1. **General Requirements**
2. Furnish and install \_\_\_ (qty) packaged, modulating, sealed combustion, power-vented, high efficiency gas-fired boiler(s) with stainless steel vertical firetube heat exchanger design
3. \_\_\_(qty) Weil-McLain SVF 1100 commercial high efficiency, packaged water boiler(s) capable of burning natural gas or propane gas
4. Boiler(s) shall have no less than a 1134 MBH maximum input rating
5. Boiler(s) shall have no less than a net AHRI gross output of 957 MBH per boiler at 100% fire rate
6. Boiler(s) shall be no less than 97.1% thermal efficiency AHRI certified
7. Boiler(s) shall be capable of full modulation firing with a minimum 5:1 turn down ratio
8. Boiler(s) shall be capable of passage through a standard 36” wide door-fit
9. Boiler(s) will include a maximum allowable working pressure of no less than 160 psig
10. Boiler(s) shall have no less than a ratio of 7.9 BTUs Gross Output/Gallon of water stored in the boiler to protect the heat exchanger from variances in gallons per minute flow rates
11. Boiler(s) shall be capable of zero clearance to combustion boiler room installation
12. Boiler(s) dimensions shall not exceed any of the following dimensions: 51.0” length, 35.4” width, and 79.1” height
13. Boiler(s) to be installed in accordance with the manufacturer’s installation instructions with all work to conform to plumbing industry standards
14. **Product**
15. 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
16. Boiler Construction
17. 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. Pickled and passivated welded design
	5. “Clover” tube design for maximum heat transfer
	6. Replaceable tray to capture heat exchanger and vent system condensate with removable design that does not require heat exchanger disassembly
	7. Access to the heat exchanger combustion chamber and fire tubes for wash down service that shall not require heat exchanger disassembly
18. Factory assembly and testing
19. 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. The burner will include an end-shot (shallow bowl) design
	3. 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
	4. Integrated leveling legs to mitigate the need for a dedicated concrete boiler pad/surface
	5. 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 4 inches water column and maximum of 14 water column
	6. 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
	7. The boiler(s) shall be equipped with a variable speed blower system capable of modulating the boiler firing rate from 100% to 20%
	8. The boiler(s) shall be equipped with a device capable of controlling the air/fuel ratio through a 5:1 turn down ratio
	9. Maximum 3” flanged water input and return line manifolds and connections
	10. Fully removable, steel boiler jacket panels with rugged steel frame and 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
20. Venting and Combustion Air
21. 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
22. Boiler(s) inlet and exhaust connection must include a 3-in1 poly-propylene vent adaptor
23. The boiler shall be direct vent or direct exhaust capable certified with the following vent materials: PVC, CPVC, PP, or SS (AL29-4)
24. Vent size shall not exceed 6" diameter
25. Vent runs up to 100’ maximum allowable length with minimum allowable vent length of 7'
26. Boiler(s) to be capable of: direct exhaust - sidewall and vertical (Category II), direct vent – sidewall, vertical, and side intake with vertical exhaust (Category II), direct exhaust – vertical (Category IV) and common venting – according to boiler manual and common venting installation parameters
27. Boiler Trim
28. All electrical components to be of high quality and bear UL label
29. Direct spark ignition
30. 50 VA transformer
31. Boiler(s) electrical requirement not to exceed 14.2 full load amps and shall accommodate a 120 volt / 1 phase / 60 hertz power source
32. CSD-1 compliant with factory report for ASME CSD-1
33. Standard boiler(s) controls to include:
	1. High limit temperature control with manual reset (190 degree F maximum allowable boiler water temperature)
	2. Combination pressure-temperature gauge; Gauge dial clearly marked and easily read
	3. Standard, factory installed, 30 psi ASME certified pressure relief valve with option to 50/80/100/150 pressure relief valve
	4. Flue gas, immersion style supply water and return water temperature sensors with option to strap-on style
	5. Low water protection with manual reset
	6. High and low gas pressure switches with manual reset indicator lights
34. Boiler Controller to include:
35. An express set-up wizard and fully customizable options
36. Operating status color LCD display
37. Standard Modbus connectivity with option to BACnet and Lonworks
38. Preset operating parameters including typical heating systems
39. Configurable outdoor reset
40. Rate setting for each input / output
41. Contact with 0-10v output
42. 0-10 input (modulation or set-point)
43. Labeled terminal blocks for field terminations
44. Ignition control
45. High limit and modulating temperature control
46. Alarm control functionality
47. Onboard time and date
48. Low water cut off
49. Manual reset
50. Warm weather shutdown
51. Freeze protection
52. Boiler service interval and contractor information
53. 4 pump contacts per boiler
54. Outdoor temperature reset and warm weather shutdown
55. Variable temperature zones that require no mixing valves
56. Multiple LCD digital temperature access points including supply, return, system temperatures, and flue gas temperature
57. Alarm contacts that include flame fail, high temperature and low water control cut off
58. 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
	7. Boiler via Zone StackingTM
	8. Auxiliary inputs - flow and switch end
	9. System auxiliary outputs for system pump or damper
59. Boiler Manuals
60. The boiler(s) shall be provided with complete instruction manuals including:
	1. Boiler Installation Manual
	2. User Manual
	3. Advanced Manual
61. 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 with the need for a forklift
62. **Certifications and Regulatory Compliance**
63. Boiler(s) shall include ASME, AHRI, CSA listing and/or approvals
64. Boiler(s) shall be manufactured to conform to ASME Section IV Boiler and Pressure Vessel Code
65. 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
66. Certified to appliance code ANSI Z21.13
67. Boiler(s) shall have an independent laboratory rating to meet <30 ppm Oxides of Nitrogen (NOx) emissions regulatory requirements.
68. Boiler(s) shall be certified to Energy Star certified by the U.S. Department of Energy

