CONDENSATE CONTAMINATION DETECTION SYSTEM
[ONLINE – 24 X 7] UCCDS-25, 40, 50, 80 & 100 NB

Description

A **Boiler** is an enclosed vessel that provides a means for combustion heat to be transferred to water until it becomes heated water or steam. It requires pure, non-contaminated water.

The boiler comprises of 3 (three) systems:-

1) Feed water system
2) Steam system and
3) Fuel system.

The water supplied to the boiler that is converted into steam is called **feed water**.

The 2 (two) sources of feed water are:-

1) Makeup water (treated water) which comes from water treatment plant.
2) Condensate or condensed steam returned from the processes

Both sources of water should meet the stipulated parameters. It is important to note that :-

- It is easy to check and maintain the quality of **makeup water.** Quality of **makeup water** is 100% under control of Boiler personnel

- Controlling the quality of **hot condensate** is difficult for the boiler personnel

Makeup water is pretreated by one of the following processes:-

1) Softening (Soft Water)
2) Demineralization (DM Water)
3) Reverse Osmosis (RO Water)

Checking the quality of condensate on a continual basis has remained an intricate problem for Boiler operators. The quality of condensate returning from processes is getting affected in many ways, as described below :-

1) From mixing of leaking media like chemicals, vegetable Oils, and other process media in equipments (Coils, Heat exchangers, Reactors, etc)
2) Mixing of pipeline debris
3) Dirt particles and other foreign substances falling in condensate collection tank.

The water chemistry may change due to mixing and dissolving of these foreign substances in the condensate.

For feedwater, below mentioned parameters are mandatory to be checked and filled in the Boiler logbook, at regular intervals :-

1)	pH	(3) TDS	(5) m / p -alkalinity
2)	Temperature	(4) Hardness	(6) Silica

Other parameters to be checked are DO_2 (dissolved oxygen), Hydrazine residual, Turbidity and electrical conductivity.

To help and assist boiler personnel for checking the quality of condensate on Realtime basis, we recommend to install UKL make “Online 24 X 7 UCCDS”

Working principle :-

Condensate contamination detection system or Clean condensate module measures the Temperature, conductivity and pH of the condensate coming back from processes. The measured values are automatically compared with the setpoint values.

- If the measured values are within the range of set values, the condensate is sent to Boiler feedwater tank

- If it deviates from the set value or range, it will automatically dump the condensate to the sewer(trench) or neutralization tank.

3-way quick opening globe control valve

Terminology:-

TDS – Total dissolved solids :
The amount of dissolved particles in a particular volume of water is called the total dissolved solids (TDS)

There are two methods to measure TDS :

1) **Gravimetric method :** This method involves evaporating the liquid solvent (water) and measuring the mass of residues left. This method is generally the best, but it has a big drawback. It is time-consuming, and hence not used routinely in the boiler plants.

2) **Conductivity method :** Conductivity is a measure of how well a material conducts electricity. In water, electricity is conducted by the available ions, or electrolytes, dissolved in the water.

The units of measurements of TDS are listed below :

1) mg/L (2) parts per million (ppm) (3) µS/cm

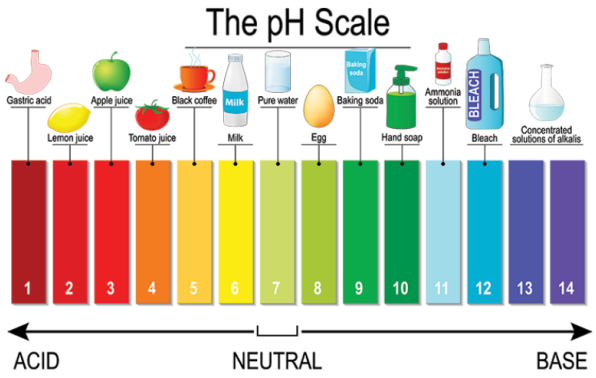
Conversion of units :

- 1 mg/L = 1 ppm
- 1 ppm = 1.56 µS/cm
- 1 µS/cm = 0.641 ppm

pH :-

pH is a scale used to specify how acidic or basic a water-based solution is. Acidic solutions have a lower pH, while basic solutions have a higher pH. At room temperature, pure water is neither acidic nor basic and has a pH of 7

The boiler water's pH level must be maintained above 9.5 (in the range of 10 to 10.5) to ensure that the proper chemical reaction occurs between the calcium and magnesium ions and the phosphate molecules



Major problems related to water in boiler :-

Below are the two major problems in any boiler

1) Scaling (2) Corrosion

Sensor details:-

Cell Constant(k) : 0.01 / 0.1 / 1.0 / 10.0 (optional)
Range : 0 to 50 ppm for cell constant = 0.01

Accuracy : +/- 2% F. S.
Temperature Compensation : Pt 100
Temperature Range : 0 to 150°C
Maximum Pressure : 10 kg/cm2
Material of Construction of Body : SS 316
Material of Construction of Electrodes : SS 316

Process Connections : ¾" Male Threaded
Insertion Length : 50 mm Below Threads
Mounting : Pipeline
Cable Length : 5 meter

Salient Features :-

1. Insensitive to contamination, fouling or scale formation on the sensor surface
2. Total galvanic separation of the measuring components from process media
3. No polarization, which is very common in conventional sensors
4. Dedicated arrangement for online flushing of dirt particles and other impurities from sensor chamber.
5. Offers versatility of changing the type of sensors (viz., toroidal sensors, etc) in the same sensor chamber
6. Adequate provision to install additional pressure gauges, temperature gauges, pH sensor, etc on each module
7. Ideal for condensate recovery for power boilers, as we can offer sensors with cell constant value as low as 0.01

