

HW 3.4 CH. 13 17, 19, 22, 23, 25, 34 (only 2)

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17) TOTAL HEAD CAPABILITY VARIES w/ SQUARE OF SPEED.

$$\frac{h_{A1}}{h_{A2}} = \left(\frac{N_1}{N_2}\right)^2, \quad N_2 = .5N_1$$

$$\Rightarrow \frac{h_{A1}}{h_{A2}} = \left(\frac{N_1}{.5N_1}\right)^2 \Rightarrow \frac{h_{A1}}{h_{A2}} = \frac{1}{.25} \Rightarrow .25h_{A1} = h_{A2}$$

$\Rightarrow$ REDUCES BY FACTOR OF 4

18) CAPACITY HAS DIRECT RELATIONSHIP w/ DIAMETER.

$$\frac{Q_1}{Q_2} = \frac{D_1}{D_2}, \quad D_2 = .75D_1$$

$$\Rightarrow \frac{Q_1}{Q_2} = \frac{D_1}{.75D_1} \Rightarrow .75Q_1 = Q_2 \Rightarrow \text{REDUCED BY 25\%}$$

22) PUMP DESIGNATION: 1 1/2 x 3 - 6

1 1/2 : 1 1/2 INCH DISCHARGE CONNECTION

3 : 3 INCH SUCTION CONNECTION

6 : CASING WILL ACCOMMODATE 6" IMPELLER OR SMALLER

23) SUITABLE SIZE FOR 100 gal/min @ 300 ft of HEAD
FROM FIG 13.22 : SUITABLE SIZE IS 1 1/2 x 3 - 10.
@ SPEED OF 3500 RPM.

25) 2x3-10 CENTRIFUGAL PUMP w/ 8" IMPELLER & 200 ft of HEAD
Q: ~230 gal/min η : ~54%
P: ~22 HP NPSH: ~11 ft

34) A) RECIPROCATING OR CENTRIFUGAL @ 3500 RPM
B) RECIPROCATING OR ROTARY
F) MIXED FLOW PUMPS, CENTRIFUGAL PUMPS
G) AXIAL FLOW PUMPS