VOLFRAM
engineering steam ®

TDS Base Auto Blowdown System

VOLFRAM offers TDS base Auto Blowdown System which provides reliable, flexible and powerful control for your boiler.

The VBL 4000 Boiler Blow-down Controllers represent the latest in technological and innovative advancements from Volfram.

All of the standard features you'd expect in conventional boiler Blow-down monitors are included, plus optional simple-to-use information management tools that enable water treatment professionals to deliver more effective service to their customers.

The VBL 4000 Controller have the ability to store TDS and temperature values, water usage, relay status and user setting. A memory stick (USB Pen Drive) is all that's needed to extract the information. Download data log form USB stick to any computer at your convenience or copy your preferred treatment program setting to another controller to startup easily!

Volfram VBL 4000 Boiler Automatic Blow-down system

Why Blow- down ?

In the process of generating steam, any impurities dissolve as well as suspended which are in the boiler feed-water and which do not boil off with the steam will concentrate in the boiler water.

As the Total dissolved solids (TDS) become more concentrated than the boiler is design for the steam, bubbles tend to become more stable, failing to burst as they reach the water surface of the boiler. There comes a point (depending on boiler pressure, size, and steam load) where a substantial part of the steam space in the boiler becomes filled with bubbles and foam is carried over into the steam main.

This is obviously undesirable not only because the steam is excessively wet as it leaves the boiler, but it contains boiler water with a high level of dissolved and perhaps suspended solids. These solids will contaminate control valves, heat exchangers and steam traps.

Whilst foaming can be caused by high levels of suspended solids, high alkalinity or contamination by oils and fats, the most common cause of carryover (provided these other factors are properly controlled) is a high Total Dissolved Solids (TDS) level. Careful control of boiler water TDS level together with attention to these other factors should ensure that the risks of foaming and carryover are minimized.

To maintain the TDS level inside the boiler, some quantity of water is drained periodically in operation is know as Boiler Blow-down.

Effects of High TDS

Foaming & Carryover:

Pure water does not foam when it boils. However, as the amount of impurities rise, a foam layer is formed at the steam separation surface. The amount of foaming is directly proportional to the TDS level in the boiler. Foaming (or "priming") causes carryover of water, or wet contaminated steam, which may be carried over into the steam system. The products of carryover would be deposited on heat transfer surfaces and ancillary equipment, reducing steam system efficiency and plant productivity. This is what causes fouling of heat exchangers, malfunctioning of control valves and steam traps etc.

Scale Deposition:

If the TDS is too high, scale will deposit on the boiler tubes and furnace (water side). This has the effect of reducing heat transfer with its subsequent effect on fuel consumption and safe operation of the boiler.

A scale deposit 1mm thick on the water side could increase fuel consumption by 5 to 8%

Above this results in to :

- **Carry Over with Steam**
- **Wet Steam and Water Hammering**
- **Reduced Thermal Efficiency due to Scaling**
- **Increase in Stack Temperature**
- **Reduction in Boiler Efficiency**

