**HVJ HIGH VOLTAGE JET ELECTRODE STEAM BOILERS**

**DESIGN ADVANTAGES**

- Higher Efficiency - 99.5% @100% Output (will not decrease over time)
- Zero Products of Combustion
- No Air Permits Required (Frees Up Current Permits)
- Full Modulation (0% to 100%) Output
- Lower Installed Capital Cost (up to 75%)
- Better Steam Quality - 99.9%+ Pure
- Lower Maintenance Cost
- Lower Insurance Cost
- Less Chemical Usage
- Higher Reliability
- More Forgiving to Operator Error
- No Possible Damage from Low Water
- No Chance of “Catastrophic” Failure (i.e. Fireside Explosion)
- No Cold Water Shock
- Few Proprietary Spare Parts

**STANDARD FEATURES AND ACCESSORIES**

- ASME National Board Registered Pressure Vessel
- Boiler Circulation Pump w/ VFD & Mech. Seal
- Heavy Duty Steel Vessel Housing
- Four Inch Fiberglass Insulation
- Control Manifold with Pressure Transmitter, Pressure Gauge, Pressure Limits (AR and MR)
- Low and High Water Alarms
- Control Cabinet Disconnect (w/Lockout)
- Blowdown Valves
- ASME Safety Valves (2)
- Conductivity Control with Low/High Setpoints

- Siemens PLC Control with Touchscreen HMI and Modbus RTU BMS Interface Standard.
- Ammeters, Voltmeter, Level Transmitter etc.
- Water Level Sight Glass
- Standby Electric Immersion Heater
- J-box on Boiler for Single Point Wiring
- By-pass Feded (for Quick Chemical Addition)
- Standard Trim Ready for Operation
- Arc Reduction System
- Enhanced Controls with Auto Startup / Shutdown

**OPTIONAL EQUIPMENT AND ACCESSORIES**

- Allen Bradley PLC w/ Touchscreen
- Utility Trim (no brass or bronze)
- Interface with other Building Managment Systems
- Switchgear for High Voltage
- Platform for Access to Valves and HV Cage
- Jib Crane for Electrode Installation / Maintenance
- Startup Spare Parts Kit
- Steam Standby Heater Bundle and Control Valve
- Interface with Utility for KW Limiting

- Startup and Commissioning Services
- HOT WATER - SYSTEM AVAILABLE
  The Precision Electrode Boiler can easily be used to produce hot water for heating or domestic use. Combined with a heat exchange and deaerator this system can provide almost instantaneous hot water for any purpose. Contact Precision Boilers to get details on this zero emissions way to produce hot water.
1 - Blowdown Valves
2 - Pump Removal Clearance
3 - Circulation Pump w/VFD
4 - Check Valve
   (for multiple pumps only)
5 - Conductivity Cell
6 - Sheet Metal Enclosure
7 - Insulation
8 - Safety Valves (2)
9 - Electrode Terminal Enclosure
10 - Conduit Entrance Panel
11 - Header Removal Clearance
12 - Conductor Rod
13 - High Voltage Insulators
14 - Back Pressure Regulator
15 - Steam Outlet
16 - Non-Return Valve
17 - Insulator Shields
18 - Electrode/Strike Plate Assembly
19 - Nozzle Header Assembly
20 - Counter Electrode
21 - Pressure Manifold & Gage
22 - Water Column & Gage
23 - Surface Blowoff
24 - Standby Heater
25 - Feedwater Valve w/Bypass
26 - Manhole
### TECHNICAL DATA

**HIGH VOLTAGE JET (HVJ) ELECTRODE STEAM BOILERS**
High Capacity, Compact, Vertical Design, With 800-50,000 kW

#### NOMINAL RATING

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#### RATING AND DIMENSIONS

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*External ANSI pump used. **Ratings are for peak operation at 150 psi with 220F feedwater. ***Weights are for 175 psi design pressure.

