Specific speed

Specific speed is an index number correlating pump flow, head and speed at the optimum efficiency point. It classifies pump impellers with respect to their geometric similarity. Two impellers are geometrically similar when the ratios of corresponding dimensions are the same for both.

This index is important when selecting impellers for different conditions of head, capacity and speed (Figure 1). Usually, high-head impellers have low specific speeds and low- head impellers have high specific speeds.

There is often an advantage in using pumps with high specific speeds. For a given set of conditions, operating speed is higher. As a result, the selected pump can generally be smaller and less expensive. However, there is also a trade-off since pumps operating at higher speeds wear out faster.

Determination of operating conditions

Before selecting a pump, it is necessary to determine the head (H) and discharge (Q) required by the irrigation system. The system head versus discharge relationship should be evaluated for the entire range of operating conditions. When the system head and/or discharge vary significantly, special attention must be given to selecting a pump (or set of pumps) that can satisfy all conditions. Because most pumps are not very efficient over wide ranges in operating heads, the most prevalent conditions should be determined and a pump that operates efficiently over this set of conditions, and can operate under all other possible conditions, should be selected.

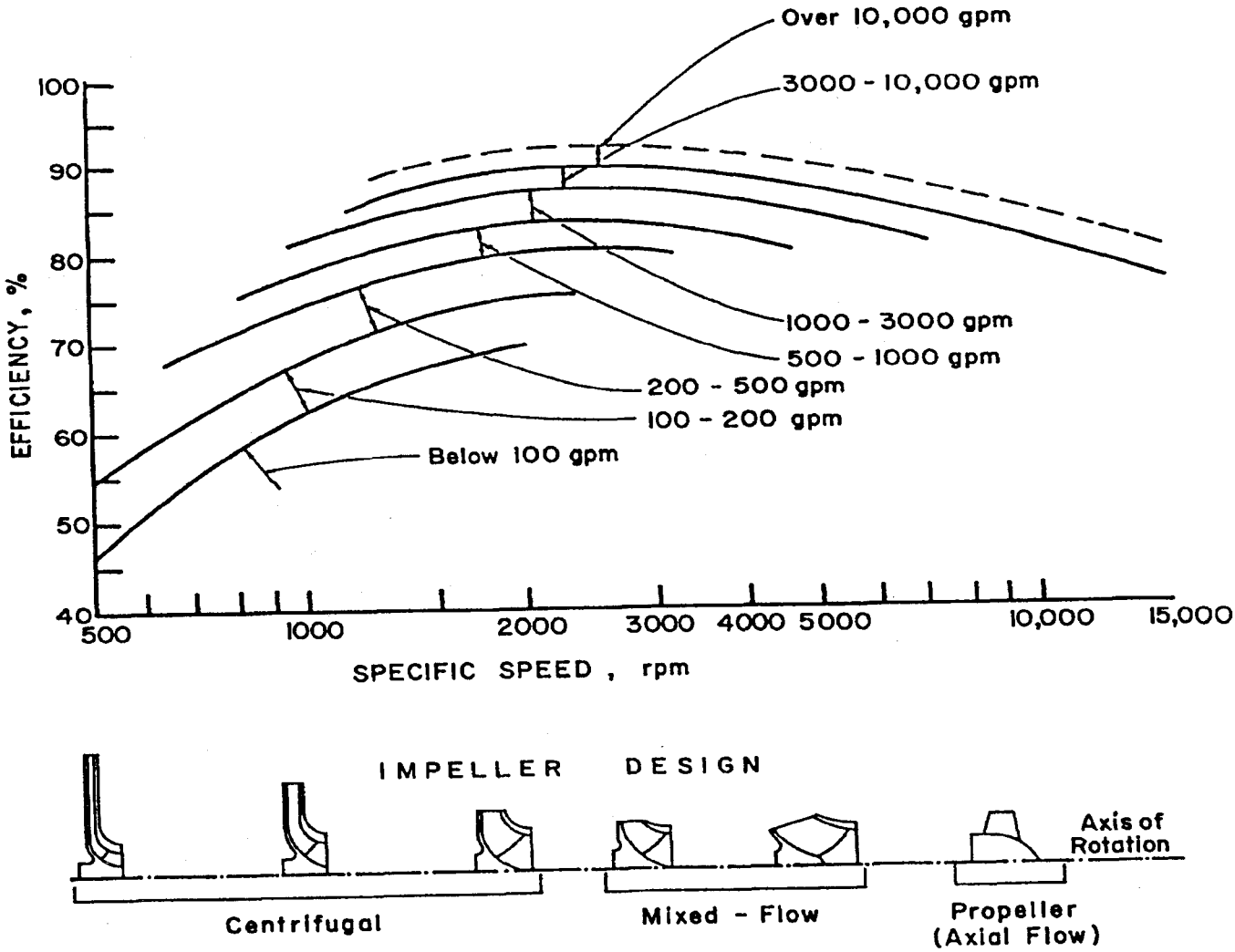

Figure 1. Theoretical pump efficiencies as functions of specific speed, impeller design, and pump capacity.