The pump and system choose the duty together

Original reference card | v0.3 | Source text checked 2026-11-19

Generic single-stage volute centrifugal pumps. Illustrations compare a separate bearing bracket with a close-coupled motor-supported arrangement; other pump families and constructions differ.

Understand the relationships

Work enters at the shaft; energy reaches the liquid: The shaft drives the impeller, which transfers mechanical energy to the liquid.

Compare where the rotating assembly is supported: KSB describes several volute-pump arrangements.

Find the intersection, not just the running indication: A centrifugal pump's operating point lies where the applicable pump curve and system curve meet.

Ratios are not an installed-system forecast: For the same pump geometry and fluid under suitable similar conditions, the ideal affinity relationships are flow ratio r, head ratio r^2 and power ratio r^3.

Preserve useful evidence

[ ] Pump/impeller/curve, fluid and seal/bearing arrangement identification.

[ ] Existing synchronized head/flow, speed, suction and process-state records.

[ ] Lineup, source level, maintenance and signal-quality history; mark missing evidence.

The next question

What do the actual curve, duty and suction records establish-and what remains unknown?

Keep the limits

Original illustration: 80% speed yields ideal ratios of 80% flow, 64% head and 51.2% power (displayed as 51%). This does not establish that a plant will receive 80% of its original flow or save 48.8% of its electricity.

Primary sources and scope

Hydraulic Institute / Europump / U.S. Department of Energy / 2004 executive summary; pump/system curves and static-head discussion
https://www.energy.gov/sites/prod/files/2014/05/f16/variable_speed_pumping.pdf

KSB Centrifugal Pump Lexicon / Undated web reference; read 2026-11-19
https://www.ksb.com/en-global/centrifugal-pump-lexicon/article/volute-casing-pump-1117514

KSB Centrifugal Pump Lexicon / Undated web reference; read 2026-11-19
https://www.ksb.com/en-global/centrifugal-pump-lexicon/article/shaft-seal-1116516

Educational reference, not a work procedure, diagnosis or qualification. Use current OEM/site requirements. Scope and full lessons: https://apexreng.com/library/component-lab/