

Comparison of AMETEK Western Research “Hot-Wet” Measurement and “Dilution” Measurement

Issue	“Dilution”	AMETEK “Hot-Wet”
<p><i>What is it and why do it this way</i></p>	<p>“Dilution” – type analysis means diluting a hot, wet sample to a condition where the water dew point is suppressed an ambient type pollution monitor (low ppm) can analyze the stack sample high ppm to % level).</p> <p>The “Dilution” sample system is extractive, with the analyzer being mounted in a shelter, near the sample point.</p> <p>The only reason for installing a “Dilution” – type CEM is to minimize analyzer cost.</p>	<p>“Hot-Wet” measurement means analyzing the sample on an “as is” basis without doing anything to the sample that changes the sample’s composition. It is an extractive method, the sample is analyzed at a temperature different from the process temperature, and it may be hotter or cooler. The sample is filtered, however the component of interest is never altered.</p> <p>“Hot-Wet” analyzers are designed to minimize sample handling. Every time the sample is manipulated (filtered, dewatered, diluted, concentrated, or altered in any way), Measurement accuracy is reduced. Good measurement practice demands minimum handling.</p>
<p><i>Differences</i></p>	<p>“Dilution” sample system outlet orifice is subject to plugging, causing severe, repetitive service problems.</p> <p>Analysis of high concentration sample requires many dilutions. Every dilution stage is subject to error.</p> <p>A very high quality, costly diluent is required for analysis to have any hope of being accurate. This diluent is not normally available at the SRU.</p> <p>The dilution factor (and hence the accuracy) is 1005 dependant on the dilution rate and the accuracy of the span gases.</p> <p>The “Dilution” sample system requires a pump to extract a sample from the SRU stack. Pumps for highly corrosive, particulate - laden sample gases are expensive and trouble - prone.</p> <p>Highly sensitive ambient monitors are subject to ambient temperature fluctuations. A walk-in shelter is required to house the instrument.</p>	<p>Analyzer is installed at grade. There are no vibration or service access issues.</p> <p>The only component internal to the stack is a simple, inexpensive probe</p> <p>Sample temperature maintained above sample/acid dew point. No phase change, with associated composition change. SO₃ does not condense, exposing analyzer components to the extremely corrosive liquid.</p> <p>No moving parts in the analyzer. Sample is pulled through analyzer using an air driven eductor. No mechanical pump is needed or used. AMETEK M4600 is built around an extremely robust split-beam photometer. There is no high-speed rotating filter wheel.</p> <p>Direct measurement. Sample is analyzed directly, unchanged, in a UV photometric analyzer. When a simple pitot-tube flow monitor is added to the sample probe assembly, instrument reads directly in mass emission units.</p> <p>Can handle a wide range of process and sample conditions. The DuPont/AMETEK 400/4000 analyzers have been successfully applied to more than 2000 different measurements. More than ten thousand of these analyzers have been produced.</p> <p>The AMETEK uses an electrically heated sample oven to maintain accurate temperature control of sample cell.</p>

<i>Optical Calibration</i>	Not Available. Calibration gas injection is required.	The model 4600 SRU is equipped with an optical calibration filter, which is equivalent in absorbance to a known concentration of the analyte. Although calibration gas is not needed to verify analyzer performance, cal gas connection are available for users who desire, or are required by regulations, to verify the analyzer with a certified calibration gas standard
<i>Installations</i>	Very few in SRU service	In excess of 700 units in SRU service