

Meeting compliance on effluent for every size of business

For many small to medium-sized businesses, obtaining a dosing solution to ensure the effluent produced by their processes is a financial obstacle and can place demand on engineering staff to maintain and monitor the performance to meet compliance of environmental directives. Now available from Lhoist and Verder is a combined dosing solution that is cost-effective for small producers and secures a dosing operation for large-scale operators in the event of a major breakdown.

The accurate and consistent dosing of chemicals in wastewater treatment requires a pump technology that delivers the chemicals in a manner that optimises their usage and effectiveness. A chemical dosing skid employing either peristaltic or metering pumps attached to pipework built into a cabinet containing a dedicated control system provides the most effective solution for this process.

The effectiveness of the dosing system is all-important, for when wastewater is being discharged from a plant it must comply with all relevant environmental regulations and standards. The Water Industry Act of 1991 states that any liquid produced wholly or in part from any trade or business activity carried out on trade premises qualifies as trade effluent and therefore requires consent from a utility company. Trade effluent control applies to all businesses from large multi-nationals to small and medium-sized enterprises.

The main effluent treatment methods employ the precipitation of impurities, separation of solids from the liquid and pH adjustment. Non-compliance with effluent waste



consent levels inevitably causes high levels of pollution and can result in prosecution, fines and even the closing down of plants. There are several types of reagents that can be used in the various stages of wastewater treatment; the most commonly used being lime, caustic soda, sodium hypochlorite, polymers and magnesium hydroxide.

To be truly effective, these reagents need to be dosed exactly, either in continuous or in batch processes. The flow of effluent may impact on the rate at which a reagent

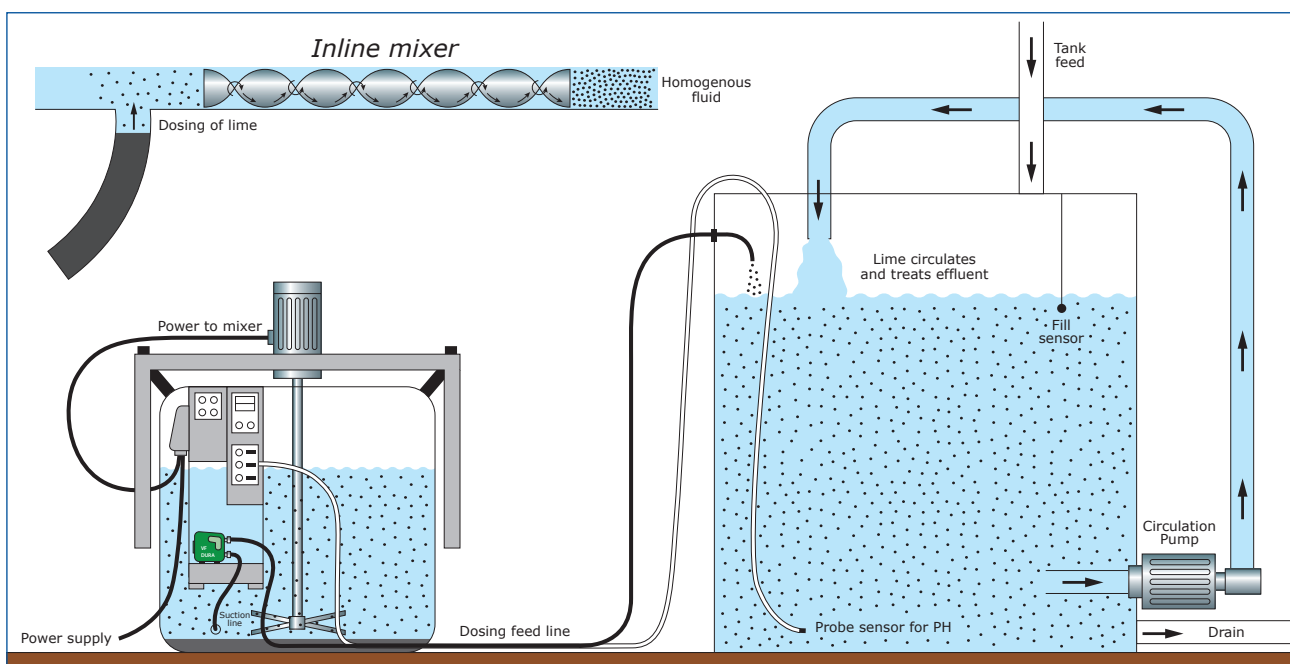
will need to be added. This is best managed by the use of a purpose-built chemical dosing system, a fact clearly appreciated by Lhoist, the UK-based manufacturers of Neutralac® SLS45, which has established an informal relationship with Verder Pumps. This relationship offers an innovative and cost-effective approach to the provision and application of this liquid lime product.

