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# Professional OIL & GAS Catalog

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PERFORMANCE | QUALITY | SERVICE | TRUST

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## API-610 Vertical Pumps

***Vertical turbine pumps that meet or exceed API-610 requirements.***

Since 1969, National Pump Company has manufactured the highest quality vertical turbine pumps.

Innovative designs, strict manufacturing procedures and high quality assurance requirements have resulted in a worldwide use of our products. The high efficiency and extended life of our products has culminated in operational and long-life cost savings.

We have a full array of materials available for most applications ranging from cast iron bronze fitted to nickel aluminum bronze and duplex stainless steel, allowing you to pump all types of fluids from seawater to hydrocarbons.

National's pumps are designed for use on offshore platforms, pipelines, and refinery services with capacities up to 15,000 US GPM, pressures up to 1,500 PSI and horsepower to 1,500.



National Pump headquarters is located in Glendale, Arizona.

Branches are strategically located in:

- ▶ Fresno, California
- ▶ Lubbock, Texas
- ▶ Olive Branch, Mississippi
- ▶ Vienna, Georgia
- ▶ Zolfo Springs, Florida

*National Pump is supported internationally by: Authorized factory representatives, dealers, distributors, and district managers.*

## API-610 Pump Specifications

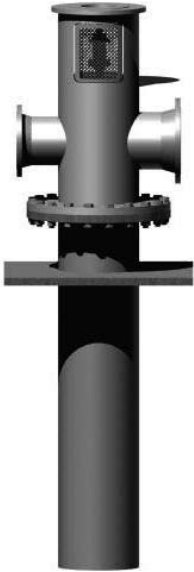

- ▶ National Pump vertical turbine pumps consist of multi-staging in the medium specific speed range from 1,900 NS through 5,000 NS.
- ▶ National Pump produces high-pressure pumps with premium efficiencies resulting in low operating costs.
- ▶ Low NPSH first stage construction, which allows for a reduction to shorter vessel length and lowering the minimum required submergence. A wide range of pressure and flow variations are available by changing pump diameter, number of stages, and/or impeller type.
- ▶ Pump bowl assemblies have a broad flow range with excellent hydraulic stability.
- ▶ Thrust balanced impellers are available for reducing axial thrust load on motor bearings.



## National API-610 Types

**Vertical Close Coupled  
Closed Suction  
(Type VS6)**

**Vertical Close Coupled  
Wet Pit  
(Type VS1)**

<b>Pump type</b>		
API-610 Class Type	Vertical pump close coupled closed suction.	Vertical pump close coupled wet pit.
Flow	To 15,000 US GPM (3,410 M <sup>3</sup> /HR)	
Pressure	To 1,500 PSI (105 bars)	
Liquid Handled	Water, petroleum, chemical solutions, condensates, L.P.G., and hydrocarbons.	Water, petroleum, chemical solutions, condensates, and hydrocarbons.
HP Range	To 1,500 HP (1,119 KW)	
Drivers	Electric motors, steam turbines, engine/gear drives, and variable speed drives.	
Materials of Construction	Any machinable and weldable alloys or combinations available.	

### Typical Markets

- ▶ Hydrocarbon Processing
- ▶ Light Hydrocarbon, High Vapor Pressure (low NPSHA)
- ▶ Pipeline
- ▶ Pipeline Booster
- ▶ Offshore Platform
- ▶ Refinery Applications
- ▶ Waste Water
- ▶ Aviation & Ground Fuels
- ▶ Cooling Water

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## Quality Assurance

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### QUALITY ASSURANCE

National's Quality Assurance program conforms or meets most recognized specifications, including:

- ▶ API-610 latest edition
- ▶ ANSI / Hydraulic Institute

### PUMP DESIGN

National utilizes licensed professional engineers, hydraulic design engineers, 3D design/modeling CAD, to ensure maximum design control.

### MECHANICAL DESIGN

Computerized structural Reed frequency analysis of resonant frequency operation. Pressure vessel design per ASME Boiler and Pressure Code Section VIII.

