56KW AUTOPELLET WOOD PELLET BOILERS DATA SHEET

1. GENERAL
   - 1.1. SUMMARY
     - 1.1.1. This Section includes packaged, factory-fabricated and –assembled boilers, trim, and accessories for generating hot water.
   - 1.2. RELATED DOCUMENTS
     - 1.2.1. Textile Wood Pellet Bag Storage Data Sheet
     - 1.2.2. Screw Conveyor Delivery System Data Sheet
     - 1.2.3. Vacuum Delivery System Data Sheet
   - 1.3. SUBMITTALS
     - 1.3.1. Shop drawings: For boilers, boiler trim, and accessories. Include plans, elevations, sections, details, and attachments to other work.
       - 1.3.1.1. Wiring Diagrams: Power, signal, and control wiring.
     - 1.3.2. Field quality control test reports.
     - 1.3.3. Operation and maintenance data: For boilers, components, and accessories to include in emergency, operation, and installation manuals.
     - 1.3.4. Post-Installation Checklist and Operating Training Form.
     - 1.3.5. Warranty: Special warranty specified in this Section.
     - 1.3.6. Other
       - 1.3.6.1. ASME stamp certificate.
       - 1.3.6.2. Startup assistance availability.
   - 1.4. QUALITY ASSURANCE
     - 1.4.1. Listed electrical components
     - 1.4.2. ASME certified pressure vessel
     - 1.4.3. EPA Phase II hangtag requirements in Maine and Vermont when installed in occupied buildings.
     - 1.4.4. Reported efficiencies have been converted by Maine Dept. of Environmental Protection and Vermont Dept. of Environmental Conservation to HHV from measurements made and reported using EN 303.5 standards (LHV)
   - 1.5. WARRANTY
     - 1.5.1. Manufacturer's standard form in which manufacturer agrees to repair or replace controls, burner or heat exchanger of boilers that fail in materials or workmanship within the specified warranty period.
       - 1.5.1.1. All parts including electronics 2 years or 6000 hours, whichever comes first from date of startup by factory-authorized personnel.
       - 1.5.1.2. Vessel 5 years from date of startup by factory-authorized personnel.
2. PRODUCTS
   - 2.1. ACCEPTABLE MANUFACTURER
     - 2.1.1. Maine Eco Pellet Heating

2.1.2. Maine Energy Systems

2.2. MANUFACTURED UNITS

2.2.1. Description: Factory-fabricated, -assembled, and –tested, steel flame-tube boilers with heat exchanger sealed pressure tight, built on a steel base plate; including insulated jacket, flue-gas vent, water supply and return connections, and controls.

2.2.2. Pressure Vessel Design: Straight, steel tubes welded into round steel vessel. Two passes with wet-leg design. Minimum heat-exchanger surface of 58.7 sq. ft. (5.45 sq. m) Including the following accessories:

2.2.2.1. Accessible drain and blowdown tappings, both high and low, for surface and mud removal.

2.2.2.2. Tappings for supply- and return-water piping.

2.2.2.3. Return-water temperature control integral to vessel.

2.2.2.4. Minimum ½ in. diameter hose-end drain valves at vessel shell low point.

2.2.2.5. Return-water thermometer sleeve 3.94 in. long ½ in. diameter.

2.2.3. Combustion Chamber: steel, with stainless steel secondary-air ports for dual-stage combustion.

2.2.4. Top and Front Doors:

2.2.4.1. Top door, sealed with heat resistant gaskets and fastened with lugs and wing-nuts.

2.2.4.2. Front hinged door, sealed with heat resistant gaskets and secured with hardened handle.

2.2.4.3. Designed so tubes, combustion chamber and burner are fully accessible for inspection or cleaning when doors are open.

2.2.4.4. Front door allow for inspection of flame conditions.

2.2.4.5. Door refractory and insulation shall be accessible for inspection and maintenance.

2.2.5. Casing:

2.2.5.1. Insulation: Minimum 2-Inch (50-mm) thick, fiberglass insulation surrounding the boiler shell.

2.2.5.2. Flue Connection: 7-Inch Flange at back of boiler.

2.2.5.3. Jacket: Sheet metal, with screw- and clip-fastened closures and powder-coated protective finish.

2.2.6. Barometric damping required.

2.3. BURNER

2.3.1. Burner: Welded steel construction, with primary-air plate ports and bottom screw-conveyor feed for wood pellet fuel. Mounted to boiler side, fastened with lugs and nuts.

2.3.2. Combustion Blower: Variable speed centrifugal fan integral to burner, directly driven by motor, with fixed primary-, secondary-air ratio plenum.

2.3.3. Fuel Supply: Chain-driven feed screw-conveyor, with modulated, on-off control sequence. Fed through air-tight fire valve.

2.3.4. Igniter: 250-W, 230-V resistive, automatic ignition.

2.3.5. Flue Gas Fan: Variable speed centrifugal fan integral to smoke box, directly driven motor, controlled via PID, using feedback from manometer.

2.4. ASH HANDLER

2.4.1. Flame Tube Cleaning Mechanism: Cam driven cleaning mechanism provides vertical oscillation of stainless steel spiral turbulators, twice daily.

2.4.2. Burner Plate Cleaning Mechanism: Steel burner scraper plate oscillated with steel rod eccentrically driven with dedicated motor, ash removal system controlled.

2.4.3. Ash Screw-Conveyor:

2.4.3.1. Screw-conveyor and hardened steel ash wiper direct drive with shaded pole motor.

2.4.3.2. Shaft rotation monitor invokes boiler shutdown when ash box full, after showing requirement to empty for 6 burner hours.

