



## **An Overview of Magnetic Water Treatment System & Further Course of Study<sup>#</sup>**

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**Abstract:** The effects of magnetic fields on running water were observed prior to the turn of the 20<sup>th</sup> century. Though, magnets of those times were not very strong, their effects were pronounced. With recent developments in rare earth magnet technology, the importance of magnetic unit in water treatment has been recognized in many industrial applications. Scale is a well known thermal insulator which prevents effective heat transfer in Heat Exchange systems and causes additional energy load thereby increasing normal energy demand by as much as 20 to 30 percent in some cases. For decades, chemical treatment has been the principal method used in treating water to mitigate, minimize and remove scale and corrosion products. However, it is costly and possibly unfriendly to the ecological balance. It is claimed by many technologists and scientists that the magnetic water treatment is one of the most effective non-chemical method to prevent scaling, corrosion and microbiological fouling in various industrial sectors. Many researchers have evaluated Magnetic Water Treatment Devices (MWTd) worldwide for scale control in various industrial processes, including desalination, and also for desorption of scales and corrosion products. The experiences acquired by the researchers during the evaluation of this innovative water treatment technology, not only in scale control but also in scale and corrosion products desorption, have been comprehensively reviewed in this paper. Furthermore, some preliminary tests, based on experience, have been proposed to be conducted on a Heat Exchanger skid at certain Top Brine Temperature with and without MWTd to study its effect in controlling scale deposition on tube internal surfaces at sufficiently higher flow rate for pre-determined test duration. This preliminary study may lay some sort of milestone in the course of advancing towards searching its commercial applicability in Multi-Stage Flash (MSF), Multi-Effect Distillation (MED) and Seawater Reverse Osmosis (SWRO) processes as well. A separate investigative test has also been suggested to be carried out in a recirculation test loop to find out and verify the claimed effectiveness of MWTd in desorption of scales and corrosion products.

**Key Words:** *Magnetic Water Treatment Devices, Multi-Stage Flash, De-scaling, Seawater Reverse Osmosis, Aragonite, Calcite, Nucleation Sites, Crystallization.*

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