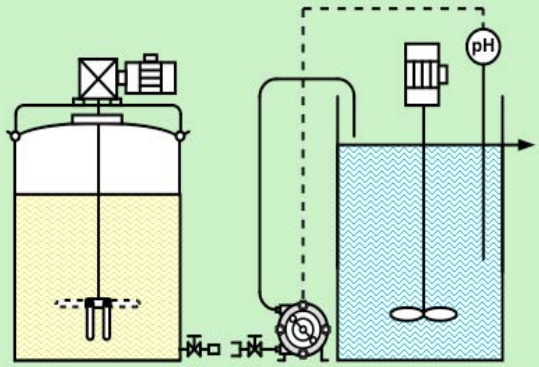
The Watermark

The Newsletter From Automated Water & Effluent Ltd Spring 2018

Reliable Lime Dosing.

Peristaltic Pump

Simple P&ID



Prepaired Lime Solution

Neutralisation Tank

Going back 20 or 30 years ago (we have been supplying process control, water treatment and effluent treatment systems for 35+ years) lime dosing for pH adjustment was popular, as lime was a plentiful low cost reagent.

The disadvantages of using lime are that it's messy, difficult to store, and being supplied in paper bags it needed to be kept dry.

Mixing lime is also an unpleasant, time consuming task and that's before the difficulty of dosing the mixed solution.

We have supplied equipment to a good number of customers who have changed over from lime to caustic dosing for pH adjustment successfully. Although dosing caustic in low temperatures can have it's own problems as highlighted in our Winter Watermark.

Some waste water streams work best when dosed with lime such as when precipitating metals or solutions containing fluorides as the sludge is usually more dense than when dosed with caustic. However - remember for every kilo of lime dosed there will be approximately 1 kilo of sludge to dispose of.

Traditionally we have offered two different types of lime dosing systems for installation a simple low cost lime dosing system and a Recirculating lime dosing system.

The simple low cost lime dosing system is designed for low flow rates and comprises of a mixing tank with a geared mixer where the lime is mixed with make up water. The makeup water is added to the tank via solenoid valve and water meter with a contacting head. The solenoid valve is controlled by the pH controller with the pH electrode installed in the neutralising tank.

The lime mixing tank overflows into the neutralising tank, so the pH controller calls for lime dosing on a low pH, the water valve open introducing water into the mixing tank and causing the mixed lime solution to overflow into the neutralising tank. Adding water to the lime mixing tank causes the milk of lime solution to become diluted. We supply a small panel with a counter and an alarm so that when a pre-set volume of water has flowed, the alarm is triggered alerting an operator to add more lime to the mixing tank, and the alarm and counter are then reset.

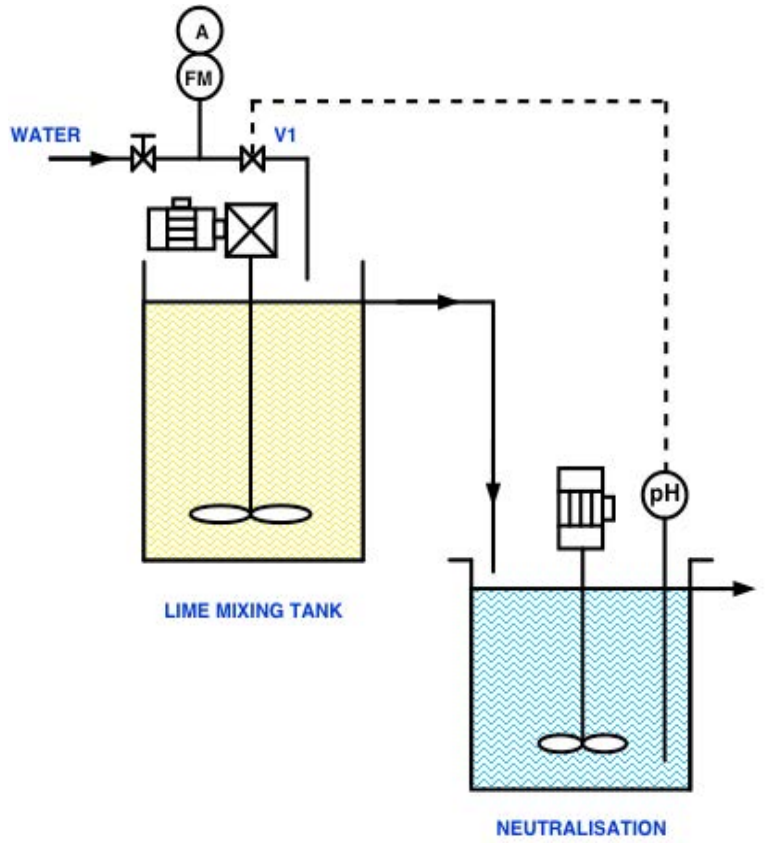
Our second system is to again use a mixing tank with a geared mixer to keep the lime solution in suspension. The tank is connected to a recirculation pump which pumps the milk of lime around a ring main. The ring main can be fitted with duty and assist valves to dose the lime into the neutralising tank, which is controlled by a pH control loop. The mixing tank will require level controls to stop the mixer on a low level and to alarm, alerting the operator to make up the lime mixture.

