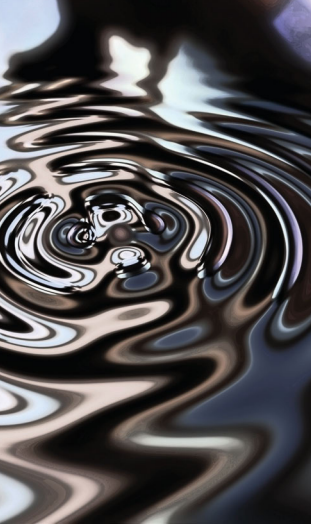


Fast-loop Fluid Sampling

In the petroleum industry, pipeline fluid content needs to be constantly sampled for quality. This measurement can be inline (inside the pipeline) or achieved by drawing off the content into a sample loop. However, a fast loop system provides increased accuracy and reduced maintenance cost by sampling what comes off the main pipeline, analysing it and returning it.

VERDERMAG

Verdermag Global pumps feature at the heart of a fast-loop fluid sampling systems. All Global pumps are 100% leak-free, which is vital in remote locations such as oil rigs

Industry Sectors

- Oil extraction
- Refining
- Tanker transfer

Fast-loop sampling

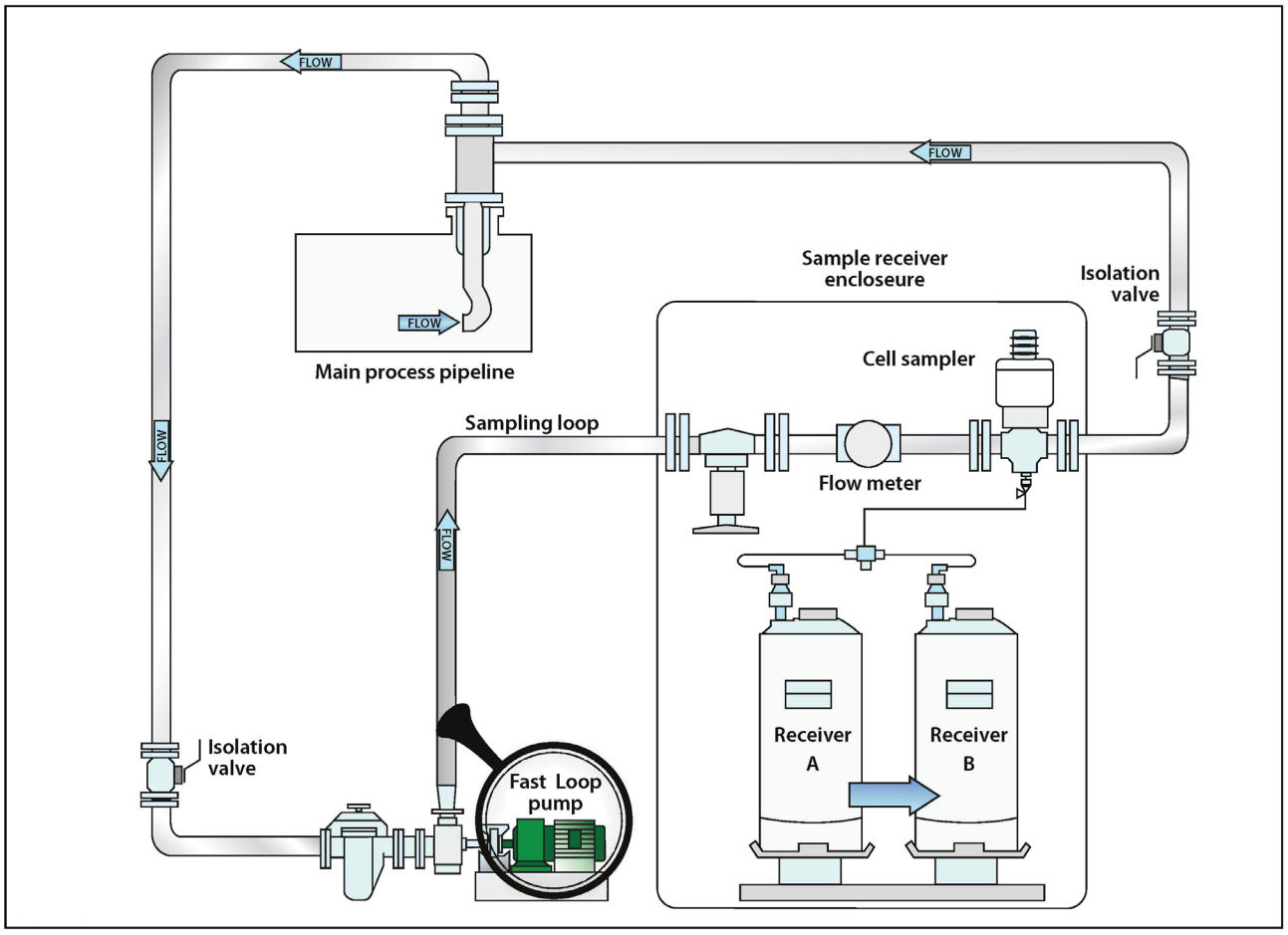
A densitometer checks the quality nd clarity of the oil for the purpose of custodial transfer between operators, also known as 'fiscal metering' systems. Crucial requirements of this process are that the mixture is circulated at high pressure to maintain homogeneity for a representative analysis.

