



# **AUTOMATIC BLOWDOWN SYSTEMS**

## BOILER BLOWDOWN

### Why is it necessary to blowdown in steam boilers?

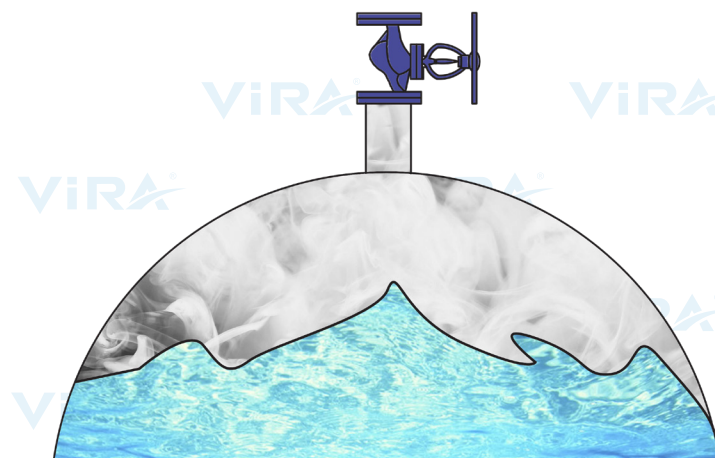
Many industries use boilers to generate steam for their energy needs. The water used to feed the boilers contains varying levels of impurities:

- Dissolved solids - Scale forming substances
- Suspended solids - Sludge forming substances
- Dissolved gasses - Corrosive gasses such as oxygen and carbon dioxide.

Boiler feedwater could contain a high level of dissolved salts and minerals, even if there is a feedwater treatment. When steam evaporates, the concentration of the salt and minerals in the boiler water increases. This causes TDS increase in the boiler water and high TDS may cause;

- Carryover of the boiler water
- Formation of sludge
- Scaling of the boiler tubes

Carryover of the water in steam lines may cause water hammer, corrosion, and deposits. Deposits on the heat transfer surfaces decrease the efficiency and cause control valves and steam traps to malfunction.



**Water Carryover**

Suspended solids accumulate at the bottom of the boiler and if they are not removed those solids prevent heat transfer from the boiler fire tube which will overheat and may even fail. Sludge formation can lead to malfunction of level control devices.

Scaling on the heating surfaces in the boiler will increase fuel cost, reduce heat transfer, and efficiency. 1 mm calcium carbonate scale increases %3 or 1mm Silicate scale increases %8 in fuel cost.

### Why Automatic Blowdown?

The blowdown rate can be controlled manually or automatically.

**With manual blowdown control**, if the level of TDS is higher than the allowed level, it may cause loss of water, heat and chemicals from the boiler. Boiler blowdown automation helps to reduce fuel, water, chemical and manpower costs.

