BOILERROOM EQUIPMENT, INC. / HEATSPONGE

Rainmaker Operation & Maintenance Manual

Hydronic boiler heat recovery
General guidance for installation review, commissioning, operation and service

GOVERNING PROJECT DOCUMENT

The project-specific general arrangement drawing signed and released for fabrication is the governing BEI document for the supplied Rainmaker. If this general O&M manual differs from that drawing, the signed, fabrication-released general arrangement drawing takes precedence. Do not resolve a discrepancy by assumption; contact BEI for written clarification before installation or operation. Applicable codes and jurisdictional requirements still apply.

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How to use this manual

This manual addresses Rainmaker hydronic boiler heat-recovery units and is a general reference for receiving, installation review, commissioning, normal and oil-firing operation, shutdown and maintenance. It is not a system design, fabrication drawing, pressure-relief design, burner procedure, repair authorization or substitute for trained personnel. Older BEI documents may identify this product as Sidekick.

Document hierarchy

- The signed, released-for-fabrication project-specific general arrangement drawing governs over this manual for the supplied unit. Check the nameplate, drawing and accepted submittal for ratings, materials, flow direction, connections, weight and access.
- Use the approved project piping and instrumentation diagram (P&ID), control narrative, boiler and burner instructions, and the site water-treatment plan for system-level operation.
- Follow applicable codes, jurisdictional requirements and insurer conditions. Refer discrepancies to BEI and the qualified project engineer before operation.

STOP AND ISOLATE

Do not operate without required pressure protection, adequate water flow, a clear condensate drain and an approved flue path. Isolate the unit for suspected water or flue-gas leakage, unexpected steaming, significant vibration, blocked drains, unsafe combustion/draft or operation outside the approved fuel and temperature envelope.

Part	Use
1 / Unit and design limits	Identify the actual construction, fuels and condensing duty.
2 / Receiving and installation	Verify handling, supports, expansion, piping and drainage.
3 / Operating modes and startup	Prepare the water circuit, select the approved mode and establish a baseline.
4 / Shutdown and maintenance	Protect during layup, inspect, clean and troubleshoot.
5 / Records and approval	Keep unit data and resolve legacy-manual assumptions.

1 Equipment and operating limits

The Rainmaker recovers boiler exhaust heat into a hydronic water circuit. Depending on the project, the gas side may operate in condensing service during natural-gas firing. The actual coil materials, orientation, water path, condensate collection, pressure rating and permitted fuels are determined by the supplied unit and its signed fabrication-released drawing. Do not assume a universal tube pitch, casing material, insulation thickness, orientation or water-side connection size.

Check on the supplied unit	Project-specific evidence
Pressure boundary	Nameplate MAWP and design temperature; code documentation, relief-device requirements and serial/job number.
Operating envelope	Approved gas mass flow, draft and pressure loss; water flow, inlet/outlet temperature and minimum flow.
Fuel and condensate	Approved fuels, condensing duty and materials; oil-firing mode, temperature controls and condensate disposal.
Connections and controls	Water in/out, vents, drains, flue transitions, trap, bypass, temperature sensors and expansion joints.

FUEL AND CONDENSATION

A condensate drain does not mean the unit is suitable for acidic condensate from every fuel. The legacy manual permits condensing operation in an approved low-sulfur application and requires a non-condensing strategy during oil firing. Confirm the actual fuel, sulfur content, inlet-water limits and control sequence with BEI before changing operating mode.

2 Receiving, storage and handling

- Inspect visible shipment condition and item count before accepting delivery; record damage or shortages on carrier documents and photograph them. Unpack and inspect concealed surfaces promptly, and notify the carrier and BEI of discrepancies.
- Check casing, flange faces, water connections, drain, insulation, lifting points, instruments, access openings and supplied loose components against the packing list.
- Store the unit stable and protected from precipitation, dirt and freezing. Cap openings and keep the gas path free of construction debris.
- Rig from approved lifting points using the actual shipping weight and center of gravity. Never lift by a header, nozzle, drain, access panel or insulation.

3 Installation review

Installation and system integration are the responsibility of the qualified project engineer and installing contractor. Resolve the signed general arrangement drawing, P&ID and control narrative before connecting the unit.

Supports and no stack loading

The Rainmaker is not designed to support any stack loading. Static stack loading is the sustained weight of stack, duct, transition, silencer or attached equipment transferred to the casing or flanges. Dynamic stack loading comprises changing forces or moments from wind, seismic motion, vibration, pressure pulsation, startup/shutdown or movement of connected equipment. Independently support and restrain upstream and downstream ducting. Verify that the foundation supports the unit and its flooded weight plus applicable environmental loads. Obtain BEI written approval before proposing any exception.

