Application Profile

Application: Green Liquor Heating

One of the primary processes in Kraft Pulp mills is the production of pulp from wood chips. Within the pulp production, there is a chemical process that that produces green liquor. Green liquor is a combination of recovery boiler smelt, and dilute white liquor. Once insoluble materials are removed, the liquor is sent to recausticizing tanks to produce white liquor. Flows vary based on the size of the pulp mill and can range from 350-1400 gpm.

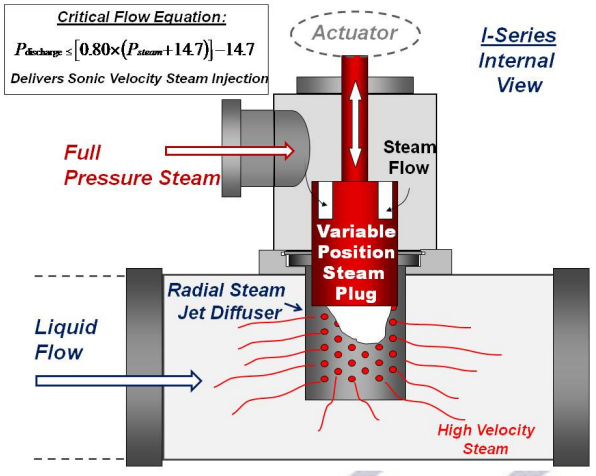
Recausticizing is a two stage process used to recover chemicals from in the pulp production process. The first stage reaction occurs with lime in a highly agitated vessel known as a Slaker at high temperatures (180-215°F). The second stage reaction occurs in a series of agitated tanks known as Causticizers where the reaction is completed.

Green liquor must be heated prior to the lime addition. Like most chemical processes, temperature plays a key role in the duration and effectiveness of the reaction. Heat exchangers or direct steam injection are typical means of heating the green liquor stream. Alternatively, steam may be sparged directly into the slaker. Spargers that use a steam control valve (PRV) to regulate temperature experience a pressure drop in the steam pressure which leads to ***low velocity steam*** entering the fluid. Low steam velocity leads to poor steam mixing and delayed condensation.

- Steam sparging at the high temperatures in the slaker tends to exaggerate dust formation from the vessel during operation into the surrounding area. This dust can be a ***maintenance*** problem.
- Green liquor is corrosive at elevated temperatures. Stainless steel welds, in particular, are susceptible to stress corrosion and can lead to shorted exchanger life and cross contamination between the steam and liquor.
- Sparging also has a tendency to create ***"hot spots"*** in the slaker or causticizer, resulting in uneven reactions within the vessel. This can cause incomplete regeneration, chemical carryover, or excessive reaction times.
- Spargers may also cause damage to the slaker walls because of ***steam hammer*** near the injection point. This is particularly a problem when coupled with the stress corrosion issues mentioned previously.

PSX Heater Solution:

A PSX heater can be installed in-line upstream of the slaker, providing consistent green liquor to the process. The PSX Heater assures ***high velocity steam*** injection for rapid and complete condensation of the steam. ***Internally modulated steam injection*** results in a more uniform causticizing reaction, thus reducing lime costs, and allowing better control of the process. The end result will be higher quality white liquor for use in the digesters and reduced operating costs. The PSX heater can also be supplied in appropriate metallurgy to address the thermal cracking that can occur when heating green liquor.



Key Direct Steam Injection Benefits

- ***Fewer Process Upsets*** *from more efficient internally modulated steam injection*
- ***Energy savings*** *as a result of lower steam consumption*
- ***Precise temperature control*** *produces a higher quality liquor with less carryover*
- ***Lower production costs*** *from more efficient slaker operation & lower lime feed costs*
- ***Reduced Maintenance costs*** *as correct metallurgy reduces maintenance costs and down time.*

For additional information, please visit … www.pro-sonix.com

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