM
- Motor power: 180 W / 230 V – 1 fase
- Ampere: 1 Amp.
- Frequency: 50 Hz

## Difference Horizontal vs Vertical ventilation

<i>Nivolator</i>	<i>Horizontal fan</i>
Vertical air circulation	Horizontal air circulation
Energy savings up to 30 % - Brings the warm air in the top of the greenhouse down, in between the crop	Circulates horizontal,
Homogeneous climate - Less humidity and you are allowed to grow at a higher humidity since you have an equal climate, less condensation on the leaves.	- Circulates the air above the crop, instead of in between the crop
Material - The Nivolator is made from aluminium, and therefore very low maintenance and a very long lifetime	- Mostly plastic
Hydro consumption - 700 rpm, only (max)180 W per fan	- Minimal 280 W
Noise - Much lower than horizontal since the Nivolator runs on 700 rpm.	- Runs on at least 1400 rpm
Air displacement - 8000 m <sup>3</sup> /hour	- Max 4500 m <sup>3</sup> /hour
Airflow - Very gentle - No dry spots	- High speed air nearby the fan
Diseases - Airflow in between the crop. Less moisture in between the leaves.	

## Important points

**Temperature distribution:** Plants must be grown in as similar a temperature distribution as possible. With horizontal fans, you only circulate air in the top of the crop and certainly with tomato. Air is circulated only at the top of the tomato plant.

Minor horizontal and vertical temperature differences. Hot air at the top of the greenhouse caused by external radiation and lighting is transferred by the Nivolator to the bottom of the greenhouse. Heat produced by external radiation near walls is also dispersed. This means there are fewer horizontal and vertical temperature differences in the greenhouse. Therefore, crop growth is more uniform and harvesting starts at approximately the same time everywhere in the greenhouse. In a 1-hectare greenhouse used for growing tomatoes there was a temperature difference of 6°C. The Nivolator was installed, after which the temperature difference was less than 1°C.

### Circulation in the greenhouse:

Air always chooses the path of least resistance. With horizontal circulation, the air will not be circulated through the plant because the air is circulating horizontal above the crops and will never go through the crops. As a result, it only circulates above the crop. The Nivolator circulates and forces the air through the crop. This creates circulation and therefore activity in the crop.

### Co2 emissions:

If there is little or no air current between the leaves, the CO<sub>2</sub> concentration close to the leaf surface drops, owing to the uptake of CO<sub>2</sub> and the limited supply. With the Nivolator, the air ensures better dispersal of CO<sub>2</sub> between the leaves, thereby increasing the plant's CO<sub>2</sub> uptake. The circulating air also disperses CO<sub>2</sub> better throughout the entire greenhouse.

### Moisture

Too much accumulation on leaves causes the stomata to close to the plant, which reduces the growth, by just removing the moisture through circulation there and spreading more throughout the greenhouse, the plant can run much better production. Stomata should be open for oxygen removal. When the Nivolator is used, the even temperatures result in a more uniform crop. The better air movement combined with high CO<sub>2</sub> uptake benefits the crop. In the case of tomatoes, the plants remained 1-2% shorter, the leaves 5% longer and the top was also 3-4% thicker.

### Fewer fungal problems.

The Nivolator produces good air currents through the crops, thereby preventing local areas of excessive humidity and reducing the likelihood of the crop being damaged by fungal growth. Tomato plants were found to have fewer Botrytis patches on the stem.