

# **WEISS - Efficient Cooling Water Cycle Management by Integrated Desalination**

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**Together with six other partners, including reputed companies and research institutes, SMS group participates as plant manufacturer in the project “Efficient cooling water cycle management by integrated desalination using the steel industry as an example”, or WEISS for short. The project is funded by the German Ministry of Education and Research (BMBF). BFI is the project coordinator.**

Since a steelworks in many ways depends on the reliable supply of suitable water for cooling (directly or indirectly, product or components), cleaning (descaling), as solvent for lubrication (roller nip lubrication oil) and surface finishing (tinning and phosphatization), the minimization of fresh water demand is an issue of crucial and, in times of global warming, growing importance to plant operators. In some countries, the discharge of waste water has become more difficult due to tighter legislation. For these reasons, water saving concepts are essential to many plant operators and to some thereof even a matter of existence.

## **Reduced Volume of Blowdown Water**

The target is to reduce the volume of blowdown water to the achievable minimum to tap the full fresh water saving potential. The selected approach comprises the measures below:

1. Softening of feed water in the conditioning section (SMS).
2. Demand-based dosing of flocculants/ flocculation aids by solids concentration monitoring (BFI).
3. Demand-based dosing and adaptation of cooling water chemicals to water treatment (BFI).
4. Development of a process for blowdown water salt separation by means of reverse osmosis (RO) (SMS) in comparison or combination with innovative processes for the integrated desalination of the cooling water circuits such as capacitive deionisation (BFI), and high pressure reverse osmosis (Wehrle) and evaporation with salt-resistant polymer heat exchangers (Fontaine). Reverse osmosis membranes are to be developed and tested with novel coatings to avoid non-removable deposits (university Duisburg / Essen (UDE)).

The partners carry out laboratory pretreatment trials with original waste water of the project partner Deutsche Edelstahlwerke. In trial containers SMS staff merges own test equipment with that of its project partners to perform the tests and takes responsibility for the joint pilot tests at the customer's plant. The test results are transferred to other applications respectively customers by material flow simulation (TU Berlin and Institut für Automation und Kommunikation (ifak)). SMS group prepares process concepts and analyzes their economical efficiency in terms of investment and operating costs.

After completion of the trials, the test containers will be available for pilot trials at other customers who use cooling circuits, too. Marketing activities of the desalination process to be developed will be the responsibility of SMS group. The process is planned to be available by the end of the activities in September 2019 at the latest.

First milestones mark the successful beginning of the project.

Pilot trials will start next year. First results will be presented, the technical feasibility discussed and the economic benefits figured out.

The results can be transferred to all cooling water circuits for direct cooling across the entire industry, which is why an outlook on the application potential in the sectors with large cooling water volumes (for example: chemical industry, paper industry, Machine factories, plastic factories, petroleum industry, glassworks, non-ferrous metallurgical plants) is given.

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