2.4.3.3. Controlled by ash removal system logic.

2.4.4. Ash Box: Detachable external compressed ash storage, fed by screw-conveyor through ball valve.

2.5. CONTROLS

2.5.1. Operating controls shall include the following devices and features:

2.5.1.1. Electric factory–installed panel to control burner firing rate to maintain boiler set temperature.

2.5.1.2. Switch-Off Temperature: Adjustable water temperature at which boiler switches off, factory preset at 185°F.

2.5.1.3. Boiler Set Temperature: Adjustable target water temperature, preset from factory at 175°F.

2.5.1.4. Safety Temperature Sensor: Manual reset stops burner if operating conditions rise above maximum boiler design temperature of 203°F.

2.5.1.5. Low-Water Cutoff: Electronic probe shall prevent burner operation on low water. Cutoff switch shall be manual-reset type.

2.5.2. System Interface: Factory-install hardware and software to enable system monitor, control, and display boiler status and faults.

2.5.3. Optional automatic, alternate-firing sequence for multiple boilers to ensure maximum system efficiency throughout the load range and to provide runtime for boilers balanced to 50hrs.

2.6. TRIM

2.6.1. RTD Controllers: Set temperature and switch-off temperature.

2.6.2. Mechanical Controller: Safety temperature.

2.6.3. Safety Relief Valve: ASME rated.

2.6.4. Pressure and Temperature Gage:

2.6.5. Drain Valve: ½-Inch diameter.

2.6.6. Blowdown Plugs: Factory-installed bottom and surface, blowdown plugs 1 1/4 -Inch.

2.6.7. Return Temperature Control: Return-water preheater.

2.7. ELECTRICAL POWER
2.7.1. Field Power Wiring to Boiler: 208 to 240 VAC 20 Amps
2.8. CAPACITIES AND CHARACTERISTICS
2.8.1. Heating Medium: Hot water
2.8.2. Maximum Operating Pressure: 50 PSI (3.50 bar)
2.8.3. Safety Relief Valve Setting: Supplied with 30 PSI
2.8.4. Minimum Return-Water Temperature: 131 °F (55 °C)
2.8.5. Supply-Water Temperature: 160-185 °F (71-85 °C)
2.8.6. Design Water Flow Rate: 12.00 GPM at 36°F temperature rise, 25.40 at 20°F temperature rise.
2.8.7. Design Pressure Drop: 6.50-Inches WC at 36°F temperature rise, 24.29-Inches WC at 20° temperature rise.
2.8.8. Nominal Efficiency: 86.7%
2.8.9. Annual Delivered Efficiency: 84.6%
2.8.10. Burner Blower: 83 W
2.8.11. Flue Gas Fan: 32 W
2.8.12. Electrical Characteristics: 220 V Single Phase
2.9. SOURCE QUALITY CONTROL
2.9.1. Test and Inspect factory-assembled boilers according to ASME Boiler and Pressure Vessel Code.
2.9.2. Allow owner access to quality-control testing of boilers

3. EXECUTION
3.1. EXAMINATION
3.1.1. Before boiler installation examine locations, and piping and electrical connections to verify actual locations, sizes, and other conditions affecting boiler performance, maintenance, and operations.
3.1.2. Determine exact locations before roughing-in for piping and electrical connections.
3.1.3. Install boilers on a flat level base on a non-combustible floor or shielding. The floor must comply with NFPA 31.
3.1.3.1. Shielding must be equivalent to a ½ -Inch micro board with a K-value less than or equal to 0.49 W/mK (R-value greater than or equal to 0.0259 K m2/W). And capable of supporting boiler without damage to surface / rating.
3.1.4. Examine mechanical spaces for suitable conditions where boilers will be installed.
3.1.5. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2. BOILER INSTALLATION
3.2.1. Consult all provided installation manuals and attend factory training programs prior to installation.
3.2.1.1. Shielding must be placed underneath the boiler and chimney connector, between the boiler and the combustible floor.
3.2.2. Install boilers according to NFPA 31 and 211.
3.2.3. Assemble and install boiler trim.

3.2.4. Install electrical devices furnished with the boiler but not specified to be factory mounted.
3.2.5. Install control wiring to field-mounted electrical devices.
3.2.6. All wiring to meet NEC as well as local codes.

3.3. CONNECTIONS

3.3.1. Drawings indicate general arrangement of piping, fittings, and specialties.
3.3.2. Allow for removable boiler casing do not attach non-removable connections to the sheet metal boiler jacket.
3.3.3. Install piping adjacent to boiler to allow service and maintenance.
3.3.4. Connect wood pellet delivery system to burner
3.3.5. Connect hot-water piping to supply- and return-boiler tappings with shutoff valve and union and flange at each connection.
3.3.6. Connect boiler flue gas to chimney.

3.4. FIELD QUALITY CONTROL

3.4.1. Tests and Inspections:
3.4.1.1. Perform installation and startup checks according to manufacturer's written instructions.
3.4.1.2. Leak Test: Hydrostatic test. Repair leaks and retest until no leaks exist.
3.4.1.3. Perform the heating system checklist supplied in the installation manual.
3.4.1.4. Operational Test: Start units to confirm proper unit operation.
3.4.1.5. Test and adjust controls and safeties, perform safety and operating controls checklist supplied in the installation manual.
3.4.1.6. Replace damaged and malfunctioning controls and equipment.
3.4.1.6.1. Check and adjust initial operating set points and high- and low-limit safety set points of water level and water temperature.
3.4.1.6.2. Make field adjustments as indicated.
3.4.1.7. Remove and replace malfunctioning units and retest as specified above.
3.4.2. Output Test:
3.4.2.1. Using the interactive controller perform the output test (P203) to individually test every component of the boiler.
3.4.2.2. Boilers shall comply with requirements indicated, as determined by field output test. Adjust, modify, or replace equipment in order to comply.
3.4.2.3. Document test results in a report and submit to Architect.