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Where Innovation Flows

Condensates & Butane Injection

APPLICATION DOCUMENT

In the oilfield, condensates (also known as natural gas liquids, or NGLs) and light hydrocarbons (also called "diluent") are indispensable components that are used in the transfer of raw crude oil. Specifically, they play a pivotal role when the recovered crude oil is too heavy or viscous to pump through a pipeline in its natural state. In these cases, the heavy crude will be injected with a condensate or light hydrocarbon to lower its viscosity to a point where it is considered "sellable," i.e., able to be sent through a pipeline to a gathering station.

Making condensate/light hydrocarbon injection more difficult over the years has been the increase operating pressures in today's pipelines, to the point where 145 psi (10 bar) or more is needed to inject the condensate or light hydrocarbon. In other words, the pumps that are used to inject these items must be able to reach and maintain high differential pressures over 24/7 continuous-duty operating cycles. The pumps must also be able to deliver consistent flow rates during injection, no matter the viscosity of the crude oil that is being treated.

In this application, the best solution may be the Regenerative Turbine Pump, the design of which enables it to excel at transferring liquids with high pressure, low flow and low viscosity, with little risk that damaging cavitation and pulsation will occur. Specifically, Blackmer® Ebsray® Series Regenerative Turbine Pumps are designed with a rotating, one-stage, non-contact, freewheeling



RC40



R80/82

impeller disc with 60 small cells on its periphery. As liquid enters the suction port, kinetic energy carries it around the narrow hydraulic channel around the cells, creating the energy and differential pressure that moves the liquid through the pump. Other advantages of Blackmer Ebsray Series pumps include a small footprint, high efficiency that requires smaller motors, quiet operation with no vibration and easy maintenance.

Because of the testing demands of condensate and light hydrocarbon injection – high volume, high flow rates and high differential pressures – Blackmer Ebsray Series has developed a new class of HiFlow Series Regenerative Turbine Pumps. The R80/R82 models, which are designed for base-mounted setups, have 3" (75mm) inlet and discharge ports. The R80 pumps can deliver smooth, non-pulsing flow rates up to 132 gpm (500 L/min), while the R82 models deliver flows up to 159 gpm (600 L/min), all at differential pressures up to 203 psi (14 bar). For applications that don't require excessively high flow rates, Blackmer Ebsray Series offers its RC Series Regenerative Turbine Pumps, which are available in three models – RC20, RC25 and RC40 – that deliver flow rates ranging from 12 gpm (48 L/min) to 53 gpm (200 L/min) at differential pressures from 175 psi (12 bar) to 200 psi (14 bar). All HiFlow and RC models can be outfitted with a bypass valve that allows the pump to transfer vapor while it is priming.



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BLACKMER EBSRAY SERIES SOLUTIONS

- [RC Series Regenerative Turbine Pumps](#)
- [HiFlow Series Regenerative Turbine Pumps](#)

COMPETITION

- **Sliding Vane Pumps**

Have difficulty in creating the high differential pressures that may be needed to properly inject condensates and light hydrocarbons into the pipeline, while also being less well suited for continuous-duty operation.

- **Side-Channel Pumps**

Can achieve high differential pressures, but require a larger physical footprint for installation. This results in higher maintenance costs due to the number of internal components the pump has. Also may need as many as five to seven impeller stages to create high flow rates, compared to just one stage for regenerative turbine pumps.

- **Multi-Stage Centrifugal Pumps**

Like side-channel pumps, more impeller stages require more components, resulting in a larger footprint and higher maintenance costs.

- **Other Regenerative Turbine Pumps**

May need to upsize the pump motor in order to achieve higher flow rates, which reduces their efficiency when compared to Blackmer Ebsray Series models that can operate with a smaller motor with less horsepower that requires less electricity and less overall operating costs.

For more information on these additional solutions, visit us at blackmer.com.



GLOSSARY

Rotodynamic – a type of pumping technology in which energy is continuously imparted to the pumped liquid by means of a rotating impeller, propeller or rotor.

Condensates/Natural Gas Liquids (NGLs) – hydrocarbon components of natural gas that are separated from the gas state in the form of liquids then used as injectable inputs that reduce the viscosity of raw crude oil that is transported via pipeline.

Light Hydrocarbons/Diluents – mixtures of petroleum by-products that are blended with heavy crude oil in order to reduce its viscosity, thereby making it easier and more efficient to transport via pipeline.

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PSG Grand Rapids
1809 Century Avenue SW
Grand Rapids, MI 49503-1530 USA
Tel.: +1 (616) 241-1611 • Fax: +1 (616) 241-3752
info@blackmer.com
blackmer.com