Why p50 gear pumps blow up

When a p50 gear pump suddenly explodes, it not only paralyzes equipment, but can also lead to safety accidents. So what turns a sturdy p50 gear pump into a “time bomb”?

1. Pressure out of control

The culprit of gear pump cracking is often abnormal pressure. In the aluminum alloy gear pump laboratory tests, its pressure limit is usually between 38-45MPa, but the actual working conditions, some special conditions of the pressure may reach more than 50MPa, far beyond its tolerance limit. When the oil outlet pipe is clogged with metal debris, the system pressure will continue to climb like a blowing balloon. More dangerously, if the safety valve adjustment pressure is too high or there is a jamming phenomenon, the pressure protection mechanism will fail.

The special construction of multi-way valves also poses a risk. Some negative opening design of the multi-way valve in the instant of reversal, will form a similar “hydraulic lock” state, so that the pump outlet pressure rises. Technicians in the disassembly of cracked pump body, often found on the gear end face similar to the “crater” plastic deformation, which is the pressure impact left traces.

2. Overloaded operation

Long-term overload operation is the gear pump “chronic poison”. When the pump continues to operate at more than 120% of the rated pressure, metal fatigue will accelerate the accumulation. A port crane gear pump, due to frequent overloading operations, the use of only 800 hours on the shell cracks. Monitoring data show that the bearing part of the temperature is 25 ℃ higher than normal working conditions, which is the material strength of the early warning signs of decline.

Excessive speed is also dangerous. The centrifugal force generated by high-speed rotation increases the axial clearance, the amount of internal leakage surge, which will eventually lead to the pump body due to local overheating and cracking.

3. Oil contamination

The cleanliness of the hydraulic oil directly affects the life of the gear pump. Metal particles into the gear pump, these tiny “killers” in the gear surface cut out a dense furrow-like wear, so that the end gap expansion, the amount of internal leakage increased. Worse still, contaminated oil will accelerate the aging of seals, shortening the life of seals.

4. Improper installation and maintenance

Loose bolts are a common safety hazard. A hydraulic system integrator in the equipment inspection found that a piece of equipment, gear pumps, 4 connecting bolts, 2 due to long-term vibration of 0.5mm elongation and deformation, resulting in the pump body and the flange surface to produce a gap of 0.15mm. In the system pressure fluctuations, this tiny gap instantly evolved into a “pressure breakthrough”, eventually triggering the pump body cracking.

5. Material defects

Casting defects are like time bombs, easy to crack. Fatigue aging will make the gear pump casing material tensile strength decline, and ultimately metal fatigue triggered cracking.

p50 gear pump cracking is never a single factor, the safe operation of p50 gear pump requires technology and management of two-pronged approach. Through the understanding of these cracking mechanisms, the establishment of a scientific prevention system, we can completely this “hydraulic heart” to build a more robust and reliable.

gear pump types
gear pump definition
industrial gear pump
gear hydraulic pump
gear pump characteristics
gear pump brand
external gear pump and internal