

# Cannon Boiler Works

## Feed Water Heater Sales Tools

### SALES & MARKETING INFORMATION

#### 1. Target Markets:

- Food / Beverage / Agriculture
- Hospitals / Institutional (i.e. VA hospitals, large colleges, military installations)
- Pharmaceutical
- Steel / Chemical / Petrochemical
- Non-boiler heat sources:
  - Turbines
  - Engines
  - Furnaces
  - Fuel cells

#### 2. Example Target Companies:

Industry Segment	Example Target Companies
Food / Beverage	<ul style="list-style-type: none"> <li>• Kraft Foods</li> <li>• Frito-Lay</li> <li>• Yuengling Brewery</li> <li>• Dannon</li> </ul>
Hospitals / Institutional	<ul style="list-style-type: none"> <li>• Veterans Administration</li> <li>• Crain Naval Base</li> <li>• Bangor, Washington Sub Base</li> <li>• Iowa Weapons Depot</li> </ul>
Pharmaceutical	<ul style="list-style-type: none"> <li>• Baxter Pharmaceutical</li> </ul>
Steel / Chemical / Petrochemical	<ul style="list-style-type: none"> <li>• US Steel</li> <li>• Wheeling Pittsburgh</li> <li>• Allegheny Ludlum</li> </ul>

#### 3. Potential Lead Sources:

Trade Shows	<ul style="list-style-type: none"> <li>• AHR Expo - <a href="http://www.ahrexpo.com/">http://www.ahrexpo.com/</a></li> <li>• Northwest Food Processors Association Expo - <a href="http://www.nwfpa.org/">http://www.nwfpa.org/</a></li> </ul>
Industry Publications	<ul style="list-style-type: none"> <li>• ASHRAE Journal - <a href="http://www.ashrae.org/">http://www.ashrae.org/</a></li> <li>• Process Heating - <a href="http://www.process-heating.com/">http://www.process-heating.com/</a></li> <li>• HPAC Engineering - <a href="http://hpac.com/">http://hpac.com/</a></li> </ul>

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	<ul style="list-style-type: none"> <li>• Food Engineering - <a href="http://www.foodengineeringmag.com/">http://www.foodengineeringmag.com/</a></li> </ul>
Miscellaneous	<ul style="list-style-type: none"> <li>• State boiler databases – <i>CBW will provide</i></li> <li>• Natural gas suppliers / providers</li> <li>• LEED Program - <a href="http://www.usgbc.org/">http://www.usgbc.org/</a></li> <li>• DOE Save Energy Now LEADER Program - <a href="http://www1.eere.energy.gov/industry/">http://www1.eere.energy.gov/industry/</a>; <a href="http://www.energy.gov/8328.htm">http://www.energy.gov/8328.htm</a></li> <li>• Database of State Incentives for Renewables &amp; Efficiency - <a href="http://www.dsireusa.org/">http://www.dsireusa.org/</a></li> <li>• INDEED Program</li> <li>• SIC: 3443</li> <li>• NAICS: 33241</li> </ul>

#### 4. Prospect Qualification Criteria:

- Natural gas, #2 oil, #6 oil, propane, methane (land fill) burning boiler system
- 50 – 3,000 HP boilers
- Over 2,500 operating hours per year
- Operating steam pressure greater than 15 psi
- Can flow Boiler or non boiler water streams
- Flue gas pressures in a range of 0.25 inches WC to 6 inches WC
- Inlet water temperature of 150-300 deg F

#### 5. Typical Decision Maker:

- Plant Engineer and/or Facilities / Operating Manager

#### 6. Others That May be Involved in the Decision Making Process:

- Energy Manager
- Environmental Manager
- Contracted 3<sup>rd</sup> party that performs energy audits
- Independent consulting engineer

#### 7. Typical Decision Making Process:

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- The boiler room manager / facilities manager requests a quote through CBW representative, perhaps with ROI data
- Internal engineering staff (or contract engineers) review the proposal and write a capital request
- Financial / Executive approval / sign-off
- Purchasing places the order