Lhoist and Verder

“Neutralac® SLS45 is a 45% strength liquid lime developed specifically to

have a low viscosity, low settlement rate and high reactivity due to its high strength," reports Xavier Mear, Lhoist's Neutralac specialist. "It is highly proficient at neutralising acid-based effluents, maintaining a steady pH and removing heavy metals, precipitating sulphate, phosphate and fluoride as well as treating fat, oil and greases." According to Lhoist it offers both significant technical

and economical benefits, being an alternative to powdered lime, caustic soda and magnesium hydroxide slurries. It delivers more efficient operation of the treatment plant and greatly reduces costs as it is a single ready-to-use reagent. Neutralac® lends itself to dosing using peristaltic pumps, making it a perfect fit for Verder's proven chemical dosing packages.



Neutralac®SLS45 is manufactured at the Lhoist plant in Buxton where there is very pure limestone. "It is used for industrial effluent, wastewater treatment, sludge treatment, food waste treatment and for increasing pH in digested sludge for agricultural uses, continues Mear. "Furthermore, being a suspension the most appropriate pumping technology is the peristaltic pump."

Verder has been building and supplying chemical dosing packages to wastewater treatment plants in a great range of industry sectors around the world for many years. The collaborative approach adopted by Verder and Lhoist identified the Dura skid-mounted system as being a suitable vehicle for demonstrating the effectiveness of Neutralac®SLS45 to potential customers.

Verder's small-scale dosing rigs connected to IBCs tend to operate at low dosing rates around 20lt/hr and the integrated package is designed around the Dura peristaltic pump. The Dura hose pump is a close-coupled compact pump offering flow rates of between 1lt/hr and 15.3m³/hr and pressures from 8bar to 16bar and is the perfect choice for this dosing package. Typically

the Dura dosing package comes with a Verderflex Dura peristaltic pump, pH monitor, control electronics, agitator for an IBC and any necessary pipework connections. Being lightweight, it is an easily transportable system that is ideal for temporary small-scale pilot applications. However, it is suitably robust to meet the demands of challenging environments, which is another reason why it appealed to Lhoist.

On trial

Introducing a new and innovative product into an established and rather conservative market is always a challenge, and for Lhoist the initial challenge was to convince potential Neutralac®SLS45 customers of its benefits. "Lhoist offer the rig as part of a risk-free trial, and we are running it alongside existing systems so that

comparisons can be made," says Mear. "If the trial is to be paused, then the customer can simply switch over to their existing system. Most customers see the rig as impressive. Feedback indicates that Neutralac®SLS45 is a far more effective product for enhanced flocculation, pH control, improved removal of heavy metals and COD level."

Lhoist recognised that instead of

installing a pump on a floor and attaching it to an IBC, it was more cost-effective to integrate all the elements in a single, compact rig. There was also the issue that in many instances robust industrial peristaltic pumps would be needed as they could be exposed to the elements, or operate in confined and environmentally challenging areas. Lhoist had identified what they needed and that is what Verder could provide. Not only that, Verder could provide a complete package that offered the flexibility to satisfy the requirements of sites where both low dosage from IBCs was needed or for continuous operations typically encountered at much larger sites.



