Evapco Europe Srl

EBDS BL

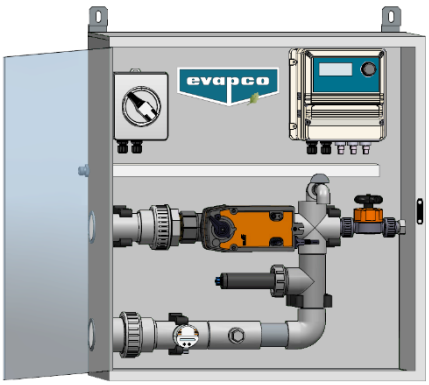
Evapco Blow-Down System

Product Description

An evaporative cooling system rejects heat through water evaporation and its thermodynamic advantages. A portion of the cooling water is discharged into atmosphere as warm, saturated discharge air, while the dissolved salts remain in the liquid water by increasing its concentration. To avoid an excessive salt concentration, a portion of the remaining water shall be eliminated through a mechanism called blowdown. In this way the make-up water, which is used to balance evaporation and discharge process into the cooling unit, will dilute the concentration of salts.

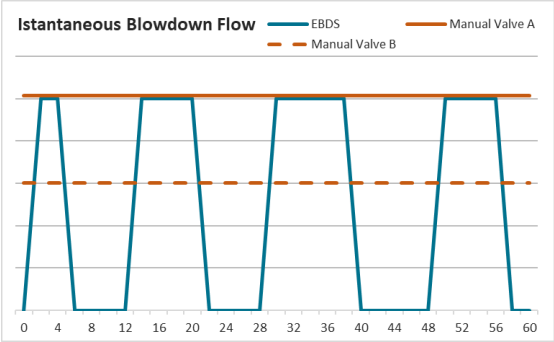
EBDS is an **automatic** blowdown system to constantly measure the electrical conductivity of the cooling water and keep its salt concentration at the desired and set value by the user, according to the quality of make-up water and its treatment.

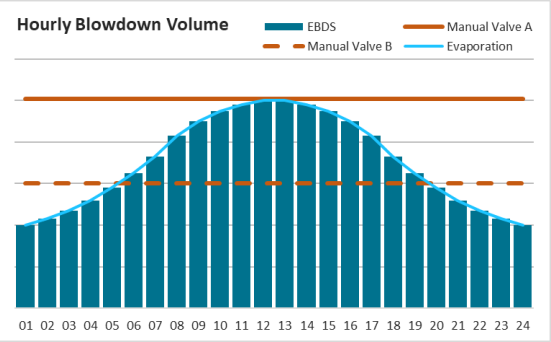
EBDS BL presents all the components preassembled, wired and tested in a **closed and protective box**, simplifying the installation on site and allowing the outdoor positioning.



Example EBDS BL-150 with the optional water flow switch

Operation





On the left is an example of the hourly trend of the "Instantaneous Blowdown Flow rate" of the EBDS automatic system comparing two manual valves (A: completely open valve - B: partially open valve).
On the right is an example of the daily trend of the "Hourly Blowdown Volume" of the EBDS automatic system comparing the same manual valves (A and B).
EBDS discharges water only when required and only for the necessary time, strictly following the evaporative thermal load and the external climatic conditions.
Valve A continuously discharges water, wasting the excess quantity.
Valve B continuously discharges water, but wasting excess quantity when this is not needed and little quantity when needed, generating high salt concentrations.

Selection Table

	Max Thermal Capacity Vs Minimum CoC*		
	1,5	**2,0**	**2,5**
EBDS-BL-120	800 kW	1600 kW	2400 kW
EBDS-BL-125	1400 kW	2800 kW	4200 kW
EBDS-BL-140	2600 kW	5200 kW	7800 kW
EBDS-BL-150	3400 kW	6800 kW	10200 kW

**This table shows the sizes of EBDS systems combined with maximum thermal capacity values of cooling systems, as a function of three minimum CoC and a pressure drop of 0.4 bar between input and output.*

Hydraulic Connections and Shipping Weights

	In	Out	Out probe	Weight**
EBDS BL-120	3/4"	3/4"	1/2"	25 kg
EBDS BL-125	1"	1"	1/2"	26 kg
EBDS BL-140	1"1/2	1"1/2	1/2"	27 kg
EBDS BL-150	2"	2"	1/2"	28 kg

***Shipping weight (Operating weight = Shipping weight + 2kg)*

Technical Data

Dimensions (L x W x H)	700 x 300 x 800 mm
Temperature (min - max)	5 - 45 °C
Pressure (min - max)	0,5 - 4,0 bar
Electrical supply	230 Volt - single phase - 50 Hz

Make-up water pressure must be enough to compensate Blowdown+Evaporation.
EBDS outline must be connected to a free discharge in immediate surroundings.

