

AUTOMATIC CONTROL OF TDS IN BOILER (MODEL: BBC 06) SUGAR LEAK DETECTION SYSTEM (MODEL: SLD 06)



SALIENT FEATURES

1. Complete system package for easy installation .
2. Accurate TDS level control minimize blowdown .
3. Reduces carryover of boiler water with steam .
4. Automatic control eliminates need for supervision .
5. For blowdown flow rates up to 500kg/h (1100lb/h).
6. For boiler pressures up to 10.55 kg/cm² (150psig).
7. System for pressures upto 32 Kg/cm² can be specially engineered.



Raw water contains impurities in the form of dissolved gases, dissolved Solids and suspended solids. Chemical water treatment may modify the form of the impurities but will not completely remove them and will normally increase the dissolved solids level.

As steam is evaporated the concentration of total dissolved solids (TDS) increase in the boiler water. If the TDS concentration is allowed to get too high then carryover of boiler water with stem will occur. This carryover can cause serious damage to the steam and condensate systems through corrosion and deposition on heat transfer surfaces. The consequent product contamination cannot be tolerated in application where steam is used in food, drink and medical sterilization processes.

In order to limit the TDS concentration to the level recommended by the boiler manufacturer it is normal practice to periodically drain off (or “blow down”) boiler water and allow it to be replaced by relatively low TDS feed water. Excessive blow-down is of course very costly in terms of lost energy and water treatment chemicals.

If you are aware of the kind of damage high TDS can cause to your steam and condensate systems (which are certainly capital investments) it is most likely that you play it safe and blow down little extra.

It would be interesting here to study the flow rate through the blow down and you can lose half a tone water heated upto saturation temperature. This can result in massive losses. And , of course , unless, you are continuously monitoring TDS how would you know the required amount of blow down.

The only solution is an AUTOMATIC BLOWDOWN SYSTEM using which , not only you can keep the TDS level in check (thereby improving the steam quality and increasing the life of your boiler) but also have large savings by preventing excessive blowdown.

HOW THE BBC06 SYSTEM WORKS

The BBC06 system works by periodically opening the sampling valve in order to purge the pipe work and set up a flow of boiler water past the sensor. To avoid wasteful blowdown especially whilst a boiler is on standby or low load, the period between each purge is automatically related to the steam load by monitoring the time the boiler is firing. The controller measures the level of TDS (total dissolved solids) of the boiler water. The measured value and the set point in the controller are compared. If it is lower than the set point the blow down valve closes at the end of the purge time (typically 10sec) and remains closed. If it is higher than the set point the controller continues the blow down cycle until the measured value drops below the set point.

Light on the facia panel indicate when the TDS is normal or when the blowdown cycle is operating. The system is easy to calibrate and commission and the set point can be quickly adjusted.

- **THE CONTROLLER**

The Unique 3000 Controllers incorporate state of the art features to optimize your blowdown cycle, protect your steam system and save your money. With microprocessor based electronics a 4 Digit LED continuous display of TDS and system status and simple Push Button interface for easy commissioning , calibration and operation.

Other features include high TDS alarm relay output for remote indication , an advance probe Conditioning circuit that automatically descales the conductivity probe and Automatic Temperature Compensation.

- **WAVETEK BBC06 VS. MANUAL BLOWDOWN**

Based on your boiler firing rate, feed water TDS and desired TDS there is only one, optimal blowdown amount. But with manual blowdown , there's only guesswork. You guess your boilers current TDS levels, you guess when to blowdown, and for how long. This guesswork, as shown in the chart below , is costing you lots of money. Just 45 seconds of extra blowdown from a 10 kg/cm² pressure boiler through a 2" valve wastes up to 500 Kg's of water that you paid to heat. Only the Wavetek BBC 06 system guarantees that you just blowdown your optimum amount, conserves fuel, protects your system and saves you money. All this being done automatically.

- **PAYBACK**

This is an payback calculation for one of our clients.

Boiler Details

Capacity : 8 PTH Pressure : 10.5 Kg/cm²
 Fuel : Oil Feed water TDS : 25 ppm

Blowdown required to maintain desire boiler water TDS 3500 ppm

Avg. Load : 140TPD
 Req. Rate : 1007 Kg/day
 Manual blowdown optimization : Rs.180000 per year.

- **Technical Specifications:**

The BBC 06 is suitable for a wide range of systems

Boiler Type Both Vertical and horizontal boilers.
 Blowdown flowrate Up to 4000 Kg/hr
 Boiler Pressure Up to 32 Kg/cm² (System for higher pressure on request)
 Required inputs 3 to 6 bar air line. 220V 50 Hz AC power line
 Blow down pneumatic globe valve high temperature- pressure 25 kg suitable for 2" (50 NB)
 Please note While the BBC06 is generally installed on an intermittent blowdown line it is recommended that the client use a continuous blowdown line if it is already available.
 When ordering your BBC 06 , please include Line size (e.g 50 NB) . Existing blowdown valve flange rating (e.g. Table H) and flange to flange distance (e.g. 210mm)

