

Producer industrial gas – IVG40-CT Pro CoolWater skid

Industry type	Petrochemistry
Cooling type and cooling towers	Open circulating cooling tower
For IVG installation	
Evaporative capacity in MW	30 MW
Water evaporation	39.00 m3 / hr
Water consumption	58.50 m3 / hr
Cooling water thickening	Factor 3.0
Kilo of chemical consumption	59,747.00 kg
Discharge waste water on:	channel water including chemicals
After IVG-CT installation	
	2019
Evaporative capacity in MW	30 MW
Water evaporation in m3 / hr	39.00 m3 / hr
Water consumption in m3 / hr	44.57 m3 / hr
Decrease water consumption in%	- / - 23.81%
Cooling water thickening	Factor 8.0
Kilo of chemical consumption	3,412.00 kg
Decrease in chemical consumption in% / -	94.83%
Return on Investment	2.0 - 2.5 years
IVG technology	IVG40-C Coolwater Pro
Absorbed power	14 kW
Discharge waste water	channel water



Phase I: Feasability study

In 2017, the producer submitted a request for joint research into their cooling water exploitation.

The focus points defined here are as follows:

- Decrease water intake for cooling
- Decrease or eliminate cooling water chemicals
- Decrease drinking water intake

The results of this feasibility study have led to an implementation of the Vortex water treatment, with sufficient measuring technology to verify the intended results.

Phase II: Implementation on location

The most important wish was to use fewer chemicals in the cooling water. To prevent corrosion, the manufacturer uses two types of corrosion inhibitors in combination with a dispersant to prevent inorganic contamination, supplemented with chlorine bleach to reduce biological contamination. An attempt is made to recirculate the cooling water as much as possible, but eventually it is necessary to flush. All kinds of legal restrictions are attached to this, which are expected to become increasingly strict.

Naturally, the producer also wants to limit the chemical dosage because of the costs of the chemicals itself and the costs of the system for administering them. But more important for them is that they want to work as environmental friendly as possible, so that the business activities can be carried out for years to come.

Because it is a new technology which needs to prove the effect on their system before switching to a new cooling water treatment, it has been agreed to start a pilot installation on one of the cooling towers. This started in 2019 by placing an IVG40-CT CoolWater Pro installation, built into a container. Since placement, fewer and fewer chemicals are dosed in phases while the water quality is measured constantly. For this, not only samples are taken from the water, but there is also a test heat exchanger in the system that is just slightly warmer than the real one. The heat exchanger is constantly monitored and if it does not contaminate, the heat exchangers in the system will certainly not.

In order to also minimize microbiological contamination, an electrolyser has been built into this installation that makes active chlorine from chlorides present in the water. Because chemicals are not being added, the mass balance remains the same. And because the active chlorine reacts immediately as it hits a microorganism, it does not end up in the drain water.



Phase III: Global conversion

The first results of this pilot are very positive. In the first quarter of 2020, the producer will be able to make the final conclusions about the new water treatment. It is expected that the positive results that have now been achieved will be continued, and then one can also start experimenting with the make-up water qualities of other sites. Because of the mixing station that they use, one can in simulate all types of make-up water. This allows them to investigate whether this method of water treatment can also work at other sites. If the use of chemicals for water treatment has ceased, this will result in an enormous environmental benefit while saving money and the 'license to operate' is secured.

