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# **TECHNICAL INFORMATION**

## **Bulletin**

**NUMBER THIRTY-THREE**

### **NOMOGRAM: PUMP PERFORMANCE ACCORDING TO AFFINITY LAWS**

The affinity laws (see Peerless Technical Information Bulletin No. 14) are a set of relationships which, for centrifugal pumps, enable these determinations:

- a. Capacity, head, NPSH and horsepower change as a result of speed change.
- b. Capacity, head, NPSH and horsepower change as a result of impeller diameter change.

Affinity law calculations are frequently used in both constant speed and variable speed pump application engineering. The calculations can become repetitive and perhaps tedious, particularly in variable speed pump application engineering. This nomogram can simplify the determination of performance changes resulting from speed (or impeller diameter) changes.

## PUMP PERFORMANCE ACCORDING TO AFFINITY LAWS

**Example:** A pump operating at 1,700 RPM delivers 200 GPM at 60 ft and requires 5 bhp. What will be the performance if the speed is increased to 2,000 rpm?

**Solution:** Align 1,700 rpm scale with 200 on scale Q, and intersect pivot line. Align point on pivot line with 2,000 on rpm scale, and read 235 on scale Q.

Align 1,700 on rpm scale with 60 on scale H, and intersect pivot line. Align point on pivot line with 2,000 on rpm scale and read 83 ft on scale H.

Align 1,700 on rpm scale with 50 (or  $50/10 = 5$ ) on scale B, and intersect pivot line. Align point on pivot line with 2,000 on rpm scale, and read 81 on scale B; divide by 10 for 8.1 brake horsepower.