### PUMP ROTOR DESIGN

- ▶ Spacing between bearing designed to eliminate critical frequency
- ▶ Torsional Analysis calculations
- ▶ Dynamic balancing as a minimum to ISO 1940 Grade G1.0

### MATERIAL SELECTION

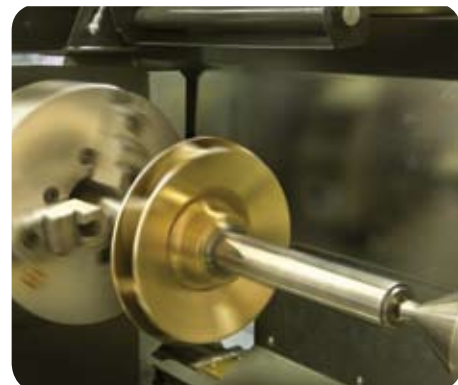
- ▶ Material selection against sulfide stress cracking (SSC) per NACE MR0175
- ▶ Evaluation for material corrosion allowances per ASME
- ▶ Material selection and design to protect against corrosion and erosion corrosion

### WELDMENT DESIGN

- ▶ Weld joint design per ASME code
- ▶ Weldment residual stress relief by furnace, electrical induction blanket and vibratory method
- ▶ ASME Code Section IX certified weld procedure qualifications

National Pump's "Quality Assurance Program" guarantees the highest quality product and the best available performance.

We have a complete hydraulic flow/pressure/efficiency testing and analysis laboratory to verify pump performance.



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## Pump Testing

### CAPACITY

- ▶ Test pit for flows to 15,000 GPM.
- ▶ Pressures up to 1,500 FT.
- ▶ 60Hz electrical power through 1,500 HP.
- ▶ All pressure and flow measuring equipment calibrated with tractability to NIST
- ▶ Special electrical power testing up to 6,600 Volts available.
- ▶ Complete string test for mechanical run testing.

### NPSH

Testing equipment for flows to 15,000 GPM.

### HYDROSTATIC

Testing equipment for pressures up to 2,000 PSI.

### PUMP "REED" CRITICAL

Pump Critical "Reed" Frequency testing.

### VIBRATION

Vibration tools for recording bearing housing vibration in root mean square (RMS) velocity, displacement, and accelerations.

National's state-of-the-art testing facility is conducted by highly qualified engineers and in accordance with Hydraulic Institute Standards, API-610, National's own internal test procedures and/or any contract specified requirements. Data is comprehensively analyzed utilizing a custom computer spreadsheet program, which incorporates all hydraulic, mechanical, and electrical losses for the unit being tested.



