How the Foxcroft FX-1000P Chlorine Analyzer Works

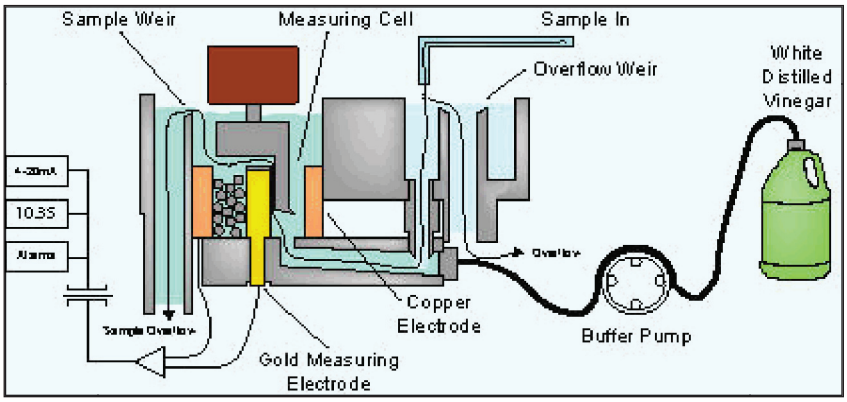
The FX-1000P Amperometric Chlorine Residual Analyzer is used to amperometrically measure the free or total chlorine residual in a treated water or wastewater sample. The system provides a 4-20mA analog output proportionate to the measured residual chlorine over the factory-set 0-5.00 ppm (mg/l) measuring range. This output can be used to drive a residual chlorine control system (with compound-loop or setpoint controllers), a chart recorder, telephone dialers, or a SCADA system. The system can be re-ranged in the field to any of its other measuring ranges.

Four important factors enable the FX-1000P to provide drift-free measurement readings:
1. Buffer solution feed rate is constant.
2. Flow rate to sample flow cell is kept constant.
3. Gold and copper electrodes are used to measure the residual chlorine.
4. The sample flow cell has a reliable cleaning method to keep the electrodes free of dirt, ensuring measurement accuracy.

The FX-1000P is an amperometric chlorine residual analyzer, which means that the chlorine residual reading is determined by measuring the electronic amperage of the measuring cell. The amperage level is directly proportional to the level of free chlorine available in the sample stream. In the case of reading total chlorine, the unit is actually reading converted free iodine from the potassium iodide that is added to the cell for total chlorine readings.

The sample flow cell is constructed such that the sample runs through it by gravity at a continuous and fixed rate. Excess flow is allowed to overflow to waste from a drain below the overflow weir.

Note that the chlorine residual will vary with a change in flow rate. To maintain accuracy, the analyzer must be recalibrated if the flow changes from a previous rate.



The sample stream runs down through the lower block, where it mixes with vinegar (and potassium iodide where total chlorine is being analyzed), and then flows upward through the measuring cell. Within the cell, the vinegar provides pH buffering to a value of 4.0, and aids in keeping the cell clean.

If potassium iodide is being used to read total chlorine, it chemically converts any free and combined chlorine residuals into free iodine, which is then read as a total chlorine reading.

The cell utilizes a mixer and 150 PVC balls to ensure even chemical mix, clean probes, and consistent readings. Very pure grade of gold and copper are used in the construction of the electrodes to ensure accuracy. Sample flow leaves the cell from the top, and runs out a secondary drain to waste.

The cell electrodes are connected to the amplifier section of the electronics, where the low-level amperage is boosted
and ranged to a useable 0 to 5 volt DC signal. The 0-5 VDC is then input to an isolation amplifier, which provides electrical isolation and an electrical safety barrier.

The 0-5 VDC output of the isolation amplifier is then doubled to 0-10 VDC, which is used in the final 3 output stages of the circuit. These are the LED display, the alarm circuit, and the 4-20 milliamp DC output signal. The amplifier board is powered by a dual bi-polar regulated DC power supply, which provides two sources of +12 and -12 Volts.

The LED display provides an instantaneous numerical reading of the chlorine residual in parts per million or mg/L.

The alarm circuit provides two user-adjustable alarm level settings that activate two relay outputs, which can be used to control external devices or alarms.

The FX-1000p chlorine residual analyzer has been designed with control applications in mind, and as such, is an excellent choice for use in process control of chlorine residuals in freshwater, wastewater, salt water, and food processing.