

**TYPE LF/LC/LCV**  
**END SUCTION PUMPS**  
Close Coupled and Frame Mounted



## END SUCTION PUMPS

Type LF (Frame Mounted)

Type LC (Close Coupled)

Type LCV (Vertically Mounted Close Coupled)

Grundfos CBS Inc. is fully committed to advancing pump technology and providing its customers with the most efficient pumps in the market.

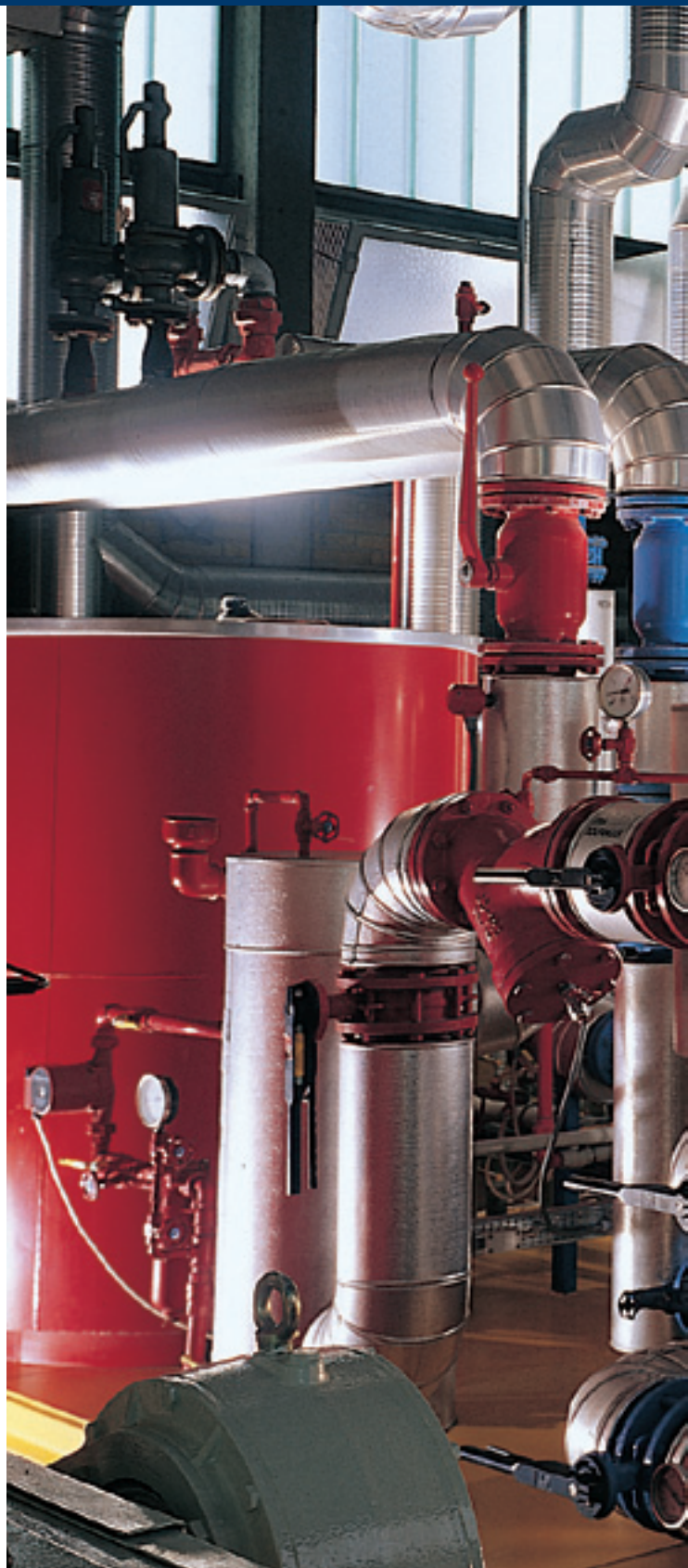
The PACO line of end suction, single stage pumps serves as the industry standard in performance, quality, and durability. With an expanded selection of 32 sizes available, the PACO line of pumps are the smart choice for a number of reasons:

- › Low life-cycle costs
- › High efficiency for reduced operation costs
- › Compensated double-volute design for reduced radial loads, minimized shaft deflection, and prolonged seal life and bearing life
- › Mechanical design for reduced maintenance and minimal downtime
- › Back pull out design for ease of maintenance and servicing
- › Range of sizes to meet precise application requirements
- › Quiet operation

Advanced features incorporated as standard on PACO end suction pumps ensure optimum performance and reliability. These features, as well as optional features that meet specialized needs, are available on the broadest line of high-efficiency pumps offered to the industry.

