



According to Jeroen Steenbrink, the central heating element in the system plays a key role as it prevents very cold air being brought in at the bottom of the greenhouse.”

Seasun positive about AVS with heat recovery:

## “Better climate control pays dividends: plant is always right”

**In 2017 the Dutch tomato nursery Seasun installed a new dehumidification system across 4.4 hectares of their lit tomato crop. The Active Ventilation System with heat recovery operates with drawn-in outdoor air which is prewarmed with outgoing greenhouse air. If required, the temperature can be raised even further with a central heating element. With two fans and four valves, the system offers various options for air circulation and mixing indoor and outdoor air.**

The Seasun Nursery, which is owned by the Gresnigt family and is located in the southwest of the Netherlands, has 64 hectares of greenhouses and grows a wide range of tomatoes and sweet peppers which they pack in-house. In 2016 they built a new 12.7 hectare greenhouse for their lit tomato crop. In 2017, one 4.4 hectare section was fitted with a

custom-made dehumidification system.

“The results of the trial were particularly striking,” says Jeroen Steenbrink, director of technology at Seasun. “We have been applying the principles of Next Generation Growing wherever possible since 2010. It would be nice if we could grow at night with the screen closed without the crop running short of anything. This puts very high demands on your climate control. Especially since a lit crop transpires more, which raises the bar even higher.”

### Extensive wish list

To keep the climate uniform, the new greenhouse is equipped with a double grow pipe which acts as the primary heating source. Each row has its own loop, so the horizontal temperature differences are very small. The pipe rail can be used as a secondary source if necessary. At present they have one energy screen, with the option of adding a second if needed.

Steenbrink: “We were looking for an air handling system that would give us more control options for optimising the climate, reducing energy consumption and boosting yields and product quality. Our rule of thumb is: the plant is always right and it must want for nothing. We looked at a range of systems and ultimately saw the most potential in the Active Ventilation System with heat recovery (AVS-WTW) from Van Dijk Heating. Moisture control and an even climate are crucial success factors for the crop. We wanted to have the option to reheat the air so we never need to blow cold air in at the bottom of the greenhouse.”

### Even more compact

The system has been on the market for several years and is used by nurseries across the world, including in Europe and North America, says sales manager Joek van der Zeeuw. The com-

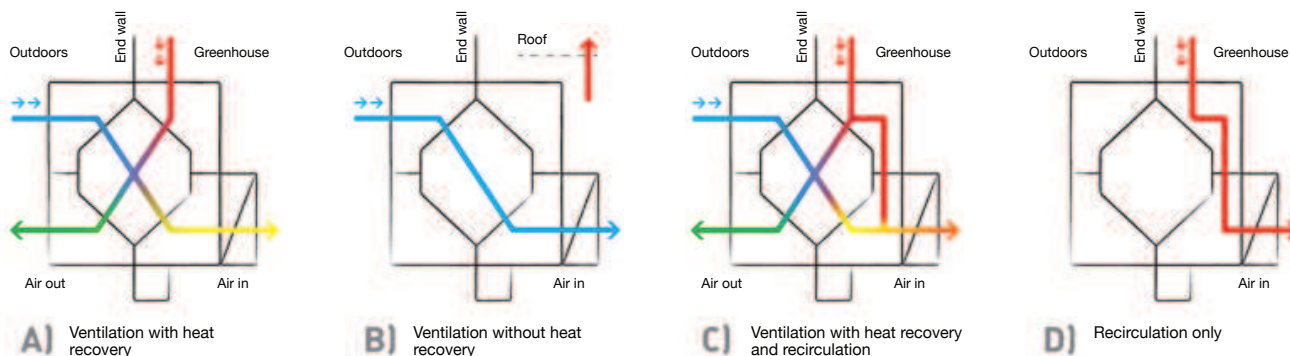
## How does the AVS-WTW system work?

**At the heart of the Van Dijk Heating system is the integrated heat exchanger across which the various air flows pass.**

This allows the ventilation air drawn in from outdoors to be heated by the outgoing greenhouse air. A fan draws in the

greenhouse air and blows it out through the integrated heat exchanger. A second fan draws in the outdoor air through the heat exchanger, thus heating it up, and blows the preheated air into the air hoses. If the preheated air is colder than the greenhouse air – the difference being no more than 1.5-2°C,

according to the supplier – a central heating element reheats it to the preset greenhouse air temperature. Although some growers omit this component, the supplier does not advocate that. The four air valves can be used in various ways.



pany has also supplied similar systems to the Delphy Improvement Centre and Wageningen University & Research.

“What made the Seasun project so challenging for us was the need to reduce the height of the system from 180 to 150 cm and add a central heating element,” he says. “The existing units didn’t fit under the purlins. It took a lot of jiggling by our engineers to fit the complex set of two fans, four valves, an integrated heat exchanger, a central heating element and a condensate drain into the available space, but we did it and we’re proud of that.”

### Acclimatisation year

At crop changeover in September 2017, 72 newly designed air handling units were fitted to both end walls of the section. There are two units on each 8 m wide truss that are connected to perforated air hoses 150 m in length.



**Joek van der Zeeuw** “Reducing the height of the AHUs was quite a challenge.”

The cultivation manager was tasked with exploring the potential of the new tool and getting what he could out of the crop. “After that you can use your experience and measurement results to start fine-tuning, but that was not a priority for us in the first year,” says Steenbrink. “This year and next we will be taking targeted measurements and comparing the section with a reference section.”

### Initial gains

Although it is always difficult to compare different years – particularly in an extreme year like 2018 – the technical director believes that using the new system will help them increase yields. “The system gives us a better handle on the climate and increases the control options. We have also saved natural gas, and besides recovering heat, the system also recovers water, which we can re-use. That last factor is an added benefit which provided us with several cubic metres of condensate per hour, which was very welcome last summer.”

The fans generally run at half power to save electricity, Steenbrink explains. “We extract moisture from the greenhouse air for as long as we can by circulating it through the integrated heat exchangers. When the moisture content exceeds the threshold value, we add in relatively dry outdoor air. It’s only when even that isn’t enough that we ramp up the speed.”

### Getting more

According to Van der Zeeuw, growers have boosted yields by more than 10 percent with this system. “After all, having more control over the greenhouse climate and humidity levels also helps reduce the disease pressure and keeps the crop in better condition,” he says.

Although this innovative system is not yet widely used in the Netherlands, the sales manager thinks a breakthrough is only a matter of time. “The payback time is easy to estimate depending on the design of the system. As the price of gas rises, it becomes more and more attractive. We think growers will also be impressed by the modular structure of the components and capacity. This enables us to offer customised solutions based on a standard concept that has clearly proven its worth.”

Steenbrink expects to achieve higher returns this year. “There is a lot more we can get out of it,” he says. “Not only in terms of higher yields, but also in energy savings and making effective use of the various control options. So that’s what we are aiming for this season. But as I said before, the plant is always right and is the most important factor.”

## Summary

The Seasun Tomato Nursery has equipped a large section of its greenhouse with an innovative air handling system with heat recovery. Featuring a central heating element for reheating, this system facilitates the application of Next Generation Growing principles and enables the nursery to achieve a better, more homogeneous greenhouse climate. In addition to energy savings, they are anticipating a positive impact on yields and fruit quality. Following an initial acclimatisation year, the section is this year being compared with an adjacent reference section.