

API SEPARATORS

BENEFITS

- Reduced gas emissions
- Longer sensor life
- Reduced labor requirements



BACKGROUND

API (American Petroleum Institute) Separators are frequently used in the treatment of refinery wastewater that has been contaminated by oil and oil-bearing sludge. Separators use the difference in specific gravity to allow heavier liquids to settle below lighter liquids. The lighter liquid is skimmed off, while the heavier liquid remains behind.

Wastewater may contain insoluble oil, sludge, and some soluble components. Soluble or emulsified oil cannot be removed by settling and requires further treatment.

In a typical API separator (Figure 1), wastewater is first collected in a pretreatment section that allows sludge removal. A diffusion barrier slowly allows the wastewater to flow down the separator towards the outlet while the lighter oil fractions can be skimmed off. Conveyors may be used to remove heavier solids and help separate the lighter oils. Baffle plates are used to prevent oil from escaping into the outlet section.

Following this primary step, further treatment processes are used to more completely remove entrained oil in all forms, including emulsified oil, and to condition the water to meet the specifications for release into a stream or body of water. Downstream treatment can include chemical flocculation to remove emulsified oil and special processes for the removal of phenols and sulfides. Factors such as oil globule size, specific gravity, temperature, and viscosity are used to optimize separator design and affect downstream water characteristics.

PROCESS

pH control is used at the discharge from the API Separator to enhance the efficiency of secondary waste treatment processes, such as flocculation. However, because the emulsified oil may still be present at this stage, the pH sensor can become coated, resulting in slow response and eventual failure. Obtaining the benefits of an accurate pH measurement may require regular attention, either by removing and cleaning the sensor or by automating a cleaning regimen using a cleaning nozzle or retraction device. The characteristics of the oil waste itself will determine how often the sensor will need cleaning.

INSTRUMENTATION

The sensor of choice for this application is the 396P pH sensor, which incorporates the high surface area TUpH™ junction. The TUpH design uses 0.5 micron size pores to preserve the pH signal by preventing the formation of a continuous coating on the sensor. The TUpH sensor has been found to greatly outlast other sensors in applications that may contain solids and other coating agents. It is superbly matched with the Model 5081-P pH Two-Wire Transmitter, which has been designed for the rugged environment found in refineries and chemical plants. The Model 5081-P simultaneously measures both glass and reference impedance as diagnostics, in addition to pH and temperature. These advanced sensor diagnostics can be used to alert the user to pH glass breakage or the buildup of a coating, and can help predict maintenance schedules.

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INSTRUMENTATION

Model 5081 pH/ORP Two-Wire Transmitter

- Hand-held infrared remote control link to activate all the transmitters functions.
- Large custom LCD display.
- NEMA 4X (IP65) weatherproof, corrosion-resistant enclosure.
- Comprehensive pH glass and reference diagnostics.
- HART and FOUNDATION Fieldbus options



Model 396P pH/ORP TU_pH Sensor

- Polypropylene reference junction and secondary reference pathway mean longer sensor life and reduced maintenance in process solutions containing heavy solids.
- Advanced on-line sensor diagnostics for use with the Models 54e pH/ORP Analyzer or the 5081 pH/ORP Transmitter.
- Versatile. Can be used in numerous loop configurations with all Rosemount Analytical and other manufacturers instruments.

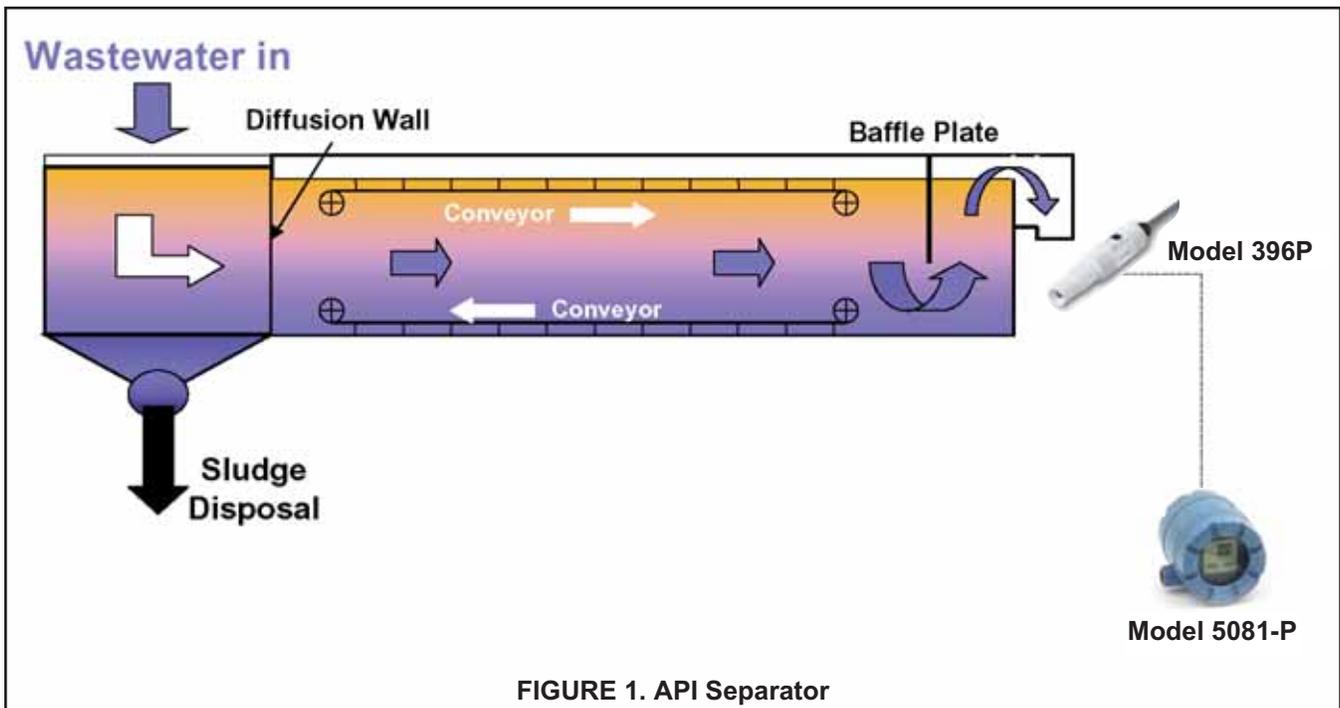


FIGURE 1. API Separator

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