The best systems are fitted with a water wash system to flush out the ring main after use, and this process can be automated. Larger systems could have automatic make up from lime silos, but these fall outside of our scope of supply as an instrumentation and dosing supplier. A more modern approach to the problem of dosing lime is to use one of the prepared lime solutions supplied by several suppliers under their own trade names and supplied ready in mixed in an IBC.

The challenge is how to accurately dose this product from the IBC. The first issue is that the lime to needs to be mixed inside the IBC to keep it in suspension. So an IBC mixer is required - this is a geared mixer with a clamp on bridge to suit the IBC. The mixer blades hand down like bananas and expand outwards when running so they will fit through the 150mm Ø port on top of the IBC. The dosing of the lime can be carried out with a peristaltic pump controlled by either a PWM relay or better still, from an inverter. Both are available from P7687 or P6587 pH controllers which will work with an antimony electrode if the waste water contains HF Acid (Hydrofluoric Acid).

We are able to supply equipment for any of these systems above, with the option of a ready wired panel for easy site installation.

Simple Lime Dosing System.

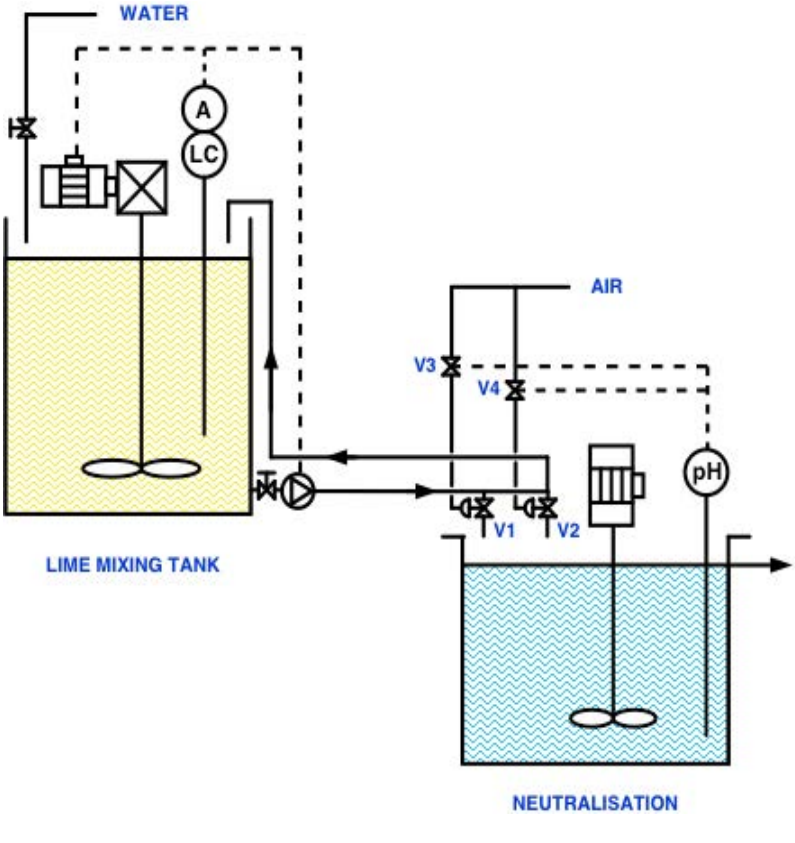


A simple low cost lime dosing system for low flow rates where the lime is kept mixed in a tank. The pH drops, calling for lime, resulting in the water valve opening causing the tank to over-flow into the neutralising tank.
The flow of the water is measured and when a preset flow has flowed through the flow meter an alarm is operated.
This alarm alerts the operator to add more lime to the mixing tank and the counter is reset when the lime has been added.
The disadvantage is that the lime is always being diluted, so more water be added as the lime strength reduces.
To save fresh water a pump could be added to make-up the lime tank with water after settlement, i.e. before a v-notch tank in a final effluent discharge system.

pH - pH control loop
F - flow batching system
A - Audible Alarm & Reset
V1 - Water valve

Do not scale

Recirculating Lime Dosing System.