Check local codes for compliance with minimum clearances. Dimensions shown on drawings and in tables are for reference only. Precision Boiler reserves the right to change dimensions without notice due to product improvements and/or product or trim options ordered. Due to the nature of welded construction, Precision Boilers, Inc. is not responsible for rough-in work that does not allow for adjustments during final installation of the product. Rough-Final pipe runs to and from the boiler and flange connections should be made after the boiler is in place.
1. General
The boiler shall be built to ASME Code Section I, Part PEB, and shall consist of a pressure vessel having a central column (header) from which water flows through nozzles toward the electrodes which surround the header. Regulation of the boiler output shall be accomplished by controlling the water level in the nozzle header so that a greater or smaller number of nozzles are supplied with water, and thus, a greater amount of water comes into contact with the boiler electrodes. The boiler electrodes shall be located entirely in the boiler steam space so that stopping of the boiler circulation pump will automatically effect boiler shutdown.

2. Boiler Circulating Pump(s)
The boiler circulating pump(s), located inside the pressure vessel for all vessels larger than 60" diameter, shall be mixed-flow centrifugal type rated for continuous duty at the boiler operating pressure and temperature, and shall be designed for compatibility with low NPSH.

3. Electrodes
Boiler electrodes shall be of mild steel construction, with replaceable electrode strike plates, and shall be supported by insulators of high grade porcelain with protective surface coatings to extend the life over standard porcelain insulators. The electrodes shall incorporate dielectric barriers on splash guard surfaces to eliminate spray-induced arcing and increase reliability for long term operation. The insulators on the steam side shall be protected from flowing steam by shields. Critical discharge surfaces of the porcelain shall be conductive, and shorting clips shall be used to bridge all air gaps. Steam leakage paths shall be provided to indicate the condition of the insulator sealing gaskets.

4. Pressure and Load Controls
The boiler control system shall incorporate both pressure control and current load control in the primary control system in a manner which will permit the boiler to maintain the desired steam pressure so long as the steam demand does not exceed a set maximum KW limit; Conductivity of the boiler water shall be monitored continuously and the sensor shall have isolation capability so normal cell maintenance can be performed with the boiler in operation. A PLC controlled air vent will automatically operate based on KWH calculations for the exhaust of non-condensable gasses that may enter the boiler during operation. The controls will bear an "Industrial Control Cabinet" UL label.

Unless otherwise specified, the control system shall be via PLC with a Touchscreen HMI. The PLC may include a modem and shall also be able to communicate with several standard protocols (such as MODBUS RTU or MODBUS TCP/IP). Check with factory for compatibility with the Customer's DCS/BAS system. System shall be Siemens, or Allen Bradley (AB) at a premium cost.

5. Standard Boiler Accessories
The boiler shall be supplied with the following necessary equipment: water column with drain valve, safety valves, back pressure regulating valve, standby heater, steam stop and check valves, feed-water control valve with 3 valve bypass, sample cooler, circulation pump seal cooling automatic valves, flow switches and flow indicator, manual and auto air vents, blow-down and surface blow-down valves, safety cage with locking mechanism for the high voltage connections.

6. Feedwater Treatment
Feedwater treatment equipment, if needed, is to be furnished by others. Feedwater hardness limits shall be based on a feedwater analysis and the percent of make-up water required. Conductivity required for the water in the boiler to enable full load operation will be in the 1400 to 2500 micromho/cm range. Feedwater conductivity, however, is recommended at less than 100 micromho/cm for efficient boiler operation, unless blowdown losses can be economically recovered via heat exchangers.

7. Manufacturing Expertise
Boiler supplier must be ISO 9001 certified and ASME accredited with National Board Authorization for ASME Section I and Section VIII Division 1. Boiler shall be supplied by a manufacturer that has field installed at least 50 electrode boilers within the last 10 years. A copy of the certificate for ASME and National Board must be provided as well as an electrode boiler reference list with contact information indented in such a manner as to facilitate verification by the client.

Represented in your area by:

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WEB: www.precisionboilers.com