

# Blackmer® Ebsray RC Series RC20, RC25 & RC40

REGENERATIVE TURBINE PUMPS | PRODUCT BROCHURE



*Blackmer*

Where Innovation Flows



Blackmer® Ebsray RC Series Regenerative Turbine Pumps are built for liquefied gases. All liquefied gas, such as LPG and Autogas, applications and installations have unique challenges and issues to overcome – high pressure, low flow, cavitation amongst others. The Blackmer Ebsray RC Series line incorporating the RC20, RC25, and RC40 are up to the challenge by providing fast, quiet, smooth, pulsation-free transfer of liquefied gases in the most challenging pumping conditions.



QUIET, EFFICIENT,  
EFFECTIVE  
LPG TRANSFER PUMPS



## Blackmer® Ebsray RC Series – RC20, RC25 & RC40

### Regenerative Turbine Pumps

Blackmer Ebsray RC Series of Regenerative Turbine Pumps are designed and precision-built for high-pressure transfer of LPG, Autogas, propane, butane and a wide variety of other liquefied gases, including DME, Aerosols, CO<sub>2</sub>, industrial refrigerants and anhydrous ammonia. These single-stage impeller pumps feature two discharge ports, either of which can be used as a bypass connection. The RC20 offers flow rates up to 16 gpm (62 L/min) and flow rates up to 28 gpm (106 L/min) for the RC25. Both pumps can operate at differential pressures up to 203 psi (14 bar). The RC40 offers higher flow rates up to 53 gpm (200 L/min) and operates at differential pressures up to 203 psi (14 bar). Unaffected by fluctuating temperatures and changing environmental conditions, these pumps offer consistent pumping performance in all conditions.

Amongst regenerative turbine pumps, the RC Series stands apart. These highly efficient pumps are very compact yet achieve high flow rates even when using a smaller motor with lower HP than competitors. Additionally, RC Series Pumps are designed to accommodate motor interchangeability, meaning the pump can be paired universally, a stark difference from manufacturers that require their own fixed motor.

Due to the compact size of the pumps and their very low operational noise, vibration and harshness, these pumps can be used confidently and safely in almost any application even in tight installation spaces. The simple and straightforward design of the Ebsray RC Series allow for quick, easy and simple repairs that can be done right in the field. In fact, a key repair advantage is the “quill,” which consists of a shaft, cartridge, mechanical seal and bearings, all in one assembly, facilitating maintenance by replacing the complete rotating assembly quickly and efficiently.



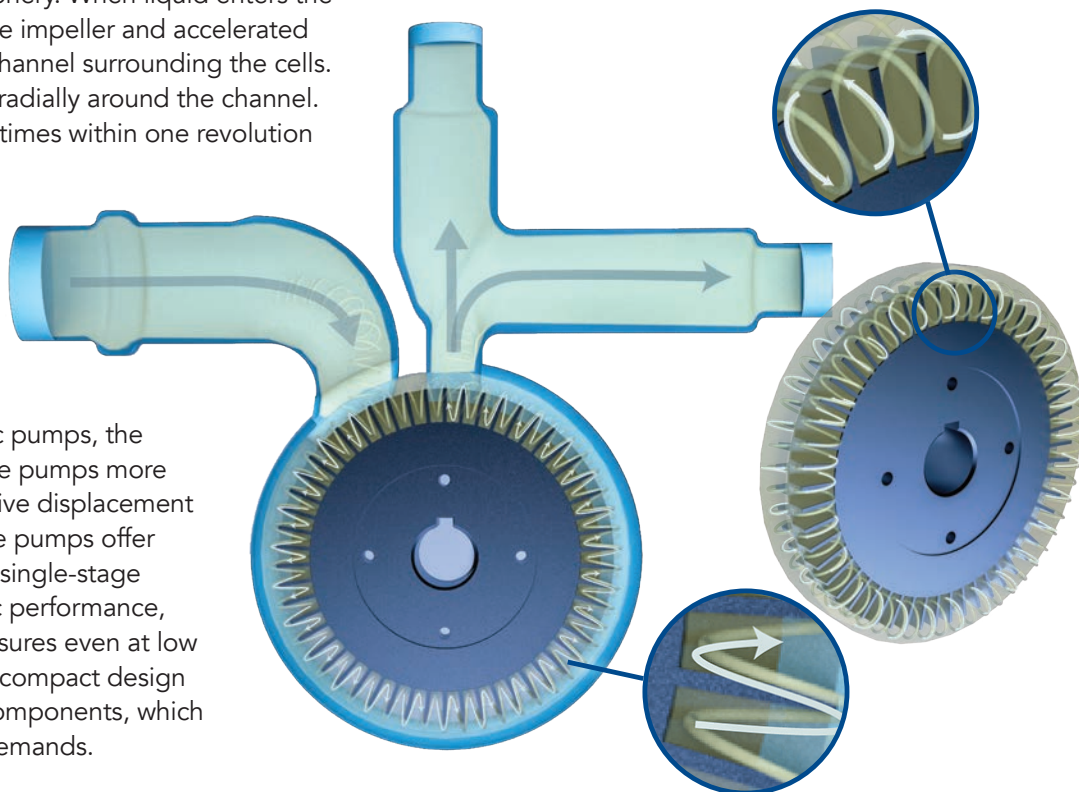
# Blackmer® Ebsray RC Series – RC20, RC25 & RC40 | Regenerative Turbine Technology

