CHEMTEX
INTERNATIONAL CHEMTEX CORPORATION

# Technical Topics

## Selection of Bleed Location in Cooling Systems

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In the cooling process, the greatest heat dissipation is achieved by evaporating droplets of water at the cooling tower. As the water is evaporated, the solids are left behind to concentrate. We bleed a portion of the water to control the water's chemistry.

The bleed-off should be located downstream of the condenser (heat exchanger) to save energy. Bleed-off from this point will remove warmer water and reduce the cooling load.

For example, assume we have a 300 ton tower, fully loaded with a 10°F drop across the tower. The system is operating at four cycles of concentration.

The evaporation (E) and bleed-off (B) rates are calculated as follows:

**E = 300 tons x 3 gpm/ton x .01 = 9 gpm**

**B = 9 gpm (E)**
**4 cycles - 1**

**B = 3 gpm**

By bleeding off warm water, the tower will become more efficient. We can calculate the savings as follows:

**Tons Saved = Bleed-off (B) in gpm x the density of water (8.34) x 1 BTU per pound of water x the temperature drop across the tower ($^{o}$F) x 60 min/hr ÷ 12,000 BTU/ton/hr**

EXAMPLE:

**Tons Saved = 3 pg. x 8.34 lb/gal x 1 BTU/lb x 10 $^{o}$F x 60 min/hr ÷ 12,000 BTU/ton/hr = 1.2 tons**

This would be a savings of 0.4% [(1.2/300) x 100]. This may not seem like much, but one ton of air-conditioning will cool approximately 750 ft. of office space. Therefore, by locating the bleed-off just after the condenser, we could save 1.2 tons x 750 ft/ton or 900 square feet of air conditioned office space. A 400 ton system operating at three cycles of concentration could save over 1,800 ft. of floor space.