

TECHNI/TIPS

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LEADERS IN LUBRICANTS

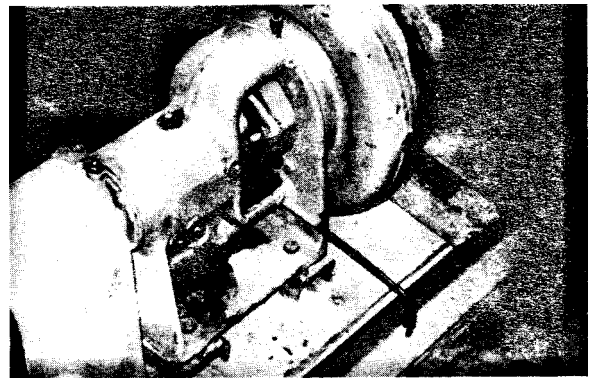
NUMBER 92

PUMPS AT WASTEWATER TREATMENT FACILITIES

In following through the wastewater treatment process, it becomes apparent that the unit group of electric motors, gear reducers, couplings/chains or belt drives, and pumps is repeated over and over. Pumps with various configurations are interspersed throughout the plant with minor differences including the coupling and belt or chain drives.

Pumps may be rotary, piston or turbine type and are usually grease lubricated, except for the turbine types, which are generally drip oil lubricated at the lower bearings and greased at the top. A top quality multipurpose EP grease should be used for its sealing ability and its impact and wear resistance. A turbine grade rust and oxidation (R&O) and anti-wear (AW) quality oil should be used.

Beginning with the wastewater collection systems and lift stations, pumps are used in large, sophisticated systems where the topography will not allow for gravity flow. When pumps are used in the collection systems, including those at the lift stations, the sewer line becomes a force main. The collection system represents a large portion of the investment in a sewage system and pumps play a substantial part. Modern sewer systems provide for the installation of adequate pumping facilities.



Savings in construction costs can be affected by using more pumping stations. In addition to electric motors (or standby internal combustion engines) many pumps and valves are involved, not only in the collection system lift stations, but throughout the wastewater treatment plant. Wastewater pumps are many and varied. They will include centrifugal pumps, axial flow or propeller pumps, mixed-flow pumps and screw pumps.

Centrifugal pumps may be mounted with a horizontal or vertical drive shaft. These are readily accessible for cleaning or repair, and involve a minimum of maintenance expense largely because of only one moving part—the impeller. This type of pump will easily handle sludge as well as normal sewage solids.

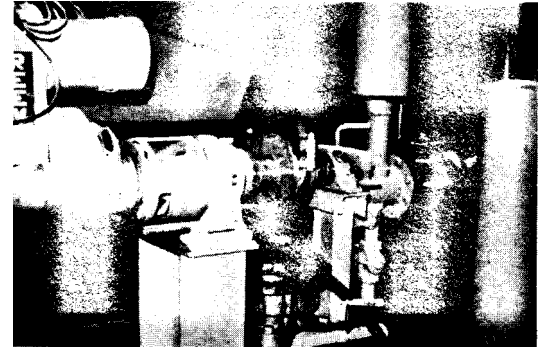
The axial flow pumps, or propeller pumps require the main shaft bearings to be located in the waterway, usually in the hub of the defusion vanes. These are recommended for limited spaces, and for economy. Mixed-flow pumps offer definite advantage for plants operating at a high load factor, and for wastewater containing trash and other solid materials.

Screw pumps can be used for pumping raw wastewater, sludge or slurries and have the advantage of less excavation, no need for suction piping, constant operating efficiency and nonlogging operation.

Pneumatic injector pumps have the advantage of few or no moving parts in contact with sewage. Such pumps are specially used for handling sewage from hotels, office buildings, and institutional and industrial plants where the basement is below the sewer lines. Ejector pumps are also used for sewage lift stations. They require no wet well and are flushed at every cycle.

Sump (submersible) pumps may be known as "ejectors" when indicating a vertical (centrifugal) pump with enclosed shaft and vertical discharge pipe. When the complete unit is lowered into a sump, or "wet well", they are called sump pumps or bilge pumps. Submersible pumps have totally enclosed, permanently lubricated, electric motors, such that the pump and motor can both operate below the liquid level.

Pumps for handling sludge should be those especially designed for the purpose. Sludge is still a "fluid" and obeys laws of hydraulics, but contains up to 10% solids. The conditions under which it is pumped differentiate from fluid sewage. Reciprocating pumps, whether plunger or diaphragm type, operate with good efficiency at a wide range of speeds and are specially suitable for handling sludge. Plunger pumps are also specially suitable for handling sludge because of the easy and rapid accessibility of the valves for removing obstructions or replacing the ball or flap valve. By substituting a flexible diaphragm for the piston head, a reciprocating or positive displacement pump becomes a diaphragm pump. They can then be air actuated or internal combustion engine driven, or electric motor driven.



Rotary pumps of the progressing cavity design, similar in operation to a screw conveyor, will handle sludge as well as viscous fluids. By opening up the impeller of a centrifugal pump, a solids handling pump is feasible for most domestic waste sludges. An important feature is easy access to the impeller through a removable cover plate.

The number and types of pumps installed at any wastewater treatment facility will depend largely on the plant's capacity and its range of treatment. Typical lubrication recommendations for various sewage, sump, sludge, slurry, scum, seal water, circulating, and chemical feed pumps are as follows:

<u>Equipment</u>	<u>Recommended LE Lubricant</u>
Motors & Pumps-	
Oil Bearings	6403/6404/6405 MONOLEC® Turbine Oil 6801-6807 MULTILEC® Industrial Oil 300 MONOLEC® Industrial Lubricant
Greased Bearings	4701 MONOLEC® Industrial Lubricant 1274/1275 ALMAPLEX® Industrial Lubricant 3751/3752 ALMAGARD® Vari-Purpose Lubricant
Gear Reducers -	1232 ALMATEK® General Purpose Lubricant 6403/6404/6405 MONOLEC® Turbine Oil 6801-6807 MULTILEC® Industrial Oil 300 MONOLEC® Industrial Lubricant 607/608 ALMASOL® Vari-Purpose Gear Lubricant
Couplings-	4701 MONOLEC® Industrial Lubricant 1274/1275 ALMAPLEX® Industrial Lubricant 3751/3752 ALMAGARD® Vari-Purpose Lubricant
Pump Packing Glands-	3751/3752 ALMAGARD® Vari-Purpose Lubricant



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