

## Effects of a Cooler on the Sampling Process in a Continuous Emission Monitoring System

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**Abstract :** A cooler has been widely employed in the extractive system of the continuous emission monitoring system (CEMS) to remove water vapor in the gas stream. The effect of the cooler on analytical target gases was investigated in this research. A commercial cooler for the CEMS operated at 4 °C was used. Several gases emitted from a coal power plant (i.e. CO<sub>2</sub>, SO<sub>2</sub>, NO, NO<sub>2</sub> and CO) were mixed with humid air, and then introduced into the cooler to observe its effect. Concentrations of SO<sub>2</sub>, NO, NO<sub>2</sub> and CO were made as 200 ppm. The CO<sub>2</sub> concentration was 8%. The inlet absolute humidity was produced as 12.5% at 100 °C using a bubbling method. It was found that the reduction rate of SO<sub>2</sub> was the highest (~21%), followed by NO<sub>2</sub> (~17%), CO<sub>2</sub> (~11%) and CO (~10%). In contrast, the cooler was not affected by NO gas. The result indicated that the cooler caused a significant effect on the water soluble gases due to condensate water in the cooler. To overcome this problem, a correction factor may be applied. However, water vapor might be different, and emissions of target gases are also various. Therefore, the correction factor is not only a solution, but also a better available method should be employed.

**Keywords :** cooler, CEMS, monitoring, reproductive, sampling

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