## How Blackmer Ebsray RC Series Regenerative Turbine Pumps Work

Blackmer Ebsray RC Series Regenerative Turbine Pumps have a rotating, non-contact, free-wheeling impeller disc that has around 60 small cells on its periphery. When liquid enters the suction port it is picked up by the impeller and accelerated around in the narrow hydraulic channel surrounding the cells. Kinetic energy carries the liquid radially around the channel. The spiraling of the liquid many times within one revolution builds energy and pressure.

This continuous regeneration of the numerous small liquid cells creates the differential pressure capability of the pump – hence the name regenerative turbine pump.

Though considered rotodynamic pumps, the operation of regenerative turbine pumps more closely resembles that of a positive displacement (PD) pump. Regenerative turbine pumps offer multi-stage performance from a single-stage impeller that optimizes hydraulic performance, resulting in high differential pressures even at low flow rates. The pumps feature a compact design with few rotating and wearing components, which eases maintenance and repair demands.



## Advantages of Regenerative Turbine Technology:

### Overall Advantages

- Diminishes the damaging effects of cavitation by smoothing the fluid through gentle collapse of vapor bubbles
- Excellent self-priming and vapor-handling abilities especially when paired with an RV series bypass valve
- Operates without vibration and noise in all pumping situations
- Smooth, pulsation-free discharge of fluid that is gentle on the whole pump system
- Maximum allowable working pressure to 34 bar (493 psi) for handling liquids with high vapor pressures
- Repairs can be performed in the field

### Regenerative Turbine Technology vs Competitive Technology

- Low NPSHr for difficult suction conditions with low NPSHa
- Small, compact footprint when compared to competing technologies

- Single-stage pump engineered to perform reliably and safely at motor speed
- Wide performance range within various conditions allows for system flexibility
- Increased flow rates and faster loading/unloading times when compared to other pump technologies

### Regenerative Turbine Technology vs Competition

- Operates without a Best Efficiency Point (BEP) for PD-pump performance curve flexibility
- Durable design for continuous-duty operation
- The mechanical seal is the only wear component
- Less complex to operate, maintain, repair and rebuild, with easy seal and impeller access
- Less operational costs due to a smaller motor than competitive brands
- Easy installation with no additional adjustments to maintain performance
- Motor interchangeability for flexibility in motor options

# Blackmer® Ebsray RC Series – RC20, RC25 & RC40

## Casing/Body

- Compact, one-piece design
- Mounting flange for close coupling IEC B5 or NEMA frame motors
- Robust construction for motor and pipeline stability/rigidity
- "O-ring" sealed, simple to service

## Ports

- Versatile 3-port arrangement, self-venting design
- Bypass valve connection port direct on pump