### 8. Typical Needs and Objectives of Prospects:

Function / Personnel	Needs / Objectives
Boiler room personnel	<ul style="list-style-type: none"> <li>• Improve the efficiency of the boiler room</li> <li>• Reduce fuel consumption</li> <li>• Extend the life of boiler room equipment</li> </ul>
Engineering	<ul style="list-style-type: none"> <li>• Fuel savings</li> <li>• Reduce plant emissions</li> <li>• Improve the overall reliability of the boiler system</li> <li>• Determine if new systems will physically fit in the boiler room</li> </ul>
Purchasing	<ul style="list-style-type: none"> <li>• Fuel cost reduction</li> <li>• Return on investment</li> <li>• Options / incentives related to payment terms</li> </ul>

### 9. Typical Delivery Time:

- 6 - 8 weeks after drawing approval

### 10. Key Features & Benefits:

Features	Parity with Key Competitors
Multiple installation configurations	Same
Standardized design	Same
Condensing flue gas (see Condensing FWH sales tool)	same
Competitively priced	Same
Benefits	Parity with Key Competitors
CBW has a <b>strong track record</b> with over 30 years of successful installations with the first two economizer stages <ul style="list-style-type: none"> <li>• Provides peace of mind that the FWH will be designed as a high quality product for the customer's specific application</li> </ul>	Better
<b>Units are customized</b> to available space and meet cost &	Better

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<p>performance requirements</p> <ul style="list-style-type: none"> <li>Ease of installation shortens start up time &amp; reduces cost of start up</li> </ul>	
<b>Factory sales support</b>	Better
<p><b>87% fuel to steam efficiency</b> which means the lowest fuel cost of boiler operation</p> <ul style="list-style-type: none"> <li>Less gas is required to produce steam, thus saving the customer money</li> </ul>	Same
<p><b>Performance-based warranty</b></p> <ul style="list-style-type: none"> <li>If the FWH doesn't live up to the performance promised under the warranty, CBW will repair or replace the unit</li> </ul>	Same
<b>High return on investment</b>	Same
<p><b>Emissions reduction</b></p> <ul style="list-style-type: none"> <li>The FWH will help customers reduce their emissions and possibly generate revenue under Cap and Trade legislation.</li> </ul>	Same
<p><b>"Green" impact</b></p> <ul style="list-style-type: none"> <li>In addition to the environmental impact of lower emissions, FWH customers may also be able to take advantage of federal, state, or local tax credits</li> </ul>	Same
<p>Removable tubes allow <b>easy maintenance</b></p> <ul style="list-style-type: none"> <li>No special training is required so any boiler operator can change out tubes. Easy maintenance also reduces downtime and the need for outside contractors which reduces maintenance costs. A code stamp is not required for changing tubes.</li> </ul>	Same
<p><b>High quality</b></p> <ul style="list-style-type: none"> <li>The quality design of the FWH reduces downtime and maintenance costs.</li> </ul>	Same
<p><b>Baffles &amp; drain systems</b> are standard on CBW's FWHs</p> <ul style="list-style-type: none"> <li>Removes potential corrosion &amp;/or maintenance issues in the boiler</li> </ul>	Same

## 11. Elevator Speech

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*Studies have shown that over a 20 year period, 96% of the cost of operating a boiler system comes from fuel costs. Also, in typical boiler systems, 10% to 20% of energy input is lost in the form of heat escaping to the atmosphere. The installation of a feed water heater helps solve this problem. A feed water heater is an economizer that captures heat from the stack, then returns it to the boiler's deaerated water system. To determine if a feed water heater is right for your facility, look at your annual boiler fuel bill and subtract 5% of the cost. If this is a significant number to you, then you should consider adding a feed water heater. The payback will have a direct impact on your bottom line. This is one of Cannon's many products that help companies reduce overall energy consumption.*

### 12. Value Proposition:

- Value Proposition for Facilities / Operations Manager (individual responsible for operating costs):

*Facility owners with steam boilers can significantly increase boiler system efficiency with Cannon Boiler Works' Feed Water Heater product line. As such, you can realize the lowest possible fuel costs and emissions, gaining as much as a 10% annual fuel savings. This not only results in a stronger bottom line, but also helps your facility take smart steps toward sustainability.*