Volfram VBL 4000 Boiler Automatic Blow-down system

Automatic vs Manual Blow-down

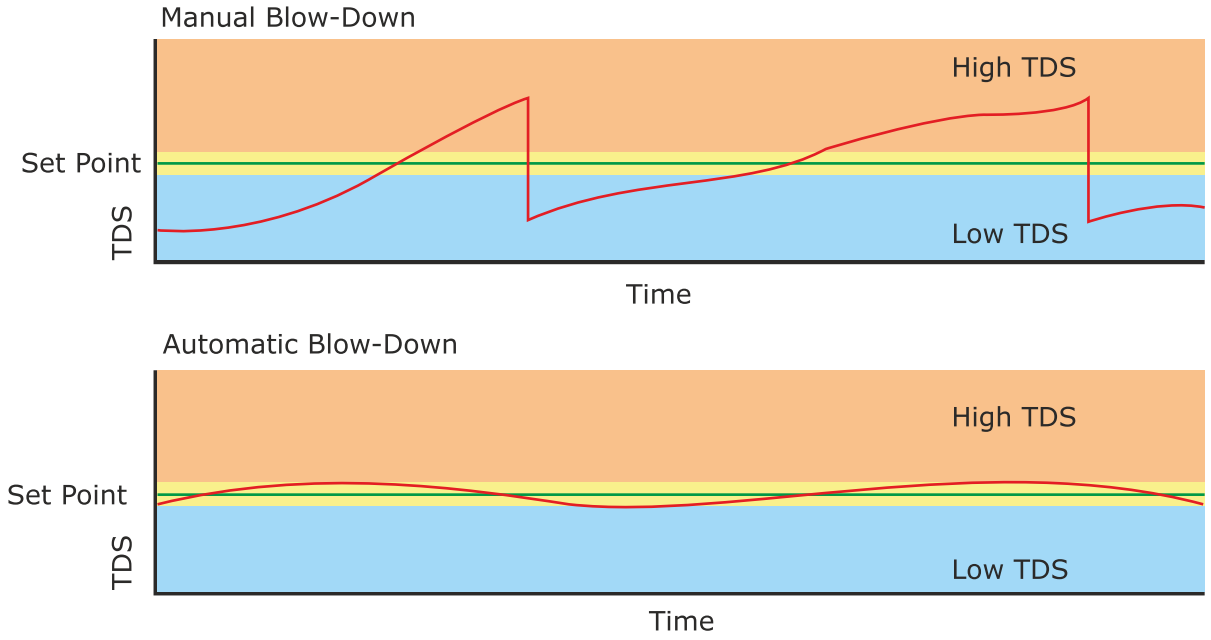
In order to prevent these problems, the TDS needs to be controlled within a certain specified maximum limit. The chart below shows the recommended water characteristics for shell boilers in accordance with IS: 10392-1982 and BS: 2486-1964, for pressures up to 25 bar g:

Boiler Water Limits for boiler up to 25 bar g

Total Hardness, mg/lit	Not Detectable
Sodium Phosphate, mg/lit Na_3PO_4	50 - 100
Total Alkalinity, mg/lit	1200
Suspended Solids, mg/lit	50
Total Dissolved Solids. PPM	3500

Blowdown of the boiler can keep TDS within the required limits. Blowdown is achieved either by manual or automatic methods. In the manual method, blowdown is achieved by opening a large bore valve at the bottom of the drum (or on the side of the drum in case of continuous blowdown). However, this practice can be highly wasteful. As the period of blowdown is not related with boiler steam load or feed water purity, the TDS level in manual methods can vary greatly, causing an average TDS level much lower than the allowable limit, and leading to excess blowdown.

On the other hand, an automatic blowdown control system, based on TDS measurement and subsequent corrective action, can maintain a TDS level much closer to the set point, resulting in considerable fuel savings.



As seen in the graphs above, the automatic control of TDS results in an average TDS level much closer to the set point. This means that the actual quantity of blowdown over a period of time gets reduced compared to the manual method.

Blowdown water is water that has been heated to the saturation temperature of the boiler, so it contains a lot of heat. At a boiler pressure of 10.5 Kg/cm2 g, each kg of blowdown water contains almost 190 kcal of heat energy. If an automatic boiler controller can reduce the blowdown of a 10 TPH boiler from 6% to 3%, i.e. a saving of 3%, the blowdown quantity would reduce by 300 Kg/hr, or 7200 kg/day. This would mean a saving of 1368000 kcal/day. This would mean a fuel saving of approximately 180 litres of oil, if the boiler was fired with furnace oil.

Volfram VBL 4000 Boiler Automatic Blow-down system

Key Benefits

Ensures Optimal Performance and Maximum Efficiency
Precise control of conductivity and chemical feed inhibits corrosion, solids precipitation and scale build-up. Unique time proportional blowdown feature saves energy by reducing water consumption.

More Informative Monthly Reports
Download stored data from the controller to a USB flash stick. Use the data to easily develop reports that show actual water usage, system conductivity, temperature, and more.

Efficient Customer Service
Quickly identify system upsets by knowing exactly what happened and when. An event log can be downloaded to tell you precisely when pumps turned on, valves opened and when the boiler was offline.