A Verder dosing system delivering Neutralac®SLS45 liquid lime. Here, the dosing rig has been forklifted into position on pallet.

The dosing system has been mounted on hooks to the side of the IBC





A high performance calcic reagent designed to create an easy to use and highly concentrated milk of lime with low viscosity and high reactivity for all waste water and sludge treatment processes. Produced in Buxton, Derbyshire, the limestone used in Neutralac is renowned for its purity, creating a consistent and high quality product.

Why Neutralac® SLS45?

Cost-effective - Neutralac® SLS45 has replaced both traditional water treatment agents such as magnesium hydroxide and caustic soda with a single chemical.

Meet compliance easier - Helps your process be compliant with environmental directives thanks to the high reactivity rate, so effluent can be returned to the water course.

Easy and safe to use - This is due to the low abrasion of lime over magnesium hydroxide and it is less corrosive than sodium hydroxide/caustic soda. With a low settling rate, the product remains in suspension with less agitation, reducing the cost of energy and maintenance of storage vessels.

Support - Lhoist provide ready technical assistance with the handling and dosage of Neutralac® SLS45 into effluent streams, assistance with trials in your process and delivery of the chemical both in IBC and bulk purchase.



A comparison of Neutralac® SLS45 (left) and caustic soda (right) demonstrating the flocculant qualities of the two treatments.

Neutralac® SLS45 not only corrects the pH as caustic soda can, but also can remove the need to dose magnesium hydroxide.

Where has Neutralac® SLS45 been used?

- Users in sewage treatment, AD & Biogas sites, food production, metals finishing, heavy industry and many other sectors of industry, in fact virtually any effluent stream requiring neutralization and/or pH correction.
- Transport distribution depots to treat surface run-off containing fuel oils, trace metals and accumulated sludge from vehicle cleaning procedures.
- Effluent from food production such as pet food, dairy, instant coffee, abattoirs or fried potato products where mixes of oils, starches, fats are handled.
- Treatment of waste water sludge at STW including digested liquid sludge, a process required to meet the bacteriological and odour control standards stipulated by the environment agency.
- In anaerobic digestion facilities, where effluent is treated prior to the AD process. Neutralac® SLS45 not only treated the effluent, it increased the biogas yield via enhanced enzymatic digestibility.



The Verder connection

The Verder connection came about back in 2013 when Lhoist needed a dosing system incorporating storage facilities, electronic control and instrumentation that could accurately deliver Neutralac® SLS45. All companies discharging wastewater have to control the pH content at the point of discharge. Other considerations include BOD, COD and heavy metals. "The majority of the potential users for our product have their own treatment plants on site and are very much aware of discharge consent levels," says Mear. "It is companies that are experiencing issues with existing caustic or lime dosing systems that are contacting us. In many existing plants the dosing technology is outdated or possibly not functioning as well as expected, which is why we are replacing an existing system with Neutralac®SLS45 and a highly effective dosing system."

This is where the trials unit comes into its own. "In our opinion the Verder rig provides better dosing control with a peristaltic pump, coupled with better pH control by using a high specification pH controller," comments Mear. This is generally better than the equipment that their customers may have been running for many years.

One of the reasons why we work with Verder is that the pump company is very accommodating and co-operative. When approached for a trial pump to go onsite and the application is outside the range of the small unit, Verder is prepared to lend pumps for specific applications. Although Lhoist says that they tend not to get much feedback on the pumps, they do get positive comments on how impressed they are with the rigs.

Markets for Neutralac® SLS45 and Verder

Using lime is an old technology but still extensively used in the water treatment, metals production, food processing, chemicals processing and surface finishing industries, to name just a few. There are many companies still using caustic soda where a simple diaphragm pump will suffice, but this and other alkali alternatives do present more of a safety problem



Neutralac®SLS45 has been used to great effect at a metals finishing plant where the metals recovery process yielded zinc, iron and nickel from their effluent.