## Impeller

- Axially self-aligning, single-stage, hydraulically balanced
- Quiet, vibration-free operation
- Ni-Resist constructed impeller provides corrosion resistance

## Bearings

- Heavy duty, deep groove ball bearings
- Grease packed, sealed-for-life
- Robust construction for motor and pipeline stability/rigidity
- Extra protection by secondary shaft seals against dust or LPG entry

## Shaft Coupling

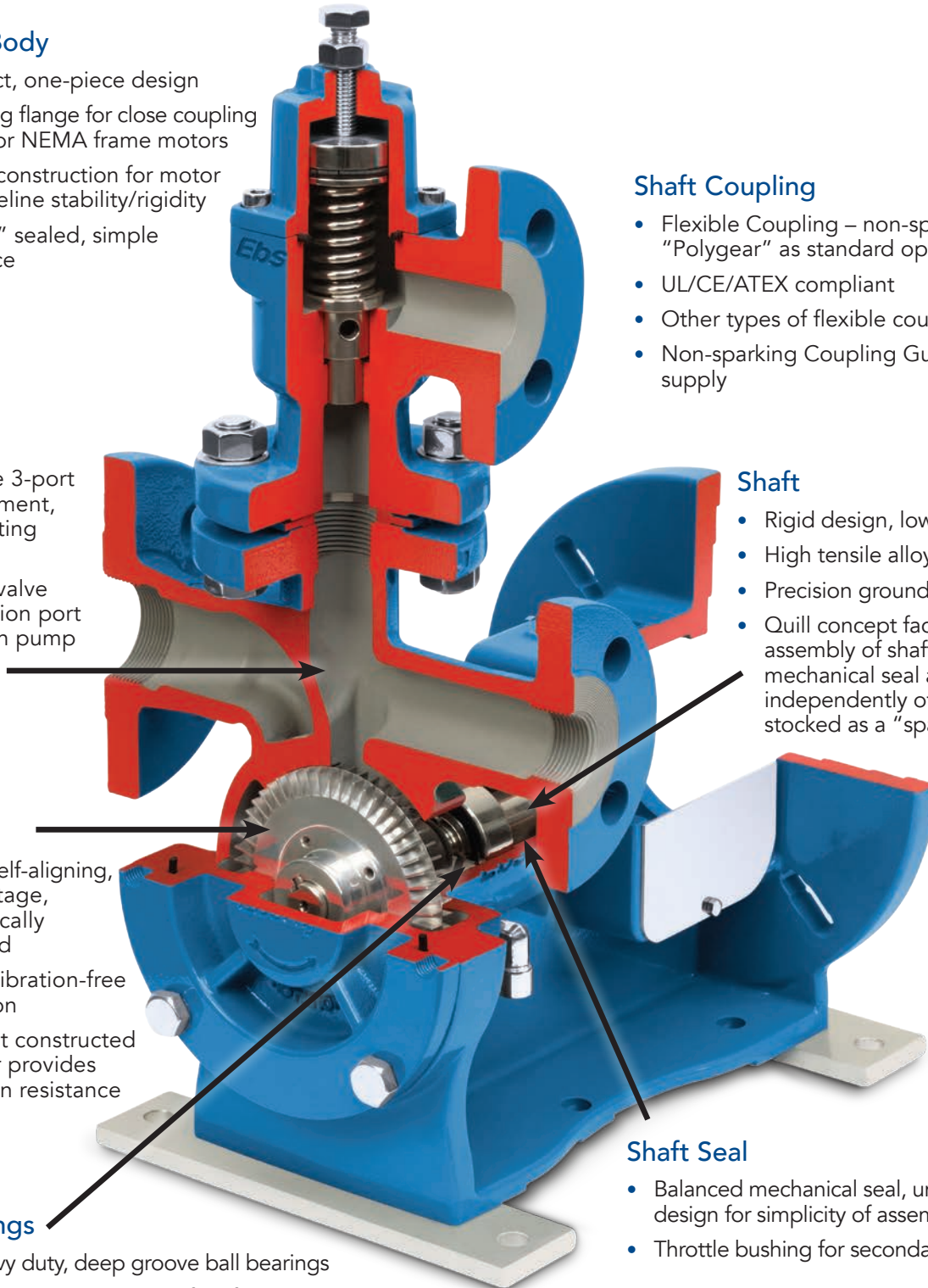
- Flexible Coupling – non-sparking "Polygear" as standard option
- UL/CE/ATEX compliant
- Other types of flexible coupling available
- Non-sparking Coupling Guard standard supply

