BOILER BLOW-DOWN HEAT RECOVERY SYSTEM
MODEL NO : UBBHRS 0.5 to 15 Lac kcal/hr
[IBR APPROVED]

Description

The generation of steam in boiler requires feed water. Feed water is often a mixture of returned condensate and treated make up water. Despite all economically justifiable efforts of treating feed water, a small amount of dissolved solids (TDS) always remain in the feed water. The TDS accumulate in boiler when water is evaporated to generate steam.

It is common practice to discharge or release a small amount of water from the boiler steam drum to reduce the dissolved solids level and eliminate deposits of solids in the steam drum.

Many boilers allow for the continuous water discharge (blow down) of water to manage dissolved solids levels. The blowdown rate can range from less than 1% when using extremely high-quality feed water to greater than 20% in a system with deficient quality of feed water. Makeup water contains a substantial percentage of total heat input for the boiler.

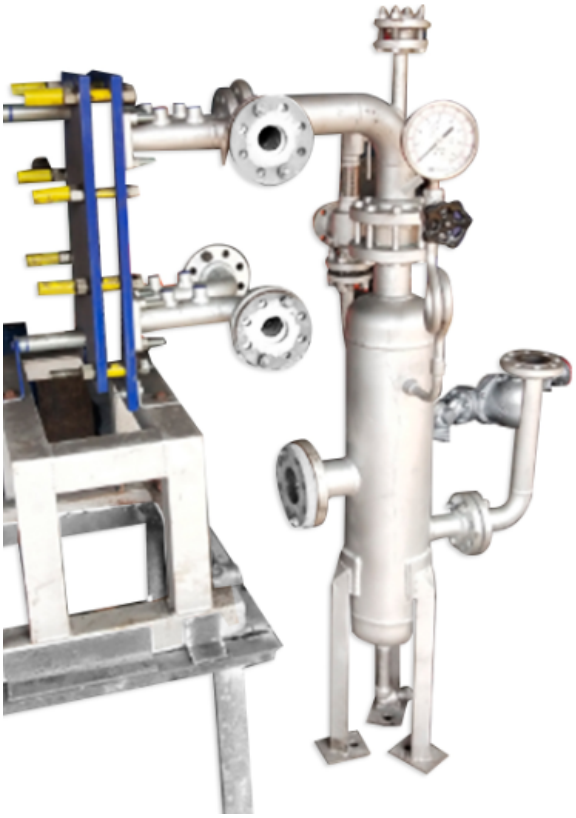
In many cases, the water and its heat content are sent directly to the drain, resulting in the wasting of energy and water.

To maintain safe TDS level, the quantity of blow down is controlled and it is recommended to recover the heat from blowdown water.

The energy savings can vary from 0.5% for a well-run boiler to 2.0% in cases where the water quality is deficient. Recovering heat from boiler blowdown also leads to reduction of CO_2 emissions saving the mother earth from pollution.

Salient features of UKL BBHRS :-

- Heat emission to environment is stopped
- Recovery of precious heat energy
- Reduction in CO_2 emissions
- Provides hot water for feed tank
- Helps to reduce DO_2 in feed water
- Waste-water can be easily channelized to ETP
- Safe environment to work as blow-down is not drained in open pit
- Compact construction
- This system helps to eliminate environmental hazards and comply with safety, health and environmental regulations
- Complete system comes will IBR approved components
- Automatic operation



Working principle :-

Blowdown waste heat can be recovered with a heat exchanger, a flash tank, or flash tank in combination with a heat exchanger. Lowering the pressure in a flash tank allows a portion of the blowdown to be converted into low-pressure steam. This low-pressure steam can be used in deaerators or to heat the cold water.

Models :-

Model No : UBBHRS - 0.5 to 15 Lkcal/hr
Capacities : 0.5, 1, 2, 5, 8, 10, 12 & 15 Lkcal/hr
[Intermittent sizes can also be provided based on the TDS and enthalpy calculations]

Application :-

Suitable for all process boilers having combined bottom blowdown and surface blowdown. Also suitable for boilers having only bottom blowdown, based on the TDS and enthalpy calculations

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Types of boiler blowdown :-

There are two types of boiler blowdown

Bottom Blowdown: As its name suggests, this function happens at the bottom of the boiler commonly known as the mud drum. In bottom blowdown, an operator is manually removing the particulate that has settled in the mud drum.

- This type of blowdown is also called intermittent blowdown
- Every boiler, no matter the size or type, is recommended to be blowdown via the bottom blowdown manual valve
- The most common practice is to open up the (usually 1 to 2") valve wide open and allow the boiler to force out this dirty, impure water to allow for clean water to replace it
- This process normally only takes 30 seconds to a minute
- Blowing down from the bottom of the boiler is an instantaneous type of process, a hot, noisy burst of pressurized water leaving the boiler. And this calls for a heavy-duty tank to handle such a burst of hot, pressurized water

Surface Blowdown: Happens near the surface at the location where the concentration of dissolved solids is highest. Surface blowdown, also known as continuous blowdown, removes the dissolved solids from the steam drum. These dissolved solids would rapidly lead to scaling if they were not removed from the system.

- Unlike the bottom blowdown process, a boiler's surface water is only recommended on larger boilers
- Surface water blowdown is a slow, continuous skimming off the top level of the boiler water.

Whether it is intermittent or continuous, replacing dirty water in your boiler is a vital, yet often under appreciated part of the boiling operation. Blowing down boiler water increases equipment service life and reduces fuel consumption.