Thermal expansion and access

The Rainmaker is not designed to absorb thermal expansion of the boiler, stack, ducts or connected equipment. The project engineer must establish expected relative movement and specify independently engineered and supported expansion joints where required. Such joints are supplied and engineered by others unless expressly included in BEI scope. Verify location, cold setting, travel and restraints. Preserve access for inspection, cleaning and removal as shown on the signed drawing.

Flue flow, negative draft and vibration

Operate within approved flue-gas mass flow and draft conditions. Excessive negative draft at the outlet can pull more exhaust through the bundle and raise local gas velocity even at unchanged boiler firing rate. Excess velocity can increase gas-side pressure loss or excite flow-induced vibration. Check actual gas flow as well as draft; draft alone does not establish mass flow. Investigate abnormal noise, casing movement or a pressure-drop change before continued service.

UNAPPROVED LOADING AND EXCESS-FLOW VIBRATION

BEI assumes no responsibility for damage resulting from external loads imposed without BEI written approval, or from vibration caused by flue-gas mass flow above the approved design conditions. The applicable contract and warranty govern allocation of liability. Legal review of this statement is required before publication.

Water piping, pressure protection and condensate

- Match water flow direction to the signed drawing. Engineer supports, isolation, vents, drains, recirculation/bypass and instruments so the coil remains protected during firing and mode changes. Do not transfer piping loads to nozzles.
- Verify the pressure-relief arrangement, set pressure, capacity and safe discharge with the project engineer, applicable code and jurisdiction. Never isolate a heated liquid volume from required protection.
- Connect the condensate collection outlet to an approved trap and disposal system suited to draft and anticipated chemistry. Prevent flue-gas escape or air ingress and keep the drain unobstructed. Verify capacity for planned wash water as well as condensate.
- Confirm materials and any neutralization or freeze protection needed for the approved fuel and operating mode.

4 Pre-start inspection

With the boiler and water circuit in the approved pre-start condition, record each check and resolve exceptions before firing.

Check	Acceptance evidence
Identity and documents	Nameplate and job number match signed fabrication-released drawing, P&ID and control narrative.
Mechanical installation	Stack/duct loads bypass unit; foundation, supports, expansion joints and service access match drawings.
Flue and drains	Gas path clear; gaskets and access covers fitted; condensate trap/disposal installed and unobstructed.
Water circuit	Flow direction, venting, recirculation, bypass and inlet-temperature controls proven.
Fuel mode	Natural-gas and any oil-firing sequence reviewed; fuel-specific operating limits established.
Pressure protection	Relief device(s), discharge and permits meet approved design; temporary test gags and blanks removed.
Instrumentation	Gas/water temperatures, flow, pressure and draft measurement points operational.
Water treatment	Approved water quality and system flushing complete; contaminants excluded from coil.

FIELD TESTING

Factory tests and data reports do not replace site inspection or required field testing of connected piping and joints. Use an approved procedure and qualified personnel; confirm jurisdictional requirements and protect pressure-relief devices as directed by the project engineer.

5 Startup and normal operation

Only authorized personnel should start the system, in coordination with the boiler, burner and water-system procedures. BEI service participation, when arranged, supports site personnel but does not transfer operating authority.

01 Confirm the pre-start checks, fuel selection, valve lineup, pressure protection, open flue route and functioning condensate trap.

02 Fill using treated water through the engineered path; vent air and avoid abrupt temperature differences. Confirm water circulation before admitting hot exhaust.

03 Start the boiler gradually under its approved procedure; prove water flow, inlet-water temperature control, combustion stability and draft.

04 At stable load, record gas and water inlet/outlet temperatures, water flow and pressure difference, gas-side pressure difference, draft, condensate flow and any vibration. Compare with the approved design case.

05 Check casing, flanges, water joints, drains and relief discharge for leakage. Stop and correct abnormal conditions under the site procedure.

Condensing operation on approved fuel

In a permitted condensing mode, verify that condensate drains freely and that collection, trapping, materials and disposal are suitable for the actual flue chemistry. Trend water inlet temperature, draft and gas-side pressure loss. If condensate appears at an unplanned location, the trap backs up or corrosion is observed, isolate and investigate before returning to service.

Oil-firing mode - special operating discipline

The legacy manual calls for preventing oil-derived acidic condensation. Before oil firing, use the approved project control sequence to maintain inlet-water temperature above the applicable oil-flue-gas dew point, or select a BEI-approved water bypass mode. If water is bypassed while hot exhaust continues through the unit, isolate, drain and vent the coil only under the engineered procedure so trapped water cannot boil, overpressure or lift the relief device. Do not infer that an empty coil is safe at any firing condition: BEI must approve the actual bypass arrangement and temperature limits. Verify clean combustion, inspect for soot after oil service and clean as indicated.

