

# Blackmer



Where Innovation Flows

## Blowing Agents

### APPLICATION DOCUMENT

Blowing agents are specialty gas liquids that are critical in the manufacture of foam-based products. Specifically, blowing agents are used at the point of the manufacturing process when a polyol and isocyanate are mixed, which allows the foam to expand. In this application, the liquids are in a high vapor-pressure state, which means that constant flow rates and pressures must be maintained in order to ensure that a nice, consistent foam that is of the highest quality will be produced. In many instances, blowing-agent production is a continuous-duty operation, which requires a pumping technology that can function reliably over a 24/7 manufacturing schedule while accommodating high differential pressures.

In this application, more and more operators are finding that the best solution is 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 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. Though considered rotodynamic pumps, the operation of Blackmer Ebsray Series pumps more closely resembles that of a positive displacement (PD) pump. This enables them to deliver multi-stage

performance with a single-stage impeller, resulting in optimized performance even at low flow rates. 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.



R80/82

The unique manufacture, handling and storage characteristics of blowing agents hit the operational sweet spot for Blackmer Ebsray Series Regenerative Turbine Pumps, which check all of the boxes for efficient, safe and reliable blowing agent handling. Blackmer Ebsray Series pumps excel in this realm because they have the capability to successfully handle all of the various components and unique chemistries that are inherent in blowing agent manufacture with no fear that final product quality will be compromised. For applications that require lower flow rates, the RC Series pumps are available in three models – RC20, RC25 and RC40 – with 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).

For applications with higher flow rates, Blackmer Ebsray Series offers its HiFlow Series Regenerative Turbine Pumps. The R80/R82 models, which excel in base-mounted setups, have 3" (75mm) inlet and discharge ports. The R80 pumps can deliver 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). All RC and HiFlow 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**

Can find it difficult to produce the varying differential pressures that are needed in the transfer of blowing agents.

- **Side-Channel Pumps**

Require a larger physical footprint for installation and have higher maintenance costs due to the number of internal components. Also 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 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.



## 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.

**Blowing Agent** – a substance that is capable of producing a cellular structure via a foaming process in a variety of materials that undergo hardening or phase transition during their manufacture, such as polymers, plastics and metals.

For more information on these additional solutions, visit us at [blackmer.com](http://blackmer.com).

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