An innovative pump and impeller design produces a higher operating efficiency – up to 91 percent – and provides a wider band of best operating efficiency, even during conditions of off-design operation.

Quite simply, the PACO line of pumps is the smart choice for lower initial cost, longer pump life, reduced operating and maintenance costs, maximum reliability, and quieter operation.

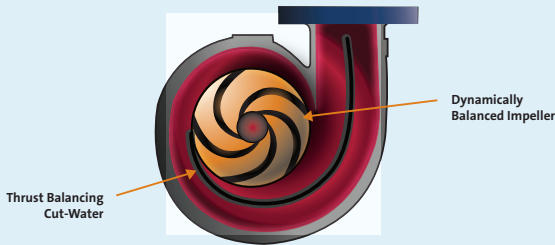
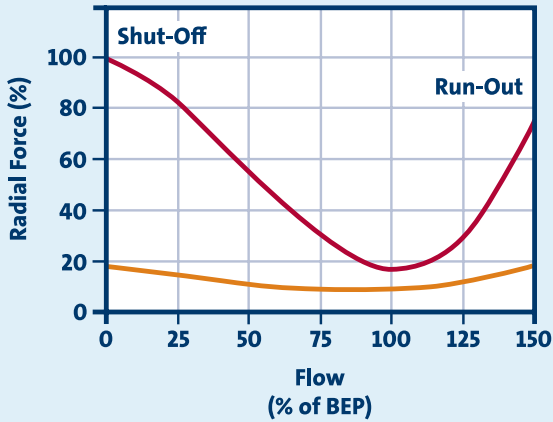


### COMPARISON CHART

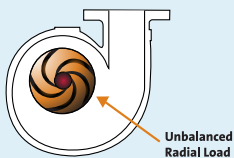
Typical radial force vs. design capacity with single and double volute

SINGLE VOLUTE

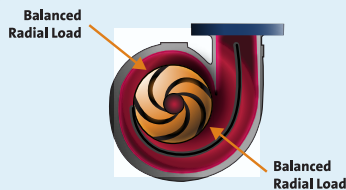
DOUBLE VOLUTE



#### Single Volute (One Cutwater)



#### Double Volute (Two Cutwaters)



## LF/LC/LCV

### Double Volute Design with Superior Advantages

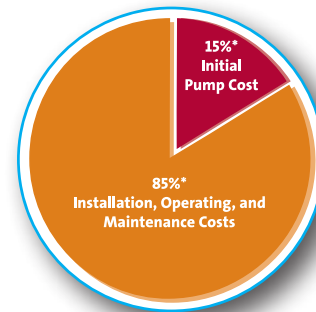
The PACO LF and LC pumps utilize a double volute design that offers a distinct advantage over single volute designs. The double volute design incorporates two cutwaters located at 180°, which divide the flow into two geometrically similar regions of the volute.

The resultant hydraulic forces within the pumps are equal and opposed. As a result, the net radial force is maintained at a very low level throughout the operating range of the pump, and shaft deflection is kept to a minimum.

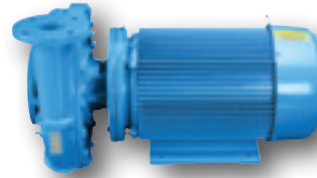
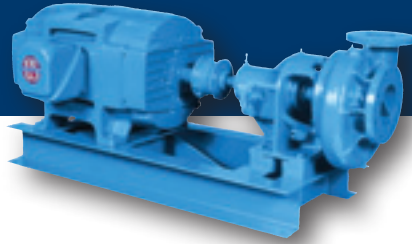
A typical single volute pump is normally designed to operate at or near the best efficiency point (BEP). In actual application, many pumps stray away from BEP due to load variances and/or changes in the system head curve.

As single volute pumps begin to operate away from BEP, the resultant radial load increases dramatically, causing increased shaft loads, deflection, and vibration. Excessive radial loads can cause premature failure of the mechanical seal, bearings, and shaft.

A double volute design ensures that hydraulic radial loads are equal and opposed and thereby nullified. Pump operation remains stable throughout the entire performance curve, with minimal shaft deflection, prolonging seal, bearing, and shaft life.



