



Lubrication of Influent Screens at Wastewater Treatment Plants, Industrial Complexes & Power Stations

.....

Wastewater treatment plants, large industrial complexes with wastewater disposal capacity, and power generation stations are generally located adjacent to a ready supply of water because they use substantial amounts of water. If there is not a lake, river or other large water source nearby for such a plant when under construction, a man-made water source is usually created.

The source of influent dictates the extent of conditioning necessary to prepare the stream for further clarification. Water treatment techniques vary from plant to plant, but those discussed here generally apply to the treatment of influent streams at industrial and municipal wastewater treatment plants and to surface water (as in the case of power stations that depend on nearby oceans, rivers, lakes and ponds for cooling purposes).

The first section of a typical water treatment facility receives the influent via a channel or basin into a screenhouse. In or near the screenhouse, you will find a series of screens, pumps and other treatment apparatus consisting primarily of rakes and screens of various configurations. Screens are used to remove from the influent any large solids or materials that are not water soluble. If solids are not removed, they become entrained in pipes and moving parts of the treatment plant and can cause substantial damage and inefficiency in the process.

Screen Types

Large modern plants usually have automated mechanically raked bar screens, while smaller or less modern plants are more likely to have manually cleaned screens. Screens of varying sizes may be used. Straight racks are used for hand-raked as well as some mechanically raked screens. Curved screens are mechanically cleaned.



The micro bar screen on the left is for removing plastics, paper, rags, etc. On the right is a typical bar screen for removing larger solids. After screening, the solids are collected and sent to the landfill for processing.

Screens for domestic and commercial wastewater treatment are generally rather coarse, consisting of racks of bars placed in the influent channel in front of the raw wastewater pump. These are anchored at an angle of 30 to 45 degrees with the horizontal, and with the acute angle on the downstream side. Materials removed by coarse screens range in quantity from 0.5 to 3 cubic feet per million gallons; by fine screens up to 30 cubic feet per million gallons.



Screening techniques have evolved over the years to be capable of removing very fine solids – down to seven microns – by using mesh metal or cloth media so that they overlap the sedimentation processes. Fine screening is applicable to a wide range of industrial wastes and for domestic and commercial wastewater that has been stabilized by biological or chemical procedures. In the latter application, they can act as advanced treatment devices.

There are three general types of mechanically operated rakes:

- 1) One type of rake for flat screens consists of a rake moving slowly upward over the back-face (effluent side) of the screen, carrying the screened materials to the top of the screen. There they are dropped into a conveyor, bucket or grinder, or onto a draining platform.
- 2) In the second type, also requiring a flat screen, the rake passes upward on the front-face (influent side) of the screen, dumps its burden, disengages the screen and then moves downward.
- 3) The third type requires curved bars, rather than the common flat screen.

During much of the time, the amount of screenable matter in the sewage is much less than the maximum for which the rake was designed. Several manufacturers provide clock-actuating mechanisms to allow automatic intermittent operation at adjustable intervals.

Traveling screens rotate to remove trash, marine life and refuse from water being channeled into the plant water system. Some use coarse or heavy-duty screens to remove floating branches, twigs or larger refuse. Others use fine screens to safely remove small marine life before returning them to the water source.

Process

Screens are used in industrial waste pretreatment for removal of solids not easily handled by sedimentation basins. Waste of a fibrous character or particulate matter easily separated from water is subjected to treatment with fine screens.

For the disc screens, stainless or alloy wire cloth up to approximately 60 mesh (0.0122-inch or 310-micron opening) is mounted on a rigid circular frame that rotates on a shaft in a channel perpendicular to the direction of the flow. The lower half is submerged so that solids impinge on the surface of the screen and are lifted in the rotation cycle above the level of flow, where they can be removed continuously by water or effluent spray.

In drum screens, the straining fabric is mounted on a cylinder that rotates in a flow channel. The construction varies, principally with regard to direction of flow through the fabric. The flow is either into one end of the cylinder with solids collection on the interior of the fabric, or the flow is from outside the drum through the fabric to the interior with solids collection on the exterior.

Lubricant Recommendations

Here are some lubricant suggestions for typical screening applications. (See *Techni-Tips #94* for comminuting application suggestions.)

Electric Motors

Because these large mechanisms rotate, they will have electric motors, gearboxes and chain drives to propel them. Water resistance and water separation is needed when lubricating these parts, and LE products are unsurpassed in this area. Depending on the type of electric motor, LE's Monolec® Extend EM Grease (1282), Almaplex® Industrial Lubricant (1275) and its Multilec® Industrial Oil (6803) or Monolec® R & O Compressor / Turbine Oil (6403) provide superior lubrication for this important power source.



Turbines & Hydraulics

To protect the sensitive aquatic environments of any nearby water source, LE's Low Tox® Turbine and Hydraulic Oils can be recommended.

Grease-Lubricated Parts

Each section of a traveling screen must be thoroughly lubricated to allow movement without binding. Because the sections move through the influent stream, they must be lubricated with water-resistant grease such as LE's Almagard® Vari-Purpose Lubricant (3750-3752), Almaplex® Industrial Lubricant (1275), Almasol® Syntemp® Lubricant (9901) or Pyroshield® Syn Open Gear Grease (5182).

Traveling Bar, Disc and Drum Screens

Motors

Oiled Bearings

- Duolec® Vari-Purpose Gear Lubricant (1602)
- Monolec® R & O Compressor / Turbine Oil (6403)
- Multilec® Industrial Oil (6803)

Greased Bearings

- Almaplex® Industrial Lubricant (1275)
- Monolec® Extend EM Grease (1282)
- Almagard® Vari-Purpose Lubricant (3750-3752)

Gear Reducers

- Duolec® Vari-Purpose Gear Lubricant (1602)
- Monolec® R & O Compressor / Turbine Oil (6403)
- Multilec® Industrial Oil (6803)
- Low Tox® Turbine Oil (6412-6413)
- Low Tox® Hydraulic Oil (6603)

Couplings & Chains

- Almaplex® Industrial Lubricant (1275)
- Almagard® Vari-Purpose Lubricant (3750-3752)
- Monolec® Industrial Lubricant (4700-4702)
- Pyroshield® Syn Open Gear Grease (5182)
- Duolec® Vari-Purpose Gear Lubricant (1602)

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

Grease Fittings

- Almaplex® Industrial Lubricant (1275)
- Almagard® Vari-Purpose Lubricant (3750-3752)





Monolec®, Multilec®, Duolec®, Almaplex®, Almagard®, Low Tox®, Duolec®, Pyroshield®, and Almasol® are registered trademarks of Lubrication Engineers, Inc

© 2011 Lubrication Engineers, Inc.

LI20086
7-11, rev. 3-19



1919 E. Tulsa | Wichita, KS 67216

www.LElubricants.com | 800.537.7683