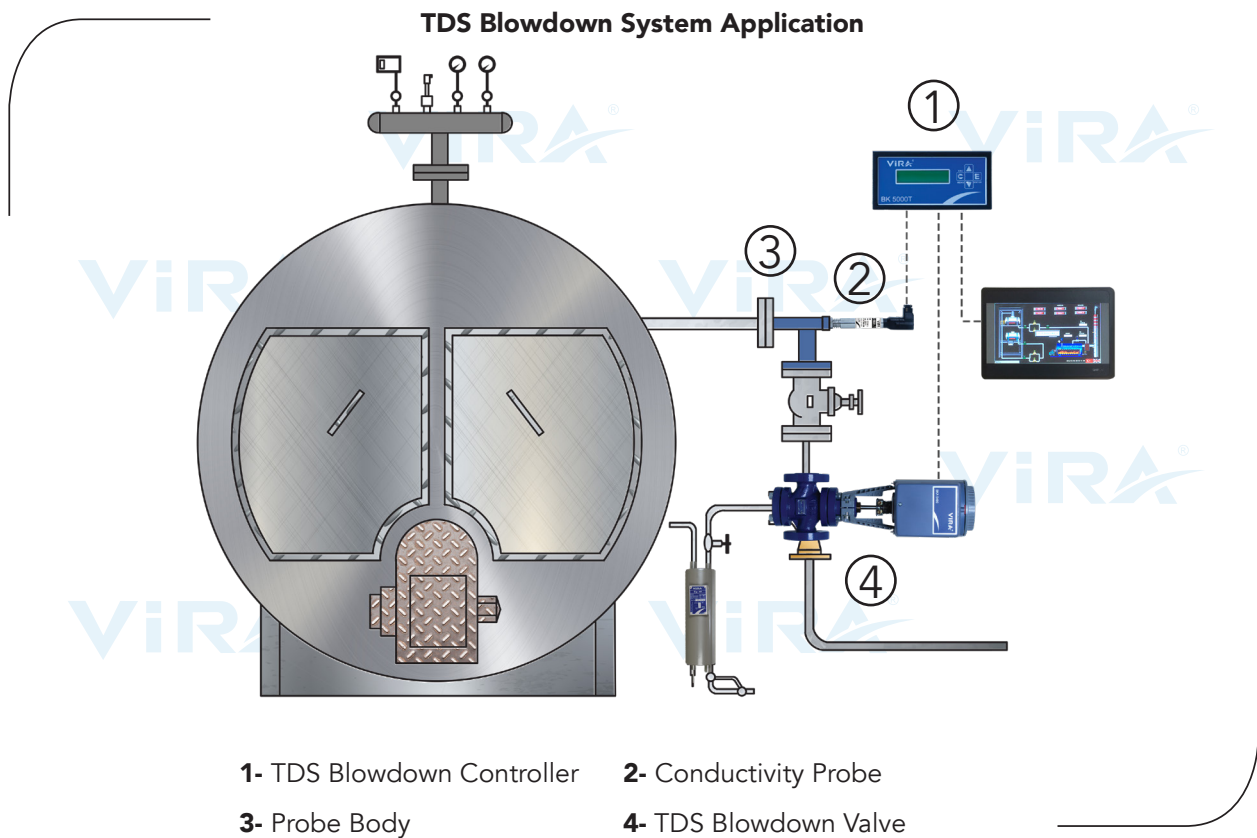
**Automatic blowdown** system ensures a maximum of dissolved solids and suspended solids are removed with a minimal loss of water and heat from the boiler

## BS4-T

### Automatic Surface Blowdown (TDS) Control

As the water in the boiler drum turns into steam, the concentration of dissolved solids in the boiler water increases. Dissolved substances are moved to the installation with dragging steam and water cause malfunctions in the system and solid materials accumulate on the heat transfer surfaces causing the heat efficiency to decrease. The blowdown process cannot eliminate scaling by itself. In addition to dosing and degassing of boiler feed water, it helps to keep the water in the boiler at the desired TDS level.

Vira offers two types of surface blowdown systems, BS4 and BS4-T. Unlike BS4 system, BS4-T system has temperature compensation feature. This feature adjusts the system's performance to compensate for the effects caused by changes in temperature. As a result, the BS4-T system is not affected by temperature and pressure changes in the boiler and does not require calibration in every change.



The conductivity probe where located in the boiler shell continuously monitors the conductivity of the boiler water. The measured conductivity value is compared with the Set Point in the controller. If the water conductivity is higher than the set value the blowdown valve will be continuously working until the conductivity value drops below the set value. If it is lower than the Set Point the blowdown valve will remain its closed position.

#### Advantages of Automatic TDS Blowdown:

- Reduced maintenance and repair costs (minimized carryover and deposits)
- Cleaner and more efficient steam
- Energy Savings
- Reduced operating costs (less feedwater consumption; chemical treatment and higher heating efficiency)
- Potential savings from a blowdown heat recovery system (where installed).
- The labor-saving advantages of automation.

## BS4-T

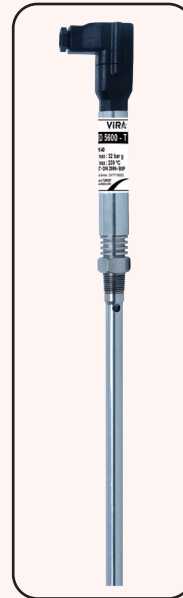
### Automatic TDS Blowdown System with Temperature Compensation Feature

#### Temperature Compensation Type TDS Blowdown Controller



- Type** : BK 5000-T
- Mains Supply** : 230 VAC (+5% / -10%) 50/60Hz
- Enclosure** : Panel Mounting
- Functions** : Continuous Blowdown Valve Control, High TDS Alarm
- Output** : 4-20 mA Output, High TDS Alarm Relay, Valve Relay, RS 485 Modbus Output
- Features** : Conductivity Set Value, Alarm Set Value, Valve Relay Test, Alarm Relay Test, Temperature Compensation

#### Temp. Compensation Type TDS Blowdown Probe



- Type** : BD 5600-T
- Nominal Pressure**: PN 40
- Max. Operat. Temp**: 239 °C
- Max. Operat. Press.:** 32 Bar g
- Connection**: 1/2" BSP Screwed
- Length**: 500 mm
- Max. Ambient Temp.** : 70 °C

BS4-T temperature compensated automatic tds blowdown system consists of BK 5000-T tds blowdown controller, BD 5600-T conductivity probe, BKV 5400 continuous blowdown valve and DG 5400 probe body.