\*According to studies by the U.S. Department of Energy

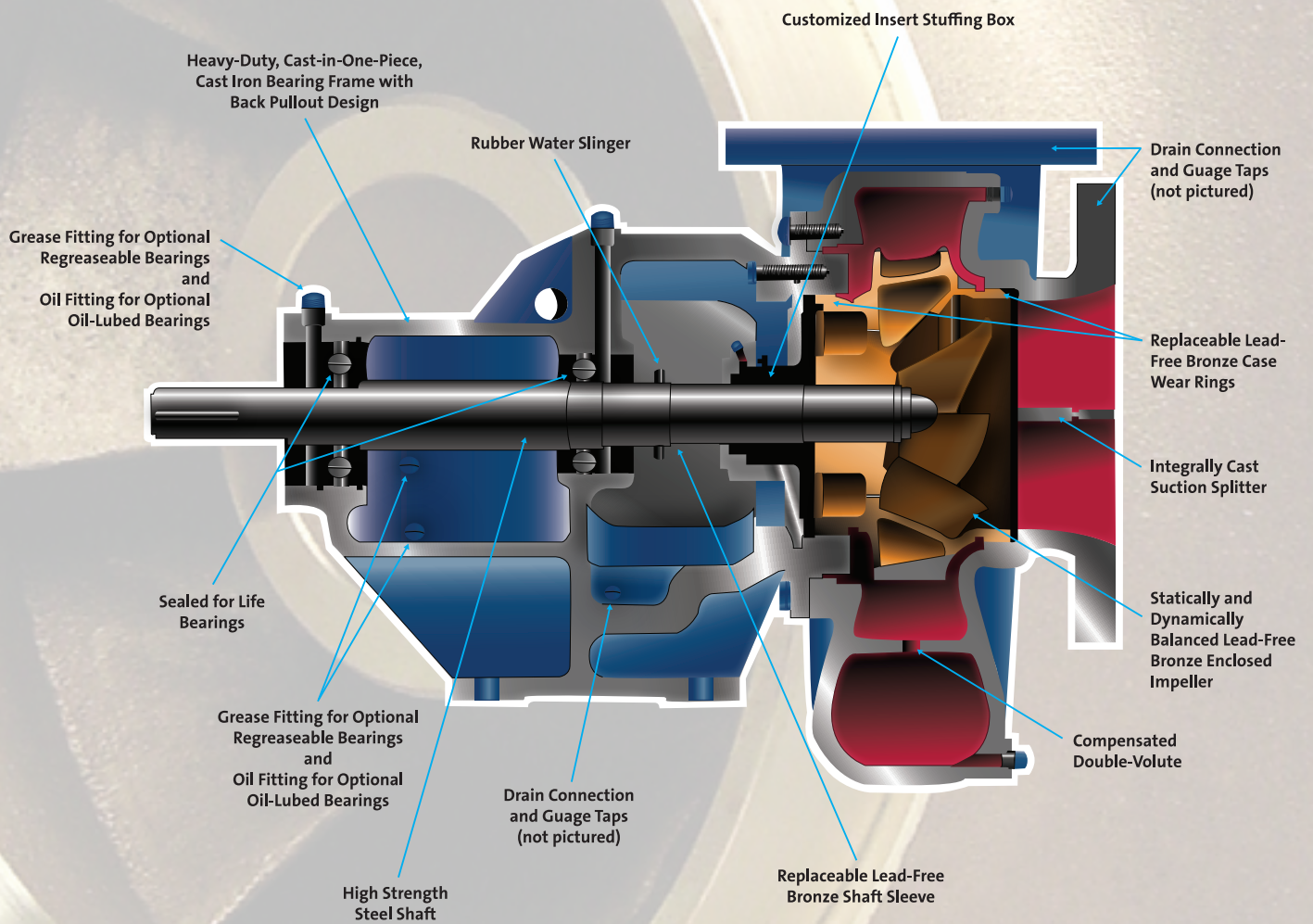


## FEATURES AND BENEFITS

PACO LF FRAME MOUNTED END SUCTION PUMP	
<b>Footed Bearing Frame</b>	<ul style="list-style-type: none"> <li>Enhances ease of maintenance and provides proper support of rotating equipment during servicing</li> </ul>
<b>Footless Volute</b>	<ul style="list-style-type: none"> <li>Establishes single point support for reducing alignment restrictions, which extend seal and bearing life</li> <li>Permits discharge orientation flexibility</li> <li>Minimizes the effects (misalignment, flange strain) of thermal expansion on volute</li> </ul>
<b>Permanently Sealed for Life Bearings</b>	<ul style="list-style-type: none"> <li>Reduce environmental contaminants and pump maintenance</li> </ul>
<b>Machined Mounting Surfaces and Fabricated Base Plate</b>	<ul style="list-style-type: none"> <li>Aid in alignment</li> </ul>
<b>Choice of Motor Enclosures</b>	<ul style="list-style-type: none"> <li>Increases flexibility of design</li> </ul>
<b>Back Pull-Out Design</b>	<ul style="list-style-type: none"> <li>Enables maintenance without disturbing piping</li> </ul>
<b>Double Volute Design</b>	<ul style="list-style-type: none"> <li>Reduces radial loads, internal recirculation, and turbulence, which increases efficiency, lowers life cycle costs, and prolongs seal and bearing life</li> </ul>
<b>Large Seal Chamber</b>	<ul style="list-style-type: none"> <li>Allows for various seal configurations and customization</li> </ul>
<b>Integrally Cast Diffuser Vane</b>	<ul style="list-style-type: none"> <li>Reduces turbulence and pre-rotation by providing laminar flow into oversized impeller eye, resulting in decreased need for extended horizontal suction pipe runs, elbows, or suction guides</li> </ul>
<b>Francis Vane Impeller Design</b>	<ul style="list-style-type: none"> <li>Increases efficiency and reduces NPSHr</li> </ul>