The engineering manager found a great increase in the clarity at this stage of the treatment.

As an alkali product with proficient metal precipitation capabilities, often an entire treatment step can be removed. Neutralac® SLS45 minimizes the risk of metals dissolution and also provides pH correction to the diluted process acid.



where ageing dosing systems tend to show wear and lack true dosing accuracy when handling liquid lime.

“Many older dosing systems use fixed speed pumps and are inefficient when there is not a requirement for continuous dosing,” explains Mear. “The Verder peristaltic pump is accurate, energy efficient, very reliable and is easy to speed up and slow down as circumstances demand and will follow a pH variation very easily. In addition, it is simple to operate and maintain.”

It is older sites where investment in dosing systems has been held back which offer the greatest opportunities for Lhoist to demonstrate the effectiveness of their products in conjunction with the Verder rigs. As effluent treatment is not necessarily a profit-making activity for many companies there is understandable reluctance to invest capital in new equipment. However, when it is pointed out that by changing to Neutralac® SLS45 and using an efficient dosing system, considerable savings can be made, and that the risks of breaking consent levels and any subsequent fines are eliminated, opinions change.

Although designed for trial purposes, the rigs built by Verder are rugged and use materials and pumps that have a proven track record of operating in harsh conditions over long periods. Thus, if a trial user wants to keep the rig at the end of the set period, it does not need to be removed. Lhoist and Verder will tailor rigs to meet the exact requirements of the customer once the rig is taken as a permanent fixture. Alternatively, Lhoist will undertake a site survey with additional engineering consultancy provided by Verder when a rig is being installed.

The enthusiasm for Neutralac® SLS45 and Verder Dura dosing rigs is reflected in the growing take up

by a broad spectrum of industry sectors, with many customers asking for trial rigs to be left as permanent installations. To accommodate this, Lhoist offers end-users the option to either purchase the rig or enter into a rental agreement, which also includes the regular supply of its product.

“We consider that renting it is a good option for SMEs as there is only a small monthly cost and Neutralac® SLS45 can often be cheaper than the alkali that is currently being used,” says Mear. “There is considerable interest in renting out a unit that provides the benefits of a lime-based product. Moving the capital investment cost over to a small monthly cost is very attractive.”



Packaged dosing system

A complete, compact dosing system and mixer unit that provides an all-in-one dosing delivery solution for a business or organization of any size.

Overview

- From less than 1l/h to 500l/h
- Up to 16 bar head
- Self-priming from IBC
- 10-25mm hose internal diameter
- 1.5 S.G.
- Up to 5000cPs viscosity
- Dosing unit weight 45kg

The system is ideal for small scale, mobile, rapid response, where space is limited or where capital investment in a cabinet system is cost-prohibitive.

As a lightweight and compact solution, the dosing unit is a simple 2 man lift and the mixer is easily mounted with a forklift or slings. Once the units are mounted on top of an IBC, the assembled system can be fork-lifted to the area for temporary or permanent use.

The unit has been designed to be compact with as few components as possible, yet still providing a robust and reliable dosing operation fit for industrial use. The dosing unit can be free-standing or hooked on to any standard IBC, with the mixer unit being easily mounted on to the IBC on a purpose-built frame.

Applications

- Treatment of effluent and wastewater streams
- pH correction
- Flocculant dosing
- Odour control

Components

- A Verderflex Dura peristaltic pump for dosing abrasive chemical suspensions such as lime
- A PE UV resistant frame with spill-catch base
- Probe sensor, specified for a variety of measurement parameters
- pH control and inverter
- Electrical distribution
- 3 phase power in/out



Left: A packaged system ready to run. It only requires connecting up to a power source such as the mains or generator, the chemical feed and for the probe sensor to be placed in the effluent.

Right: The Verdermix dynamic mixer and mounting for any standard IBC. The dynamic mixer maintains the fluid ensuring it is an evenly dispersed suspension with no dead spots in the IBC.



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