Custody transfer in fluid measurement is defined as a metering point where the fluid is being measured for sale from one party to another. During custody transfer, accuracy is of great importance to both the company delivering the material and the eventual recipient, when transferring a material.

It's imperative that custody transfer equipment help the end user accurately measure quantity and comply with both legal and contractual demands on traceability and validation. Without this, the transaction becomes very hard to enforce.

The bottom line is that without accurate measurement, it's very hard to accurately complete the financial exchange. When you buy a pound of apples, you expect to pay for a pound of apples. The grocer will weigh them for you before the sale and, as a result, you are confident in the transaction. If the grocer simply held up a bag and said, "That feels right to me", that confidence would be impossible. Ultimately, metering is about confidence.

The pumps are built into a steel cabinet containing the sampling loop with associated piping and instruments including flow meters and densitometers.

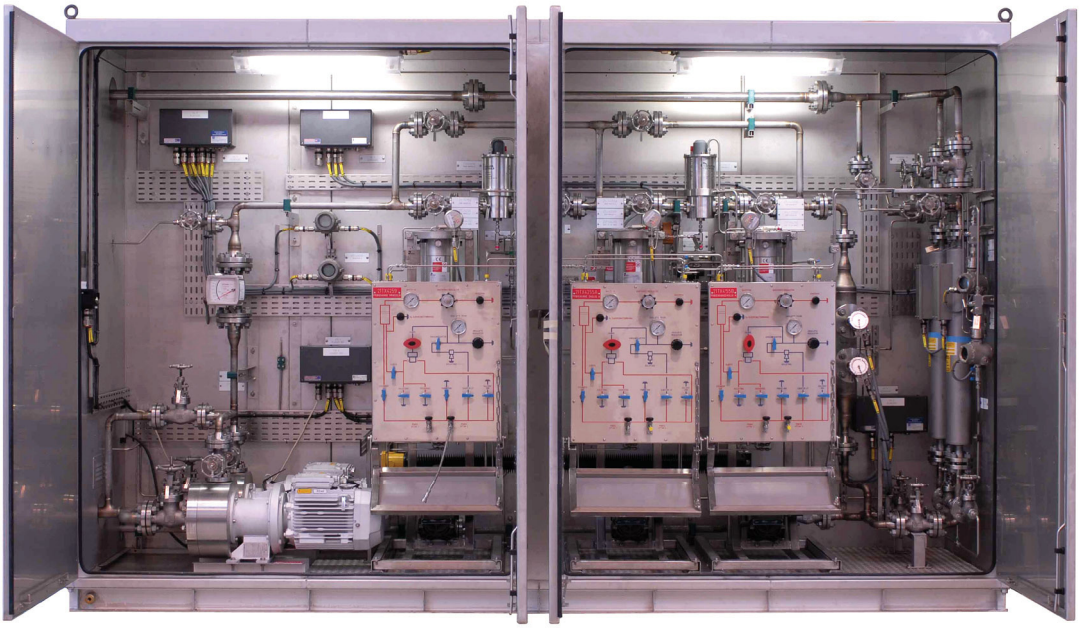


A Verdermag Global pump situated in an example Fast-loop System

Such a cabinet typically contains two pumps for duty standby, and sits next to a pipeline, which may be over a metre in diameter, with crude oil circulating within at 80 bar pressure. This is about average for petroleum gushing out from the inside of an oil well. Verdermag Global units will withstand up to 200 bar and are used on metering systems for both upstream and downstream applications that include platforms, floating production storage and offloading vessels (FPSOs), terminals, offloading facilities and refineries.
The types of fluid typically handled are crude oil/hydrocarbon products, which include fuel oil, liquid petroleum gas (LPG), liquid natural gas (LNG), condensate, kerosene and naphtha. As well as being referred to as custody transfer equipment and fiscal metering systems, the equipment that utilise these pumps is also referred to as fast loop bypass sampling systems, metering skids, densitometers and hydrocarbon sampling devices.

