

PETROCHEMICAL

Premium Vertical Motor Machining Protects Pump Seals & Bearings



- **Application** = Pump
- **Motor Type** = AC Vertical
- **Manufacturer** = US Electric
- **HP** = 200
- **Voltage** = 460
- **RPM** = 1781
- **Frame** = 447VP
- **Type** = LVCE-4

The Challenge

Refineries and chemical plants are full of vertical motors (2 – 300 HP) driving pumps which supply hydrocarbons or hazardous organic chemicals. When mated to the pump, vertical motors that are not machined and assembled to high tolerances will induce mechanical stresses and vibrations on pump bearings and seals resulting in hydrocarbon or chemical leakage. These leaks can result in spills, fire, explosion, and injury to plant workers. It can also mean involvement from the Environmental Protection Agency (EPA), as the plant is responsible for reporting all leaks and spills to the EPA.

The Solution

IPS machinists have developed proprietary tooling and extensive procedures to achieve the highest machining tolerances when reconditioning or rewinding vertical motors. In particular paying close attention to the shaft run-out of a vertical motor to the motor base spigot (rabbet). These better tolerances deliver reliability and longer life to the pump seals and bearings and include the following:

- 0.001" shaft run-out. Typical shaft run-out of new or repaired motors is 0.002" to 0.005".
- 0.001" flange face run-out. Typical face run-out of new or repaired motors is 0.003" to 0.015".
- 0.001" rabbet fit run-out. Typical rabbet fit run-out of new or repaired motors is 0.003" to 0.015".
- Maintain rabbet opening to 0.004" of standard.



IPS machinists deliver tighter run-out tolerances on shafts, flange faces and rabbet fits for vertical motors driving pumps at petrochemical facilities. Doing so delivers reliability and increased life to pump seals and bearings.

TOTAL COST OF OWNERSHIP (TCO)



The Savings

Even though the IPS premium machining process for vertical motors takes more time and is more expensive when compared to less stringent machining processes, the refinery experienced \$12,400 in annual savings/motor or over \$60,000 in total savings/motor over the past 5 years, since receiving the updated IPS vertical motor machining. These savings are driven by the following:

- Reduced frequency in reconditions - from 6 to 9 months in service up to 2 to 3 years in service
- Reduced EPA reporting— giving the plant a better score with the EPA and saving time for plant staff

COST ITEM	COST DESCRIPTION	ANNUAL TCO	IPS SOLUTION
Labor	Maintenance		
	Total Events (X / Year)	2	1
	Maintenance Labor Rate (\$ / Hour)	\$50	\$50
	Maintenance Personnel per event	4	4
	Avg. time per event	32	32
	Sub-Total (\$ / Year)	\$12,800	\$6,400
Materials	Repair		
	Total events (Qty. / Year)	2	1
	Pump Rebuild cost (\$)	\$5,000	\$5,000
	Motor Recondition cost (\$)	\$3,000	\$5,000
	Sub-Total (\$ / Year)	\$16,000	\$10,000
1st Year TCO =		\$28,800	\$16,400
IPS SAVINGS PER MOTOR =			\$12,400

The Conclusion

IPS offers proprietary tooling and procedures to deliver proven and unmatched machining tolerances for vertical motors. By doing so, IPS is also able to help you minimize the frequency of vertical motor and pump reconditions, and free up you maintenance team from repeated removal / installation requirements and time consuming EPA reporting. IPS delivers valuable maintenance and repair solutions that helps you minimize unplanned downtime, increase production and potentially return cost avoidance savings to an operation. If you are not currently using IPS for your electric motor and generator repair and would like to receive more information about TCO documented savings, contact IPS at www.ips.us or www.ips.ca.