## Shaft

- Rigid design, low deflection
- High tensile alloy steel
- Precision ground surfaces
- Quill concept facilitates one-piece assembly of shaft, cartridge, mechanical seal and bearings independently of pump, or stocked as a "spare part"

## Shaft Seal

- Balanced mechanical seal, unique cartridge design for simplicity of assembly/maintenance
- Throttle bushing for secondary sealing



### About the Blackmer Ebsray RC Series Regenerative Turbine Pumps

The Blackmer Ebsray RC Series of Regenerative Turbine Pumps are used for high-pressure transfer of LPG, Autogas, and other near vapor pressure fluids from above or below ground tanks. These highly efficient models all use a flanged motor, resulting in cost savings, feature a single-stage impeller and a unique three-port design with two discharge ports designed for operational and installation flexibility. Additionally, the cartridge-designed mechanical seals and bearings can be easily replaced without having to disconnect the pump from the piping. The pumps can deliver differential pressures up to 203 psi (14 bar) with flow rates up to 53 gpm (200 L/min) at motor speeds up to 3,500 rpm. The RC Series pumps can be used in 50Hz or 60Hz environments, and all models comply with ATEX, UL51 and AS1596 regulatory codes for use in potentially explosive atmospheres.

#### RC20

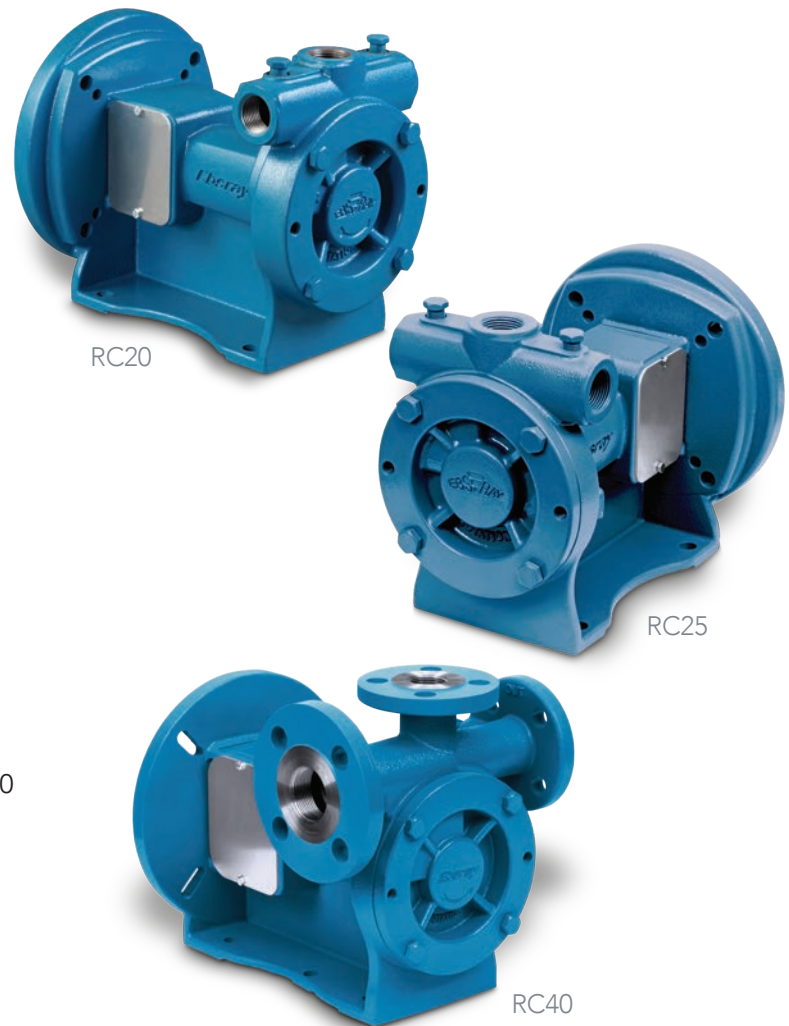
- Max. Flow 16 gpm (62 L/min)
- Max. Differential Pressure 203 psi (14 bar)
- One Hose Dispensing for Autogas
- DN 25/1 in. NPT(F) Inlet and Outlet Ports

