

# ONI-AquaClean Water Treatment AC-2G Series

German Patent Application  
No. 10 2017 011 936.8

**Top Cooling Water Quality  
for More Process Safety,  
Increased Productivity,  
and Energy Efficiency  
...without Using Biocides**



Management  
System  
ISO 9001:2015  
ISO 14001:2015  
ISO 55001:2018  
[www.tuv.com](http://www.tuv.com)  
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Fachbetrieb WHG VDI 6022 A  
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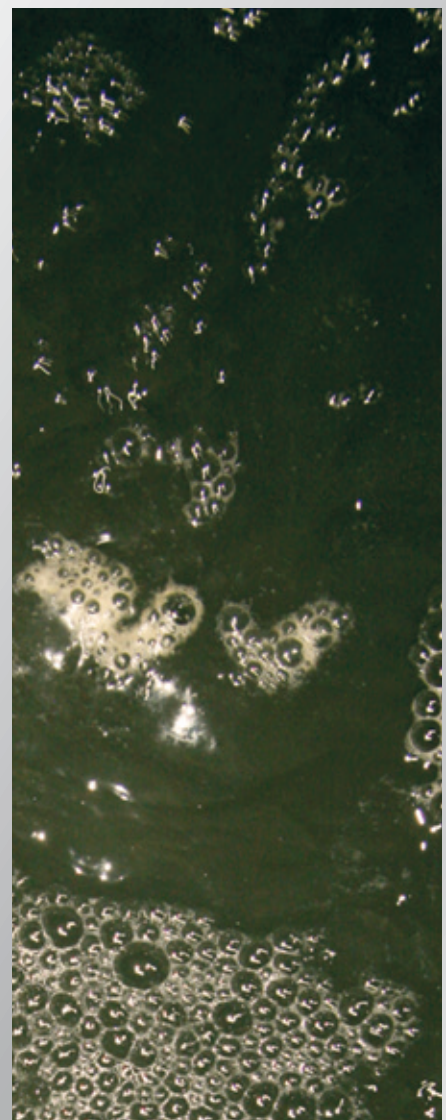
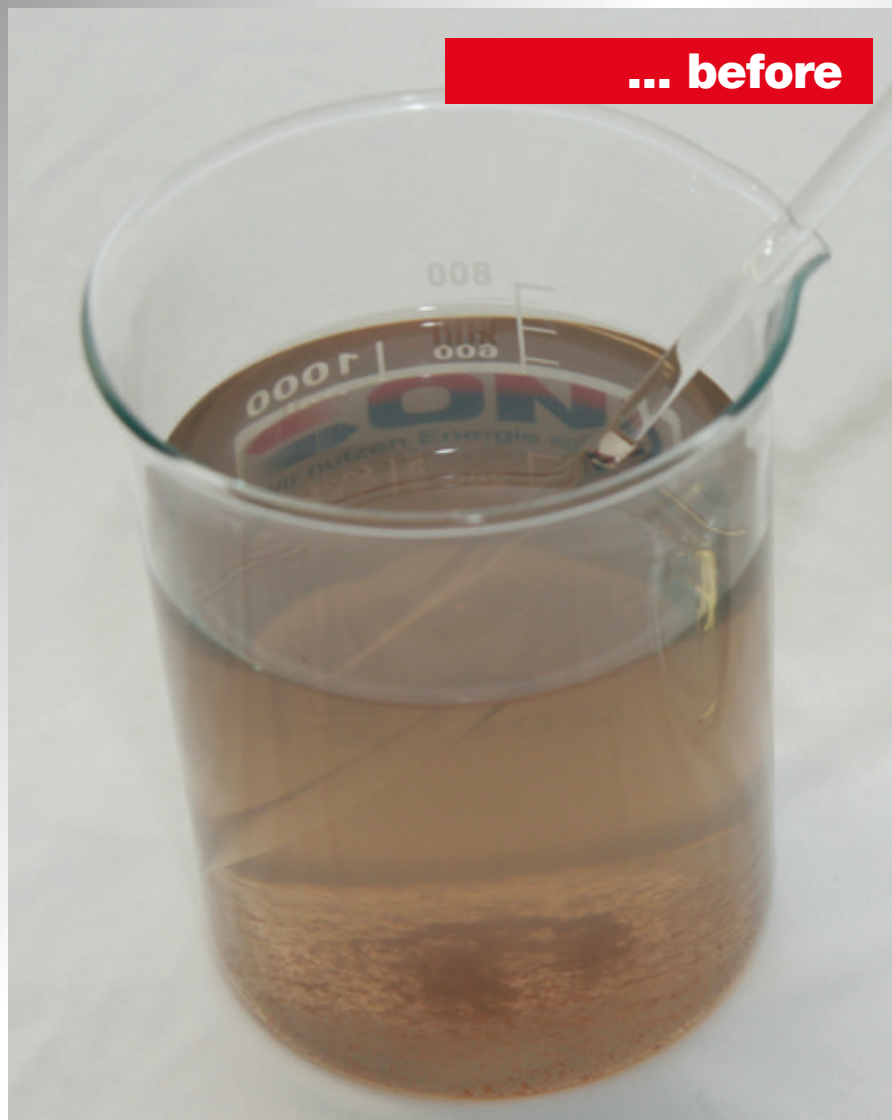