6 Operating checks

When	Record and response
Each shift	Boiler load and fuel; gas/water temperatures, water flow and pressure loss, draft, condensate drain, leaks, noise and vibration.
Fuel or load change	Verify control sequence, water circulation, inlet-water limits, draft and condensate behavior in the selected mode.
Oil service	Trend soot and condensate evidence; inspect on the site schedule and after sustained oil firing.
Abnormal trend	Validate instruments; compare at like operating conditions; investigate flow loss, fouling, drain restriction or changes in draft.

Water chemistry

Follow a site-specific water-treatment plan developed for the actual circuit and alloys. Keep oxygen, solids, pH and other contaminants controlled. If supplied with 300-series stainless tubing, assess chloride stress-corrosion risk using actual alloy, temperature and chemistry; do not apply a generic chloride threshold. Protect the unit from grease, scale, construction debris and cleaning chemicals entering from connected piping.

7 Shutdown, layup and freeze protection

- Follow the boiler shutdown procedure and maintain required water flow through cooldown. Isolate only when permitted by the approved system sequence.
- After pressure and temperature fall to safe levels, vent or drain in accordance with the engineered procedure. Protect against vacuum, trapped hot liquid and freezing.
- Select wet or dry layup with the project engineer and water-treatment specialist. Do not assume every installed orientation drains completely; confirm low points, vents and pockets.
- Keep the flue path and condensate drain protected during long standby and inspect the coil, trap and water circuit before recommissioning.

8 Inspection, cleaning and maintenance

Set intervals using the actual fuel, hours, duty, observed deposits, water analysis, insurer and jurisdictional requirements. The frequencies below are planning prompts, not universal code intervals.

Interval	Typical activity
Shift / daily	Review trend log, drain performance, leakage, unusual noise and casing movement.
After oil use	Inspect gas side for soot at intervals set for the installation; arrange cleaning if deposits accumulate.
Monthly / seasonal	Inspect supports, expansion joints, insulation, trap and instrument condition; review water treatment.
Planned outage	Isolate and cool; inspect gas-side deposits, corrosion, casing, coil surfaces, access gaskets and water joints.
Inspection cycle	Coordinate pressure-boundary inspection and relief-device service with authorized personnel and the jurisdiction.

Fireside cleaning and repair

Clean by a method approved for the supplied coil and deposit chemistry. Where wet washing is permitted, avoid overwhelming the collection tray or trap; collect and dispose of contaminated wash water properly. Dry and inspect before closure. Pressure-boundary repairs require a qualified organization, applicable inspection and an approved test procedure. The legacy manual notes that field repair of some Sidekick assemblies is limited; confirm the service route with BEI before disassembly or shipment.

9 Troubleshooting and records

Observation	First check / next action
Condensate at wrong location	Check fuel, inlet-water temperature, casing seals, trap and intended condensing mode.
Oil soot or acidic corrosion	Check combustion, oil-firing control, dew point strategy and drainage; consult BEI.
Low heat recovery	Compare boiler load and inlet conditions; check water flow, bypass settings, fouling and instruments.
Excess gas pressure drop / vibration	Check deposits, restrictions, draft and actual flue mass flow; stop if outside approved limits.
Relief-device discharge	Isolate per site procedure; check valve line-up, trapped water, heat input and pressure protection.
Water leakage	Isolate and depressurize; inspect joints and coil through qualified personnel.

- Retain the signed fabrication-released general arrangement drawing, nameplate details, BEI job and serial numbers, accepted submittal, control narrative, P&ID, inspection and repair records.
- Keep baseline and operating logs for fuel, load, flow, temperatures, pressure differences, draft, condensate observations, water quality and changes in control settings.
- For technical service, provide model, serial/job number, photographs, fuel/mode at time of issue, operating trend and observed failure mode to BEI.

Engineering release checklist

This is a rewritten review draft based on the 13-page HeatSponge Sidekick O&M Manual Version 1.0, available at https://www.heatsponge.com/assets/heatspongesidekickommanual.pdf. Before replacing the current manual, BEI should approve the product scope and confirm these points against its current Rainmaker line:

- Whether Rainmaker and legacy Sidekick units share the same water bypass, oil-firing and drain/vent controls; provide separate instructions where they differ.
- The actual condensing fuels, permitted sulfur content, coil/casing materials, oil dew point strategy and any inlet-water limits.

- Actual code stamp/registration and relief-device supply for each project; avoid universal claims from the legacy document.
- Scope of BEI field repair and applicable warranty terms; the legacy statements should not be reused as a general warranty.
- The stack load, expansion and draft/vibration wording, plus the liability paragraph, for engineering and legal signoff.

After BEI approval, issue a revision number, date and defined model scope; retain the applicable job-specific released drawing with each equipment record.