- Value Proposition for Engineers

*The Cannon Boiler Works Feed Water Heater System optimizes the process efficiency of boilers. By removing heat from the flue gas stream, you can reduce the amount of fuel needed and gain as much as 7% in annual fuel savings. At the same time, you reduce your emissions and increase the life of the boiler. The bottom line is that Cannon's Feed Water Heater line will help you increase the service life of your boiler system while having a positive impact on plant profitability.*

### 13. Key Heat Recovery Competitors:

Competitor	Strengths	Weaknesses
Kentube	<ul style="list-style-type: none"> <li>• Deep pockets of Fintube Technologies &amp; U.S. Steel</li> <li>• Designs and manufactures large variety of economizers, air heaters, &amp; gas-to-liquid / gas-to-heat recovery equipment</li> <li>• ISO 9001:2000</li> </ul>	<ul style="list-style-type: none"> <li>• No cold water applications</li> <li>• Circular design reduces repair ability</li> </ul>

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	<ul style="list-style-type: none"> <li>• Opened new fabrication facility in 2008. Constructed with three 70 ft by 400 ft manufacturing bays with expanded crane capacity ranging from 15 to 30 tons.</li> <li>• Fintube R&amp;D facility</li> <li>• On-line RFQ capability</li> </ul>	
<p><b>Value Proposition:</b> High quality; Most effective, efficient heat recovery systems available.</p>		
<b>e-Tech</b>	<ul style="list-style-type: none"> <li>• Claims potential of &lt;1 yr payback</li> <li>• Promotes “Greengineering™”. Heat recovery solutions that produce efficiencies of up to 95% of the fuel dollar, while reducing pollutants in exhaust.</li> <li>• Complete waste heat recovery systems save up to 15% or more on overall energy costs (according to e-Tech’s website).</li> <li>• 30 years of experience &amp; 1,000s of designs for many applications</li> </ul>	<ul style="list-style-type: none"> <li>• No modular designs</li> <li>• e-Tech has a less extensive materials selection than CBW which limits their ability to compete on certain applications</li> </ul>
<p><b>Value Proposition:</b> Trouble-free, cost-saving heat recovery solutions; Precisely engineered for specific application</p>		
<b>Cain (Cleaver Brooks)</b>	<ul style="list-style-type: none"> <li>• 12 lines &amp; 1,350+ industrial heat transfer products</li> <li>• Serves broad spectrum of the combustion retrofit market: diesel &amp; gas cogeneration, boiler exhaust, &amp; fume incineration</li> </ul>	<ul style="list-style-type: none"> <li>• Only sold half the number of economizers to CBW</li> <li>• Limited customer support</li> </ul>
<p><b>Value Proposition:</b> High quality; Customer satisfaction</p>		
<b>Boilerroom Equipment, Inc. (Heat Sponge)</b>	<ul style="list-style-type: none"> <li>• On-line sales engineer (Bruce) - helps customers select a HeatSponge economizer and generate predicted performance, pricing, and proposal on-line</li> </ul>	<ul style="list-style-type: none"> <li>• On-line software doesn’t catch system design mistakes which can impact system safety, performance and service life</li> </ul>
<p><b>Value Proposition:</b></p> <ul style="list-style-type: none"> <li>• Simple: Economizers designed to be easy to procure, install, &amp; operate</li> <li>• Effective: Designed to provide high performance heat recovery</li> <li>• Economical: Economizers are competitively priced &amp; easy to service</li> </ul>		

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### 14. Feed Water Heater Positioning Guidelines

- Energy efficiency and reduced boiler system operating cost
- High quality products that are easy to maintain and backed by CBW's experience, strong track record, and factory application assistance

### 15. Feed Water Heater Collateral Materials:

- Website
- Feed Water Heater brochure
- On-line savings calculator (*in development*)
- PowerPoint presentation (*in development*)
- White paper (*in development*)
- Example ROI calculation for the Feed Water Heater
- Feed Water Heater case studies (*availability TBD*)
- Webinar series and archive (*in development*)
- Rep tools on Representative Login section of CBW's website. Includes:
  - Standardized design drawings
  - Inquiry form
  - Piping drawings (*in development*)

