

HCl Compliance Troubleshooting (Isokinetic FTIR)

Background

U.S. EPA Method 26A is the manual test method generally prescribed for HCl compliance across most industry sources. CleanAir performed three compliance runs of Method 26A at a power plant with a wet stack and showed non-compliance with the emission limit. Another testing firm confirmed CleanAir's results. The power plant needed a diagnosis of the control devices in the process and CleanAir got involved.

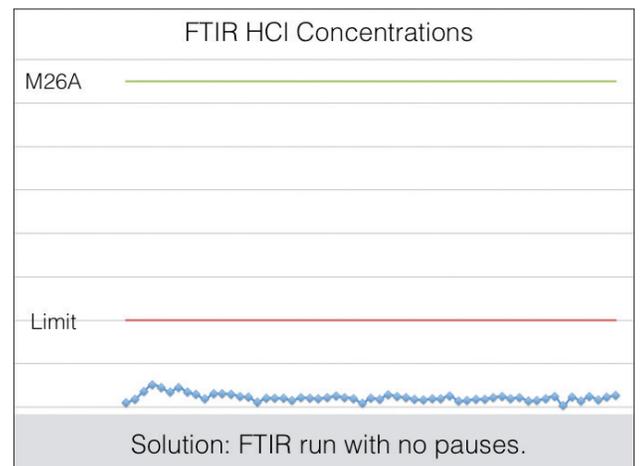
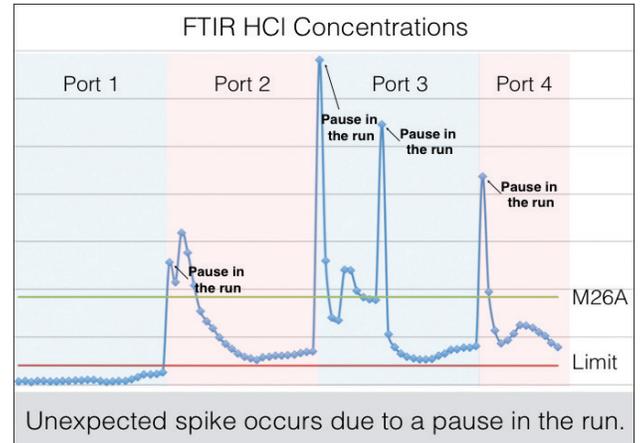
CleanAir's Approach

CleanAir used an extractive Fourier Transform Infrared (FTIR) Spectrometer to monitor HCl continuously while adhering to all the 26A sampling requirements. This included the filter type, filter size, isokinetic sampling, glass nozzle, glass liner, and traversing the stack. The isokinetic sampling is important here since there are HCl-containing droplets that must be collected in a representative fashion.

Results

The scrubber liquor was found to have a high concentration of chlorides, far above what was expected. Also, due to its overall age, the scrubber and mist eliminator were so deteriorated internally that the flow rate of the flue gas was outside of the manufacturer's specification. The additional droplets were sampled and found to have the same characteristics as the scrubber liquor as they were rich in chlorides.

Method 26A is known to have a high bias when certain types of chlorinated compounds are present in the flue gas. The FTIR's HCl measurement is direct and does not have this same bias. When performing a run, the real-time HCl concentration from the FTIR showed compliant concentration levels in the first port location. However, when pausing the sampling for a port change (as is common practice with Method 26A), spikes of HCl were measured. This happened because of stagnation in the sampling system that caused pooling of condensed chlorinated compounds (not unlike the impingers from Method 26A). When flow restarted, the dissociated chloride compounds were vaporized as HCl. Ultimately, CleanAir showed that this sampling artifact was the root cause of reported non-compliance and also showed that actual HCl emissions were within compliance limits.



Summary

CleanAir diagnosed high HCl measurements as being artificial and helped determine a root cause for the environment and sampling methodology contributing to these artificial numbers.