## When Turbid Cooling Water Fuels Costs

The water quality in cooling circuits has a decisive influence on energy efficiency, operational and process safety as well as the operating and maintenance costs of production plants, system circuits, and their components! Practice has shown that poor cooling water quality is the reason why a relatively large number of companies have to deal with high operating and maintenance costs and, in individual cases, even with production losses.

That's why staff members, for example from the maintenance department, try to address this problem with a host of measures and equipment installations ... with varying degrees of success. We've found an efficient and effective solution with our completely new system approach.

View of the water surface of a tank supplying an injection molding company's mold circuit with cooling water. Pollution with bacteria and solid particles resulting from corrosion and abrasion products leads to heat transfer problems in moulds due to deposits and cross-section constrictions.



The water sample taken from the tank exhibits an extremely high load of solid particles as well as extensive biological pollutants.

# ONI-AquaClean Significantly Improves the Water Quality

Attempts to control cooling water pollution which is caused by bacteria, viruses, algae, and fungi are usually made by adding chemicals. Apart from their problematic handling, considerable costs are incurred and sustainable success is rarely achieved.

Furthermore, the environmental impact due to solid particles ranging from easily depositable coarse grains to dispersing ultrafine grains continues to be a problem.

**Our ONI-AquaClean system technology solves this problem in one step!**

## ONI-AquaClean for a Crystal Clear View

The water quality has improved significantly. Solid particles are no longer verifiable. **The biological pollutants in the cooling water were reduced from 100,000 KbE/ml<sup>1)</sup> to approx. 100 KbE/ml, which translates into a reduction of 99.9 %!** The peak value to

be aspired for cooling water amounts to no more than 10,000 KbE/ml. A value of less than 100 KbE/ml meets the requirements for drinking water.

Another positive effect is the oxidation of dissolved metals through ozonization. The resultant oxidation products are subsequently removed from the water through ultrafiltration. This effect significantly decreases the cooling water's corrosiveness and, thus, correspondingly reduces the use of corrosion inhibitors.



<sup>1)</sup> KbE stands for colony forming units

This is the water sample which was taken after ONI-AquaClean system technology had been applied for three weeks.



# Systemic Water Treatment for Sustainable Success

ONI-AquaClean technology has a systemic structure. Measurement sections – for conductivity, pH value, redox voltage, and volume flow – in conjunction with a high-performance computer deliver all the information that is needed for a gradual treatment of the cooling water. The actual water treatment is then implemented via diverse filter units as well as a downstream, intrinsically safe ozonization. A pump unit supplies the ONI-AquaClean system, independent of the cooling water network, with a defined quantity of water, and ensures the discharge of the requisite amounts of backwash water.

**The Best Way to Reach  
Top Cooling Water Quality:**

**ONI-AquaClean**



The ONI-AquaClean device is fully installed with pipes and equipped with all control units necessary for its operation. Depending on the available space, two versions are available. For in-house systems, the mobile variant housed in a closed enclosure is used in most cases. The ONI-AquaClean 2G-smart version has been designed for container refrigeration systems with a very limited space available, which has a considerably smaller installation depth.

## Two Important Steps in Reaching Top Water Quality

The foundation for achieving top water quality is to keep the concentration of solid particles and the biological burden in its most diverse types as low as possible. The reason for this are the various action mechanisms of these constituents such as corrosion in the form of pitting or obstructions of the heat transfer due to biofilms which are enriched by solid particles. To achieve the best possible result here, the ONI-AquaClean system was equipped with a multi-stage filter unit.



A view of the multi-stage filter unit equipped with backwash AFM and ultra-superfine filters.

### A Powerful Combination

The combination of several filter units consisting of a backwash AFM<sup>\*)</sup> filter and a downstream, **also backwash ultra-superfine filter having a filtration capacity of up to 0.1 µm** permits a massive reduction of solid particles and even of the smallest bacteria and viruses.

A pump unit was integrated with the objective of keeping the impact on the filter units as consistent as possible as well as bridging the pressure gap between the pipe system and the downstream components.

This makes the ONI-AquaClean system completely independent of the central cooling water supply and does not retrieve any additional pump head reserves from that source.

