A3C Series Condensing Hydronic Boilers

Models: A3C-399, A3C-600, A3C-1000, A3C-1500, A3C-2000, A3C-2500
A3C-3000, A3C-3500, A3C-4000, A3C-5000, A3C-6000
A3C-7000, A3C-8000, A3C-10000, A3C-12000

ALDRICH SERIES A3C FIRETUBE CONDENSING HYDRONIC BOILERS

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes packaged, factory-fabricated and assembled, gas-fired, three pass condensing firetube boilers, trim, and accessories for generating hot water for pressure as noted on plans.
   1. Three pass firetube condensing boiler
   2. Burner - Specify Fuel: Natural Gas, LP Gas or Combination Gas/#2 Oil

1.2 SUBMITTALS

A. Product Data: Include performance data, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings: For boilers, boiler trim, and accessories; Include plans, elevations, sections, details, and attachments to other work.
   1. Wiring Diagrams: Power, signal, and control wiring.
   2. Fuel Train Schematic

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For boilers, components, and accessories to include in emergency, operation and maintenance manuals.

B. Warranties: As specified in this section.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

B. ASME Compliance: Fabricate and label boilers to comply with ASME Section IV Boiler and Pressure Vessel Code.

C. ASHRAE/IESA 90.1 Compliance: Boilers shall have minimum efficiency according to: Gas and Oil Fired Boilers – Minimum Efficiency Requirements."

D. UL Compliance: Control devises and control sequences according to requirements of UL.

E. CSD-1 Compliance: Boilers/burners equipped to meet current state code.

F. For quality purposes the boiler must be manufactured by a company having at least ten (10) years documented boiler manufacturing experience in accordance to ASME Section IV Boiler and Pressure Vessel Code.

1.5 COORDINATION

A. Furnish and coordinate size and location of concrete bases.

1.6 WARRANTY

A. Boiler manufacturer will repair or replace any part of the A3C boiler pressure vessel that is found to be defective in workmanship or materials within ten (10) years of shipment from the factory.

B. The boiler is covered against failure from flue gas corrosion and /or defective material or workmanship for a period of ten (10) years from the date of shipment from the factory. Waterside corrosion or scaling is not covered. The manufacturer will repair, replace, exchange or credit at their option, FOB factory, the pressure vessel

C. In additional to the above pressure vessel warranty the burner, trim, and controls are warranted for a period of one (1) year after installation.

PART 2 – PRODUCTS

2.1 HORIZONTAL THREE PASS FIRETUBE CONDENSING BOILER

A. Basis of Design Product: Subject to compliance with requirements, provide products as listed:
   1. Aldrich Company – Manufactured in Wyoming, IL, Model: A3C-_____

B. The boiler must be manufactured by a company having at least ten (10) years documented boiler manufacturing experience in accordance to ASME Section IV Boiler and Pressure Vessel Code.

C. Description: Factory packaged and firetested firetube condensing boiler complete with gas burner, gas train, and controls mounted and wired, skid mounted requiring only supply, return, fuel, drain, electrical and vent connections.

D. Fabricate base and attachment to pressure vessel with reinforcement strong enough to resist boiler movement during a seismic event when boiler base is anchored to building structure.

E. Design: Horizontal three pass firetube design. The boilers combustion chamber shall be water jacketed including a water surrounded furnace. All fireside surfaces are to be constructed using duplex 2205 stainless steel.
   Boilers constructed using a carbon steel, aluminum, 300 series stainless steel or 400 series stainless steel materials for fireside surfaces are not allowed.
   Boilers constructed of single pass or two passes are not allowed.
   Boiler to have a minimum efficiency of 95% when return water temperatures are <80°F.

F. Maximum allowable working pressure (Specify Pressure): 160 PSIG

G. U-Type Flex Joint: The furnace must incorporate a “U-Type” flex joint. The “U-Type” flex joint burner port to furnace minimizes the effects of differential stress as the boiler furnace expands at a greater rate than the firetubes during operation. Boilers with other types of furnace to tube sheets construction are not allowed.

H. Front Access Door: Door to include swing joint with hinges for easy fireside access to combustion chamber without removal of the door. Boiler designs that do not include front access door with hinged swing joint are not allowed.

I. Rear Access Door: Door to include swing joint with hinges for easy access to fireside of boiler without removal of the door. Boiler designs that do not include rear access door with hinged swing joint are not allowed.

J. Boiler Casing: The external surfaces shall be covered with a minimum of 2” mineral fiber insulation encased within an 18 gauge steel jacket.