### 16. Referral Customers – *in development*

### 17. Case Studies – *in development*

### 18. Pricing Guidelines:

- Call CBW for quote
- Prices for 50 HP to 3,000 HP units range from \$6,000 - \$150,000
- Typical installed cost is \$60,000

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### 19. Payment Terms:

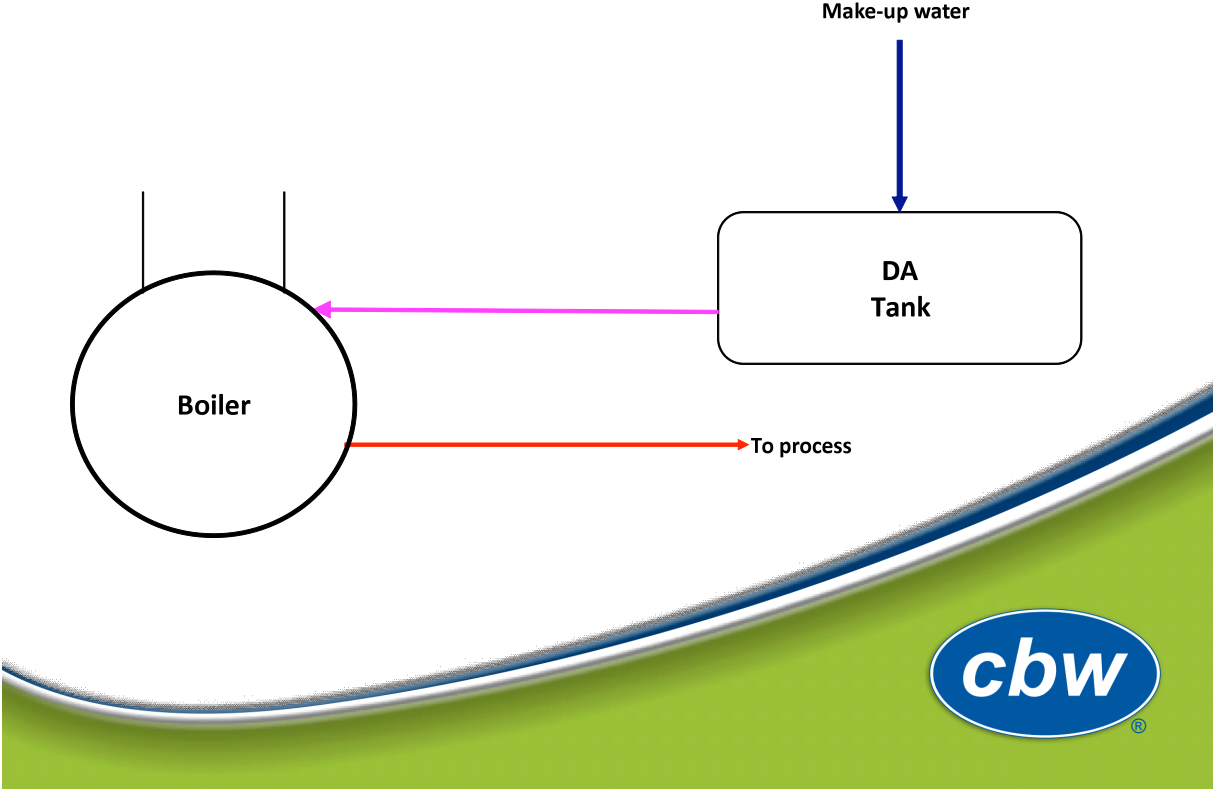
	Order Value	Payment Terms
Existing Customers	Less than \$25,000	Net 30 days
New Customers	Less than \$25,000	Net 30 days <i>(with credit approval)</i>
Existing & New Customers	Over \$25,000	With credit approval: <ul style="list-style-type: none"> <li>• 10% upon customer-approved drawings</li> <li>• 40% upon major milestone <i>(determined jointly by CBW and customer)</i></li> <li>• Remaining 50% upon shipment <i>(Net 30 days)</i></li> </ul>



