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Lubrication of Blowers at Wastewater Treatment Plants

Blowers are numerous in any large wastewater treatment plant, with individual blowers scattered throughout for various needs, or banks of them to supply a large volume of air to the aeration and sludge treatment areas.

The careful selection of lubricants for these blowers cannot be emphasized too much because blowers are a vital component in a successful wastewater treatment process, and proper lubricant selection is critical to maintaining the reliability of the blowers. Any oils that are used should be long-lasting, highly stable and have low-deposit tendencies.

The two types of blowers found most often in wastewater treatment plants are rotary and reciprocating units.

- **Rotary blowers** can be lubricated with grease, oil or both. The grease should be a tough multifunctional lubricant, while the oil should be a high-quality turbine oil that has anti-wear characteristics and incorporates anti-foam and rust and oxidation (R & O) inhibitors.
- **Reciprocating blowers** should be lubricated with the same high-quality turbine oil recommended for rotary blowers, although slightly heavier (higher viscosity).

How Blowers Are Used

Proper lubrication of the blowers is extremely important as large volumes of air are needed throughout the entire wastewater treatment process, including the following areas.

Oxygenation Ponds
In the aeration and oxygenation process, air is forced through mains (piping) from the blower building, then through diffusers at the bottom of the oxygenation ponds. The air bubbles up through the liquid to cause flocculent to foam together on the surface, from where the floc is carried off through troughs at the sides of the ponds.

Flotation Units
As part of the clarification process in some plants, air is used to float suspended matter. After being applied in a preparation tank, the air – in the form of rising bubbles – carries partially emulsified particles of oil and grease to the surface to collect with the scum. Most flotation units designed for treatment of difficult waste or sludge use dissolved air flotation. The influent is supersaturated with air under pressure. Minute air bubbles are formed and carry floatables to the tank surface.

One flotation unit design employs diffuser plates in a modification of the ridge and furrow system. Another uses downdraft tube aerators.

Grit Chambers
The aerated grit chamber is designed to remove larger, heavier particles, sand, stones, etc. that would cause excessive equipment wear in the other plant treatment processes. The airflow pattern to the grit chamber causes the grit to settle to the bottom of the chamber while keeping lighter organic material in suspension to be processed further downstream. The airflow also prevents septic odors in the wastewater by increasing its dissolved oxygen content.

Sludge Tanks

A sludge tank – also known as an aeration tank – is where the biological reactions occur in the activated sludge process. Activated sludge consists of sludge particles produced in wastewater by the growth of organisms. The term "activated" comes from the fact that the sludge contains living bacteria, fungi and protozoa organisms that feed on incoming wastewater and speed up waste decomposition.

Aerobic bacteria thrive as they travel through the aeration tank, multiplying rapidly with sufficient food and oxygen. A blower – or aeration source – is needed to provide the oxygen. By the time the waste reaches the end of the tank, the organisms have used most of the organic matter to produce new cells. After a certain amount of time, the activated sludge is allowed to settle out by sedimentation and is disposed of or reused.

Power Generation

Most blowers are powered by electric motors. However, in some larger plants they may be powered by gas, diesel or dual fuel internal combustion engines operating on the methane gas generated in the sludge digestion process. These engines may be powering generators that run the blowers and a few other pieces of equipment or they may be powering large generators that supply the electrical needs of the entire plant. In some instances, you may find blowers that are powered directly by internal combustion engines in case the plant's main source of power fails or is interrupted.

Top-quality engine oil will normally be used for these engines. Some gas engines require low-ash oil, but it should still be of the same quality. Some branded oils have special additives and inhibitors and will far outperform conventional oils. Using these can reduce lubricant, maintenance and energy costs. Small gasoline engines can use the same engine oil selected for larger engines. For more information about lubricating these engines, refer to Techni-Tips #90.

Lubricant Recommendations

Below are suggested products for the lubrication of standard blowers, but we advise you to consult your *OEM Lubrication Guide* or LE's Technical Services Department for the most accurate product recommendations.

Oils

R & O

- Monolec® R & O Compressor / Turbine Oil (6403-6405)
- Multilec® Industrial Oil (6803-6805)

Hydraulic

- Equipower™ Ultra Hydraulic Oil (6132, 6146, 6168)
- Equipower™ Ultra HVI Hydraulic Oil (6522, 6532)

Synthetic

- Monolec® Syn Industrial Oil (9032, 9046, 9068, 9100, 9150)

EP

- Duolec® Industrial Gear Oil (1602, 1603, 1605)

Greases

- Almaplex® Industrial Lubricant (1274-1275)
- Almagard® Vari-Purpose Lubricant (3751-3752)
- Monolec® Multiplex Lubricant (4622)
- Monolec® Industrial Lubricant (4701)

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