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April 30th 2012 ~ Monday Morning Minutes:

Cooling Tower Pumps and Piping – Part 4

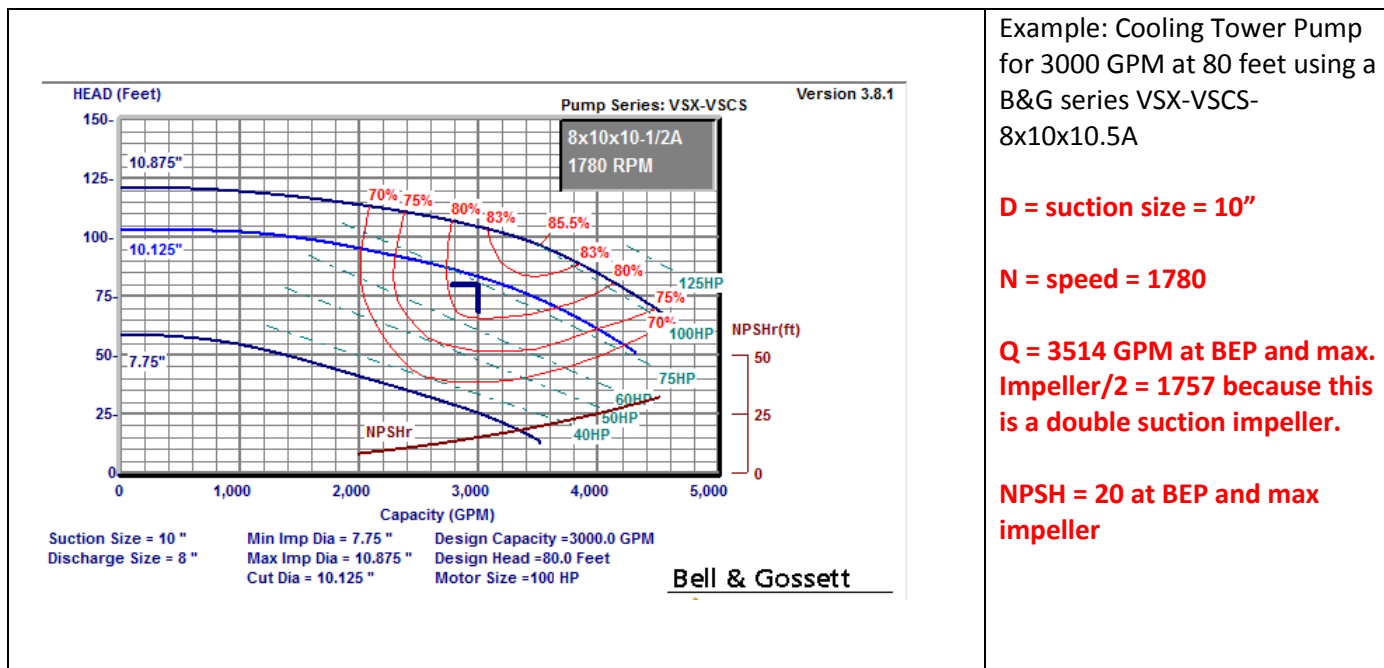
It's all about Pressure.

By Norman Hall

NOTE: We found an error in our last Monday Morning Minute and corrected it at 9:30 AM on 4-23-12. If you read or printed the MMM before that time, please go back at re-print it.

Last week the R. L. Deppmann Monday Morning Minute left you with a multiplier of 1.3, 1.5, or 2.0 to use with the pump $NPSH_R$. Let's look at an example this week using the suction energy formula we introduced last week and add one more margin to the formula.

Let's start with the additional margin. Tower water has a great deal of air entrained and that air can play havoc with the gauge pressure at the pump suction. How often have you witnessed the bouncing gauge in this situation? **This is the reason I add 5 extra feet to the $NPSH_R$ as a safety factor.** You may choose to add this or not, but I always start by adding it in. Now let's look at an example. I suggest you have the last Monday Morning minute handy.



Example: Cooling Tower Pump for 3000 GPM at 80 feet using a B&G series VSX-VSCS-8x10x10.5A

D = suction size = 10"

N = speed = 1780

Q = 3514 GPM at BEP and max. Impeller/2 = 1757 because this is a double suction impeller.

NPSH = 20 at BEP and max impeller

So from the last MMM: $Suction\ Energy = D \times n \times (RPM \times Q^{.5} / NPSHR^{.75}) \times 10^{-6}$

So Suction Energy = $10 \times 1780 \times (1780 \times (1757)^{.5} / (20)^{.75}) \times (.000001) \approx 140$ which is a **low energy pump.**

Now, from the chart published in the last Monday Morning Minute, the multiplier to use with published $NPSH_R$ will be 1.3 and the recommended safety factor from statements above will be 5 feet. The $NPSH_R$ at 3000 GPM is 15 feet absolute from the curve above. We will want our available NPSH to be **[[15 x 1.3 = 19.5 + 5 = 24.5]] feet absolute or greater.**

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Next week we turn our attention to the suction piping of the cooling tower pump and available NPSH...

*[Click here to request a copy of the Xylem Bell and Gossett
Cooling Tower Piping technical bulletin TEH-1209](#)*

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