

Summary THE DESIGN AND ANALYSIS PROCESS Understanding the Functionality: Reciprocating pumps convert rotary motion (from a crankshaft) into linear motion (of a piston). This includes performance testing, endurance testing, and reliability analysis. Determining Design Goals: The design goals typically include minimizing mechanical stresses, reducing frictional losses, and optimizing the pump's efficiency. Considerations for Specific Applications: The optimal rod to crank ratio may vary depending on the specific application, such as pump size, operating speed, fluid properties, and intended usage. Simulation and Prototyping: Using computational tools or physical prototypes, simulate the pump's operation under various conditions to evaluate the chosen rod to crank ratio. A higher ratio typically leads to smoother piston motion but may increase mechanical stresses and friction. Iterative Improvement: Based on the test results and feedback, iterate on the design to further optimize performance, efficiency, and reliability. Ratio Selection: The ratio of connecting rod length (L) to crank radius (R) is a critical parameter. It affects the motion of the piston and the forces acting on various components.