METTLER TOLEDO APPLICATION NOTE

Influent Monitoring And Heavy Metal Removal

BACKGROUND

The raw sewage entering a wastewater treatment plant comes from a variety of domestic and industrial sources. Therefore, contaminants such as lead, mercury, and other heavy metals are often present. The levels of these contaminants are strictly regulated to protect the environment and the microorganisms that biodegrade the sewage.

THE PROCESS

Monitoring the influent pH for excess acid or base can alert the plant operators that contaminated raw sewage is entering the plant. This allows the influent to be diverted and treated to avoid upset.

The wastewater to be treated is typically in the acidic pH 4 to pH 5 range; therefore, the heavy metals are present as dissolved ions. Lime is added to a reaction tank to raise the pH to 8.3 or above to precipitate these heavy metal ions. The mixture is then transferred to a settling tank with a large hold-up time for precipitation. The precipitate forms a free flowing thick sludge that is drawn off for final disposal. To aid in the settling of the sludge, a polymer flocculent is often added either to the reaction tank or at the inlet of the settling tank. (see Figure 1)

Monitoring pH allows a controller to adjust the lime feed rate to maintain the desired pH. As with any pH control application, good mixing in the reaction tank is needed for responsiveness. The control action required will depend upon the specifics of the installation and may also require flow measurement.

INSTRUMENTATION

The composition of the waste stream does not present a corrosion problem to the wetted materials of the pH sensor; however, electrode coating does. Therefore the sensor of choice is the InPro® 4500 pH Electrode. The Xerolyt® solid polymer reference system allows an open annular junction which is highly resistant to contamination from heavy metals, lime, insoluble precipitates, and polymer flocculants present in the process. The disposable and rugged construction of the sensor also has the advantage of reduced maintenance and downtime typically associated with rebuilding and cleaning sensors.

The InPro 4500 Solid Polymer pH electrode is compatible with all Mettler-Toledo pH analyzers. For example, the model 2050 analyzer can be specified for a low cost solution and the Model 2100 analyzer can be specified when FM or CSA classifications are required.

PRODUCTS

2050 pH Analyzer

- Economically priced, full featured transmitter
- Large, easy-to-read LCD allows quick view of information
- Two relays as limit contacts with delay timer to minimize false alarms and one relay as alarm or wash contact

2100 pH Analyzer

- Detachable front panel and plug-in terminals for ease of installation
- All functions accessible through the keypad for increased ease of use
- Continuous sensor and transmitter diagnostics to monitor performance
- FM certification for Class I, Div 1 & 2 Environments and CSA General Purpose Approval
- 3 year warranty

InPro® 4500 Solid Polymer pH Electrode

- Patented Xerolyt® solid polymer reference system maintains a stable potential for accurate and repeatable pH measurement and low maintenance
- Open junction eliminates reference clogging and extends sensor life
- High pressure resistance eliminates requirement for pressurizable housing
- Xerolyt solid polymer is particularly suitable for use in emulsions, suspensions, heavily contaminated or sulfide-containing media, and solutions with a high concentration of suspended solids

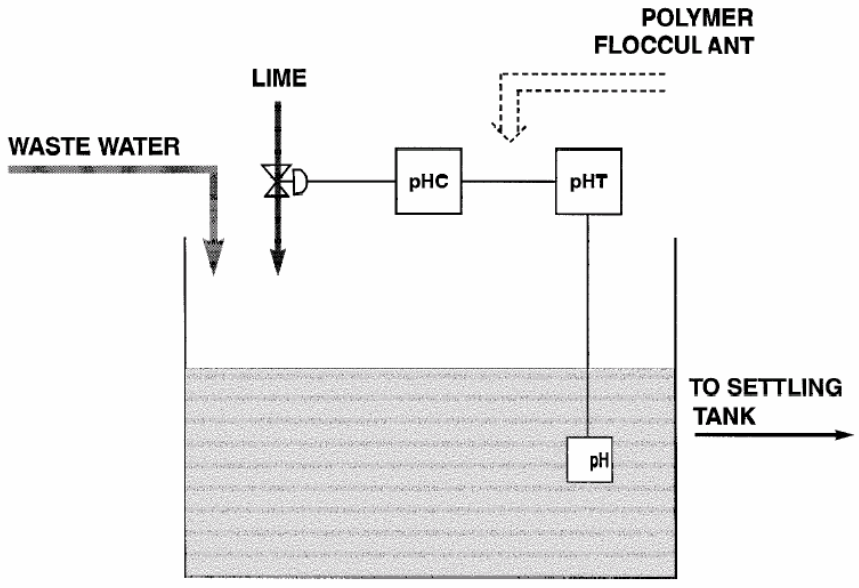

FIGURE 1. Influent Monitoring and Heavy Metal Removal

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