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Understanding the factors involved in pump performance is key to optimizing the fluid-handling systems in your operations.

Have you become so focused on the efficiency of the motors around your plant that you're losing sight of the equipment those motors are driving? In many applications, pumps included, the answer to the efficiency question is best addressed when the complete system is studied.

Sooner or later, most maintenance professionals who work with pumps will encounter a pump curve and its key parameters, one of which is Best Efficiency Point (BEP). The BEP graphically represents the point on a pump curve that yields the most efficient operation. For electric motors, efficiency varies with load, with the best efficiency being at about 75% of load. With rotodynamic pumps (which includes centrifugal and axial flow types), efficiency depends on three important pump curve parameters—*head, flow (i.e., capacity or volume) and power*—as expressed in this simple equation:

$$BHP = \frac{Q \times H}{3960 \times n} \times s.g.$$

Where:

BHP = brake horsepower
Q = flow
H = head
n = efficiency
s.g. = specific gravity (remains constant)

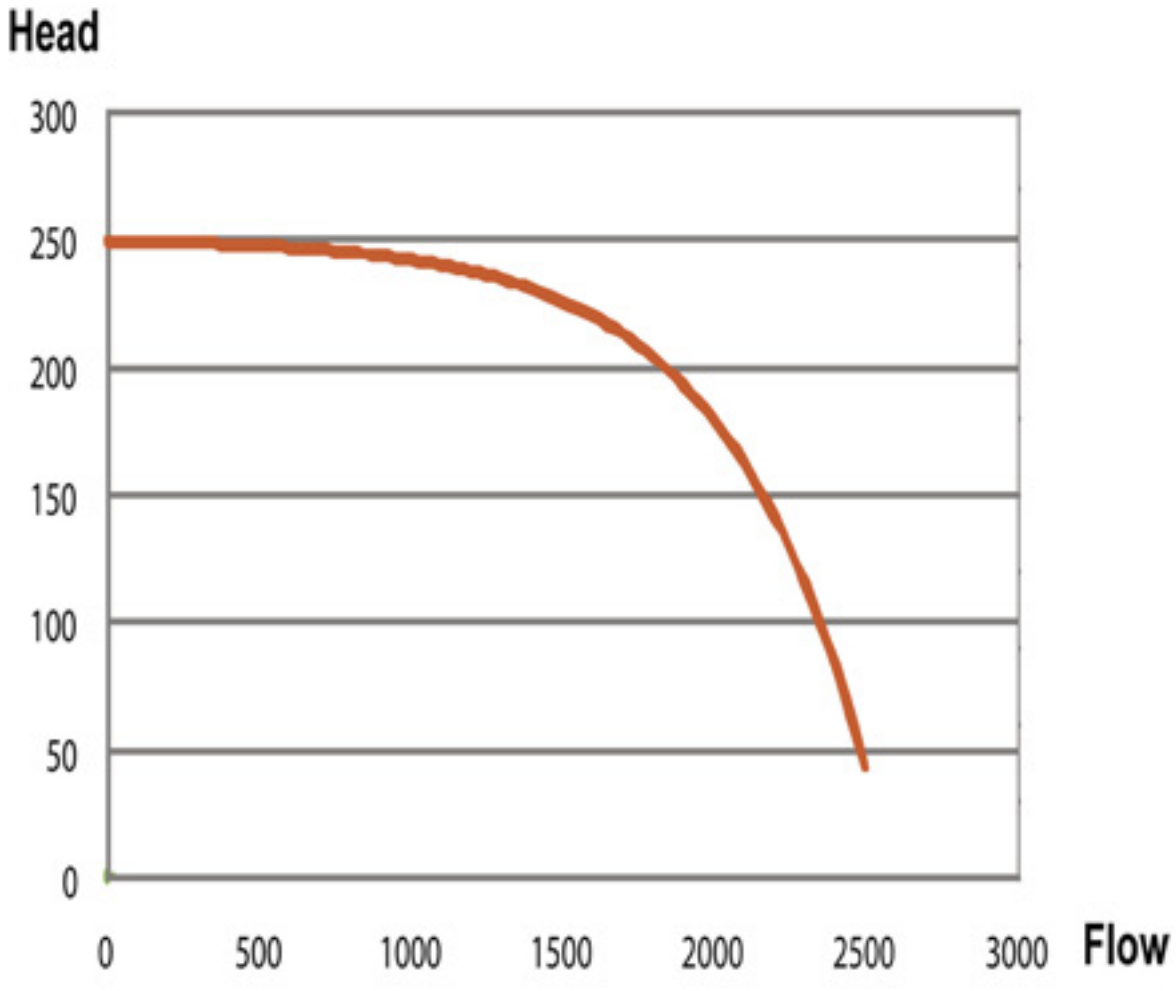

Fig. 1. Pump curve: head vs. flow

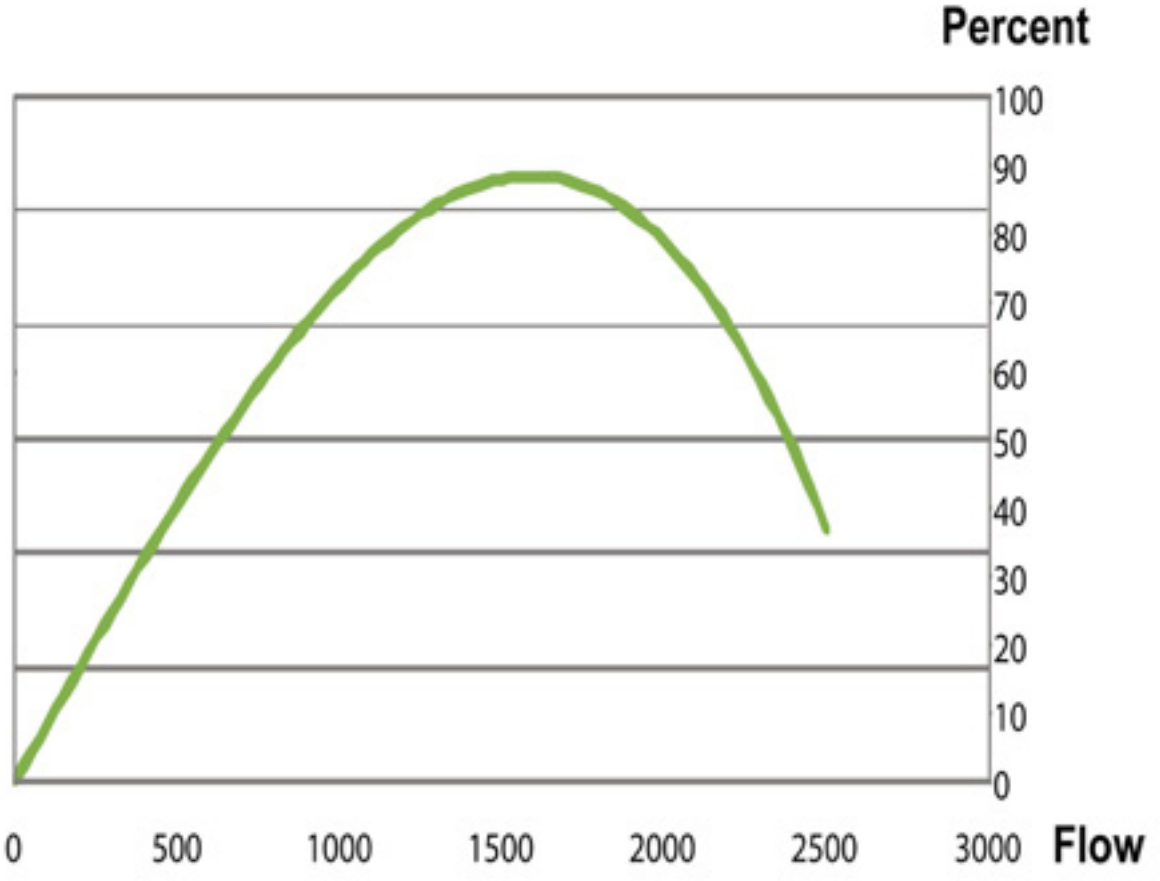

Fig. 2. Efficiency curve: efficiency vs. flow

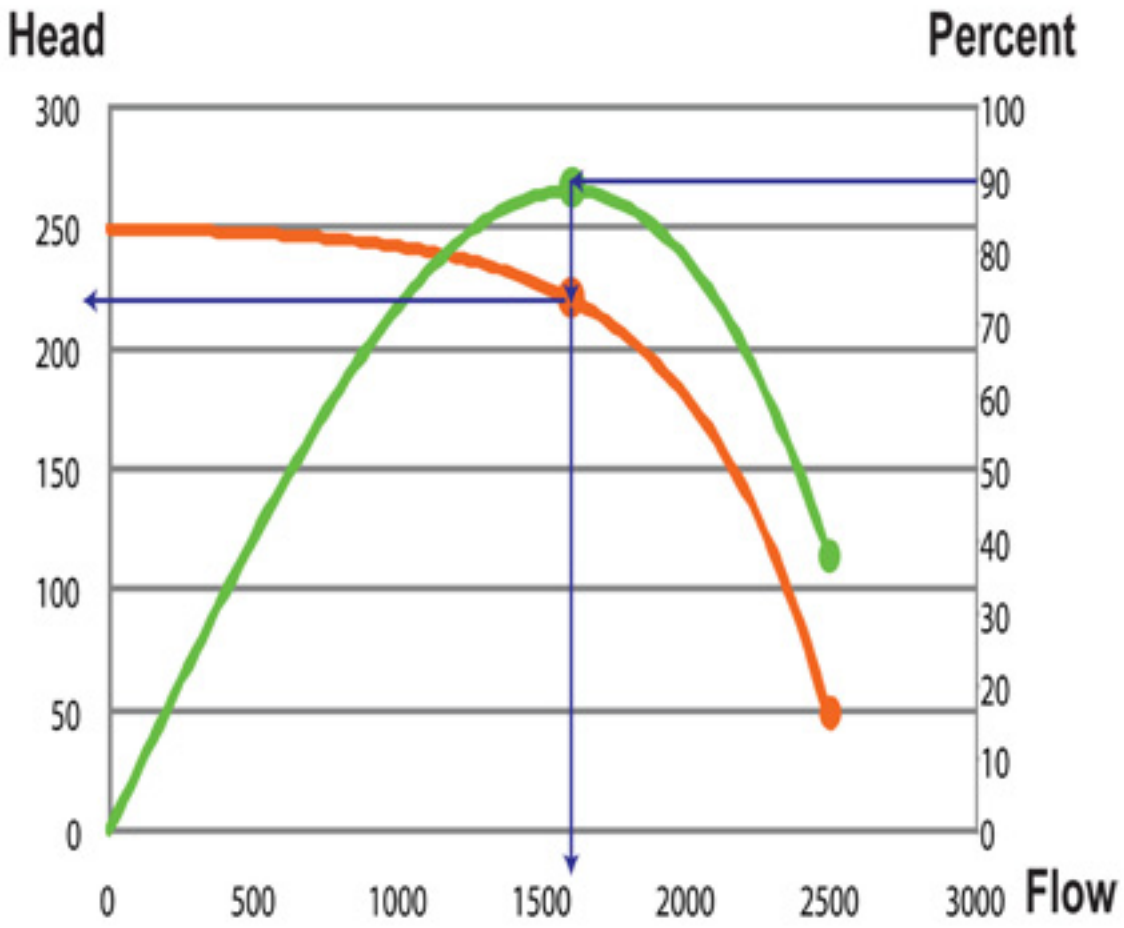

Fig. 3. Head and flow at BEP

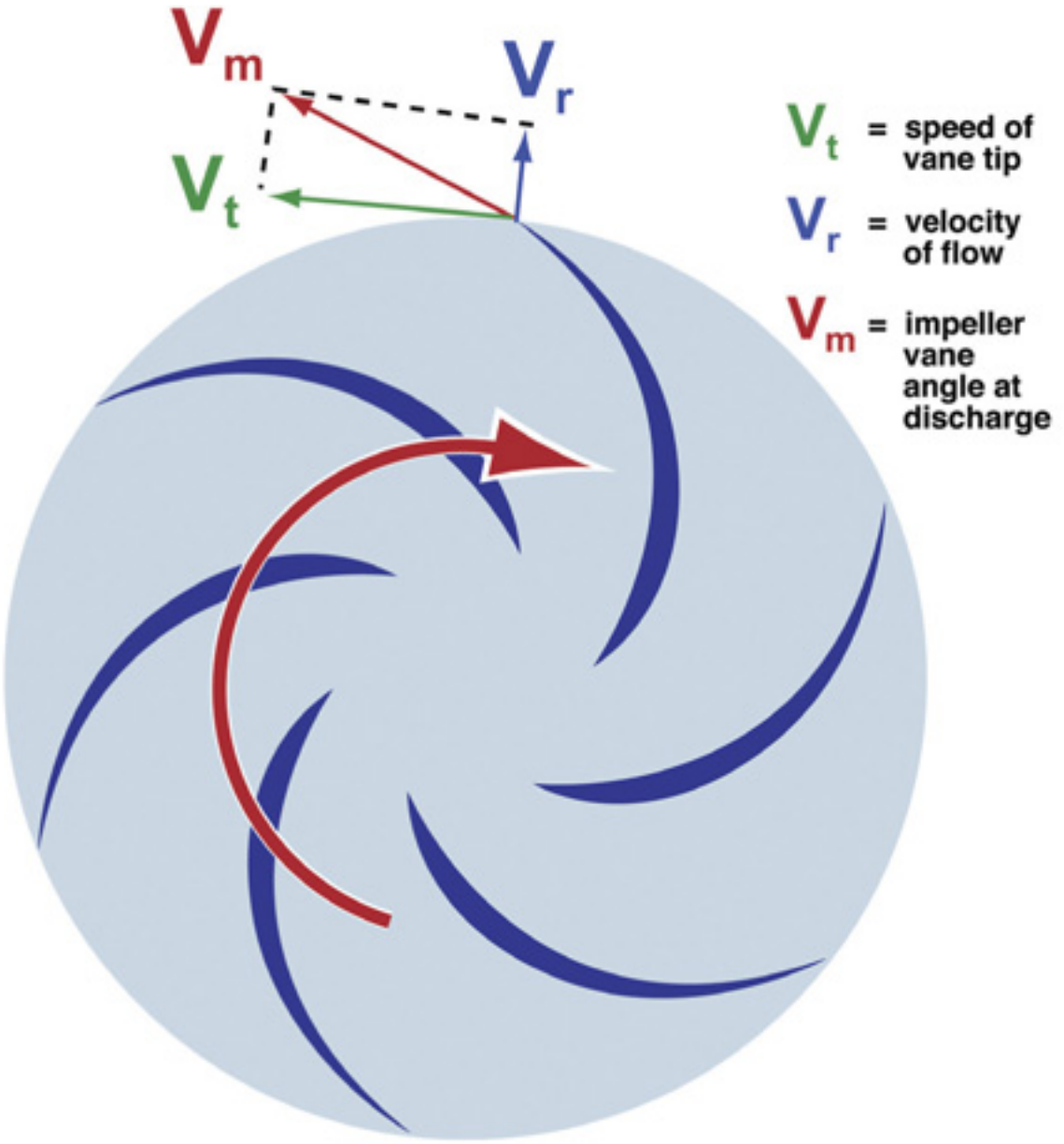

Fig. 4. Impeller discharge angle vectors