pH Control of Printing Plate Etchant Waste

BACKGROUND

Acidic etching solutions, which are used by newspapers and various other printing houses to prepare printing plates, must be neutralized before they are discharged into municipal sewer systems. These acidic wastes consist of rinse water, spills, and spent process solutions. Etching solutions can be quite high in acid concentration and may therefore require varying amounts of alkaline reagent to neutralize them.

PROCESS

The waste material is treated in two neutralization tanks (see Figure 1). The first tank is equipped with a pH analyzer and two valves (or feed pumps) that are actuated by separate low alarm contacts. After the initial treatment, the effluent flows into the second tank which is also equipped with a pH analyzer and reagent feed. A series of valves is utilized so that the reagent solution can be added at varying rates. These three valves can be designed for much different capacities. For example, the flow capacity of the first valve may be 30 times that of the second valve and the capacity of the second valve 30-100 times that of the third valve.

Better pH control is possible with this system because the first valve acts as a base load reagent feed while the second valve operates as a rough control and the third valve is the final control. The actual configuration used is determined by the type of solution being discharged. For example, rinse water at pH 6 is a very dilute acid, and it requires only a single valve operation (usually the smallest capacity valve in the series). For spills at pH 4, the second valve is needed for rough control and the third valve acts as a trim control. Stronger acids (spent process solutions) at pH 2 will need all three valves open for neutralization. Since the pH scale is logarithmic, simple on-off control at low alarm setpoints of 3, 4.5, and 6.5 would respond to all 3 requirements.

Normally, a record of discharged materials will be kept in order to comply with local, state, or EPA requirements. This record can be in the form of a chart recording of the isolated current output from the pH analyzer.

INSTRUMENTATION

For both tanks, the recommended analyzer is the Rosemount Analytical Model 54e pH Analyzer, featuring isolated current output and three programmable process alarms. The Model 396P TUpH™ Sensor is the sensor of choice due to its resistance to fouling by the undissolved solids often present in these streams.

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INSTRUMENTATION

Model 54e pH Microprocessor Analyzer

- Comprehensive pH glass and reference diagnostics warn user of the need for calibration, maintenance, or sensor replacement.
- Heavy-duty NEMA 4X (IP65) enclosure of epoxy-painted aluminum.
- Fully descriptive diagnostic messages and easy-to-use interface spell out each operation in English, French, German, Italian, or Spanish.
- HART and AMS compatible
- Optional PID current outputs and TPC control relays.

Model 396P pH/ORP TUpH Sensor

- Polypropylene reference junction and helical pathway mean longer sensor life in process solutions containing heavy solids.
- Disposable, one-piece construction is convenient and economical where minimal troubleshooting and maintenance downtime are of prime importance.
- Versatile. Can be used in numerous loop configurations with all Rosemount Analytical and other manufacturers' instruments.

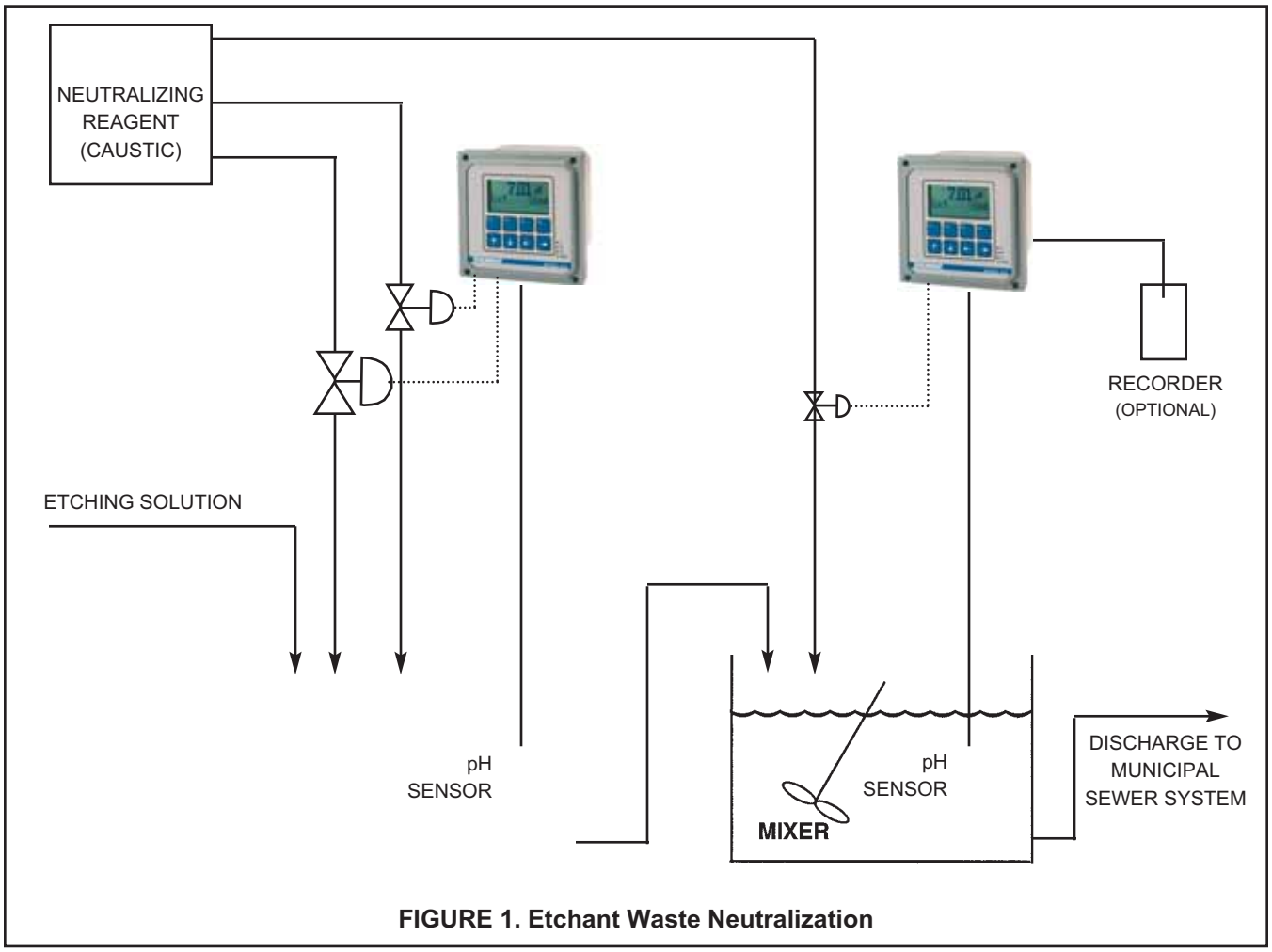

FIGURE 1. Etchant Waste Neutralization

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