#### RC25

- Max. Flow 28 gpm (106 L/min)
- Max. Differential Pressure 203 psi (14 bar)
- Two Hose Dispensing for Autogas
- DN 25/1 in. NPT(F) Inlet and Outlet Ports

#### RC40

- Max. Flow 53 gpm (200 L/min)
- Max. Differential Pressure 203 psi (14 bar)
- Four Hose Dispensing for Autogas
- 1-1/2" NPT, Flanged to Suit 1-1/2" ANSI Class 300 and DN40 DIN PN40 for Inlet Port
- 1" NPT, Flanged to Suit 1" ANSI Class 300 and DN25 DIN PN4 for Outlet Ports



#### Applications:

- Autogas driveway dispensing for up to four hoses
- Transfer and industrial dispensing
- Marine dispensing
- Portable tanks
- Cylinder filling
- Forklift refueling
- Direct burner or vaporizer feed
- Above ground and underground tank



# Regenerative Turbine Pumps

## Operating Limits

Pump Model	Maximum Differential Pressure	Maximum Working Pressure <sup>1</sup>	Hydrostatic Test Pressure	Nominal Maximum Flow Rate – 60Hz	Nominal Maximum Flow Rate – 50Hz	Minimum Temperature	Maximum Temperature <sup>2</sup>	Maximum Speed <sup>3</sup>
RC20	203 psi (14 bar)	493 psi (34 bar)	1015 psi (70 bar)	16 gpm (62 L/min)	13 gpm (48 L/min)	-40°F (-40°C)	390°F (200°C)	3800 rpm
RC25	203 psi (14 bar)	493 psi (34 bar)	1015 psi (70 bar)	28 gpm (106 L/min)	21 gpm (80 L/min)	-40°F (-40°C)	390°F (200°C)	3800 rpm
RC40	203 psi (14 bar)	493 psi (34 bar)	1015 psi (70 bar)	53 gpm (200 L/min)	44 gpm (165 L/min)	-40°F (-40°C)	390°F (200°C)	3800 rpm

<sup>1</sup> 400 psi (27.5 bar) in regions where Underwriters Laboratories UL51 applies

<sup>2</sup> Elastomer dependent

<sup>3</sup> 3600 RPM in regions where Underwriters Laboratories UL51 applies

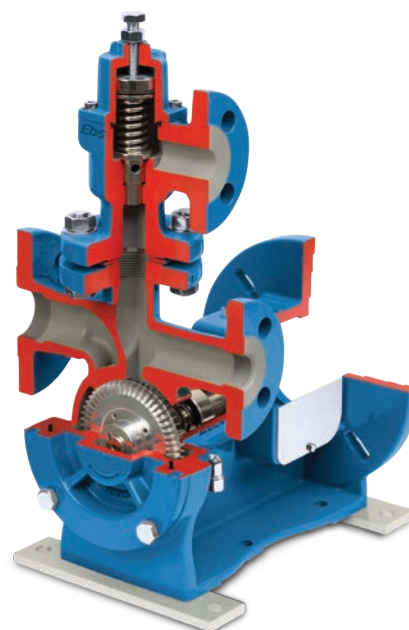
## Porting Connection Options

Pump Model	Inlet Port	Outlet Ports	Gauge Ports
RC20	DN 25/1" NPT(F)	DN 25/1" NPT(F)	1/4" NPT
RC25	DN 25/1" NPT(F)	DN 25/1" NPT(F)	1/4" NPT
RC40	1-1/2" NPT, Flanged to suit 1-1/2" ANSI Class 300 and DN40 DIN PN40	1" NPT, Flanged to suit 1" ANSI Class 300 and DN25 DIN PN40	1/4" NPT

