



Annulus top Up Service

The system provides a complete one stop shop solution for annulus top up operations, we provide a purpose built air driven pump system combined with the required metering, recording and measurement package for each specific job.

The complete package requires one engineer to operate and download the data as required by the customer.

Pump System

The pumping system (approx 1m x 1m x 1m) has been purpose built for annulus top up operations comprising of a **Pre-fill Circuit** and **High Pressure Circuit** and is **ATEX** approved for use in potentially explosive atmospheres Group 11 Category 2. The frame is fitted with four lifting eyes, and designed and manufactured in accordance with **DNV 271**.

Pump specifications are detailed below assuming 100 PSI air supply and continuous liquid supply via a 1.5" NPT fluid inlet.

Pre fill Specifications

- 1.5" Blagdon double diaphragm plastic pump unit.
- Output flow 290 Litres / per minute.
- Fitted with a self relieving pressure reducing regulator 2" diam. 0-160 PSI. pressure gauge and a pump start/stop valve.
- Relief valve set at 10Bar.
- Fitted with a check valve to protect the diaphragm pump from the pressure line.

High Pressure Specifications

- Hydraton air driven double acting double headed pump model DHDA33.
- Output pressure 6,728psi.
- Output flow 31.7 Litres / per minute.
- Fitted with a self relieving pressure reducing regulator 2" diam. 0-160PSI pressure gauge and a pump start/stop valve.
- Pump Isolation Valve.
- Fitted with a 10,000PSI dual scale stainless steel pressure gauge having an accuracy of +/-1%.
- Relief valve set at 5,250PSI.
- Fitted with ¼" NPT connection for measurement / metering communications.
- Fitted with 1.5" BSPP outlet connection.



Purpose Built Container

The container includes the pump which is mounted on rollers, the pump slides out of the container on a set of guides, allowing easy access for crane lifts.





Measurement

We have selected **Multi Pulse Positive Displacement Meters** to accompany the annulus top up system. They provide a cost effective reliable solution for a wide range of industrial flow measurement.

Design Simplicity

It has a simple robust design and offers the advantage of only one moving part. As each piston rotation passes a known liquid volume, the inherent repeatability of the Positive Displacement meter makes it particularly suited to batching and dispensing duties which annulus top up work basically is.

Application Flexibility.

The meters adapt easily over a wide range of liquids from non-conductive low viscosity solvents, to extremely viscous lubricants.

The flexibility is further enhanced as its performance is independent of flow profile eliminating the need for straight pipe runs as required by most other metering technologies.

Therefore this meter by eliminating the need for straight pipework upstream and downstream is ideal for rigging up in constricted wellhead areas.

Features

- Accuracy +/- 0.5%
- Stainless steel construction
- Two independent pulse outputs with high noise immunity (CE compliant)
- Measures high/low viscosity liquids
- No requirement for flow conditioning
- Hygienic configurations.
- High pressure models available.
- Insensitive to mounting orientation.
- Flameproof or intrinsically safe integrated LCD rate totaliser with pulse and analogue outputs.



Monitoring and Recording

To complete the system we use **LEO Recorders**, these instruments would be fitted to each annuli throughout the operation. They have the ability to record both temperature and pressure in time spans as short as one second.

Application Flexibility

The recorder is a highly portable and accurate solution to reading process variables. We can configure the recorder to your annuli pipework connections, additionally the unit can be mounted through 360degrees allowing for true plug and play utilization. We can configure the recorder for either interval recording (set periods of time) or event recording (such as a change in pressure) and can store up to 57,000 values between download.

Recording

Interfacing and configuration is handled by the **Logger 4X** software package which in addition to the configuration allows graphical display of measured values, compensation for air pressure, exporting of data and real time reading of measured values.

Features

- Available in 300Bar / 4,350PSI or 700Bar / 10,150PSI.
- Has the ability to convert between units of measurement.
- Accuracy +/- 1%
- Interval range 1 second – 24 hours.
- Resolution 100mBar
- Range samples (time to full) - 1 second sample – 8hrs
5 second sample – 1day 16hrs
10 second sample – 3days 7hrs
15 second sample – 4days 23hrs
30 second sample – 7days 2hrs
1minute sample - 14days 4hrs