Verdermag Global pumps are especially suitable for fast-loop high pressure systems. The Verdermag range of metallic magnet driven pumps have, over the years, specialised in adhering to the strict guidelines laid down by the petrochemical giants to supply units that can give the reliability and performance required.

The whole system operates at an extremely high pressure, which a Verdermag Global pump is well suited to. Verdermag Global high-pressure pumps from 1-80 cubic metres per hour are specified as recirculation pumps in fast loop oil sampling, depending on the application.
Because of the high system pressure, Verdermag's Global high pressure range can withstand system pressures of up to 200 bars and is available in ATEX and Scandinavian NORSOK build specifications.



2 Verdermag Global high pressure pump units installed in a fast-loop system to recirculate fluid

Zero leakage

The pump is a vital component that circulates the fluid around the system to enable measurement. Magnet driven pumps are used mainly because of their zero leakage properties and reliability, usually measured in terms of mean time between failures (MTBF). It does this by using a design that removes the need for a seal around the drive shaft.

Before the use of magnet driven pumps, shaft seal pumps were used. The elimination of the seal greatly lessens the possibility of leakage. Damage to a pump seal from vibration and loss of integrity from aging increases the risk of fluid loss over time. Magnetic drive pumps effectively remove this problem and are now the product of choice for handling high-risk materials in hazardous areas.

Due to the remote and hazardous nature of the equipment, payback is typically very quick; because failure at the location that metering systems are installed is costly in terms of the expense in getting resources to site and the associated price tag of any downtime.

Centrifugal pumps always had a problem in terms of the shaft sealing, because there is always some inherent emissions from a mechanical seal arrangement. The average emission rate of a mechanical seal pump is around 0.01-0.08 cubic metres per hour. While that may seem at first to be low, the actual pollution rate is very high when considering that 2 Verdermag Global high pressure pump units installed in a fast-loop system to recirculate fluid large chemical processing plants can have up to thousands of pumps in operation.

In 1989, the US Environmental Protection Agency (EPA) published its first report on environmental pollution with major reference to pump emissions. The report documents that in 1987 the American chemical and petrochemical industries emitted 390 tons of toxic materials into the atmosphere, with a large proportion directly attributable to pump leakage through the shaft seal.

The Verdermag Global range of metallic magnet driven pumps has a record of adhering to the strict guidelines for reliability and performance laid down by the petrochemical giants in order to be retained as a preferred supplier. The range of pumps can be found anywhere from the Statoil's Scandinavian oil fields to Malaysian exploration laboratories.

The range of ATEX Zone 1 approved Verdermag Global drive pumps are intrinsically safe and can be used for numerous petrochemical requirements. Made from materials ranging from basic carbon steel to super-alloys such as Hastelloy or Inconel, they can withstand temperatures up to 205 degrees centigrade

Flooded units

Verdermag Global pumps are flooded units where the bearings are permanently lubricated by the crude oil circulating within. Verdermag Global centrifugal pumps use high quality silicon carbide bearings, providing high tolerance to thermal shock and pressure, extreme hardness and resistance to wear, compatibility with highly aggressive media and efficient revolution from their perfectly smooth construction. Providing the bearings are kept lubricated and free of debris, they will run for many years, sometimes up to 25 years and often beyond the life of the motor powering the pump. Most of the major oil companies apply their own specifications in addition to mandatory requirements, and in many cases Verder has been called on to supply X-Rays and radiographs of wells, or provide special paint coatings.

Verdermag Global produce pumps to a client's specification including materials, paint specification, mountings and much more...

Most of them also insist on a full audit trail of test documents on materials used, which can be tracked back to the mill or casting company. This is important in terms of traceability and paperwork for insurance purposes. Verder is very conscious of standards such as BS EN 10204 type 3.1 certification on wet end components, which are in contact with the fluid being pumped.

All these measures are augmented by full five-point hydrostatic performance tests on all products to derive a pump working curve between open and closed valve performance.

When you are next buying apples, spare a thought for the companies you deal with in your day job. Just as you want confidence that your pound of apples weighs precisely that, so your partner companies want confidence in the custodial transfer process. Accurate metering and pumping equipment provides exactly that.

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