K. Water Capacity: The boiler must be of a high mass, large volume design as listed below:

Gas Input (BTUH)	Minimum Water Capacity (Gallons)
399,000	100
600,000	100
1,000,000	160
1,500,000	160
2,000,000	240
2,500,000	300
3,000,000	300
3,500,000	340
4,000,000	360
5,000,000	430
6,000,000	540
7,000,000	650
8,000,000	810
10,000,000	1,060
12,000,000	1,220

L. Include the following:
1. Handholes or inspection tappings for water-side inspection.
2. Lifting lug on to of boiler.
3. Minimum 1” boiler drain valve.
4. Minimum 3/4” condensate drain connection.
5. Tappings or flanges for supply and return connections
6. Condensate Neutralizer: Each boiler to include a factory supplied condensate neutralizer appropriately sized based on rated input of the boiler. Each condensate neutralizer is to be field installed by installing contractor.

2.2 WATER BOILER TRIM

A. Boiler to include the following factory mounted/wired:
   1. Theraltimeter gauge
   2. ASME relief valve
   3. Operating control
   4. High limit control (Manual Reset)
   5. Modulation control
   7. Probe type low water cut-off (Manual Reset)

   Note: Controls may be installed in spool piece located directly above boiler supply connection. If this is the case the spool piece must be easily removable for rigging purposes and reattached once boiler is rigged into place.

2.3 BURNER

A. Basis of Design Product: Subject to compliance with requirements, provide products as listed:
   1. Power Flame or Equal – Model: _____ with a minimum turndown of 10:1

B. Code Compliance: UL, CSD-1

C. Burner must be factory mounted and wired.

D. For burners that require a remote panel the panel is to be mounted on a hinged pivot point located beneath burner. This ensures ease of access to fireside of boiler. Panels without hinged pivot point are not allowed.

E. Light Package: Power On, Load Demand, Main Fuel, FSG Alarm

F. Quick Connect Wiring of Burner and Gas Train: Burner to include factory wired burner quick connect wiring. This provides quick and easy removal of the burner and gas train for applications when the burner may need to be shipped loose or removed for rigging purposes. The quick connect system greatly reduces the time required for the installing contractor to remount and make wiring connections.

G. Burner to include a Siemens LMV3 linkageless modulation system consisting of independent servo motors to manage the air-fuel ratio. Burner also to include a Siemens RWF55 PID controller and temperature sensor.
   The use of linkage type or CAM type modulation is not acceptable.

H. Blower: Forward-curved centrifugal fan integral to burner, directly driven by motor.

I. Gas Train: Control devices shall comply with requirements in ASME CSD-1 and UL. Gas train to include pilot shut-off valve, regulator, pilot solenoid valve, intermittent electric spark pilot ignition with 100 percent main valve and pilot safety shutoff with electronic ultra violet supervision of burner flame (flame rod not acceptable).

I. Main Gas Train: Factory piped and wired (may be removed for shipment as a complete assembly for protection), main gas regulator, main gas safety shut off valve, secondary gas safety shut off valve, isolation valve(s) with test cock(s), high and low gas pressure switches.

2.4 SOURCE QUALITY CONTROL

A. Test and inspect factory-assembled boilers, before shipping according to ASME Boiler and Pressure Vessel Code.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Before boiler installation, examine roughing-in for concrete equipment bases, anchor bolt sizes and locations, and piping and electrical connections to verify actual locations, sizes, and other conditions affecting boiler performance, maintenance, and operations.
   1. Boiler locations on drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections and consult mechanical engineering Project Manager for approval prior to proceeding.

B. Examine mechanical spaces for suitable conditions where boilers will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 BOILER INSTALLATION

A. Equipment Mounting: Install boilers on cast-in-place concrete equipment bases.
   1. Coordinate sizes and locations of concrete bases with actual equipment provided.
   2. Construct bases to withstand, without damage to equipment, seismic force as required by code.
   3. Construct concrete bases 4” high and extend base not less than 6” in all directions beyond the maximum dimensions of boiler unless otherwise indicated.

C. Install gas-fired boilers according to NFPA-54.

D. Install electrical devices furnished with boiler but not specified to be factory mounted.

D. Refer to drawings for additional requirements.

3.3 START-UP SERVICE

A. The mechanical contractor is required to engage a factory authorized service representative to perform start-up services and also provide owner’s maintenance personnel training on the adjustment, operation and recommended maintenance of the boilers.

END OF SECTION