Conversion table (ppm to µS/cm) :-

ppm	µS/cm
1	1.56
2	3.12
3	4.68
5	7.80
10	15.60
20	31.20
50	78.00
100	156.00
200	312.00

Sizes :-
UCCDS : 25, 40, 50, 80 and 100 NB

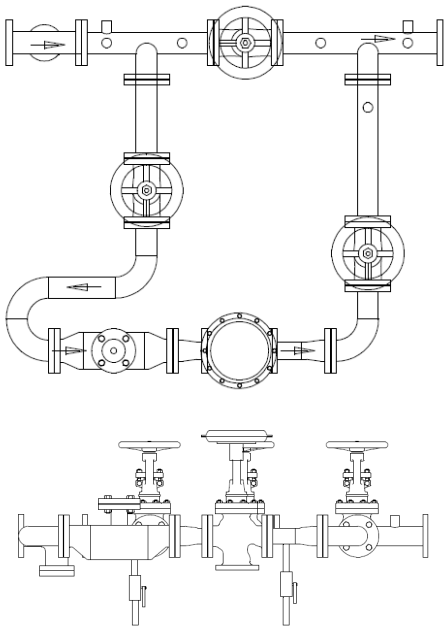
End connections :-
Flanged Ends : #150 / #300

Operating Conditions :-
Operating pressure(Maximum) : 10.50 kg/cm^2
Operating Temperature(Maximum) : 150 ^oC

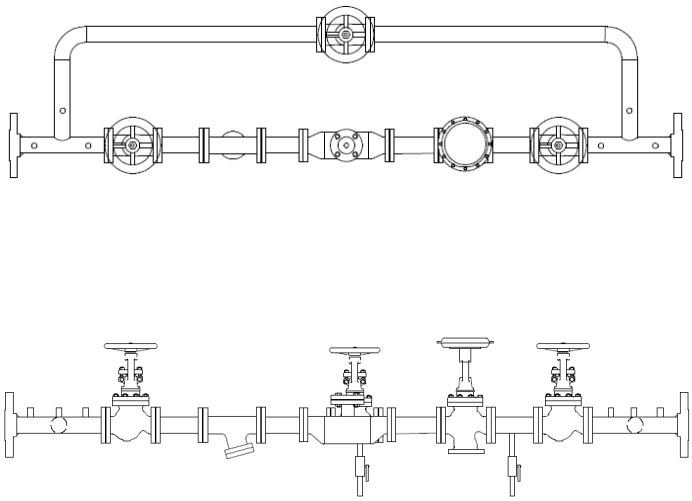
Installation :-
On Horizontal pipe only
In discharge line of pressure powered pump unit

GENERAL ARRANGEMENT

TYPE-1



TYPE-2



Bill of Material :-

Sr No	Part Name	Material
1	Sensor Chamber	ASTM A 106 Gr B
2	Isolation valves	ASTM A 216 Gr WCB
3	Y Strainer	ASTM A 216 Gr WCB
4	Seamless pipe	ASTM A 106 Gr B
5	Long bend	ASTM A 106 Gr B / ASTM A 234 Gr WPB
6	Flanges	ASTM A 105 / ASTM A 516 Gr 7C - SORF
7	Eccentric reducer	ASTM A 234 Gr WPB
8	3-way Control valve	ASTM A 216 Gr WCB / ASTM A 216 Gr WCC
9	Half coupling with plug	ASTM A 105
10	Seamless pipe	ASTM A 106 Gr B
11	Drain line	ASTM A 105
12	Drain valve	ASTM A 216 Gr WCB

Product range

UTD 55 | UTD 62 | UTD 120
Thermodynamic steam Trap

UTST | UCT10
Thermostatic steam trap & Sanitary steam trap

UFT 15 to 100 NB | UCA 20
Float trap for steam and compressed air application

UG 25/45 | UP 64Ti | UP 110Ti | UP 215Ti
Bi-metallic steam trap

UITVS
Compact trap valve station

UIBT 28US
Inverted bucket steam trap in complete stainless steel Construction

UIBT 1701 to UIBT 7004
Inverted bucket steam trap in cast carbon steel Construction

UDCV
Non-slam disc check valve

UMS
Baffle type moisture separator for steam and air

UAV
Air vent(thermostatic type) with air bottle for steam

UAE
Air eliminator for liquid application

UBSV
Bellow seal globe/gate valve

UHPV
High pressure(#1500/#2500) globe/gate valve

USTR
Y & T type strainers in cast carbon steel and stainless steel

USG
Double window sight glass

USI
Steam injector for boiler feedwater

UFV
Condensate

UPPPU
Condensate pressure powered

UDH
Deaerator head(atmospheric) for boiler feedwater tank

UAPT
Automatic pumping trap – Combination of a conventional trap and pump for effective condensate discharge

UCCDS
Online(24X7) condensate contamination detection system

UBBHRS
Boiler blowdown heat recovery system

UPRS
Pressure reducing station

UCCM / USDM
Condensate collection and steam supply manifold

Other Products *Cast / Forged Steel Piston Valves, Bellow seal valves, High Pressure valves (Gate/Globe) , Strainers – "Y" Type, ITVS*
Steam Traps (Thermodynamic, Thermostatic, Ball Float Traps and IBT), Pressure Reducing Station, Condensate Recovery Products.
Level Gauges (Reflex, Transparent, Bicolor), Sight Glass, Hot Water Generation System, Safety and Relief Valves.
FSD Products : *Compressed Asbestos / Non-Asbestos Fiber Sheeting / Cut Gaskets, Spiral Wound Gaskets.*

In view of technical progress design and dimensions are subjected to change without notice.

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