

## Study on Magnetic Separation Device for Scale Removal from Feed-water in Thermal Power Plant

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**Abstract** — To improve the thermal power plant efficiency, we proposed a water treatment system with High Gradient Magnetic Separation (HGMS) system using superconducting magnet, which is applicable in high-temperature and high-pressure conditions. This is a method to remove the scale from feed-water utilizing magnetic force.

One of the issues for practical use of the system is how to extend continuous operation period. In this study, we succeeded in solving the problem by eliminating the deviation of captured scale quantity by each filter. In fact, in the HGMS experiment using the solenoidal superconducting magnet, it was shown that decrease in separation rate and increase in pressure loss were prevented, and the total quantity of captured scale increased by proper filter design.

The design method of the magnetic filter was proposed, and will be suitable for the long-term continuous scale removal in the feed-water system of the thermal power plant.

**Keywords (Index Terms)** — Thermal power plant, scale, High Gradient Magnetic Separation (HGMS), solenoidal superconducting magnet.