

# EVAPCO ENGINEERING FLASH



## COOLING TOWER EQUALIZATION

The purpose of this “e-flash” is to explain what an equalizer is and its function on a cooling tower. This paper will also explain the difference between an external equalizer and an internal equalizer (referred to as a “flume box”).

### Equalizers

An external equalizer is a piped connection, specifically sized to maintain equal water levels between multiple cells or multiple units for an open cooling tower system. Equalizers must be used when two or more cooling towers are piped with a common header.

The equalizer lines must be properly sized for 15% of the largest cooling tower flowrate to accommodate any slight flow imbalance that may occur during the operation of the tower. It is critical that the cooling towers be installed so that the overflow connections of all towers are at the same level. While the arrangement of the piping must be properly sized and designed, the use of equalizers with valves allows for multiple cells to be isolated with greater ease and versatility. A multi-cell tower can be arranged in a common header system in order to have redundancy built into the system such that a single unit can be taken off-line when a greater cooling capacity is no longer required. The ability to take individual units off-line with equalizers and valves allows you to easily isolate cells, optimize flow balance between units, and even automate your system operation for better efficiency.

The equalizer connection location is limited to the deep side of the basin of the cooling tower cells. However, equalizer connections can be placed in various locations on the bottom or the side of a unit, and can be a multitude of different connection types. The connections can be ASA flanged, beveled for weld and grooved, or a male pipe thread. The optimal equalizer connection location is on the side of the basin; requiring minimal piping and minimizing the collection of dirt and debris. However, if a bottom equalizer is necessary, a cleanout connection should be provided at the lowest point in the equalizer piping.

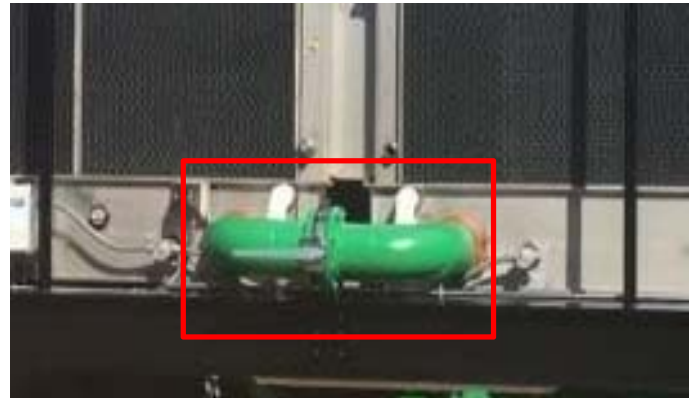


Figure 1: Side equalizer with isolation valve

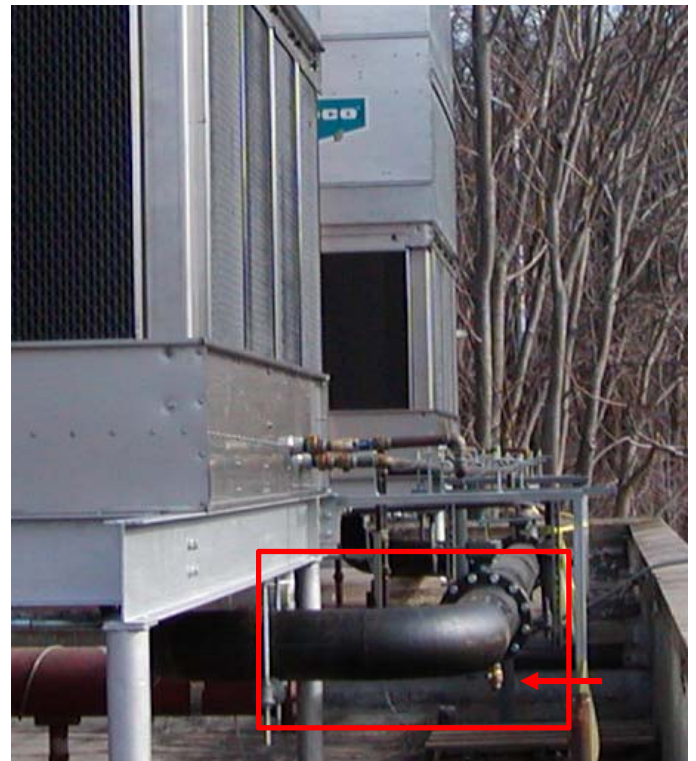


Figure 2: Bottom equalizer with cleanout connection

## **Flume Boxes**

A flume box is an internal equalizer on multi-cell cooling towers. The flume box is a wide rectangular connection that spans from the basin of one cell of a multi-cell unit to another. The flume box allows the water level in both basins to remain at a relatively equal state. The virtual nature of the flume box offers the engineer the most simplistic and economical means of equalization. As systems grow in size and complexity, the use of flume boxes for equalization becomes less pragmatic due to limitations in capacity control, vibration isolation, and even its functionality in preventative maintenance. Consult your local sales representative for the best applications of flumes.

