



## VARIETY OF CHEMICALS USED TO ADJUST BOILER WATER CHEMISTRY

<u>CHEMICALS</u>	<u>APPLICATION</u>	<u>COMMENTS</u>
<b>SODIUM HYDROXIDE (Caustic Soda)</b>	Increases alkalinity, raises pH, precipitates magnesium, creates the proper conditions for fluid sludge	Contains no carbonate precluding formation of CO <sub>2</sub> in steam; pH control improves form of calcium precipitate (See Phosphate)
<b>Sodium Phosphate</b>	Precipitates calcium as hydroxyapatite.	Reaction requires sufficiently high alkalinity & pH.
<b>Sodium Aluminate</b>	Precipitates calcium and magnesium.	Forms a flocculent sludge. Used in river water pretreatment.
<b>Chelating Agents (EDTA,NTA)</b>	Control scale by forming heat-stable soluble complex with calcium and magnesium.	Prevents precipitation of scale forming compounds on metal surfaces. May break down at high pressure. Use oxygen free water.
<b>Tannins, Starches, Lignin derivatives, Carboxymethyl-cellulose</b>	Prevent feedwater line deposits, coat scale crystals to produce sludge that does not adhere as readily to heat transfer surfaces.	Organic dispersants (often called protective colloids) used with phosphate. Also, distort scale . growth, inhibit caustic embrittlement. Rarely used due to high feed demand and poor results.

### CHEMICAL

### APPLICATION

### COMMENTS

<b>Polymers/Copolymers</b>	<b>Disperse sludge, distort crystal structure of calcium and magnesium deposits; prevents fouling by corrosion byproducts.</b>	<b>Distortion of crystal structure of precipitates preventing their adherence to metal surfaces. May be used in with chelant, phosphate or carbonate program.</b>
<b>Sodium Sulfite</b>	<b>Prevents oxygen corrosion</b>	<b>Neutralizes residual oxygen by forming sodium sulfate. May decompose at high temperatures and pressures, forming H<sub>2</sub>S in steam. Catalyzed form yields much more rapid reaction.</b>
<b>Hydrazine/Hydrazine</b>	<b>Prevents oxygen corrosion</b>	<b>Reacts with residual oxygen to form Nitrogen and water Hydrazine is a carcinogen.</b>
<b>Filming Amines (Octadecylamine, Soya Amine &amp; Others)</b>	<b>Control return-line corrosion by forming protective film on metal surfaces.</b>	<b>Protects against oxygen and CO<sub>2</sub> attack. Low level of continuous feed maintains film. Feed based on steam production.</b>
<b>Neutralizing Amines (Cyclohexylamine,</b>	<b>Control return-line corrosion by adjusting condensate pH up.</b>	<b>Protection given by neutralizing carbonic acid formed from CO<sub>2</sub>.</b>
<b>Sodium Nitrate</b>	<b>Inhibits caustic embrittlement.</b>	<b>Used where water may have embrittling characteristics.</b>
<b>Antifoams</b>	<b>Reduces foaming tendency of high solids boiler water.</b>	<b>Usually added with other (Polyglycols, Silicones, chemicals used for scale control, sludge Dispersant.</b>