CERAMFORGE
ENGINEERED CERAMICS

PISTON AND CYLINDER FOR HLPC PUMPS

PISTON AND CYLINDER FOR HLPC PUMPS

In HPLC systems, pistons and cylinders are critical components responsible for creating precise fluid displacement in reciprocating pumps. As the piston moves within the cylinder, it draws and dispenses ultra-small volumes of sample or solvent at controlled high pressures.
Ceramic versions of these components outperform metal or polymer counterparts by offering, superior wear resistance under continuous motion, inertness to aggressive mobile phases (acidic, basic, or organic solvents), tight sealing with sapphire or ceramic check valves for micro-flow control and non-contaminating performance critical for analytical accuracy.
CeramForge pistons and cylinders are designed with ultra-fine tolerances to ensure smooth, low-friction movement and long service life—ideal for both binary and quaternary pump systems.

MATERIAL DIVERSITY

Zirconia (Y-TZP / MgO-PSZ) | Zirconia Toughened Alumina (ZTA) | Alumina (Al_2O_3) | Sapphire
Each component is manufactured using isostatic pressing, precision CNC grinding, and polishing, ensuring ultra-low surface roughness and tight clearances for leak-tight performance.

INDUSTRIES SERVED

- Pharmaceutical & Biotechnology Industry
- Chemical & Fine Chemical Industry
- Food & Beverage Industry
- Environmental Analysis
- Clinical & Medical Diagnostics
- Academia & Research Institutions
- Battery and Energy Materials (Emerging Use)

KEY ADVANTAGES

- Exceptional Wear Resistance
- Chemical Inertness
- Contamination-Free
- High Dimensional Accuracy
- Long Service Life
- Non-Stick Surface Finish

APPLICATION

- Thermal shields and enclosures for high-voltage electronics
- Outer sleeves and support rings in mud motors and rotating tools
- Housings for bearing assemblies in pumps and turbines
- Flow chambers for corrosive or abrasive chemical handling
- Enclosures for vacuum processing and semiconductor plasma tools
- Casings for sensor protection in molten metal or chemical baths
- Structural protection in laser systems, plasma arcs, or thermal spray booths

CONCLUSION

When durability, precision, and chemical resistance are critical, CeramForge ceramic pistons and plungers stand above traditional alternatives. Our components are engineered to perform under pressure—both literally and figuratively—delivering consistent, contamination-free operation in the harshest fluid-handling environments.