<b>Bronze Case Wear Rings</b>	<ul style="list-style-type: none"> <li>Extend pump life and increase pump efficiency (included as standard)</li> <li>Provide simple and inexpensive renewal of "like new" operating tolerances, even after years of operation</li> </ul>
<b>Impellers</b>	<ul style="list-style-type: none"> <li>Trimmed to exact customer specifications for customization</li> <li>Static and dynamically balanced to ISO 1940-G3 for reduced noise and vibration</li> <li>Hydraulically balanced to decrease thrust loads and prolong seal and bearing life</li> </ul>
PACO LC/LCV CLOSE COUPLED END SUCTION PUMPS	
<b>Close Coupled Design</b>	<ul style="list-style-type: none"> <li>Provides compact construction and space savings</li> </ul>
<b>Registered Fit</b>	<ul style="list-style-type: none"> <li>Eliminates machine tolerance stacking</li> <li>Provides positive placement of components for permanent rigid pump to motor alignment</li> </ul>
<b>Permanent Rigid Alignment</b>	<ul style="list-style-type: none"> <li>Eliminates need for alignment</li> <li>Prolongs seal and bearing life</li> </ul>
<b>Industry-Standard JM Frame Motor</b>	<ul style="list-style-type: none"> <li>Simplifies motor replacement</li> </ul>
<b>Type LCV Pump</b>	<ul style="list-style-type: none"> <li>Offers vertical mounting of close coupled design for increased space savings</li> </ul>
<b>No Grouting Requirements</b>	<ul style="list-style-type: none"> <li>Makes installation easy</li> </ul>
<b>Francis Vane Impeller Design</b>	<ul style="list-style-type: none"> <li>Increases efficiency and reduces NPSHr</li> </ul>
<b>Impellers</b>	<ul style="list-style-type: none"> <li>Trimmed to exact customer specifications for customization</li> <li>Static and dynamically balanced to ISO 1940-G3 for reduced noise and vibration</li> <li>Hydraulically balanced to decrease thrust loads and prolong seal and bearing life</li> </ul>

# THE INDUSTRY STANDARD FOR PREMIUM PUMPS

Performance you can count on. Quality you can expect. Reliability you can trust.



