

As a Control Parameter of Steam Quality Is Cationic Conductivity a Friend or a Foe?

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The purity of steam and boiler feedwater is used as criteria for ensuring component availability and reliability in power plants. Steam turbine manufacturers tie stringent steam purity requirements to warranty clauses of their machinery. The acid (cation) conductivity, with its many limitations, is a preferred control parameter for steam purity enforced by turbine manufacturers. In a previous paper, a survey of 20 operating plants (mostly Power plants) across Canada ranging in pressure from 900 to 2850 psig (6.2 to 19.65 MPag) was presented. The survey collected data cation conductivity, organic acids, turbine operating hours, and maintenance/inspection history. Organic acid levels measured showed no direct correlation with system reliability in all plants surveyed. Subsequently a series of papers have been published discussing the value of using the cationic conductivity as a control parameter. There is no experimental data showing the corrosion impact of amine neutralized organic acids in the first steam condensate on the turbine blades. It is our opinion that, at the same amount of chloride present, first condensate from an amine boiler treatment is less damaging to the metal than from an ammonia boiler treatment. Calculated data showing the pH impact in the steam condensate, at the same level of anionic impurity, are presented for discussion. (The same level of anions corresponds to the same value of cationic conductivity). Independent Power (IPP) operators, unlike most utility generating stations, operate with minimal staff and invariably rely upon outside expertise for their water chemistry needs. Having a better understanding of the implications of the value of this steam purity control parameter can help them with their daily decisions to comply with tight steam purity requirements. Also knowledge can empower them to evaluate their risk of damaging their equipment when they are outside the control value.