

**CHEMTROL® BT110 Boiler Water Controller**  
**BID SPECIFICATION (04/2017)**  
**WATER TREATMENT AUTOMATION SYSTEM**

- A. **A PROGRAMMABLE WATER TREATMENT AUTOMATION SYSTEM** shall be supplied for continuous monitoring of water conductivity (or TDS), temperature, Langelier Saturation Index and for automatic control of a blowdown valve and chemical feeders. The controller shall include a programmable microprocessor with an eight-line display screen and a 16-key front panel keyboard for operator access.
- B. The system shall be a **CHEMTROL® BT110 Controller** of current design and model manufactured by SANTA BARBARA CONTROL SYSTEMS of Santa Barbara, California or a technically equal system certified by the specifying agent as capable of providing equal performance for all operating functions.
- C. Exceptions to the specifications shall be described in detail together with a list of ten (10) similar operating systems of same model and manufacture, with the name, address and telephone number of operating personnel.

**D. SPECIFICATIONS**

1. The controller shall automatically maintain the water conductivity or TDS level below a user-defined level by opening a blowdown valve and purging surface water of the boiler. The valve involved can be either a solenoid or motor-driven valve; including a motor-driven valve requiring power to close. The conductivity control of the BT110 is configured to run on a timed-sample basis. The operator can determine the frequency with which the controller samples the surface water of the boiler to determine the conductivity in the boiler. Controllers offering solenoid control only shall not be considered equal. The operator can also program the deadband above the setpoint that the blowdown relay energizes. This is programmed in percent of the setpoint (normally 2%). The following operational modes shall be available: Off, Manual, Automatic, Cycle Timer.
2. The controller shall monitor and display the water temperature. The operator shall be able to select automatic temperature compensation for conductivity readings with an adjustable temperature compensation.
3. The conductivity setpoint and calibration level shall be adjustable with a 16-key keypad mounted on the front panel of the unit. For the conductivity and temperature inputs, the operator will have the choice – depending on the accuracy needed – of using 1 or 2 -point calibration. Controllers with internal switches or calibration adjustments and/or requiring special signal-generating equipment to service shall not be considered equal.
4. The controller shall include programmable high and low alarms for the conductivity and temperature functions, using sensor inputs with operator selectable feed and bleed lockout and alarm buzzer options.
5. The controller shall continually calculate and display the Langelier Saturation Index using either sensor readings and/or manual input for pH, temperature, total alkalinity and calcium hardness. The water saturation condition shall be displayed on the front menu as either: “Scaling”, “Corrosive”, or “OK”.
6. The controller shall record and display the elapsed run time of each activation event and a cumulative run time resettable at any time by the operator. The controller shall include operator-adjustable safety time limit alarms that automatically lock out the valve or chemical feeder. The operator shall also be able to adjust the limit on the run time alarm.///
7. The controller shall be capable to display the flow rates and cumulative volumes of make-up and blowdown water using halleffect or reed-switch water-meters (not included). Three (3) resettable water totalizers will be available for each water flowmeter.

8. The controller shall be capable of actuating each chemical additive feeder in the following operator-selectable modes: off, manual, bleed & feed, bleed-then-feed, cycle timer, percent of flow, daily schedule and 14-day schedule. The operator shall be able to choose to lock the chemical feeder when the bleed valve is activated and to accumulate feeding time during lock-out for delayed feed, to lock the bleed valve when the chemical feeder is activated and to actuate pre-bleed program before feeding. In addition, the operator shall be able to schedule a delayed single shot booster feeding program for each additive feeder.

9. The controller shall include on-board memory for storing of test data on operator-adjustable schedules. Operator shall be able to download datalog on-site through the controller USB/RS-485 serial communications port to a computer. A Windows software program shall be supplied for visual text and graphics representation of test data.

10. The controller shall be contained in a NEMA 4X rated lockable fiberglass cabinet with an LCD graphic display screen of eight lines of twenty (20) alphanumeric characters. A front panel 16-key touch pad shall be provided for direct access to all the menus and submenus and for entering numerical data. The main menu shall display current readings, control modes and operational status for Conductivity/TDS and Temperature. All screens shall have the capability of being displayed at any time in unabbreviated English, French or Spanish and in US or metric units.

11. The controller shall be factory set to water treatment industry standard. The operator shall be able at any time to adjust all programmable functions to preferred settings. The controller shall have a reset mode to reset all or selected functions to the original factory standards.

12. The controller electronics shall be covered by a standard manufacturer warranty of five (5) years. Special extensions of more limited warranties shall not be considered acceptable. All sensors will be covered by a standard one (1) year warranty. Other parts shall be covered by their own manufacturer's warranty. The controller shall not require a service technician for annual calibration, seasonal start-up, or whenever chemicals supplier or type are changed.

13. The manufacturer shall supply a complete instruction, operating and maintenance manual. Check-out of installation, start up, and instruction of operating personnel shall be performed by an authorized and properly trained manufacturer representative.

#### **D. OPTIONS**

14. ETHCOM OPTION: The controller shall include a communication module for remote true duplex operation and for automatic downloading and visual graphics representation of test data by a PC-compatible computer with supplied Windows software. The connection to the controller shall be made through a standard ethernet-style network. Controllers using simulation or virtual representation of the display screen shall not be considered equal.

15. RS485 OPTION: The controller shall include a RS485 serial communications port and external converter for direct true duplex operation and for automatic downloading and visual graphics representation of test data by a PC-compatible computer with supplied Windows software. Controllers using simulation or virtual representation of the display screen shall not be considered equal.

16. OPTION MODBUS: The controller shall include software-based conversion of sensor signals, setpoint, high & low alarms, cumulative run time and total feed time for Conductivity/TDS, Temperature, and Flow available with optional sensors, into MODBUS protocol for monitoring on Building Management Systems. The controller shall also allow MODBUS writing for changing control modes and setpoints from Building Management Systems. (Other Protocol options are Lonworks, Bacnet /MSTP, Bacnet/IP, TCP/IP, N2 Bus.)