

# Reduce the TOC (Total Organic Carbon) content of industrial condensate using IX (Ion Exchange)

## INTRODUCTION

As a result of industrial processes, a large amount of water streams such industrial condensate and cooling tower blowdown are produced. However, this water needs to be treated before being reused or discharged, since it might have suspended particles and other undesired constituents. In order to purify this water, several methods can be used and one of them is Ion Exchange (IX), which is used by a dutch water company called Evides IndustrieWater, sponsor of the project. Four columns of glass were filled with resins, small plastic beads, responsible for exchange ions with the water, resulting in a final water without ions such potassium, chloride and calcium, therefore more pure. This type of water can be used in sectors such petrochemical industry and energy sector.



Figure 1 - Completed Ion Exchange lab set up

## DEFINITION ASSIGNMENT

In order to place the set up in a fume hood in the future, the IX columns needed to be fitted into a frame. The automatization of the columns of ion exchange needed to be improved, picking up where the last student responsible for the project finished. A program in LabVIEW was created by the last student and changes in the program needed to be done in order to enhance the production of demineralised water, by calibrating the measurement of the conductivity in the program and by checking the valves, pumps and the development of the complete process.

## RESULTS

The calibration of pumps and conductivity meter was made, followed by tests of the setup. As a result, after the calibration, the setup worked as expected. A frame was mounted and all the items were attached to the frame, followed by tests with the pumps and valves. No problems were noted after running the complete cycle. A simpler program was created in LabVIEW and the steps of the cycles could be tested more easily, by setting the time of each step in the user interface. This change will improve future tests with the setup, making them faster and simpler.

Necessary adjustments to the conductivity measurement of LabVIEW were also made, so that the conductivity shown in LabVIEW was similar to the displayed value of the sensor. This result was expected and important to be corrected, since conductivity is a necessary parameter for a better quality of the demineralised water production.

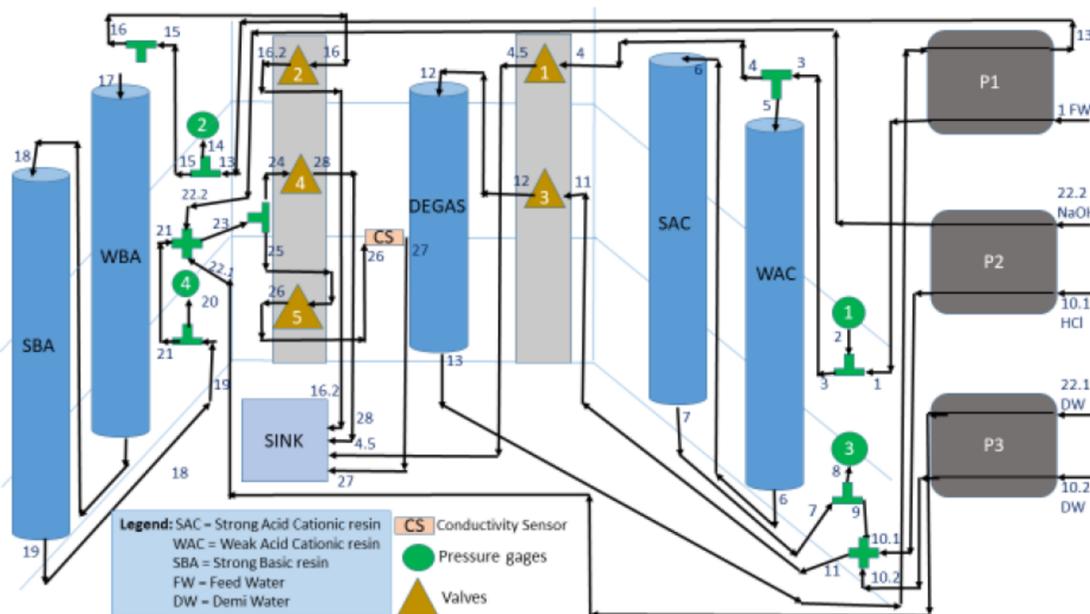


Figure 2 - Scheme of the Setup



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