Validation and Verification Made Easy
Use stored data from the controller to simply and easily validate water treatment results. The data and event logs show water usage, system conductivity, and temperature, as well as accumulated chemical feed and blowdown times.

Save Time
Copy the user settings from your controller to a USB flash stick and upload to a new controller. Programming your new controller this way can be accomplished in seconds. It's that simple!

Measurement Performance

	Range	Resolution	Accuracy
Conductivity	0-10,000 µS/cm	1 µS	10-10,000 µS/cm ± 1% of reading0-10 µS/cm ± 20% of reading
Temperature	32 to 401°F (0 to 205°C)	0.1° C	± 1% of reading

Inputs

Power

100-240 VAC, 50/60 Hz, 8A
Fuse: 1.0 ampere, 5 x 20 mm

Signals

Cond Electrode	:	1.0 Cell factor, 10K thermistor
Flow Meter (option)	:	Isolated, dry contact closure required (i.e. relay, reed switch)
Flow Switch (option)	:	Isolated, dry contact closure required (i.e. reed switch)

Outputs

Mechanical Relays

- VBL4000: Two powered relays (Blowdown & Feed) 4 - 20 mA (optional)
- Internally powered Fully isolated 600 Ohm max resistive load Resolution .001% of span Accuracy ± 1% of reading

Mechanical

Enclosure	Polycarbonate
NEMA Rating	NEMA 4X (Ip65)
Display	2 x 16 characters backlit LCD
Ambient Temperature	0 to 50°C

Volfram VBL 4000 Boiler Automatic Blow-down system

Features

Boiler Conductivity Controllers / Boiler Condensate Monitors

Choice of measurement units

- To customize your control or complement your calibration procedures, conductivity may be displayed as µS or PPM; temperature as °F or °C.

Four chemical feed options

- Feed & blowdown simultaneously, with or without feed lockout timer
- Feed after blowdown has finished, as a percentage of blowdown time
- Feed as a percentage of time elapsed
- Feed as a percentage of make-up water

Detects flashing during timed samples

- Rechecks the conductivity after the sample valve closes and reopens if the reading is now above set point.

Self-diagnostics

- Software, electronics and sensor are constantly monitored, without having to take the controllers off-line.

Choices of blowdown modes for timed samples

- In intermittent sampling, the blowdown valve is open until the set point conductivity is reached.
- In intermittent with timed blowdown, the blowdown valve opens for a set programmable time.
- In intermittent with time proportional blow-down, the blowdown valve opens for a variable time that is calculated based on the conductivity of the sample versus the set point.

Automatic temperature compensation

- Conductivity measurements are temperature compensated to ensure the higest accuracy.