<sup>\*)</sup> AFM stands for activated filter material



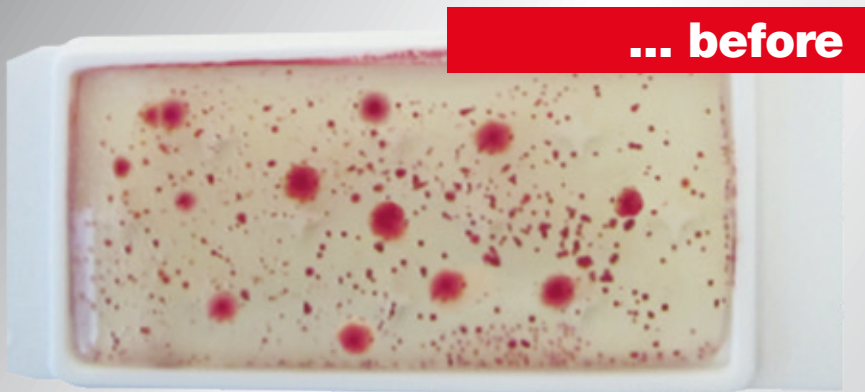
# Intrinsically Safe Ozonization Replaces Expensive Biocides

The application of ultra-superfine filter technology creates the foundation for a targeted reduction of harmful biology in the cooling water circuit. When combined with an intrinsically safe ozonization system, a highly efficient unit is created which consistently combats biological pollutants in the entire system.

Practical experience shows that after the ONI-AquaClean system has been in operation for a period of 3 to 4 weeks, even in extensive network structures, **bacterial pollutants can be reduced by up to 99.9 %**. All other biological burdens are removed to virtually the same extent.

## Biology Is Massively Curtailed

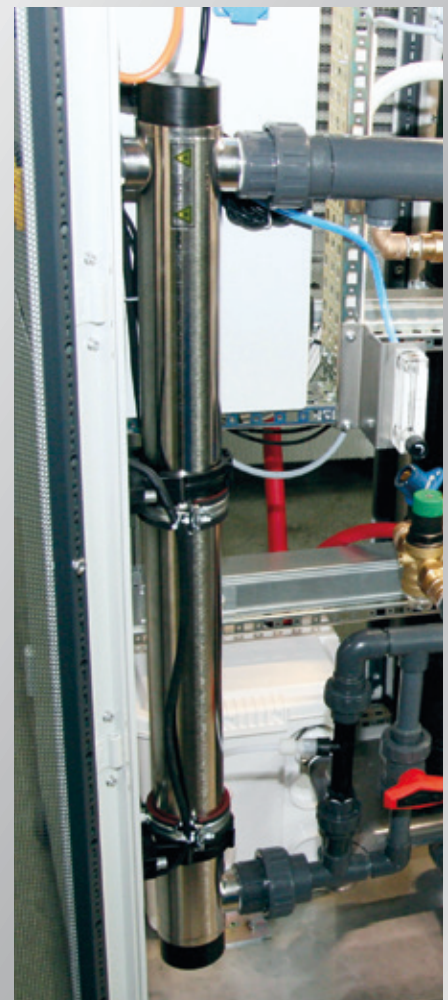
Prior to using the ONI-AquaClean system, the specific environment of the plant and the water quality are recorded and analyzed by our experts in order to ascertain the individual starting conditions and, at the same time, to determine the requisite operating strategy.



Germination test result: Water sample taken from a cooling water circuit prior to commissioning with **approx. 100,000 KbE/m ...**



... and three weeks after the installation and operation of the ONI-AquaClean system with **approx. 100 KbE/ml.**



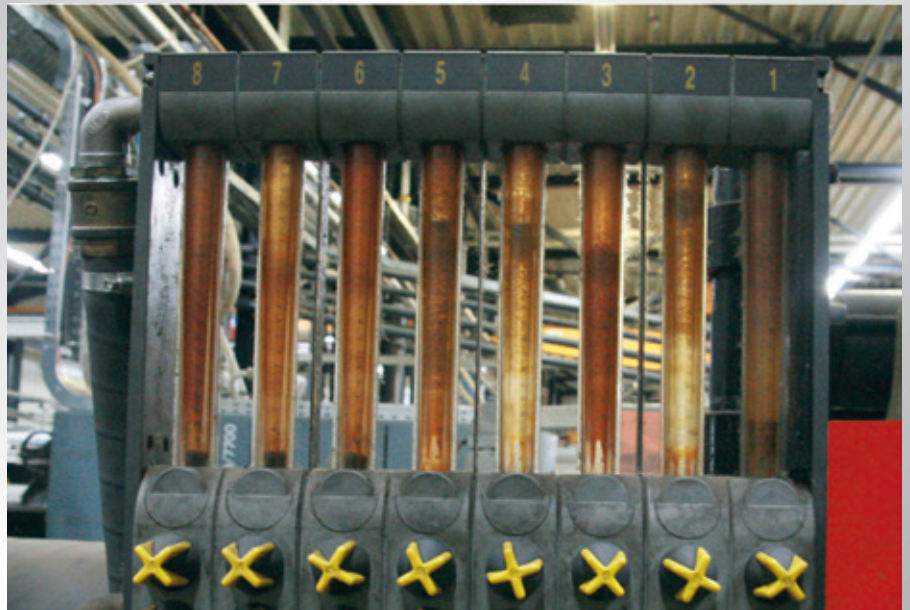
A view of the ozone reactor which is integrated into the ONI-AquaClean device and provides additional hygienic safety.