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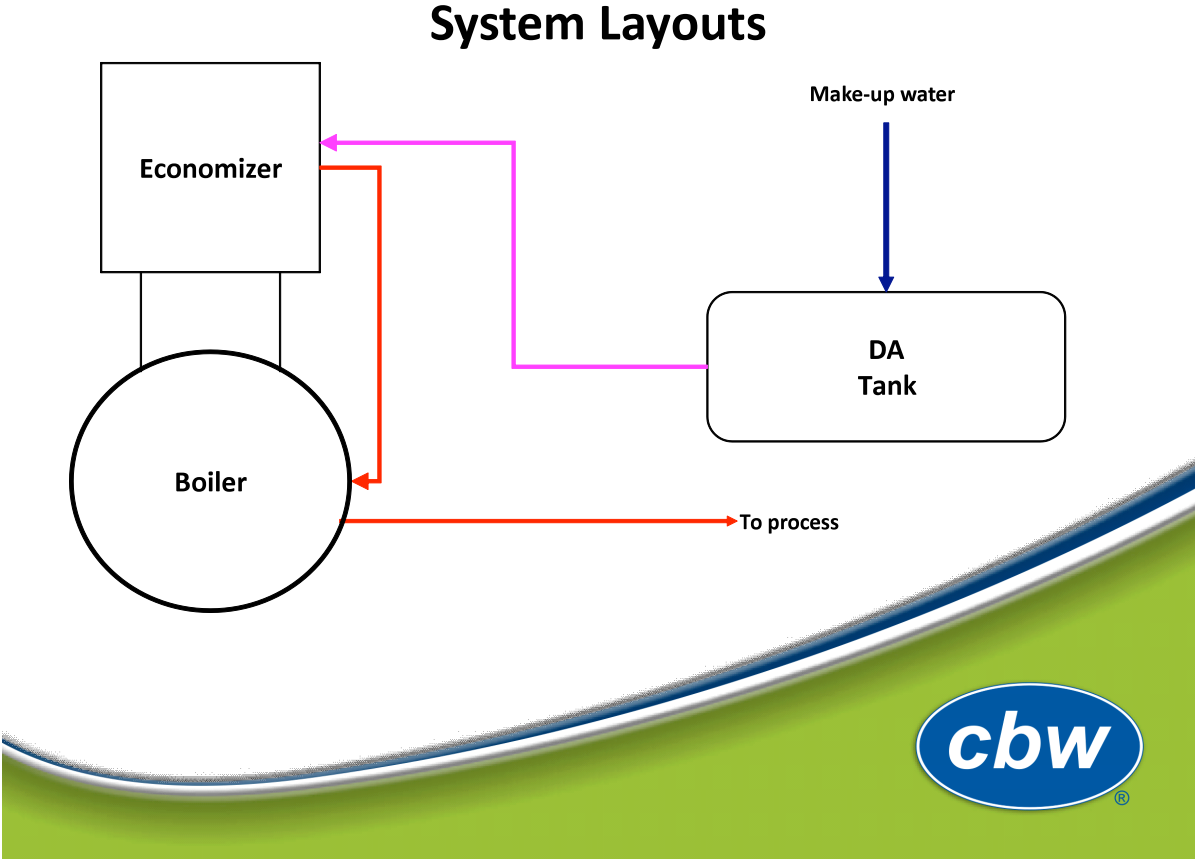
**20. Feed Water Heater System Layout Without Economizer:**

**System Layouts**



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## 21. Feed Water Heater System Layout With Economizer:



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### FREQUENTLY ASKED QUESTIONS AND ANSWERS

#### 1. Can the economizer be made shorter?

In all cases, the answer is YES, but there are compromises to doing so. We will work with you to minimize any performance compromises and make your installation as easy as possible.

Our Feed Water Heater line of economizers has inlet and outlet transitions included in the base price. The lower transition has a baffle and drain system, that helps keep condensate from entering the boiler, at no extra cost. Making a unit shorter could compromise not only the baffle system but more importantly the backpressure put on the boiler/burner system, and this could negatively impact performance.

On our traditional welded economizers again the answer is YES, as these units are infinitely variable to fit the available space and performance characteristics of the boiler/burner system.