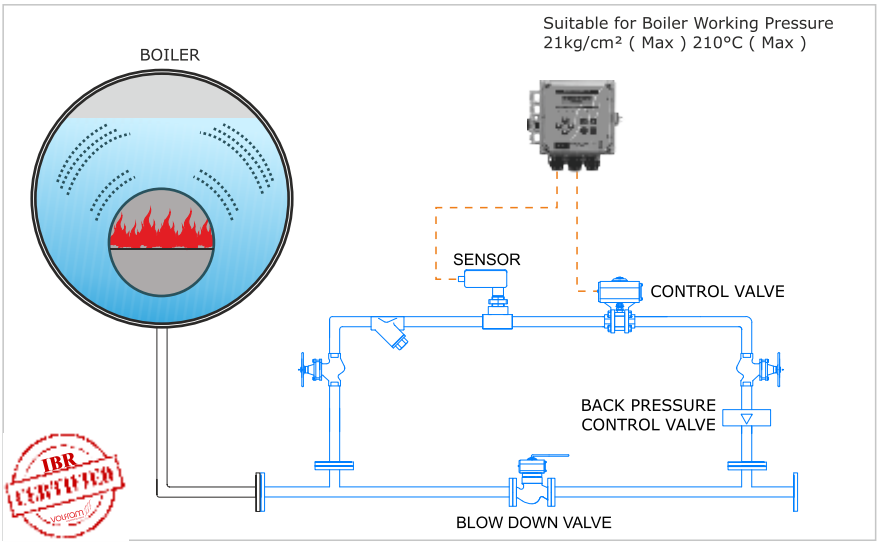
USB Flashstick Support

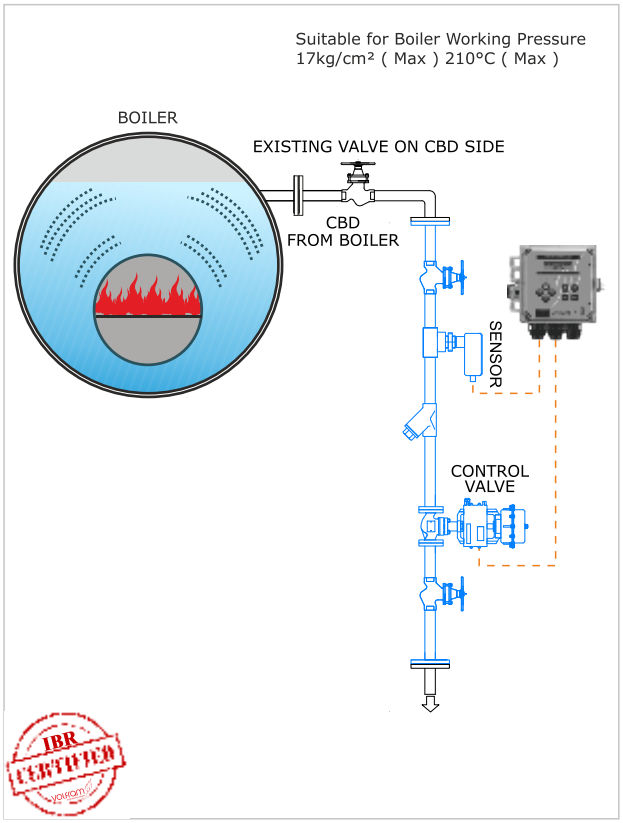
- Standard for data logs, event/relay and reset logs, and user configuration file import/exportProgramming your new controller this way can be accomplished in seconds. It's that simple!

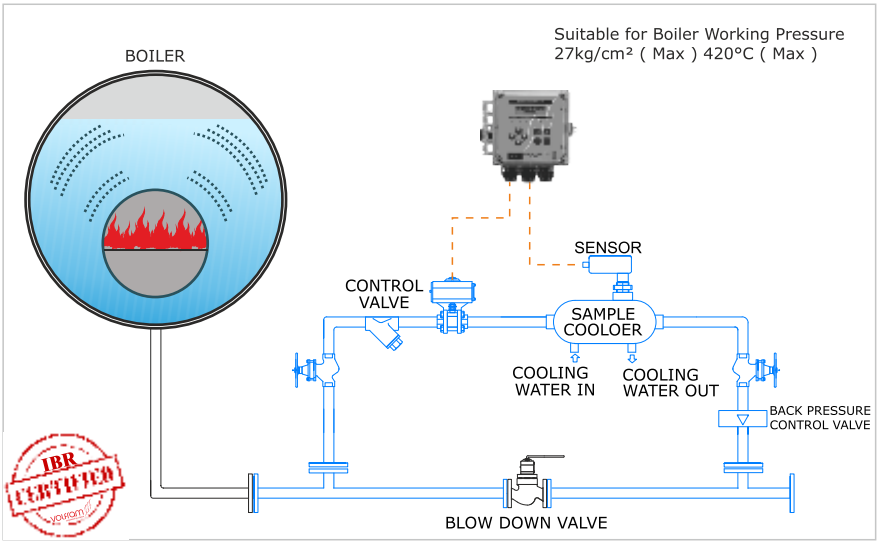
Volfram VBL 4000 Boiler Automatic Blow-down system