- **CALCULATION BLOWDOWN RATES**

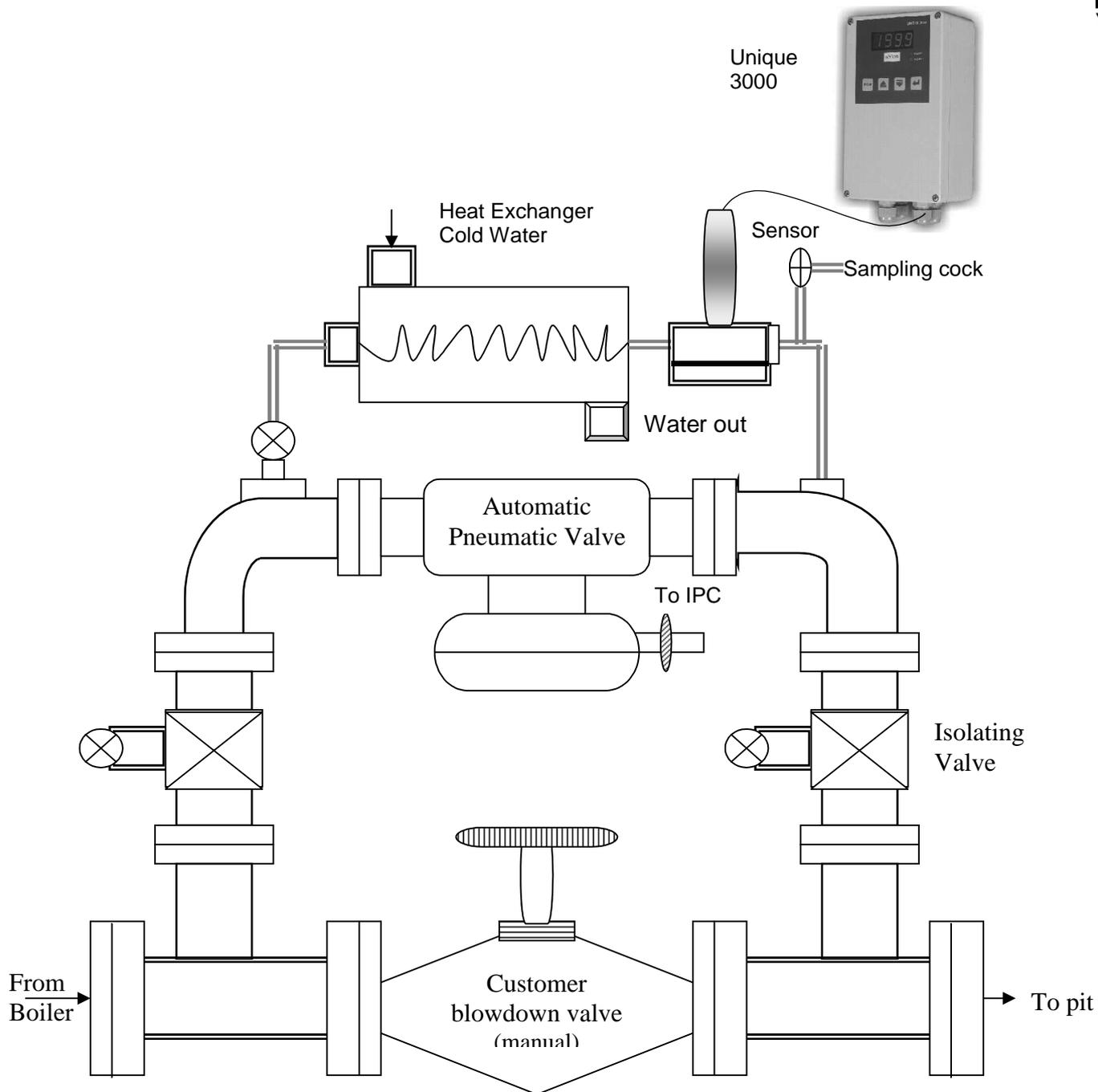
For an estimation of the blowdown rate you can do this simple calculation

Blow down rate= (F/(B-F) x S F= Feed water . TDS in ppm
 B= Required boiler water TDS in ppm S= Steam generation rate of the boiler in kg/hr.

- **TDS Controller Unique 3000 Technical Specifications.**

Range: 0-4000 ppm, Two relay set points for electrical controller. Auto Temperature Compensation 0-100°C , Isolated mA Output- 4-20mA 500 E Load for pneumatic control blowdown TDS Sensor- S S Body with in built ATC Pt100 control valve 2" NB Electrical motorized control valve for model BBC 06 / 2" NB Solenoid Valve / 2" NB pneumatic control valve with IP converter and PID
 Electronic Hooter for Model SLD 06. For TDS level detection.

SCHEMATIC OF BLOWDOWN SYSTEM.



MECHANICAL INSTALLATION

Selection of the blowdown take –off point.

The main blowdown valve is fitted at the bottom of the boiler for draining and removing any sludge accumulations from the bottom of the boiler. It should remain in place when the system is fitted and should be manually opened for a few seconds – normally on a daily basis. The system is for limiting the concentration of dissolved and suspended solids in the boiler water and for this purpose the take off point need not to be from the bottom of the boiler. Indeed there are advantages in using a side connection if one exists so that there is less chance of scale entering the blowdown valve. If the bottom connection is used it is necessary to tee off upstream of the main blowdown valve as shown. We recommend that wherever possible the tee is taken off the blowdown line to reduce any problems of scale.

WAVETEK ELECTRONICS

21, Milap society, Off Deenanath Mageshkar Hospital Road, Erandwane, Pune -411004(INDIA)Telefax:+91-20-25453955.

Email: marketing@wavetekindia.com, info@wavetekindia.com Visit us at: [Wwww.wavetekindia.com](http://www.wavetekindia.com)