Tuthill Pump Group has provided pumps for water and wastewater treatment applications for over 50 years. Water and wastewater treatment processes require the use of metering of various chemicals throughout stages of treatment. Some of these chemicals are hazardous requiring a leak free environment. They can also be difficult to handle with pumps due to vapor locking from chemicals such as Sodium Hypochlorite. Tuthill Magnetically Coupled external gear and HD circumferential piston pumps are proven reliable solutions for water treatment chemical metering, polymer blending, and some secondary treatment sludge applications.

Tuthill Magnetically Coupled External Gear Pumps provide metering accuracy of +/- 1% and turndown ratios of 100:1, depending on drive characteristics. Magnetically coupled external gear pumps provide smooth, repeatable, flow, reducing fluid agitation and eliminate the need for pulsation dampeners. The nearly pulsation free flow also creates an environment to successfully feed a flow meter, resulting in economic controlled used of chemicals with a closed feedback loop system. Positive displacement external gear pumps operate at motor speeds, eliminating the need for gear reducers. Commercially available motors and controllers are easily controlled through a signal feedback system such as 4 to 20 mA received from a plant flow meter or chemical flow meter.

Traditional Diaphragm Metering Pump designs typically struggle with vapor locking of some chemicals. The valve-less flow-through design of the Tuthill Technaflo product resists vapor locking on Sodium Hypochlorite with a continuous flow-through design.

Tuthill Technaflo Pumps are designed to provide life expectancy, of up to 20,000 hours, reducing downtime. In addition, the magnetically coupled external gear design lends itself to simple field repair, replacing gears, bearings, and o-rings as required. Many installations stock a replacement pump head to simply replace in the field and rebuild the existing product within minutes in the maintenance shop.

Tuthill Technaflo Magnetically Coupled External Gear Pumps are available in 316 stainless steel, Hastelloy C, and Titanium with flow range from 1 ml/min to 10 GPM at differential pressures to 250 PSI. Pump are available with PPS or Peak Gears, and may be driven by a variety of motors and drives capable of receiving feedback signals for metered control of product.

Technaflo pump products have proven performance metering treatment chemicals such as; Sodium Hypochlorite, Ferric Chloride, Hydrofluorosilicic Acid, Methanol, Polymer, Sodium Bisulfite, Sulfuric Acid, Sulfurous Acid, and Alums.

![Tuthill D - Series 0.23 ml/Rev External Gear Pump Metering Typical Performance](chart.png)
Tuthill HD circumferential piston pumps are an effective solution for handling polymers, secondary sludge and scum. The heavy-duty non-contact self-priming design can operate dry without any damage to the pump.

The Tuthill HD design uses an external bearing and timing gear chamber eliminating possible contamination, extending pump life. The low shear technology is ideal for pumping and metering shear sensitive polymers. The Tuthill HD circumferential piston pump technology easily handles a wide viscosity range and high differential pressures. The Tuthill HD pump is available in ductile iron and 316 stainless steel construction with flow rates up to 600 GPM and differential pressures to 300 PSI.

The HD circumferential piston design is a good alternative for applications experiencing failure from a run-dry situation, short wearlife due to abrasion, and product degradation of shear sensitive material.

For sealing effectiveness combined with intermittent run-dry capability, Tuffseall™ cartridge lip seals are available for the popular HD sizes.

**Vallejo Sanitation**

The 60 MGD Vallejo Sanitation, in California uses Tuthill pumps to meter 12.5% Sodium Hypochlorite, replacing large diaphragm pumps that were vapor locking. They are using a Tuthill W-Series Magnetically Coupled external gear pump with 2.3 ml/rev displacement constructed of Hastelloy C. The pump flow varies from .5 to 80 GPH at 60 PSI differential pressure by a variable frequency drive. Since there are no pulsations, the flow is now measured by a flow meter with an analog output signal to the variable frequency drive.

The Technaflo pumps have eliminated vapor locking, and the need for pulsation dampeners, decreased repair time, increased the turndown ratio, and reduced chemical usage. Since there are no pulsations output with the external gear design, the flow is now measured by a flow meter sending an analog output signal to the variable frequency drive, controlling chemical usage in real-time.
Truckee Meadows

The 39.8 MGD facility in Nevada has used Tuthill Technaflo pumps since 1994 to meter Methanol. In addition to Methanol, they are now using Tuthill pumps for 12.5% Sodium Hypochlorite, 39-47% Ferric Chloride, Sodium Bisulfate and 98% Sulfuric Acid ranging in sizes from 0.11 ml/rev to 5.3 ml/rev displacements and constructed of 316 stainless steel, Hastelloy C, and Titanium.

City of Detroit

The 1.2 BGD City of Detroit Wastewater Treatment Plant is using Tuthill HD 600 316 stainless steel circumferential piston pumps to meter polymer and polymer solution, replacing progressing cavity type pumps. The Tuthill HD 600 pumps are used for two polymer applications. They pump 30,000 CPS raw polymer at 120 GPM and 100 PSI, and 2000 CPS dilute polymer from 70 to 120 GPM at 60 PSI. The City of Detroit has been using Tuthill HD pumps for over 45 years.

Conclusion

Tuthill pumps are proven solutions for metering and transfer of typical water and wastewater treatment chemicals such as Ferric Chloride, Hydrofluorosilicic Acid, Methanol, Polymer, Sodium Bisulfite, Sodium Hypochlorite, Sulfuric Acid, Sulfurous Acid, Methanol, and Alum. Tuthill chemical and corrosion resistant magnetically coupled external gear pumps resist vapor locking from out gassing Sodium Hypochlorite with their valve-less design. They are easily applied for metering with their high turndown ratios and accuracies up to +/-1%. With this level of control operating from flow meter feedback, users can easily treat chemically to plant flow and conserve the use of chemicals appropriately.

Tuthill HD circumferential piston pumps are a non-contact self-priming design with an external bearing and timing gear chamber that can operate dry without any damage to the pump. The HD low shear technology is ideal for pumping and metering shear sensitive fluids.