

Tuthill Process Pumps Products Marketing Report Report # 7 (Rev. 04/13/06)

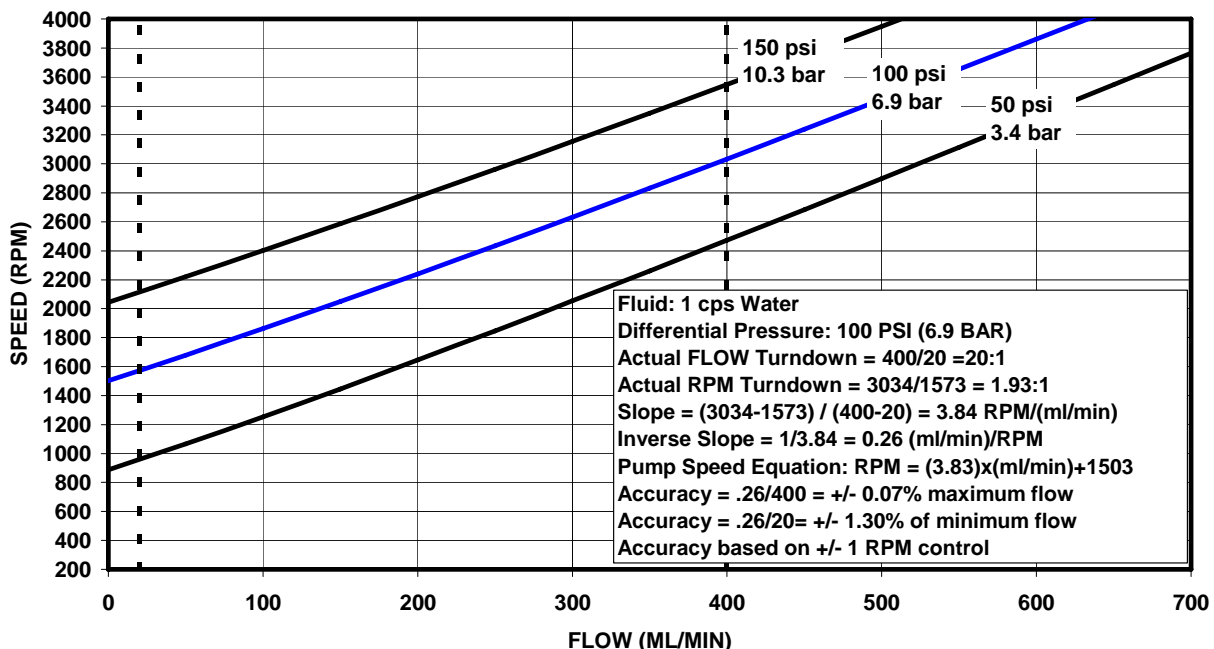
Tuthill Pumps Ideal for Water and Wastewater Treatment Applications

Tuthill Pump Group has provided pumps for water and wastewater treatment applications for over 40 years. Water and wastewater treatment necessitates metering many different chemicals and moving waste by-products such as sludge. Historically, many municipalities use costly diaphragm metering pumps that are prone to vapor locking on Sodium Hypochlorite. Sludge removal is often tried with large progressing cavity type pumps that require frequent maintenance. **Tuthill Magnetically Coupled external gear and HD circumferential piston pumps** are proven reliable solutions for municipal chemical metering and wastewater sludge transfer applications.

Tuthill Magnetically Coupled external gear pumps are proven performers for water and wastewater treatment applications. They provide metering accuracy up to 0.25% and turndown ratios exceeding 100:1. External gear pumps provide smooth flow-reducing fluid agitation and eliminate the need for pulsation dampeners. The smooth flow also makes external gear pumps flow meter and residual

measurement friendly. They operate at motor speeds eliminating the need for gear reducers. They use standard motors and controllers and are easily controlled through a signal feedback system such as 4 to 20 mA.

The valve-less flow-through design resists vapor locking by not trapping gasses from gassing off Sodium Hypochlorite. The compact design is easily and quickly repaired. Magnetically coupled external gear pumps provide unprecedented life expectancy, up to 20,000 hours, reducing downtime. **Tuthill Magnetically Coupled external gear pumps** are available in 316 stainless steel, Hastelloy, and titanium with flow range from 1 ml/min to 10 GPM at differential pressures to 250 PSI. Magnetically coupled external gear pumps typically provide improved system performance and substantial economic savings. They have proven performance pumping and 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

Tuthill HD circumferential piston pumps are an effective solution for handling polymers, sludge and other difficult fluids. 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 450 PSI.

For sealing effectiveness combined with intermittent run-dry capability, **Tuffseal™ cartridge lip seals** are available for the popular HD sizes. The **Tuthill HD** pump is a robust technology that has proven long life performance. **Tuthill HD** pumps are proven solutions for metering and transfer of typical water and wastewater treatment chemicals such as polymer, and byproducts such as sludge, and fly ash.