Allowable TDS (ppm) for different types of boilers :-

Lancashire	: 10000 ppm
2-Pass economic	: 4500 ppm
Package & 3-Pass economic	: 3000 – 3500 ppm
Low pressure water tube	: 2000 – 3000 ppm
Medium pressure water tube	: 1500 ppm
Coil boilers and generators	: 2000 ppm
High pressure water-tube	: 1000 ppm

***The above figures are offered as a broad guide only**

Boiler blowdown (BD) calculations :-

The formula to calculate the amount of blowdown

Formula-1 $\%_{BD} = \frac{F}{B - F} * 100$ (If % is required)

Formula-2 $Q_{BD} = S * \frac{F}{B - F}$ [kg/hr] (If direct quantity is required)

Formula-3 $\text{Minutes of blowdown [per day]} = \frac{Q_{BD} \text{ [in kg/day]}}{\text{Amount of water removable based on BD valve size and boiler pressure [in kg/min]}}$

Where, $\%_{BD}$ = % blowdown
[with reference to steam generated]

F = Actual (existing) TDS of boiler feedwater (BFW)
[To be taken from client, from logbook, etc]
[in ppm]

B = Maximum allowable TDS for boiler
[Refer above paragraph or ask to client]
[in ppm]

Q_{BD} = Amount of boiler blowdown
[In kg/hr] ≈ [kg/day]

S = Steam generation rate (kg/hr) or
[Steam generation capacity (TPH)]

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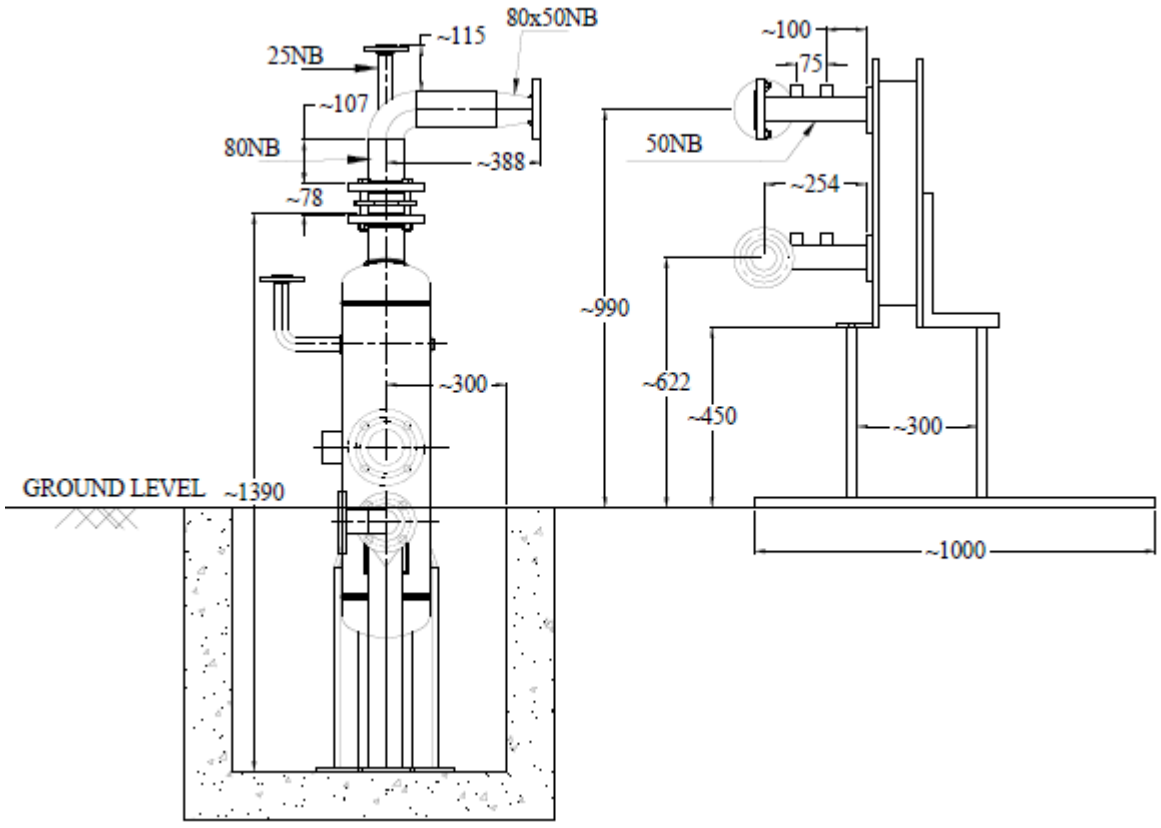
GENERAL ARRANGEMENT



Above dimensions are indicative only. It may differ based on Models

Bill of Material :-

Sr No	Part Name	Material
1	Plate Heat Exchanger	Plates AISI 316L
2	Ball Float Trap	ASTM A 216 Gr WCB
3	Safety valve	ASTM A 216 Gr WCB
4	Non-return valve - DCV	ASTM A351 Gr CF8M (SS316)
5	Temperature Control valve	ASTM A 216 Gr WCB / ASTM A 216 Gr WCC
6	Pneumatic Piston actuated on/off valve	ASTM A 351 CF8
7	Flash vessel	ASTM A 106 Gr B
8	Piston valve (Isolation/Throttle valve)	ASTM A 216 Gr WCB
9	Y Strainer	ASTM A 216 Gr WCB
10	Control Panel	C.S., FLP / Non-FLP (based on requirement)
11	Pressure Gauge / Temperature Gauge	Bourdon type, Casing – SS304/SS316
12	RTD PT-100 sensor	Sheath – SS316

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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