Increasing the boiler water temperature means an increase in the conductivity value within the boiler. This increase amount is 2% for every 1 °C. The Vira BD 5600-T probe can perform both conductivity measurement and temperature compensation on the same probe.

## BS4

### Automatic TDS Blowdown System

#### TDS Blowdown Controller



- Type** : BK 5000-T
- Mains Supply** : 230 VAC (+5% / -10%) 50/60Hz
- Enclosure** : Panel Mounting
- Functions** : Continuous Blowdown Valve Control, High TDS Alarm
- Output** : 4-20 mA Output, High TDS Alarm Relay, Valve Relay, RS 485 Modbus Output
- Features** : Conductivity Set Value, Alarm Set Value, Valve Relay Test, Alarm Relay Test

#### TDS Blowdown Probe



- Type** : BD 5400
- Nominal Pressure**: PN 40
- Max. Operat. Temp**: 239°C
- Max. Operat. Press.:** 32 Bar g
- Connection**: 1/2" BSP Screwed
- Length**: 500 mm
- Max. Ambient Temp.** : 70 °C

BS4 automatic tds blowdown system consists of BK 5000-T tds blowdown controller, BD 5400 conductivity probe, BKV 5400 continuous blowdown valve and DG 5400 probe body.

BS4 Tds blowdown system is used in constant pressure boilers that do not require temperature compensation. It is calibrated at maximum pressure. The Vira BD 5400 probe can only measure conductivity.

### Automatic TDS Blowdown Valve

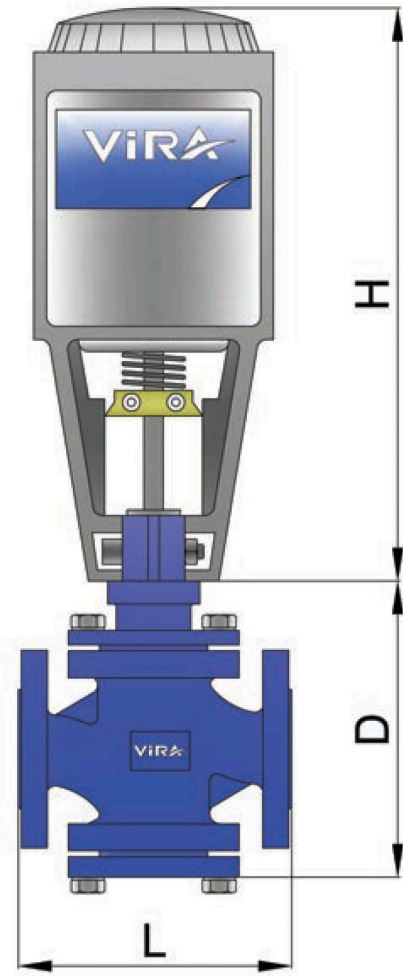
- Type** : BKV 5400
- Nominal Pressure** : PN 40
- Max. Operat. Temp.** : 239°C
- Max. Operat. Press.** : 32 Bar g
- Size** : DN 20
- Body** : GGG 40
- Sample Cooler Outlet** : 1/4" BSP Screwed

#### Valve Blowdown Capacity (for DN 20)

Pressure bar g	Capacity kg/h
3	525
5	750
7	1200
10	1500
12	1550
15	1650

#### DIMENSIONS

Type	Size	H mm	D mm	L mm	Weight kg
BKV 5420	DN 20	340	105	150	10 kg



### TDS Blowdown Probe Body

- Type** : DG 5400
- Nominal Pressure** : PN 40
- Max. Operat. Temp.** : 239 °C
- Max. Operat. Press.** : 32 Bar g
- Size** : DN 20
- Body** : Carbon Steel

#### DIMENSIONS

Type	Size	A mm	B mm	C mm	D mm	Weight kg
DG 5420	DN 20	77	42	102	105	3,7 kg