A system where lime is recirculated by a pump to keep the lime moving and help prevent the lime settling out in the ring main.
When the pump is stopped, the ring should be flushed through with water.
This system shows duty and assist lime pneumatic valves operated by pilot valve. The assist valve could be a larger valve set to operate at a lower pH value to follow the logarithmic nature of pH control.
A low lime tank level sounds an alarm alerting the operator to make-up the lime tank with water and lime. The low level alarm can stop the recirculating pump and mixer, or just storage the lime dosing so the level does not go any lower leaving the mixer and pump running so the lime can not settle in the pipe or pumps. The pump and mixer must be stopped before adding lime.

pH - pH control loop
LC - Level control loop
A - Audible Alarm & Reset
V1 & V2 - Pneumatic lime valves
V3 & V4 - Air pilot valves

Do not scale

Technical Tips

Temperature Control

Almost every customer that uses our instruments for the measurement of pH, Redox, Conductivity, Dissolved Oxygen, Turbidity, Residual Chlorine, Liquid Level, or flow will applications for temperature measurement and control. As temperate is possibly the largest industrial measurement and control parameter carried out within the UK.

We are able to help our customers with their temperature measurement & control applications. In the Summer 2015 issue of The Watermark we wrote about the temperature control of large processing tanks.

The Watermark for Winter 2012 / 13 had a feature about temperature sensors and transmitters which leads us into the introduction of a new product to our range:- The model SRT73 Temperature Controller which is a panel mounting temperature controller designed to work with RTD sensors with user selectable inputs to suit PT100, PT500, or PT1000 with 2, 3, or 4 wire configurations.

temperature controller SRT73

In our opinion Platinum RTD sensors are the best choice for the measurement and control of liquid temperature proving both extremely reliable and extremely accurate.

The SRT73 instruments are a cost effective unit featuring a bright red (or green to order) 3 1/2 digit LED digital display, with two independently adjustable set-points. the set-points can be configured as:-

High-Low:- providing control for heating and cooling.

High-High:- for heating with the second set-point used as a policeman.

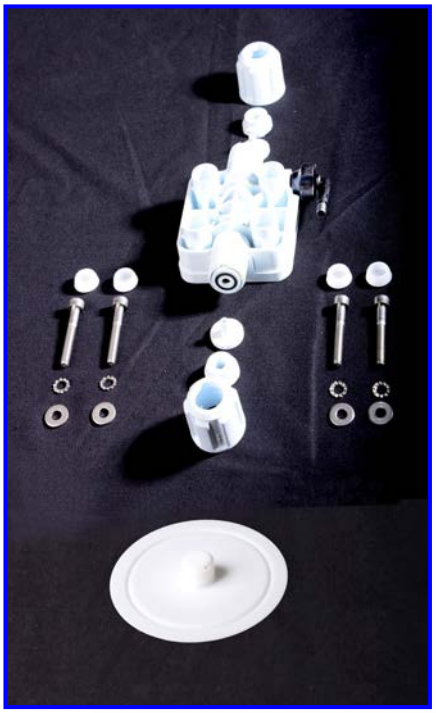
Low-Low:- for cooling with the second set-point used a policeman.

There is an alarm LED which maybe configured to indicate auto of range temperature or open or short circuit of the connecting cables to the temperature sensor.

For applications of control at higher temperature the model SRT73 can be supplied to order for use with thermocouples type:- K, S, j, T, N, R,B, E; with measuring ranges from -200°C to + 1370°C with other ranges available on request. Mains supply is 86 - 264 VAC at 50 or 60Hz with 19 - 50 VDC or 16 - 35 VAC versions available to order.

There is an RS485 port which enables data transmission in production process monitoring systems and the SRT73 can be configured with the local keypad or via the RS485 and free software.

Pump Spares



We supply a lot of small dosing pumps to many different industries for dosing chemical reagents into customers processes.

One commonality between industries is that it's essential to our customers that this pumps keep on pumping the required chemical reagents to the customers processes.

We are able to supply our remake kits from stock with part numbers RMK-xxxx where the precise part number depends upon the pump the remake kit is required for.

temperature controller SRT73

Our remake kits contain all the parts to remake the wetted end of the pump which normally includes the pump head complete with new seals and "O" rings, the diaphragm which is in most cases made from solid PTFE with a mounting thread. The suction and delivery valves complete with seals & "O" Rings and the valve fitting kits which allow the hose connections. In addition there make kits include a new set of stainless steel mounting bolts, washers and bolt caps.

For our red series electronic dosing pumps the heads are almost always PVDF being resistant to most chemical reagents being pumped.

You need to specify the "O" ring material being either Viton or EPDM to suit the chemical reagent being used in the dosing pump.

Once the liquid end has been remade, remember to check the mounting bolts are tight after a few hours running to prevent any leaks occurring.

A good tip is to purchase a remake kit and store close to the pump so it is available at the point of use, or for process critical applications some customers prefer to install duty & standby pumps.

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