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PART	Material Class and Material Abbreviations													
	I-1	I-2	S-1	S-3	S-4	S-5	S-6	S-8	S-9	C-6	A-7	A-8	D-1	D-2
	Full compliance materials													
Pressure Casing	CI Cast Iron	BRZ Cast Iron	CI Carbon Steel	NI-Resist Carbon Steel	STL Carbon Steel	STL Carbon Steel	STL Carbon Steel	316 AUS Carbon Steel	NI-Cu Alloy Carbon Steel	12% CHR Carbon Steel	AUS AUS	316 AUS 316 AUS	DUPLEX DUPLEX	Super Duplex Super Duplex
Bowls	Cast Iron	Bronze	Cast Iron	NI-Resist	Cast Iron	Carbon Steel	12% CHR Carbon Steel	316 AUS Carbon Steel	NI-Cu Alloy	12% CHR Carbon Steel	AUS	316 AUS	Duplex	Super Duplex
Impellers	Cast Iron	Bronze	Cast Iron	NI-Resist	Carbon Steel	Carbon Steel	12% CHR Carbon Steel	316 AUS Carbon Steel	NI-Cu Alloy	12% CHR Carbon Steel	AUS	316 AUS	Duplex	Super Duplex
Case Wear Rings	Cast Iron	Bronze	Cast Iron	NI-Resist	Cast Iron	12% CHR Hardened	12% CHR Hardened	Hard-faced 316AUS	NI-Cu Alloy	12% CHR Hardened	Hard-faced AUS	Hard-faced 316 AUS	Hard-faced Duplex	Hard-faced Super Duplex
Impeller Wear Rings	Cast Iron	Bronze	Cast Iron	NI-Resist	Cast Iron	12% CHR Hardened	12% CHR Hardened	Hard-faced 316AUS	NI-Cu Alloy	12% CHR Hardened	Hard-faced AUS	Hard-faced 316 AUS	Hard-faced Duplex	Hard-faced Super Duplex
Shafting	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel	ANSI 4140	ANSI 4140 f	316 AUS	NI-Cu Alloy	NI-Cu Alloy	AUS	AUS	316 AUS	Duplex	Super Duplex
Throat bushings	Cast Iron	Bronze	Cast Iron	NI-Resist	Cast Iron	12% CHR Hardened	12% CHR Hardened	316 AUS	NI-Cu Alloy	12% CHR Hardened	AUS	316 AUS	Duplex	Super Duplex
Interstage Sleeves	Cast Iron	Bronze	Cast Iron	NI-Resist	Cast Iron	12% CHR Hardened	12% CHR Hardened	Hard-faced 316AUS	NI-Cu Alloy	12% CHR Hardened	Hard-faced AUS	Hard-faced 316 AUS	Hard-faced Duplex	Hard-faced Super Duplex
Interstage Bushings	Cast Iron	Bronze	Cast Iron	NI-Resist	Cast Iron	12% CHR Hardened	12% CHR Hardened	Hard-faced 316AUS	NI-Cu Alloy	12% CHR Hardened	Hard-faced AUS	Hard-faced 316 AUS	Hard-faced Duplex	Hard-faced Super Duplex
Case and Gland Studs	Carbon Steel	Carbon Steel	ANSI 4140 Steel	ANSI 4140 Steel	ANSI 4140 Steel	ANSI 4140 Steel	ANSI 4140 Steel	ANSI 4140 Steel	NI-Cu Alloy Hardened	ANSI 4140 Steel	ANSI 4140 Steel	AISI 4140 Steel	Duplex	Super Duplex
Gasket	AUS, Spiral Wound	AUS, Spiral Wound	AUS, Spiral Wound	AUS, Spiral Wound	AUS, Spiral Wound	AUS, Spiral Wound	316 AUS Spiral Wound	AUS, Spiral Wound	NI-Cu Alloy, Spiral Wound, PTFE filled	AUS, Spiral Wound	316 AUS Spiral Wound	Duplex SS Spiral Wound	Duplex SS Spiral Wound	Duplex SS Spiral Wound
Discharge Head/ Suction Can	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel	AUS	316 AUS	316 AUS	Duplex	Super Duplex
Column / Bowl shaft bushings	Nitrile butadiene	Bronze	Filled Carbon	Nitrile butadiene	Filled Carbon	Filled Carbon	Filled Carbon	Filled Carbon	Filled Carbon	Filled Carbon	Filled Carbon	Filled Carbon	Filled Carbon	Filled Carbon
Bolts	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel	316 AUS	316 AUS	316 AUS	NI-Cu Alloy	316 AUS	316 AUS	316 AUS	Duplex	Super Duplex

# National Keeps You Pumping Around The World

**At National Pump**, pump technology is our business. From principals and engineers to sales and service personnel, our key staff members have more than three centuries of combined industry experience. We want to help you achieve your goals and objectives, and we're big enough to meet your needs, yet small enough to provide the one-to-one service you deserve.

**At every stage** of our work, from research and development to design, production and testing, we use up-to-the-minute technologies and the most modern equipment available to ensure that every National Pump meets the highest possible standards of efficiency and reliability. Using conventional or special materials, we manufacture pumps for specific needs and conditions.



Delivering Pump and Pump Systems  
Reliability, Quality  
and Service Since 1969

Proud member of American Petroleum Institute and these organizations:



[www.nationalpumpcompany.com](http://www.nationalpumpcompany.com)

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