

Industrial Refrigerants

APPLICATION DOCUMENT

Refrigerants are specialty gas liquids that are produced at a dedicated manufacturing facility before they are transferred to an industrial plant where a refrigeration operation is taking place, with the refrigerant stored in large chillers that must be kept operational at all times. Refrigerants can be constructed via many different recipes featuring many different chemistries. As such, they require a pumping technology that is compatible with the wide array of chemicals that are used in continuous-duty refrigerant-manufacturing operations.

In this application, the best pumping solution is often 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, Ebsray® 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 Ebsray 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 Ebsray pumps include a small footprint, high efficiency that requires smaller motors, quiet operation with no vibration and easy maintenance.



RC25

R80/82

The unique manufacture, handling, transport and storage characteristics of refrigerants is the perfect vehicle for direct-drive rotodynamic Ebsray® Regenerative Turbine Pumps. Ebsray pumps excel in this application because they have the capability to successfully handle all of the various components and unique chemistries that are inherent in refrigerant 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 – that deliver flow rates ranging from 48 L/min (12 gpm) to 200 L/min (53 gpm) at differential pressures ranging from 12 bar (175 psi) to 14 bar (200 psi).

If high flow rates are necessary, Ebsray offers a new solution with its HiFlow Series Regenerative Turbine Pumps. The R80/R82 models, which are typically used in base-mounted setups, have 3" (75mm) inlet and discharge ports. The R80 pumps can deliver smooth, non-pulsing flow rates up to 500 L/min (132 gpm), while the R82 models deliver flows up to 600 L/min (159 gpm), all at differential pressures up to 14 bar (203 psi). 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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EBSRAY 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 refrigerants.

- **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 Ebsray 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.

Refrigerant – a substance or mixture most commonly consisting of fluorocarbons that is used in a refrigeration cycle that undergoes phase transition from a liquid to a gas and back again.

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

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