

"Condition Those Samples to 77°F (25°C)"



Accurate on-line analysis of water and steam samples requires that the sample temperature and pressure be reduced to safe levels, and that sample temperature and flow to the analyzers be closely controlled.

Controlling the temperature to 77°F±1°F is very important. Current analyzer technology has sophisticated temperature compensation built-in to correct the analysis to its value at 77°F. The instruments may even have more than one potential temperature compensation curve built-in, so the operator can select the one that is most representative of the sample stream to be analyzed.

Unfortunately, the temperature compensation gets less reliable the further away the sample gets from 77°F, and the more contamination present. For example, a slight increase in conductivity may be due to a nearly spent resin bed, or a small condenser leak, or to temperature compensation being only partially effective. Due to this chance of error, EPRI and Sentry recommend controlling sample temperatures to 77°F±1°F to avoid any uncertainty.

There are two temperature effects which must be compensated for in a pH analyzer. One is the electrode correction due to the voltage increase across the glass electrode at an elevated temperature. This can be modeled closely with proper equations, and is usually corrected by the instrument.

The second effect relates to the dissociation of different species in water. Unless the specific composition of water is known prior to the analysis (unlikely since this is the purpose of the analysis), temperature compensation, regardless of the curve selected, is only an approximation of the actual water conditions. This is true because the amount of compensation required depends both on the pH of the sample and the actual chemical species present. Acid/base species, such as carbonates or ammonia, dissociate differently with changes in temperature than a salt, such as sodium chloride.

Because this second effect cannot be modeled, Sentry recommends that sample temperatures be conditioned to 77°F±1°F, by definition the temperature where these effects are the same for each species in water. This is the only way to obtain the most consistent and reliable trending information.

Note: Future articles will discuss the reasons why a cooling water temperature control unit and secondary sample coolers are the preferred means for close temperature control of samples.

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Every Customer a Commitment***

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