Installation and Operation Instructions for CONTINENTAL Models CP, CL, CM, and CG

1. **The Operating Principle of the CONTINENTAL Progressive Cavity Pump** is based on two pumping elements. One is a high strength steel single thread helical screw **rotor** that turns in a double thread helical screw **stator**. The **stator** is a molded elastomer of various selected compounds bonded into a steel tube.

2. The outer circumference of the turning **rotor** is in contact with the internal circumference of the **stator** and provides an effective seal creating cavities of liquid that are moved from the suction end to the discharge end of the pumping elements.

3. The displacement of the liquid is uniformly positive, without pulsation or turbulence. The rate of flow is proportional to the speed of the rotating **rotor**. Pressure is uniform and independent of the pump speed, but is attributable to the length of the **rotor** and **stator** elements.

4. Dry friction is harmful to Progressing Cavity Pumps**. Do no operate the pump until it is filled with the liquid to be pumped**. This liquid serves as a lubricant and as a seal between the rotor and stator and is not a priming operation. Approximately 10% of the pump's displacement rating will satisfy the cooling and lubricant requirements until full displacement capacity is attained.

5. Mount the pump on a properly machined and fabricated steel base that is anchored with bolts on a level solid foundation.

6. **Alignment of direct driven pumps** that are driven by a motor or a speed reducer should be carefully checked after the pump base has been mounted on the foundation. Check the alignment of the coupling halves with a straight edge. Alignment should be checked at least four points 90° around the O.D. of the coupling. A space between the pump and driver shaft ends should be held to no less than 1/8".

7. **Belt driven pumps** should be checked after mounting the pump base on the foundation. Make sure, with the help of a straight edge, that the belts and pulleys are in alignment and that the belts have the proper tension.

8. **Pump rotation:** The pump can be operated in either a clockwise or counterclockwise direction when viewing the pump form the driveshaft end. The recommended operating direction is clockwise when viewing the pump from the driveshaft end. The inlet and discharge ports are

related to the rotation of the pump. Please contact the factory if you have any questions regarding rotation.

9. **Piping** to pump should generally be the same size as the pump inlet port and discharge port openings. Those systems handling viscous, volatile high pressure or high temperature materials may have to be more appropriately sized.

    a. All threaded joints should be coated and sealed with pipe compound.
    b. Provide for expansion in the piping system to all for movement and deflection.
    c. Use pipe supports to keep the weight of the piping system from causing strain on the pump.
    d. Make all lines as direct and free of fittings as possible. Minimize suction line by locating the pump below or close to the liquid being pumped.
    e. When the pump is handling abrasive, corrosive liquids, slurries, sludges, cements, adhesives or any liquids that harden, it should be flushed **clean**. The rotation of the pump can be operated both clockwise and counterclockwise to accomplish this operation most thoroughly.
    f. It is a good practice to consider installing pressure and/or vacuum gauges in both the inlet and outlet pipes to the pump to check that it conforms to your operating specifications.

    Progressing Cavity Pumps are **positive displacement** and the discharge outlet must be kept open or a **relief valve** or a **by-pass piping** arrangement should be provided. If the discharge or inlet into the system is to be shut off or closed, provisions must be made for a relief valve or by-pass arrangement or damage can be done to the pump and the drive, including the motor. Strainers, filters and foot valves should be properly sized so as not to affect performance of the pump and should usually be installed in the suction line.

10. **Pump Bearings** are anti-friction ball type and should be periodically grease lubricated. They are initially packed when assembled at the factory.

    a. **Do not over lubricate**.
    b. Use quality anti-friction bearing grease.
    c. It is recommended that under normal use, that no lubrication be added for the first 1200 hours of operation unless it is uncomfortable to hold the hand on the bearing housing.
    d. The bearing shaft assembly should be inspected and cleaned after running the pump for approximately 2500 hours.
    e. All old grease should be removed from the bearing housing, and only new grease applied to bearing races so as to fill them flush.
    f. Add a few drops of oil to bearing seals before remounting assembly.

11. Packing maintenance procedures

a. The Packing Gland should be firmly tightened so as to prevent excessive leakage through the packing, but not so tight that it will cause overheating. Always adjust packing gland evenly. Align the packing gland so that it evenly goes into the packing gland cavity of the pump housing.
b. **CONTINENTAL Progressing Cavity Pumps** are supplied with a lantern ring in the midsection of the packing with access to a lubrication fitting on the external surface of the pump body. Lubricating the packing regularly with small amounts of lubricant or flushing with water will extend the life of the packing and help maintain a good seal.
c. A scored driveshaft reduces the life of packing and should be replaced.
d. When replacing worn packing use standard die-cut formed packing. Do not use one piece spiral packing. Press into place the die-cut and preformed packing rings and stagger the joints 180° apart.
e. After packing is installed, tighten the gland bolts evenly and firmly. Bolts should be backed off gradually as the stuffing box warms up, to avoid overheating of the packing area.
f. A small amount of leakage through the packing can be normal and helpful for good operation and easily drained away from the base.

Pre-Start-Up Checks

1. Read and understand all information furnished with pump.
2. Review operating conditions.
3. Check setting of relief valve in discharge line.
4. Check for proper position of belt or coupling guards. Do not operate pump without guards.
5. Fill the pump with the liquid to be pumped. **Do not operate pump dry**.
6. **Rotate driveshaft** of pump four or five rotations. This creates a seal between the rotor and stator to create pumping action.
7. Make sure the inlet and discharge lines are open.
8. Start the unit.
9. Check to see if the pump is delivering liquid. If it is not, refer to the section on checking pump performance.

Troubleshooting Pump Performance

A summary of possible causes of improper performance of Progressing Cavity Pumps

No liquid delivered

1. Pump rotating in wrong direction.
2. Inlet lift too great.

3. Clogged inlet line.
4. Air pockets or vapor lock.
5. Air leaks in inlet line.
6. Faulty relief valve in system.

Pump Takes Too Much Power

1. Speed too high.
2. Liquid more viscous that anticipated.
3. Operating pressure higher than specified. Check this with gauge at the pump outlet.
4. Outlet line obstructed.
5. Mechanical defect, such as bent shaft, tight packing gland, or misalignment of piping.
6. Relief valve in system not operating properly.

Insufficient Liquid Delivered

1. Air leaks in inlet line.
2. Air leaks in through packing.
3. Speed too low.
4. Excessive lift at inlet. Check this with gauge at the pump inlet.
5. Viscosity of liquid too high for size and length of inlet pipe.
6. Foot valve or end of inlet pipe not immersed deeply enough in liquid.
7. Foot valve, if used, too small, stuck, or not working properly.
8. Partial air pockets or vapor lock.
9. Pump damaged by misalignment.
10. Excessive clearance in pump caused by wear or corrosion.
11. Faulty relief valve in system.

Excessive Noise

1. Started pump. Liquid not getting into pump.
2. Air leaks in inlet line.
3. Air or gases in liquid.
4. Pump speed too high.
5. Improper mounting. Check alignment thoroughly.