#### 2. Can CBW provide piping and installation assistance?

YES, we have some standard piping diagrams available for email to our customers. These are only suggestions, as every installation is slightly different in the existing equipment and available space. Also, our knowledgeable representatives, located nationwide, are experienced in making installation issues disappear.

In all cases, we wish to have water flowing through our economizer whenever the burner is on; therefore provisions have to be made for circulation through our heat exchanger and back to an existing tank when the boiler is not calling for water.

We can guide you through the three methods for doing this:

- Manual valve or set orifice plate
- Spring loaded pressure regulator
- Solenoid valve as slave from boiler feed valve.

#### 3. What pressure should the safety valve be set at?

Our units are designed and Code stamped between 400 and 450psig. We supply the valve matching the unit design pressure as a default. At a customer's request, we can set the valve lower (matching existing boiler) or higher (requires Code calculations at extra cost).

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### 4. What are CBW's standard materials of construction?

Tubes: CBW's units come standard with SA178 Grade A boiler tubes.

- Several grades of stainless steel are available as upgrades, depending on potential corrosion problems and operating temperatures, such as 304SS, 316SS, Duplex SS, AL6XN.

Fins: CBW's units come standard with low carbon steel fins, with nickel brazed fin attachment to the tube.

- Also available are 409SS, 304SS and 316SS depending on potential corrosion problems and operating temperatures.

Frame: CBW's standard frames are made of carbon steel angle iron, and are available in 304SS depending on potential corrosion problems and operating temperatures

Removable side panels: CBW's standard units include 16 ga. 304 stainless steel lining, two inches of insulation, and 16ga. carbon steel painted exterior.

Transitions: CBW's standard units include 10 ga. carbon steel painted exterior. Thicker carbon steel is available to support extra weight, and 304 stainless steel is available for potential corrosion problems.

### 5. *Do we have to insulate CBW's unit in the field?*

The removable side panels are insulated. The piping and transitions should be insulated by the installer. We do not offer additional insulation for the transitions because it may not survive during shipment.

### 6. What are the potential problems with austenitic stainless steel tubes, Type 304 and 316?

Stress corrosion cracking of austenitic stainless steel eliminates its use in ASME Section I pressure vessels. Chloride levels in the water, or halogen compounds in the flue gas, can cause tube leaks in a very short time. Many studies can be found on-line on the subject (search: stainless steel SCC). We offer duplex stainless steel tubes to combat this problem.

### 7. What is duplex stainless steel used in CBW's tubes?

ASME SA789 type 2205 duplex stainless steel is a homogeneous mixture of austenitic and ferritic stainless steel. It is acceptable for ASME Section VIII units and has better corrosion resistance than 300 series stainless steels in most boiler room applications. We have had great success with this grade of tubes in our units, as they normally last the life of the boiler system. Many studies can be found on the internet on this subject, (search: duplex stainless corrosion)

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**8. Does CBW's unit come with a bypass damper?**

Our standard offer does not include a bypass damper, as we want to recover heat 100% of the time that the boiler is operating. An integral bypass is available in cases where it is needed. Our On-Demand unit has a bypass damper system included.

**9. What is the difference between a regular economizer and a condensing economizer?**

The difference is the temperature range in which the economizer is operated. Our units may look identical in outward appearance, but can be used in a condensing application if originally design to do so. A traditional economizer is operated in a hot environment, the tubes and the flue gases are over 200°F. A condensing economizer operates in a cool environment, where the tubes and flue gasses may be well under 200°F. A large savings increase occurs when the flue gas temperature is decreased to under 135°F, but this is only effective when burning natural gas.

**10. Can feed water heaters be used on hot water boilers?**

Yes, although feed water heaters are sized differently on hot water vs. steam boilers. Normally due to their high water flow rate, economizers only flow a portion of the boiler flow rate. Still, efficiency gains in the range of 2 – 5% are possible.

**11. What does CBW have available for small boilers under 100 HP?**

The FB-4 unit is designed as a universal economizer for boilers under 100 HP. It is lightweight and easy to install.

**12. What ASME code stamp applies?**

Units are typically designed for Section 8 Division 1 on indirect fired pressure vessels. Normally, Section 1 is not available due to the need for stainless steel tubes in condensing applications. Section 1 does not allow stainless steel tubes.