Alternative Options

- ☐ **I**: Inductive conductivity probe
- ☐ **C**: Electrodes conductivity probe

Available Accessories

- ☐ Water Flow Switch
- ☐ Heating Cable
- ☐ mA Output (Conductivity and Temperature Values)
- ☐ Modbus Connection
- ☐ pH or Redox probe

EBDS BL

Evapco Blow-Down System BOX

PART 1 - GENERAL

1.1 Related Documents

Drawings and general provisions of the contract, terms and conditions of Evapco Europe, apply to this section.

1.2 Summary

This section includes factory assembled and tested, automatic blowdown system.

1.3 Submittals

- Unit-specific data with design information include: performance information, pressure drop, alternative options and available accessories.
- Technical drawings with unit details, hydraulic and electrical connections location and dimensions.
- Unit maintenance and management information included in the maintenance booklet.

1.4 Warranty

The warranty applied is the Evapco Express Standard Warranty downloadable at http://evapco.eu/terms-conditions-and-warranty-statements and detailed in the offer.

1.5 Note

EBDS is a conductivity control and discharge system for evaporative cooling units water. As any other machinery, it needs to be started, managed, controlled and maintained by competent and qualified personnel, including water treatment as scope of supply.

PART 2 - PRODUCTS

2.1 Contractual item

EBDS is an automatic blowdown system for evaporative cooling units, pre-assembled and factory tested, that falls within the definition of machine, CE marked and supplied with Declaration of Conformity in compliance with the Machinery Directive 2006/42/EC.

The installation of EBDS on existing plants, carried out state-of-the-art and following the instructions of the handbook, does not require the updating of the CE marking of the plant.

EBDS discharges the cooling water to the drain only when the measured conductivity reaches the maximum set-point value and only for the necessary time to drops it to the minimum set-point value. Maintaining the conductivity of the water within a certain range allows you to control the concentration of dissolved salts and then manage the risk of scale and corrosion in the water cooling circuit.

Thanks to the box which contains all the devices, EBDS BL can be easily installed on vertical surfaces to operate both indoors and outdoors.

In case of external location, it is not necessary to foresee a protection cover against atmospheric agents like wind or rain. The only exception is the frost risk, for which it is necessary to pay particular attention and customer shall provide suitable prevention during both installation and operation phases.

2.2 Components

- Box Pre-assembly

  The hydraulic and electric pre-assembly of all the components inside a closed box allows the installation of the blowdown system in a single and specific area of the plant to operate both indoors and outdoors. Box pre-assembly reduces the costs and errors of on-site installation, as it offers a pre-tested system and leaves few external connections of the machine to be made on site.
- Box

The closed box includes all the system components. The box has corrosion-resistant PP or PVC structure, transparent front door, closing hook, fixing brackets and PVC collectors with female threaded connections for water inlet and outlet.

- Controller

  The digital microprocessor controller receives the signal from the conductivity probe, analyzes it and manages the bleed off valve and alarm control outputs.

  The controller with encoder knob, liquid crystal display and IP65 degree of protection, has an adjustable measuring scale 0-3000 µs/cm or 0-30 ms/cm, automatic temperature compensation of the measured conductivity value, an opening/closing valve range that can be set, a minimum/maximum conductivity range that can be set, probe control function, maximum valve opening time control function, stand-by input, flow switch input, cumulative alarm output, system data storage with log display.

- Conductivity Probe

  The conductivity probe continuously analyzes the electrical conductivity of the cooling water and transmits the measured signal to the controller. Two types of probe can be selected:

  Inductive probe (**I**) with measuring range 0,3-300 mS/cm

  Inductive conductivity probe with PEEK body and magnetic sensor separated from direct contact with water. The separation between the inductive sensor and the fluid allows a stable reading and eliminates polarization errors and electrode coating problems that commonly affect conventional conductivity contacting-electrode models. An integrated PT100 probe offers a temperature compensation.

