Dylan Arnold HW11 University ID: 01166349
MET330 Professor Ayala July 29th, 2023

13.17 When speed varies:

Total Head Capability $\frac{ha_1}{ha_2} = \left(\frac{N_1}{N_2}\right)^2$ original

If speed of rotation of impeller is cut in half (i.e. $0.5N_1$), how does total head capability change?

$$\frac{ha_1}{ha_2} = \left(\frac{0.5N_1}{N_2}\right)^2$$

$$\frac{ha_1}{ha_2} = 0.25\left(\frac{N_1}{N_2}\right)^2$$

↳ or 1/4

Total head capability will be 1/4 or a quarter of the original value if the speed of rotation of the impeller is cut in half.

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13.19 If diameter of given centrifugal pump is reduced by 25%, how much does capacity change?

$$\frac{Q_1}{Q_2} = \frac{D_1}{D_2}$$ original

$$\frac{Q_1}{Q_2} = \frac{0.25D_1}{D_2}$$

Capacity varies directly with impeller diameter, therefore the capacity will also be reduced by 25% of a quarter of the original value.

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13.22 Describe each part of centrifugal pump designation 1 1/2 x 3 -6

1 1/2 = discharge connection size (nominal inch)
3 = suction connection size (nominal inch)
6 = Casing class - Nominal size (in inches) of largest impeller.

13.23 For line of pumps in fig 13.22, specify suitable size for delivering 100 gal/min at a total head of 300 ft.

- Suitable size would be a 1 1/2 x 3 -10

↳ largest impeller size (in inches)

↓ discharge size (nominal inch)

↓ suction size (nominal inch)