# LF/LC/LCV

## End Suction Pumps

### Technical Data

Flow, Q: max 6,000 gpm  
 Head, H: max 400 feet  
 Fluid temp.: max 275° F  
 HP range: 1/3 to 300 hp  
 Discharge sizes: 1" to 10"

### Applications

- HVAC
- Plumbing
- Industrial
- Wastewater

### Standard Features

- Lead-free bronze construction
- Dynamically balanced enclosed-type impellers
- Mechanical seal or packed box
- Suction and discharge pressure gauge taps
- Full-flanged connections on discharges 2-1/2" and larger
- Internal case suction splitter
- Low NPSH requirements
- Wear rings
- Rigid designed steel base with machined pump and motor mounting surfaces

### Optional Features

- Materials of construction
- Alloy shafts and sleeves
- Seal materials and configurations
- Motor enclosures (TEFC or explosion-proof)

### Certifications

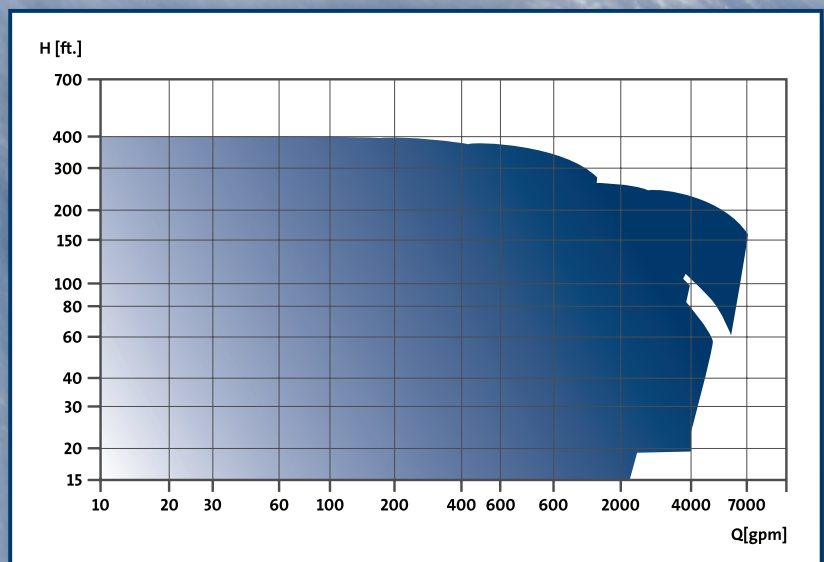
- ISO 9001 Certified
- ANSI/NSF-50 Standard Certified available
- ANSI/NSF-61 Standard Certified available

	CASE WORKING PRESSURE	ANSI FLANGE
Standard	175 psi	125 lb.
Optional	350 psi*	250 lb.

\* Some models available, RTF

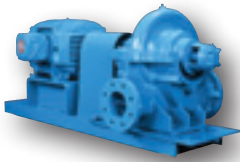
CONSTRUCTION FEATURES			
FEATURE	LC(V)	LF	MATERIAL(S)
Volute	•	•	Cast Iron - ASTM A48, CL 30
Impeller	•	•	Bronze - I836, C89833
Case Wear Rings	•	•	Bronze - NiAl Bronze, ASTM B148, C95400
Backplate	•	•	Cast Iron - ASTM A48, CL 30
Motor Shaft	•	•	Carbon Steel
Pump Shaft	•	•	AISI 1045, 303, 304, 316
Shaft Sleeve	•	•	I836, C89833
Coupling	N/A	•	Flex Coupling
Coupling Guard	•	•	ANSI/OSHA Compliant
Packing	•	•	Braided Synthetic, Graphite
Mechanical Seal	•	•	Conventional, Cartridge, Single, Double
Stand	•	•	Cast Iron, Fabricated Carbon Steel

## LF/LC/LCV Performance Range



## WE HAVE YOU COVERED

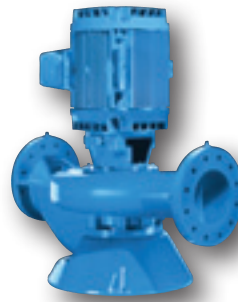
Grundfos offers a full line of PACO brand products to cover all your pumping needs. Visit [www.pacopumps.com](http://www.pacopumps.com) for information about all of our pumps plus an online selection tool, life cycle cost calculations, technical data, and CAD drawings.



PACO KP Split Case Pump



PACO KPV Vertically Mounted Split Case Pump



PACO VL Vertical Inline Pump



PACO VSM/VSMS Vertical Space Miser Pump



PACOFlo 9000 Booster System



PACO QDSC Submersible Pump



PACO GR Condensate Return Pump



PACO NCP Dry-Pit Non-Clog Pump

## PARTS & SERVICE

Grundfos is committed to excellence in after-sales service. Genuine PACO parts are pre-engineered and pre-packaged to simplify selection, ordering, and stocking. Virtually all required parts for PACO products are available as kits.



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