1. **General Requirements**
2. Furnish and install \_\_\_ (qty) packaged, modulating, sealed combustion, high efficiency gas-fired boiler(s) with stainless steel vertical firetube heat exchanger design
3. \_\_\_(qty) Weil-McLain SVF 3000 commercial high efficiency, packaged water boiler(s) capable of burning natural gas or propane gas
4. Boiler(s) shall have no less than a 3000 MBH maximum input rating, 2874 MBH gross output rating and 2499 net AHRI MBH at 100% fire rate
5. Boiler(s) shall be no less than 95.8% combustion efficiency AHRI certified
6. Boiler(s) shall be capable of full modulation firing with a minimum 8.3:1 turn down ratio for natural gas and propane applications
7. Boiler(s) shall be capable of passage through a standard 36” wide door-fit
8. Boiler(s) will include a maximum allowable working pressure of no less than 160 psig
9. Boiler(s) shall have no less than a ratio of 19.3 BTUs Gross Output/Gallon of water stored in the boiler to protect the heat exchanger from variances in gallons per minute flow rates
10. Boiler(s) shall be capable of zero clearance to combustion boiler room installation
11. Boiler(s) dimensions shall not exceed any of the following dimensions: 84.4” length, 35.2” width, and 79.1” height
12. Boiler(s) to be installed in accordance with the manufacturer’s installation instructions with all work to conform to plumbing industry standards
13. **Product**
14. Acceptable boiler manufacturer(s) must
    1. Comply with specifying engineer’s requirements and meet the full intent of the project(s) design specifications
    2. Provide complete submittal including literature, manuals, wiring diagrams, fuel piping diagrams and access to electronic revit files; Any alternate must be of equivalent performance, size and footprint, piping configuration, clearance requirements and heating surface
    3. Provide bid submittal to engineer by requested date or at least seven working days in advance of bid opening for approval; substitutions are not permitted after award of contract
15. Boiler Construction
16. Boiler(s) heat exchanger must include
    1. Vertical firetube design
    2. 316L stainless steel tube/tube sheet and condensate tray and 304 stainless heat exchanger shell make of material
    3. Fire testing and hydrostatical pressure testing at the factory in accordance with ASME requirements
    4. Alternating, opposed indentation firetube geometry for maximum heat transfer
    5. Serviceable condensate tray to capture heat exchanger and vent system condensate with removable design that does not require heat exchanger disassembly
    6. Counter-balanced / hinged cover-plate design
    7. Cooled cover-plate design to redirect heat back in to the heat exchanger and minimize external temperature
    8. Barrel nut cover-plate to heat exchanger bolt design
    9. Cover-plate hatch for quick access to burner and heat exchanger
    10. Access to the heat exchanger combustion chamber and fire tubes for wash down service that shall not require heat exchanger disassembly
17. Factory assembly and testing
18. Boiler(s) main components:
    1. The boiler cover plate shall include a hinged design to allow for easy access to the heat exchanger internal components and require a maximum of 18” overhead clearance from top of boiler
    2. Integrated roller casters to enable boiler removal from the shipping crate, transport to the boiler installation site and boiler positioning without the need for a lift jack or fork lift
    3. Integrated leveling legs to mitigate the need for a dedicated concrete boiler pad/surface
    4. Boiler(s) shall be supplied with a gas valve designed with negative pressure regulation (fan venturi effect “pulls” gas through the valve rather than gas pressure “pushing” gas through the valve); Negative pressure regulation enables the boiler to operate in a safe condition at the minimum allowable inlet pressure; The inlet gas (natural gas or propane) pressure to the boiler valve shall be at a minimum of 3.5 inches water column and maximum of 14 water column
    5. The burner shall include a premix combustion design, made with stainless steel and a woven metal fiber outer covering to provide a wide range of modulating firing rates
    6. The boiler(s) shall be equipped with a device capable of controlling the air/fuel ratio through a 10:1 turn for natural gas and propane applications.