## Convincing Results from Practical Applications

Knowledge has it that all theory is gray. That is why plant operators are interested in findings and insights gained from practical applications – particularly when it comes to new, innovative system solutions. The photo of a water battery with highly contaminated sight glasses is representative for many plant environments that are typically encountered in practice.

Here, algae, bacteria, and dirt particles have literally left their marks. The position of the suspended matter can merely be guessed rather than truly identified. Not surprisingly, the same pollutants are also found in moulds, heat exchangers, and the entire plant network where they have a negative impact.

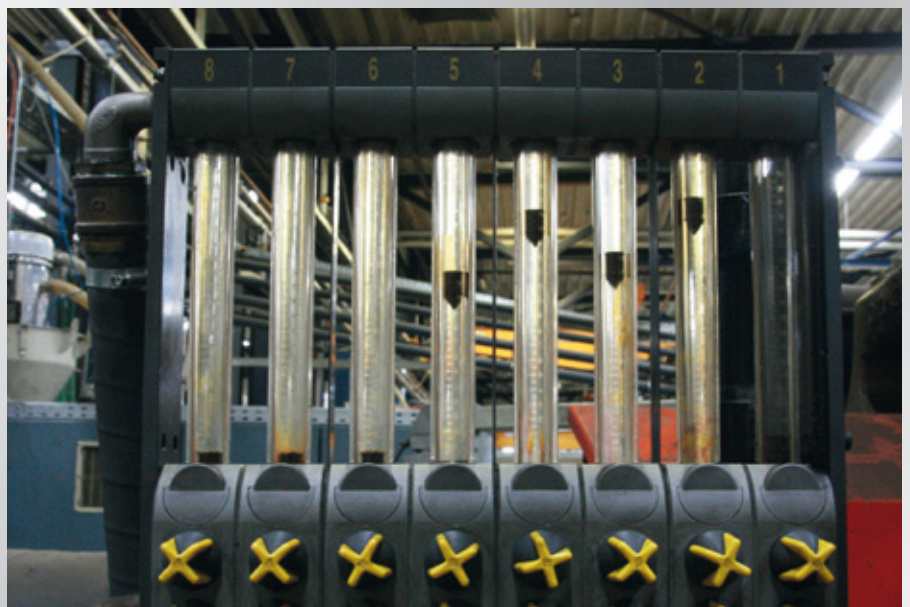
**... before**



The positive impact of the ONI-AquaClean system on the plant environment is impressively demonstrated by the photo of a water battery with almost clear sight glasses. Suspended matter is clearly visible.

What is important here is the fact that this state is maintained during the continuous operation of ONI-AquaClean technology!

**... after**





# Well Organized and Everything under Control

A complex and highly efficient system for water treatment needs to be well organized and properly controlled. That is why the ONI-AquaClean system is equipped with a high-performance computer and system software which we developed. Thus, it is possible to achieve a substantial improvement of the cooling water quality within no time and to monitor the system's individual development. Potential applications for this system technology are found in all industrial sectors in which the water quality influences production processes or process cycles.

## Premium Water Quality Creates Room for Core Competences

**Experience shows that using the ONI-AquaClean system in cooling circuits which exhibit a problematic water quality solves a whole number of problems at the same time.**

First and foremost, these problems include cost burdens caused by pollutants or biological burdens in the cooling water. Here, the spectrum ranges

# ONI-AquaClean Creates This Extra Room

from production downtimes and the resultant cleaning of moulds, heat exchangers, in some cases even of the entire cooling water system to the purchase of biocides all the way to the replacement of installations and facilities which were destroyed by corrosion. Added to this are cost burdens which are incurred in affected operating sections which are not transparent because they cannot be accurately recorded.

In many of these cases, ONI-AquaClean technology is the ideal system solution because the application of this technology significantly improves the cooling water quality and, subsequently, also the operating conditions in cooling water networks. This eliminates a lot of problems and creates the prerequisites so that the company can focus on its core competences.

Numerous successful applications of the ONI-AquaClean system aptly demonstrate that plant operators are increasingly attracted by the rapid progress that is made when it comes to improving the cooling water quality and the associated impact on the overall system.

**Our experts would be pleased to assist and advise you.**



The companies of the ONI-group.



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