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### **POTENTIAL OBJECTIONS AND APPROPRIATE RESPONSES**

**1. The customer wants to avoid condensing of the flue gas, regardless of the fuel being burned ...**

CBW designs its feed water heaters with proper materials and a water removal system so that condensing is not harmful to the boiler system or economizer. Condensing is always avoided when heavy fuels are burned.

**2. The customer doesn't have available budget or money ...**

Many of our customers have found they can install a feed water heater on a maintenance budget or by using outside financing. Customers need to remember that they're losing money every year they don't have an installed feed water heater. Many times the installation of an economizer is a cash positive transaction, even when the cost is financed.

**3. I don't want to have to maintain another piece of equipment ...**

The life expectancy of a properly designed feed water heater far exceeds the life of a boiler.

**4. How will the feed water heater affect my upstream and/or downstream equipment? I don't want it to shut down the boiler system ...**

CBW properly designs its feed water heaters for the boiler burner combination. As such, overall downtime and the potential for unscheduled outages are reduced. If maintenance is required, the economizer can be taken out of service and the boiler can continue to operate until the repairs can be made. It's important to note that CBW's feed water heater design can be repaired quicker than any competitor designs.

Potential corrosion of the stack downstream can be addressed by upgrading the materials of the stack.

**5. At one time, I had an older style economizer, but it didn't work ...**

Significant design considerations and changes have taken place over the last 30 years; many of these in the last 5 years. Today, CBW has 1,000s of successful installations in the field.

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#### **6. It won't fit under the roof or through the door of our boiler room ...**

CBW provides options for its feed water heaters so that they can be installed outdoors. Our units can be installed vertically or horizontally, or floor mounted with an added ID fan. The system can also be field assembled for installation at almost any site.

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### PRODUCT COMPARISON

*Instructions: To determine appropriate equipment, select fuel type, then inlet water temperature.*

Fuel Type	Traditional welded economizer	FWH economizer	Condensing economizer	Direct contact economizer
<b>Liquid Propane</b>				
212° – 300° F	X	X	X	X
150° – 212° F		X	X	X
32° – 150° F			X	X
<b>Natural Gas</b>				
212° – 300° F	X	X	X	X
150° – 212° F		X	X	X
32° – 150° F			X	X
<b>#2 Oil (diesel jet fuel / military grade fuel)</b>				
212° – 300° F	X	X	X	X
150° – 212° F		X	X	X
32° – 150° F				X
<b>#6 Oil</b>				
212° – 300° F	X	X	X	
150° – 212° F				
32° – 150° F				
<b>Landfill Gas (methane)</b>				
212° – 300° F	X	X	X	X
150° – 212° F		X	X	X
32° – 150° F				X
<b>Coal</b>				
212° – 300° F	X			
150° – 212° F				
32° – 150° F				
<b>Wood</b>				
212° – 300° F	X			
150° – 212° F				
32° – 150° F				



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### INFORMATION REQUIRED FOR QUOTATION

Rep Company:	Rep Name:
Rep Phone:	Rep Fax:
Rep Email:	
Project Reference:	
End User Company:	Contact Name:
Address:	
Phone:	Fax:
Email:	
<i>NOTE: Include country and city codes international</i>	

Boiler Make:	Boiler Model:			
Boiler HP:	No. of Boilers:			
Maximum Allowable Gas Side Pressure Drop: _____ inches water column				
Primary Fuel:	Fuel Cost:			
Secondary Fuel:	Fuel Cost:			
Operating Pressure:	% Sulfur in Fuel Oil:			
Boiler Firing Rate	100% Load	75% Load	50% Load	Low Load
Flue Gas Temp.				
Water Temp.				
Alt. Water Temp.				
Alt. Water Flow				
Operating Hours per Year				

*NOTE 1: Cannon Feed Water Heaters can be installed up stream of the DA tank for cold process water heating when applicable.*

*NOTE 2: All **yellow highlighted areas** must be completed.*

**For a detailed computer evaluation of your application, please email [shaynakjl@cannonboilerworks.com](mailto:shaynakjl@cannonboilerworks.com) or fax (724-335-6511) the above information to CBW.**