

**S. P. THERMAL SYSTEMS INC.**  
 4504 GREEN MEADOW BLVD.  
 Beamsville, Ont. , L0R 1B5  
 PH 905 563 8651 FAX 905 563 6234

DATE  
 CUSTOMER

1-Oct-03  
 ABC

**BOILER SELECTION DETERMINATION - *Fire Tube* versus *Water Tube* Boiler**

In order to determine which boiler design is most suitable for your application the following information should be reviewed with a competent Boiler Consultant.

Consideration	Fire Tube Design	Water Tube Design	Comments
<b>Pressure</b>	Design to operate to about <b>300</b> psig	Designed to operate to around <b>3000</b> psig	
<b>Super Heater</b>	Not available	Available	
<b>Capacity</b>	Up to around 50,000 lbs / hr	Unlimited	
<b>Turn down</b>	10 : 1	10: 1	
<b>Physical Size of boiler</b>	Depends on Design. Normally <b>bigger</b> Foot Print on Fire Tube design	Depends on Manufacturer Design. Normally <b>smaller</b> foot print.	
<b>Fuel used</b>	Solids - Liquids - Gases	Solids - Liquids - Gases	
<b>Efficiency</b>	Depends on the amount of boiler <b>passes</b> . The more passes the <b>higher</b> the efficiency	Depends on the amount of Boiler <b>passes</b> . The <b>more</b> passes the <b>higher</b> the efficiency. Volcano ThermoFlo is a <b>5 pass</b> design	
<b>Factory Packaged</b>	Full package available	Depends on boiler size Larger units <b>not</b> fully packaged	
<b>Factory Fire Tested</b>	Normally done	<b>Not</b> normally done.	
<b>Heat Transfer Rate</b>	40% Less than Water Tube Boiler Design	<b>Higher</b> , therefore faster to arrive at Pressure Will use <b>less</b> fuel to arrive at Pressure or Temperature on start up.	
<b>Damage in Shipment</b>	Normally <b>less</b> due to refractory design.	Depends on boiler design. Check with your Boiler Supplier	
<b>Water Treatment needs</b>	<b>Less</b> Critical	<b>More</b> critical	
<b>Response to load change</b>	Better response in most cases due to <b>larger</b> steam drum	Check steam drum space to arrive at conclusion. Will vary based on manufacturer design.	

<p><b>Maintenance and repair cost</b></p>	<p><b>Depends on</b></p> <ol style="list-style-type: none"> <li>1 - Manufacturer. Are parts available from any supplier or <b>ONLY</b> from manufacturer, Ask Boiler Supplier</li> <li>2 - Depends on load swings, operation, and boiler having <b>good</b> internal water circulation of return and supply water to reduce Thermal Shock</li> <li>3 - <b>Wet back</b> Fire Tube designs are <b>less</b> refractory maintenance than <b>Dry Back</b> designs. Wet Back designs are made by <b>Hurst Boiler</b> who we represent.</li> <li>4 - Depends on refractory design. Discuss with your Boiler suppliers.</li> <li>5 - Depends on tube length and tube sheet design</li> <li>6 - Water Treatment failure are <b>less</b> on a F.T if Water Treatment is not addressed</li> <li>7 - Tube replacement is much <b>easier</b> on a Fire Tube boiler than with a Water Tube</li> </ol>	<p><b>Depends on</b></p> <ol style="list-style-type: none"> <li>1 - Manufacturer. Are parts available from any supplier or <b>ONLY</b> from manufacturer. Try to evaluate with your Boiler supplier.</li> <li>2 - Bent Tube W.T designs are <b>less</b> prone to Thermal Shock in the Water Tube design. <b>Volcano ThermoFlo</b> is a Bent Tube design.</li> <li>3 - Depends on refractory design</li> <li>4 - Tube length are normally shorter reducing failure from Thermal shock</li> <li>5 - Water Treatment failure are <b>higher</b> if Water Treatment is not addressed</li> <li>6 - Tubes are replaceable but <b>more</b> difficult than a Fire Tube design</li> </ol>	
<p><b>In Ontario, Canada Operating cost based on Stationary Engineers requirements require to be considered</b></p>	<ol style="list-style-type: none"> <li>1 - Below 50 BHP Steam, Engineer is <b>not</b> required on Fire Tube Boilers</li> <li>2 - Above 50 BHP and above 15 PSIG steam pressure, Engineer <b>is</b> required on F. Tube</li> <li>3 - 150 BHP and operating below 15 PSIG (L.P) steam pressure, Engineer is <b>not</b> required Higher than 150 BHP Engineer <b>is</b> required</li> <li>4 - Hot Water design, Engineer is <b>not</b> required</li> </ol>	<ol style="list-style-type: none"> <li>1 - Depends on boiler design. With the <b>Volcano Boiler ThermoFlow designs</b> up to <b>900 BHP</b> High pressure Steam can be operated <b>without</b> Stationary Engineers in Ontario Canada.</li> </ol>	<p><b>In Ontario, Canada Companies prefer to use boilers not requiring Stationary Engineers To do this they have a choice of either Water Tube or Coil Boilers. Call us we have the Products for you. Ph 905 563 8651</b></p>