

American
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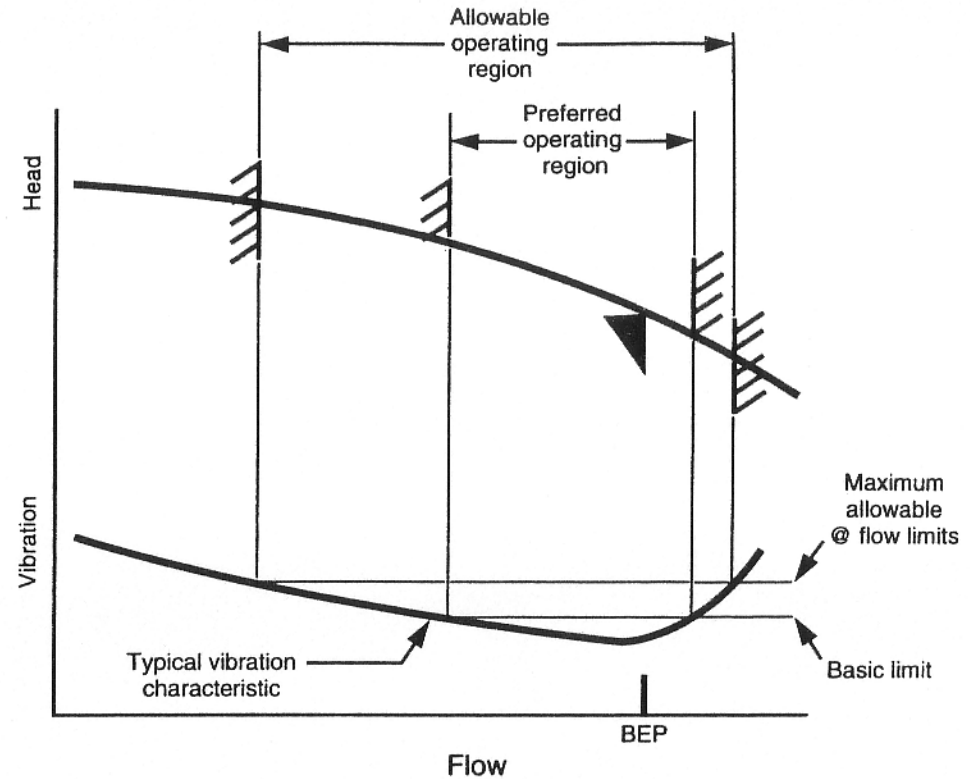


Figure 2-7—Relationship Between Flow and Vibration

2.1.12 Pumps shall have a preferred operating region (see 2.8.3, Vibration) of 70–120 percent of best efficiency capacity of the furnished impeller. Rated capacity shall be within the region of 80–110 percent of best efficiency capacity of the furnished impeller.

Note: Setting specific limits for the preferred operating region and the location of rated capacity is not intended to lead to the development of additional sizes of small pumps or preclude the use of high specific speed pumps. Small pumps, which are known to operate satisfactorily at flows outside the specified limits, and high specific speed pumps, which may have a narrower preferred operating region than specified, should be offered where appropriate, and their preferred operating region clearly shown on the proposal curve.

2.1.13 The best efficiency point for the furnished impeller shall preferably be between the rated point and the normal point.

2.8.3 VIBRATION

Note: Centrifugal pump vibration varies with flow, usually being a minimum in the vicinity of best efficiency point flow and increasing as flow is increased or decreased. The change in vibration as flow is varied from best efficiency point flow depends upon the pump's energy density, its specific speed, and its suction specific speed. In general, the change in vibration increases with increasing energy density, higher specific speed, and higher suction specific speed.

With these general characteristics, a centrifugal pump's operating flow range can be divided into two regions, one termed the *best efficiency or preferred operating region*, over which the pump exhibits low vibration, the other termed the *allowable operating region*, with its limits defined as those capacities at which the pump's vibration reaches a higher but still "acceptable" level. Figure 2.7 illustrates the concept. (Note that factors other than vibration, for example, temperature rise with decreasing flow or NPSHR with increasing flow, may dictate a narrower allowable operating region).