  The probe is installed in a PVC probe holder with fastening ring for easy extraction and with binding coupling, in order to constantly ensure the correct orientation with the flow direction.

  Or alternative option

  Electrodes conductivity probe (**C**) with measuring range 0-5 mS/cm

  Stainless steel conductivity electrodes probe with PVDF body. The electrodes have a direct contact with water and provide a quick and accurate response. An integrated PT100 probe offers a temperature compensation. The probe is installed in a PVC probe holder with fixing ring for easy extraction.

- Motorized bleed off valve

  The bleed off valve with motorized actuator opens only when receiving the voltage signal from the controller. In case of missing signal or power failure, the valve automatically closes through its safety spring return.

  The stainless steel ball valve has PTFE seat and EPDM o-ring.

  The total flow area of these valves eliminates the clogging risk that exists using solenoid valves with diaphragm shutter due to cloudy water or low pressures.

  The motorized actuator IP54 includes a manually adjustable limit stop to partialize opening and bleed off flow, slow rotation times to avoid water hammer and circuit damage (75 s in opening and 20 s in closing), opening and closing torque of 10 Nm (up to 1"1/2) and 20 Nm (over 1"1/2), manual opening by crank with lock lever and durability test with 60,000 complete opening/closing cycles.

- Output probe manual valve

  The manual valve allows the water outlet flow regulation measured by the conductivity probe.

  The manual valve has EPDM membrane type with PVC body, manual safety lock of the handwheel and vertical piston movement to display the opening degree.

- Sampling tap

  The PVC ball valve allows sampling of the cooling water downstream of the conductivity probe for analytical checks.

- Switch disconnector

  Wall-mounted IP66 rotary disconnector switch with insulating housing and black padlockable control knob.

2.3 Optional accessory components

The following accessories are available and selectable with this system. If any of these components are included in the current supply, they shall be remarked, verified in the offer and later in the order confirmation.

- SFA Water flow switch

  The flow switch detects the actual water flow through the conductivity probe and sends a free contact to the controller, confirming that the measured value is referred to the cooling circuit water and not to stagnant water.
  In case of missing flow, the controller goes into alarm and the motorized bleed off valve closes through its safety function.
  The flow switch works through the principle of calorimetric measurement which allows operation in a wide flow range (3 - 300 cm/s) and displays the flow level in a LED scale.
  The flow switch has stainless steel body and fluid contact probe, adjustable switching point of the output contact and an LED bar display to indicate the switching point and the flow position in a proportional scale.

- CSC Heating cable

  In some geographical area installation with low thermal load or intermittent cooling system operation during winter period, the heating cable reduces (without eliminating) the risk of pipes freezing or system device damage. This heating cable acts only as a support to reduce frost risk and for this reason it is also necessary to plan any possible corrective actions on site and follow all the indications and suggestions of the relevant manual.
  The shielded heating cable with two conductors IPX7 with external PVC sheath is equipped with 24 W power. It is activated through the bimetallic automatic thermostat at a temperature of +3°C and it's turned off at a temperature of +10°C.

- UMA mA Output (conductivity and temperature values)

  The controller has two electrical current outputs, both with 0-20 mA or 4-20 mA scale, proportional to the conductivity and temperature values measured by the probes.

- MBS Modbus connection

  The controller has an electronic connection card via Modbus RTU protocol.
  This electronic card allows to remotely communicate and manage the machine with the master tool of the existing local network with a minimum time between one interrogation and another of 500 milliseconds.

- SPH pH Probe or SRX Redox Probe

  pH probe
  pH measuring electrode, combined electrode with double junction and epoxy body, with PVDF inline electrode holder and controller suitable for two parameters receipt. The pH parameter is only displayed on the controller, without any effect on the bleed off valve.

  Or alternative accessory

  Redox probe
  Redox potential measuring electrode, combined electrode with double junction and epoxy body, with PVDF inline electrode holder and controller suitable for two parameters receipt. The redox parameter is only displayed on the controller, without any effect on the bleed off valve.