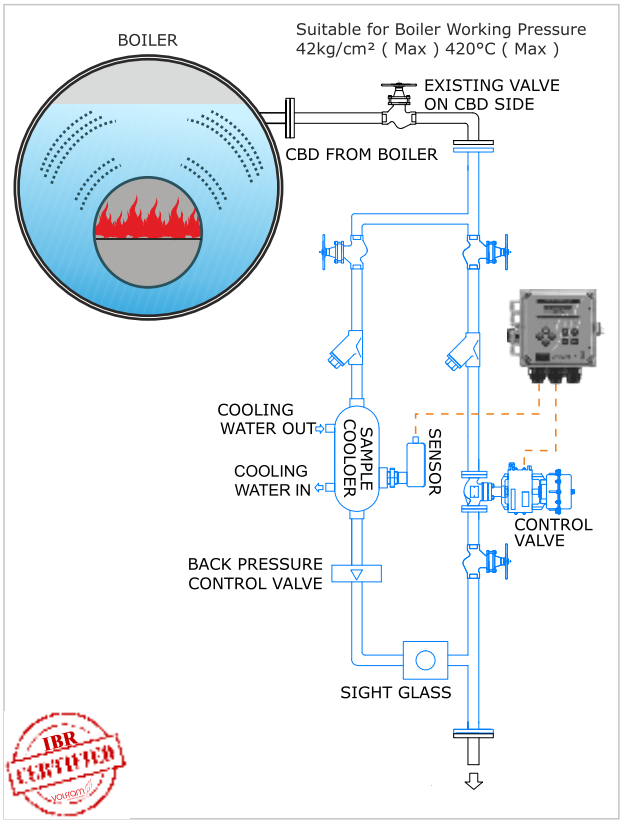
Volfram offers customised prefabricated IBR certified blowdown systems for easy installations.

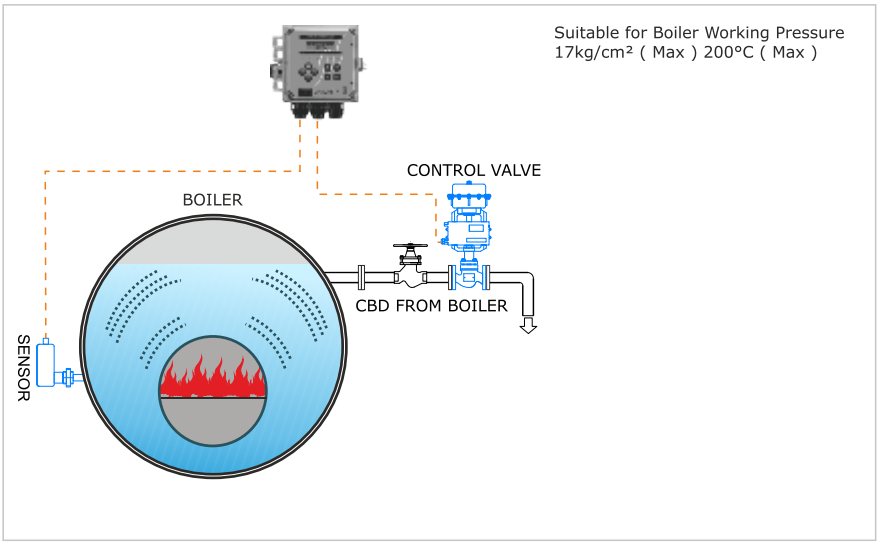
Please click on the line for Volfram Auto Blow Down System https://youtu.be/gSfA3yRS40g











The customised prefabricated piping assemblies are provided with IBR certification. With our certified team, we can undertake site installation.

Volfram Boiler and Steam Accessories

Steam Boilers

Condensate Recovery System

Rotating Plug Float Trap

pH6000 Series Controllers

Flow Meter

SS Safety Valve

Non Return Valve

Steam Injector

Control Valve

VOLFRAM
engineering steam ®

Volfram Systems India Pvt. Ltd.

Office: Sr. No. 18, Rutuvihar, 402,
Waranasi Soc., Warje, Pune - 411058,
Maharashtra, India
Tel. +91 20 65108181 | GPS: 18°29'9"N,73°47'29"E
www.volfram.in | Email: steam@volfram.in