Water and Wastewater Solution Examples

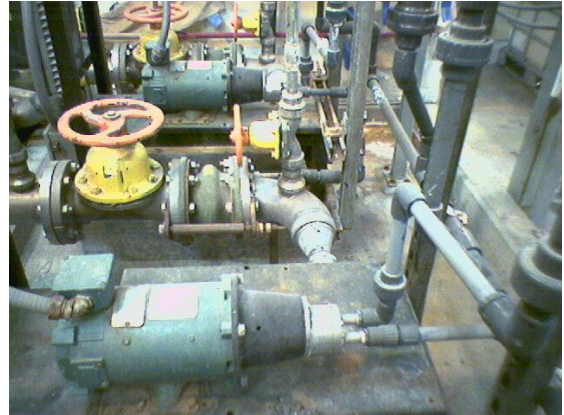
60 MGD Vallejo Sanitation, California uses Tuthill pumps to meter 12.5% Sodium Hypochlorite, replacing large diaphragm pumps that were vapor locking. They are using a **Tuthill D-Series Magnetically Coupled external gear pump** with 2.3 ml/rev displacement constructed of Hastelloy. The pump flow varies 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 **Tuthill Magnetically Coupled external gear pumps** have eliminated vapor locking, eliminated the need for pulsation dampeners, repair time, increased the turndown ratio, and reduced chemical usage 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 **Tuthill Magnetically Coupled external gear pumps** have eliminated vapor locking, eliminated the need for pulsation dampeners, repair time, increased the turndown ratio, and reduced chemical usage.



Vallejo Sanitation: 12.5% Sodium Hypochlorite metering: **Tuthill D-Series** pumps replaced diaphragm pumps

The 46 MGD Truckee Meadows, Utah started using **Tuthill Magnetically Coupled external pumps** in 1994 to meter Methanol. Because of the trouble-free performance of the Tuthill external gear pumps, Truckee Meadows specified **Tuthill Magnetically Coupled external gear pumps** for a recent expansion. In addition to Methanol, they are now using Tuthill pumps for 12.5% Sodium Hypochlorite, 39-47% Ferric Chlorite, 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, and titanium.



Truckee Meadows:
Tuthill T-Series pumping Methanol

Vacaville Water Treatment, CA replaced a solenoid-actuated diaphragm pump with a Tuthill pump in a 12.5% Sodium Hypochlorite injection remote well application. The Sodium Hypochlorite is injected into the city water at the remote well site. The wells are used for water replenishment and are shut down during peak electricity demands typically from noon to 6:00 PM to eliminate electrical surcharges. The solenoid-actuated diaphragm pump would frequently vapor lock during start-up, requiring an operator to travel to the remote location to manually start the pump. Sending a technician to a remote well site each time was not feasible. To keep the well operational, they started operating it 24 hours a day resulting in a Substantial increase in electricity costs.

Vacaville has 16 remote well sites and now specifies only **Tuthill Magnetically Coupled external gear pumps** for metering Sodium Hypochlorite in their well locations.

The 15.4 MGP Napa Sanitary District, California started replacing diaphragm pumps with Tuthill T-Series 2.6 ml/rev 316 stainless steel

magnetically coupled external gear pumps for Sodium Bisulfite in 2001. The Tuthill pumps proved to be very reliable and additional Tuthill T-Series 2.6 ml/rev pumps have been added for pumping polymer.



Napa Sanitation District
Left: **T Tuthill T-series** compact installation pumping polymer
Right: **Tuthill T-series** replacing a diaphragm pump for Sodium Bisulfite

Pig's Eye Waste Water Treatment Plant, in Minnesota is using a Tuthill model HD 330 circumferential piston pump in ductile iron construction for pumping dissolved air floatation (DAF) sludge. In a DAF system, solid particles are separated from the liquid phase by flotation. Air is introduced into the system, creating fine bubbles that adhere to or are absorbed by the solids causing the solids to be buoyant and rise to the surface. The solids are skimmed and then pumped.

The pumps will see anything from foam to thick solids and run dry situations. Tuthill HD pumps handle this challenging service where the alternatives of centrifugal pumps would potentially clog, and progressing cavity pumps would be vulnerable to run dry conditions.

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. The **Tuthill HD** pumps typically operate for 20 years without a catastrophic pump failure, while the progressing cavity type pumps last only 2 to 3 years. The City of Detroit recently increased their capacity by changing from HD 330 pumps to the HD 600 pump size.

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 Alums, and byproducts such as sludge, and fly ash. 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 0.25%. **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 polymers, and challenging DAF system wastewater sludge.