

# Hydro-powered metering pump

**S**upplier of liquid dosing pumps for over 25 years, LDT Dosiertechnik GmbH is now offering a specialised metering pump from Dosatron which works on hydro power and requires no electrical supply. The proportional pumps are installed directly into the water supply line and are operated by a hydraulic motor which only needs the flow and pressure of water to operate.

## A viable alternative

Water powered metering pumps remove concerns relating to energy efficiency and offer an alternative to the more commonly used electrically operated metering pumps. They have been successfully applied across many industries including environmental and hygiene applications, water treatment, car wash, metal processing, printing industry, horticulture and animal health. ATEX and FDA certified models have further extended the use of this technology to areas such as chemical, petrochemical, mining and food processing.

## Pump operation

Water operated proportional metering pumps use a volumetric hydraulic motor that enables continuous injection of liquid or soluble concentrate. Requiring only water as a power source, the concentrate is drawn independently and mixes with the driving water within the pump. Electrically driven piston or diaphragm metering pumps dispense the desired dosage in the process stream depending on the set number of strokes or pulses. The water driven proportional metering pump, however, ensures dosing is always proportional to the water flow, according to the manually adjusted dosing rate,

even if there are flow and pressure fluctuations in the water mains.

Electrically driven pump alternatives require a downstream mixing process to create a useful solution. The hydro-powered proportional metering pump, however, combines the functions of a water meter, an injector and a mixer into a single device. The continuous and immediate mixing in the chamber of the dispenser further ensures a homogenous solution that is ready for immediate use, making this type of pump ideal for applications such as preparation of disinfectant solutions. Overall the pump installation is highly cost effective and its design ensures consistent quality of the prepared concentrate solution.

## Metering accuracy

Venturi systems also do not require electricity for operation and generate a water flow by reducing the flow area to create a negative pressure downstream of the constriction. This draws concentrate from a container and adds this to the water but such systems are limited by long pipe lengths, viscous feeds or variations in mains water pressure that makes recalibration necessary. The metering accuracy of hydro-

powered proportional metering pumps is not affected by piping lengths so these flexible units can be installed in any location without compromise to performance; giving them a distinct advantage over venturi based technology.

Dosatron proportional metering pumps are available for flows from 0.7 m<sup>3</sup>/h to 20 m<sup>3</sup>/h, with operating pressures from 0.12 to 10 bar and a dosing rate in the range of 0.03% - 25%. The high metering accuracy and repeatability of +/- 3% (according to API675 standard) offers an economic advantage for the operator as the media can be used in

higher concentrations. The design of the pump further eliminates the possibility of overdosing.

## Choice of housing

In addition to the economic benefits the Dosatron pump offers the user, a choice of housing and sealing materials are available to suit application needs. A high resistance to metering liquids is ensured through the use of a specific polypropylene (polyacetal, HT). For high concentrations of aggressive acids and lyes, an option of PVDF housing is also available. Sealing material options include AF which is a combination of EPDM / Aflas for use with



*Pressed out water is running back in water recycling reservoir.*



Sludge with high content of water/polymer filled in the belt filter.

alkaline concentrate; VF (a Viton material) for use with acids and oils, and Kalrez for use with highly concentrated acids.

The flexibility of the Dosatron pump is further enhanced with options such as external injection (IE) of the metering liquid into the water flow, inter alia, which is recommended for certain corrosive concentrates and polymers. A bypass switch (BP) is also available to turn the intake system on or off as desired. For applications with higher viscous concentrates (> 400 cps) a special Type V kit is recommended which handles viscosity up to 800 cps.

The simple construction of the Dosatron proportional metering pump, which comprises only a few components, makes the device very easy to maintain and handle. The unit is supplied with a wall bracket for straight forward installation, a suction tube and a suction filter. Other accessories such as foot valves, hoses, a back-flow preventer, water filter, pressure regulator and water hammer damper are also kept in stock at LDT for rapid customer delivery.

## Applications

With water as the driving power of the proportional metering pump, the device is suitable for nearly all applications in which a concentrate has to be metered in a water stream. One typical

example includes polymer dosage in water treatment applications.

## Polymer dosage

Liquid polymers are used in sludge dewatering and flocculation processes across industrial and municipal process water, wastewater and effluent treatment applications. For sludge dewatering processes, polymers are used to chemically precondition the sludge prior to dewatering so that the flakes settle faster. This happens regardless of the downstream drainage technology utilized; which is typically filter presses, belt filters, filter bags or a drying bed. In wastewater treatment demulsifiers and coagulants are used to grow micro flocks in the wastewater. Flocculants or polymers are then used to bind the micro flocks into larger flocks that are easier to remove in subsequent physical treatment steps. The use of additional liquid or powder additives may follow depending on the application.

Dosing systems in conjunction with electrically driven metering pumps are still often used for polymer dosing applications. Hydro-powered Dosatron proportional dosing pumps, however, offer an efficient, compact and cost-effective alternative. As well as not requiring electrical supply, built-in dosing or admixture is achieved independently of fluctuations in the flow or pressure of the water mains.

The Dosatron polymer unit model PU1 was specifically developed for polymer dosing applications. It includes a proportional metering device type D25RE2 IEPO and a dynamic mixer type DMIX25.

The dispenser operates in the usual manner; using water as the power source and aspirating the liquid polymer independently. The polymer, however, does not pass through the pump but through an external injection (IE) device directly into the water stream. This configuration reduces any risk of clogging in the mixing chamber and lowers pump cleaning overheads. The IE is further equipped with a self-cleaning flap valve to prevent back-flow in the concentrate container. The dynamic mixer, which is also equipped with a hydraulic piston, is coupled with the proportional metering pump and improves the mixing result of the polymer solution. The capacity range of the polymer unit PU1 is 10 l/h – 2.5 m<sup>3</sup>/h at an operating pressure of 0.3 - 5 bar and a dosing rate of 0.2% - 2%.

The use of the Dosatron polymer unit is dependent on the type and viscosity of the polymer utilized. It can be installed as a fixed station directly in front of a reaction tank or storage container or on a mobile unit. The device can also be used for the pretreatment of the wastewater from the

producer before it is added to the sewage system.

## Summary

The hydro-powered proportional metering pump offers many advantages. With no electrical connection needed, the self-priming unit is easy to install and flexible in its application. The device's simple construction ensures reliability, requires little maintenance and provides easy operation with simple adjustment of percentage dosing rate. The inherent design of the unit ensures high accuracy and consistency independent of flow variations, no over- or under-dosing of chemicals and that metering stops when there is no water flow.

Other applications for a proportional metering pump include disinfection, cleaning, irrigation fertilization, pest management, nutrient supply, hygiene, pH adjustment, flocculation, medication, drinking water treatment, odor neutralization and cooling lubricants. ●

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Filter cake nearly dry after leaving the belt filter.