

## Installation Details

**Location:** A car engine manufacturing factory, Hyundai Motor Ulsan

**Area:** A cold water circulation pipeline for the cooling tower and the induction hardening machine

**Pipe size:** 100 mm

**Model:**  Vulcan S25

**Installer:** Vulcan-Korea team

## Scale Problems

1. Scale problems in the pipelines and the induction hardening machine.
2. There are 9 secondary small pipes, they had to be cleaned manually every 2-3 months.

## Vulcan Effect

**Installation of a Vulcan S25 unit:** May 21st, 2018.

Note: scale was not manually removed before the Vulcan was fitted on source pipe (see photo).

**Examination of secondary piping:** November 21st, 2018

1. Since Vulcan S25 was installed, the Hyundai Engineering Team has stopped the regular manual cleaning process.

**Observation:** the flow rate with the Vulcan unit is now even higher than immediately after previous manual cleaning had been done.

2. After Vulcan S25 had been installed for 6 months, the secondary pipes were opened: scale that had been left in piping had disappeared and all 9 secondary pipes had become clean (see photo).

**Observation:** Biofilms in the cooling tower had disappeared since the Vulcan unit was installed.



Vulcan S25 was installed around 50 meter before the induction hardening machine.



There are 9 secondary small pipes with water meters. These meters were installed to make sure a stable flow rate. If the flow rate goes down, it would cause a problem of the induction hardening machine. Therefore, the pipes had to be cleaned manually every 2-3 months.



**First inspection:** May 21, 2018.

Inside of a secondary small pipe, before Vulcan S25 was installed.



**Last inspection:** November 21, 2018.

After 6 months with Vulcan treatment: the pipe is free of scale.