## Materials of Construction

Description	Standard Materials
Body & Cover	Ductile Iron ASTM A536
Impeller	Ni-Resist
Shaft	Carbon Steel
O-Rings*	Fluoroelastomer (FKM)
Oil Seal	Nitrile (NBR)
Mechanical Seal Assembly	Carbon/Silicon Carbide/Fluoroelastomer (FKM)
Mechanical Seal Cartridge	Ductile Iron ASTM A536

\* Optional O-Ring materials include Nitrile, FFKM/PTFE, and Neoprene

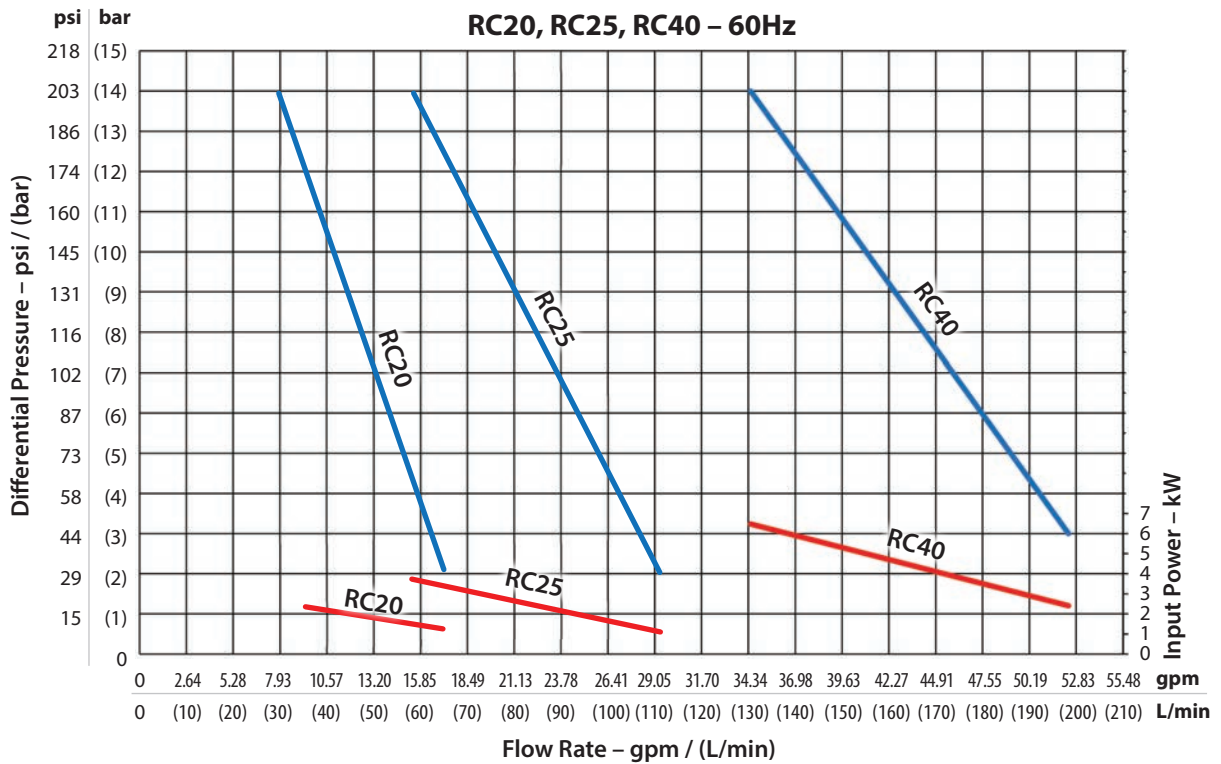


# Regenerative Turbine Pumps

## Performance Curves

Flow

Power





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