    7. Maximum 3” flanged water supply and return line manifolds and connections
    8. Fully removable, steel boiler jacket panels with rugged steel frame with commercial powder coat
    9. True sealed cabinet design in which heat radiant heat is redirected into the heat exchanger to maximize operating efficiency
    10. Industrial grade push button control display
    11. The control system shall have an electronic display for boiler set-up wizard, boiler status, boiler diagnostics and typical heating system presets
    12. A pleated canister-style intake air filter with Filter Minder system to enable user to monitor filter dirtiness / clogged condition
    13. Dual cover plate site glassed spark flame rod and flame visible from either side of boiler
    14. Dual pressure and temperature gauge taps on both sides of the supply water manifold
    15. Tapping on return water manifold to accommodate a flow switch
    16. Tapping on the supply water manifold for the relief valve to mitigate need in downline external piping
19. Venting and Combustion Air
20. Boiler(s) must be capable of using outside air piped directly to the boiler for combustion; Inlet and termination of these pipes must be connected to either sidewall or through-the-roof wall terminations as recommended by the manufacturer
21. The boiler shall be direct vent or direct exhaust capable certified with the following vent materials: PVC, CPVC, PP, or SS (AL29-4)
22. Vent/air connection to be 10" in diameter
23. Vent runs up to 100’ maximum allowable length with minimum allowable vent length of 10'
24. Boiler(s) to be capable of: direct exhaust - vertical (Category II), direct vent – sidewall, vertical, and side intake with vertical exhaust (Category IV), direct exhaust – vertical (Category IV)
25. Common venting is achievable as a Category II system according to the boiler manual installation instructions and common venting installation parameters found in the application guide.
26. Boiler Trim
27. All electrical components to be of high quality and bear UL label
28. Direct spark ignition
29. 50 VA transformer
30. Boiler(s) electrical requirement not to exceed 16.3 full load amps and shall accommodate a 208 volt / 3 phase / 60 hertz power source
31. CSD-1 compliant with factorytest report for ASME CSD-1
32. Standard boiler(s) controls to include:
    1. High limit temperature control with manual reset (210 degree F maximum allowable boiler water temperature)
    2. Operating limit temperature control (190 degree F maximum set-point)
    3. Combination pressure-temperature gauge; Gauge dial clearly marked and easily read
    4. Standard, factory supplied, 30 psi ASME certified pressure relief valve with option to 50/80/100/150 pressure relief valve
    5. Supply & return system to include ½” NPT X4” immersion style water temperature sensors with option to strap-on style
    6. Low water cut-off protection with manual reset
    7. High and low gas pressure switches with manual reset and indicator lights
    8. Outdoor temperature sensor
33. Boiler Controller to include:
34. An express set-up wizard and fully customizable options
35. Operating status color LCD display
36. Standard Modbus connectivity with option to BACnet and Lonworks
37. Preset operating parameters including typical heating systems
38. Configurable outdoor reset
39. Rate setting for each input / output
40. Contact with 0-10v output
41. 0-10 input (modulation or set-point)
42. Labeled terminal blocks for field terminations
43. Ignition control
44. High limit and modulating temperature control
45. Alarm control functionality
46. Onboard time and date
47. Low water cut off
48. Manual reset
49. Warm weather shutdown
50. Freeze protection
51. Boiler service interval and contractor information
52. (3) 120V powered outputs/2.2 amps max each, (1) dry contact/10 amps max
53. Outdoor temperature reset and warm weather shutdown
54. Variable temperature zones that require no mixing valves
55. Multiplex LCD digital temperature access points including supply, return, system temperatures, and flue gas temperature
56. Alarm contacts that include flame fail, high temperature and low water control cut off
57. Multiple boiler functionality to include:
    1. Up to 8 boiler cascading / lead lag operation and boiler rotation for equal run hours
    2. Series, parallel, or SmartTM sequencing
    3. Lead boiler rotation
    4. Variable primary flow design capable
    5. Three boilers priority capability: either (2) network and (1) local or (1) Network and (2) local
    6. (24) Zone inputs and outputs with 8 total cascaded boilers via Zone StackingTM
    7. Auxiliary inputs - flow and end switches
    8. System auxiliary outputs for system pump or damper
58. Boiler Manuals
59. The boiler(s) shall be provided with complete instruction manuals including:
    1. Boiler Installation Manual
    2. User Manual
    3. Advanced Manual
60. Boiler Packaging
    1. Shall include an integrated shipping ramp to allow for removal from shipping crate and positioning up on to an existing boiler pad without the need for a forklift
61. **Certifications and Regulatory Compliance**
62. Boiler(s) shall include ASME, AHRI, CSA listing and/or approvals
63. Boiler(s) shall be manufactured to conform to ASME Section IV Boiler and Pressure Vessel Code
64. CSD-1 compliant: manual reset low water cut-off, manual reset high and low gas pressure switches, UL 353 certified high limit control with manual reset, and UL 353 certified operating control
65. Certified to appliance code ANSI Z21.13 / CSA 4.9 gas-fired low pressure steam and hot water boilers
66. Boiler(s) shall have an independent laboratory rating of <30 ppm Corr. 3%O2 Nitrogen Oxides (NOx) emissions

