

**Unfired Clean Steam Generator Series "ASTEg"
Suggested Specification - High Temperature Liquid -****1. CODE REQUIREMENTS**

- A. The Packaged Unfired Clean Steam Generator(s), its installation, and all equipment associated with the operation of the unit(s) shall comply with all applicable codes. The contractor is cautioned that all aspects of the installation shall meet the requirements of: ASME latest revision, The National Electrical Code (NEC), Local Authorities Codes.
- B. The installation and any modifications shall be in accordance with the practices recommended by the American Society of Heating, Refrigeration, and Air Conditioning Engineers.
- C. Unit(s) shall be ASME code constructed and stamped in accordance with Section VIII, Division 1, Unfired Steam Generators.
- D. Unfired Steam Generator(s) shall be registered with the National Board of Boiler and Pressure Vessel Inspectors, and signed copy of shop inspection report shall be furnished.

2. PERFORMANCE

- A. Furnish and install The Alstrom Corporation Series "ASTEg" Horizontal (Vertical) Model _____ Packaged Unfired Clean Steam Generator(s), to generate _____ lb/hr saturated steam @ _____ psig, using _____ High Temperature Liquid, entering @ _____ deg. F in the tubes, _____ psi pressure drop in the tube bundle.

3. GENERAL DESIGN

- A. Unfired Clean Steam Generator(s) shall be furnished as a complete package ready for installation including all necessary components for operation.
- B. Unit(s) shall have tube bundle with 18 gauge BWG tubes of 316L stainless steel expanded into and seal welded to 304 stainless steel tubesheet with fabricated carbon steel head and confined gasket. Generator(s)'y kj qwseal welded tube bundle will be not accepted.
- C. Unfired Steam Generator(s) vessel shall be stainless steel and shall be constructed with a flanged stainless steel supply connection.
- D. All Unfired Steam Generator(s) components subject to the generated steam side shall be of stainless steel construction. Component piping on generated steam side shall be stainless steel.
- E. Unfired Steam Generators shall be furnished with steam separator. Steam separator shall be designed and mounted internally to insure supreme quality of steam.

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- F. Unfired Steam Generator(s) shall be furnished with a TDS Surface Blowdown System. A factory installed automatic blow down system consisting of a control which measures the total dissolved solids in the Unfired Steam Generator. The blow down valve opens if the total dissolved solids exceed the set point, the valve shall blow down the boiler until fresh water brings the total dissolved solids level to the desired setting. Automatic blow Down System shall be furnished with a NEMA I control system and all factory wired to a single point 120 volt connection.
- G. Unfired Steam Generator(s) shall be supplied with Alstom Series "ALSTAR" Continuous Blowdown Heat Recovery System to preheat incoming feed-water. (If applicable).
- H. Unit(s) should be provided with required slow and quick opening manual blow-off valves.
- I. Field piping of supplied water to the unit's valve and venting from the unit shall be the responsibility of the contractor in the field.
- J. Unfired Steam Generator(s) shall be factory mounted, wired, piped, and hydrostatically tested prior to the shipment.
- K. Unfired Steam Generator shall be furnished with 2" fiberglass thermal insulation and enameled metal hot less than 20ga jacket, and mounted on a suitable support skid, which shall be permanently welded to the shell.

4. CONTROLS AND ACCESSORIES:

- A. Unfired Clean Steam Generator(s) shall be furnished with:
 - A1. Pneumatic-operated stainless steel 2-way control valve to modulate incoming feed-water to maintain the desired normal operating water level in the vessel.
 - or -
 - A2. Electrical-operated stainless steel 2-way control valve to modulate incoming feed-water to maintain the desired normal operating water level in the vessel.
- B. Unfired Steam Generator(s) shall be furnished with a high water level, low water level and high pressure alarm system to shut of supply of high temperature liquid, feed-water, and generate alarm audio and visual signal.
- C. Unfired Steam Generator(s) shall be furnished with central panel. If pneumatic control system is selected Unfired Steam Generator(s) should be furnished with separately installed electric alarm panel with alert dry contacts and contacts for remote off control.

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- D. Unfired Steam Generator(s) shall be equipped with check valves before feed-water control valve and after main trap.
- E. Unfired Steam Generator shall be furnished with (2) two ASME Code Section I or Section VIII pressure safety relief valves with a SS wetted parts and a capacity to relieve the total amount of generated steam.
- F. Unit(s) shall be furnished with:
 - F1: A pneumatic-operated 3-way control valve to modulate incoming high temperature liquid to maintain the desired pressure of generated clean steam.
 - or -
 - F2: Electrical-operated 3-way control valve to modulate incoming high temperature liquid to maintain the desired pressure of generated clean steam.
- G. Unfired Steam Generator(s) shall be furnished with a supply and return high temperature liquid pressure and temperature gauges as well as generated steam pressure gauge, and ASME gauge glass assembly.
- H. Manual shut off gate valves should be provided for supply high temperature liquid and generated steam sides.

5. QUALITY ASSURANCE:

- A. All equipment or components of this specification section shall meet or exceed the requirements and quality of the items herein specified, or as denoted on the drawings.
- B. Ensure equipment pressure ratings are at least equal to system's maximum operating pressure at point where installed, but not less than specified.
- C. Equipment manufacturer shall be a company specializing in manufacture, assembly, and field performance of provided equipment with a minimum of 5 years experience.
- D. Equipment provider shall be responsible for providing certified equipment start-up and, when noted, an in the field certified training session. New equipment start-up shall be for the purpose of determining equipment operation.

6. WARRANTY:

- A. In addition to one (1) year standard equipment warranty Manufacturer shall provide an extended (3) three year warranty for pressure vessel and tube bundle.