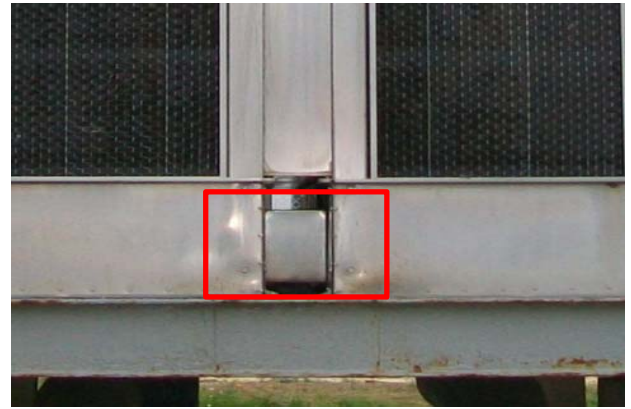


Figure 3: Side view of flume box connecting two cells

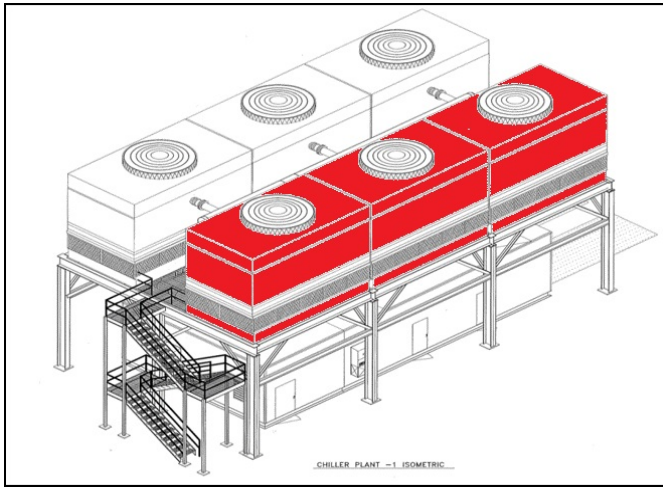


Figure 4: Multi-cell units can be internally equalized by flume boxes hence the cells highlighted red have shared basins and the units in white have shared basins. External equalizers are used to connect the red cells to the white cells in a common header system.

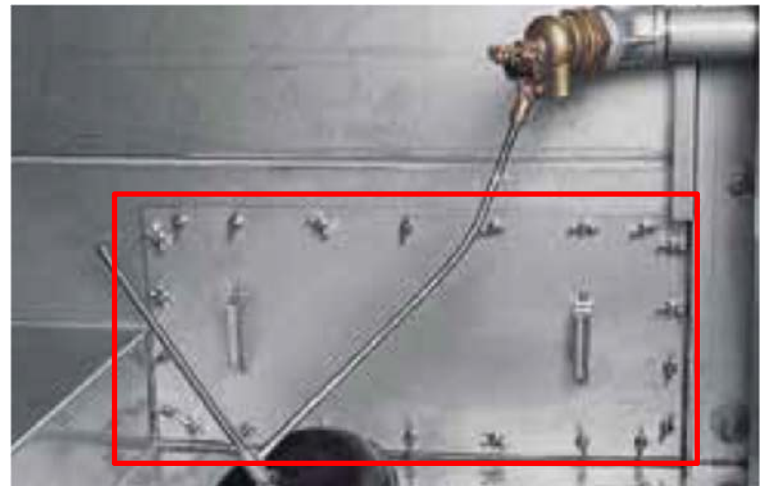


Figure 5: Flume plate over flume opening

**For more information on the sizing of equalizers, cell operation and sequencing, please contact your local EVAPCO Sales Representative!**

**Best Regards,**

Ian Levy  
Senior Marketing Engineer  
HVAC / Replacement and Aftermarket

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