

# API 610 PUMPS FOR THE OIL & GAS INDUSTRY



**Trillium Flow Technologies** designs, engineers and manufactures innovative fluid-transfer technologies that meet the latest API 610 standard. Our pumps are used throughout the Oil & Gas production value chain – from upstream exploration, to midstream transport, to downstream refining. Trillium pumps can be found in harsh environments and challenging applications where operational reliability is paramount.

## API 610 PRODUCTS

### FLOWAY® VERTICAL TURBINE PUMPS

Designed for use in applications requiring higher pumping pressures. Floway pumps feature a vertical, close-coupled, single or multi-stage design, with a fabricated discharge head, top-mounted motor and wet-pit or closed-suction options. Our pumps are also available with low-NPSH impellers to minimize barrel length.



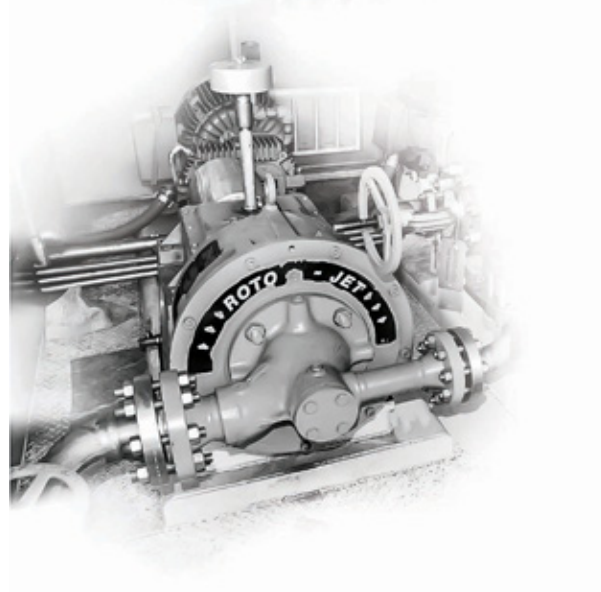
### GABBIONETA PUMPS™

Focused on the Oil & Gas market for 60 years, Gabbioneta Pumps include the whole API 610 range with overhung, between bearings, vertically suspended, single or multi-stage pumps, designed for the most severe operating conditions. Gabbioneta Pumps assists customers from enquiry to delivery, through project management, engineering, supply chain, manufacturing and post order in the new “one stop shop” located in Nova Milanese since 2016. We also sell and service the full line of Begemann pumps at this facility.



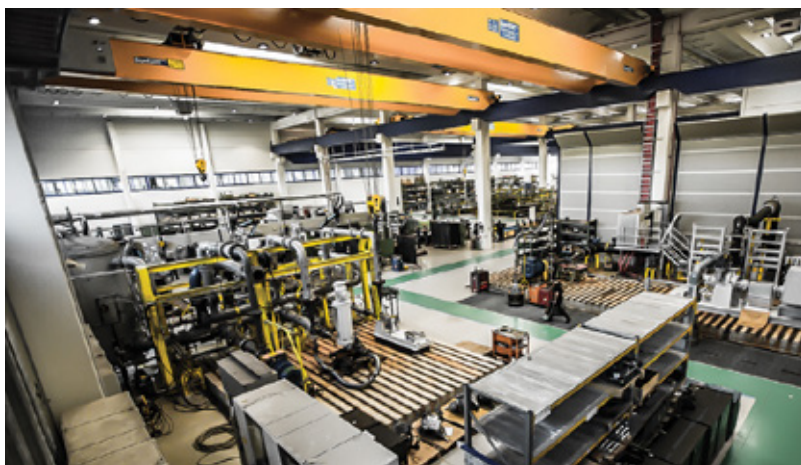
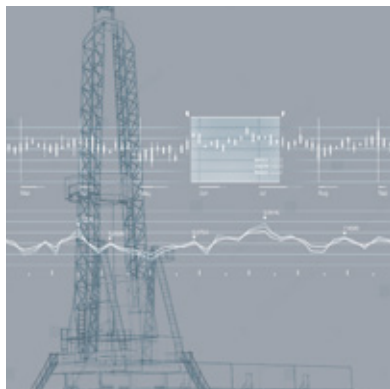
### ROTO-JET® PITOT TUBE PUMPS

Roto-Jet pumps are ideal for use in low-flow, high-head applications. The design of Roto-Jet pumps allows them to achieve a broad operational range without generating damaging hydraulic forces during a process upset. This feature results in improved mechanical seal and bearing life, and maximized mean-time between failure, with a corresponding decrease in maintenance costs and an increase in operational reliability.



## DESIGN AND TESTING ARE THE HEART AND SOUL OF OUR OPERATION

All of Trillium Flow Technologies' pumps have been designed and tested to ensure they meet the demands of high-volume, high-pressure, fluid-transfer applications common in Oil & Gas production.



### TESTING CAPABILITIES:

Trillium Flow Technologies' full service pump testing facilities meet the needs of the Oil & Gas industry with the latest API 610 testing capabilities.

- Maximum flow capacity: up to 50,000 gpm (12,000 m<sup>3</sup>/h)
- Maximum power: up to 10,700 horsepower (8,000 kW)
- Maximum pressure: up to 5,000 psig (410 bar)
- Maximum voltage: up to 13.5 kilovolts
- Testing capability: 50 Hz, 60 Hz and other variable frequencies



### ENGINEERING CAPABILITIES:

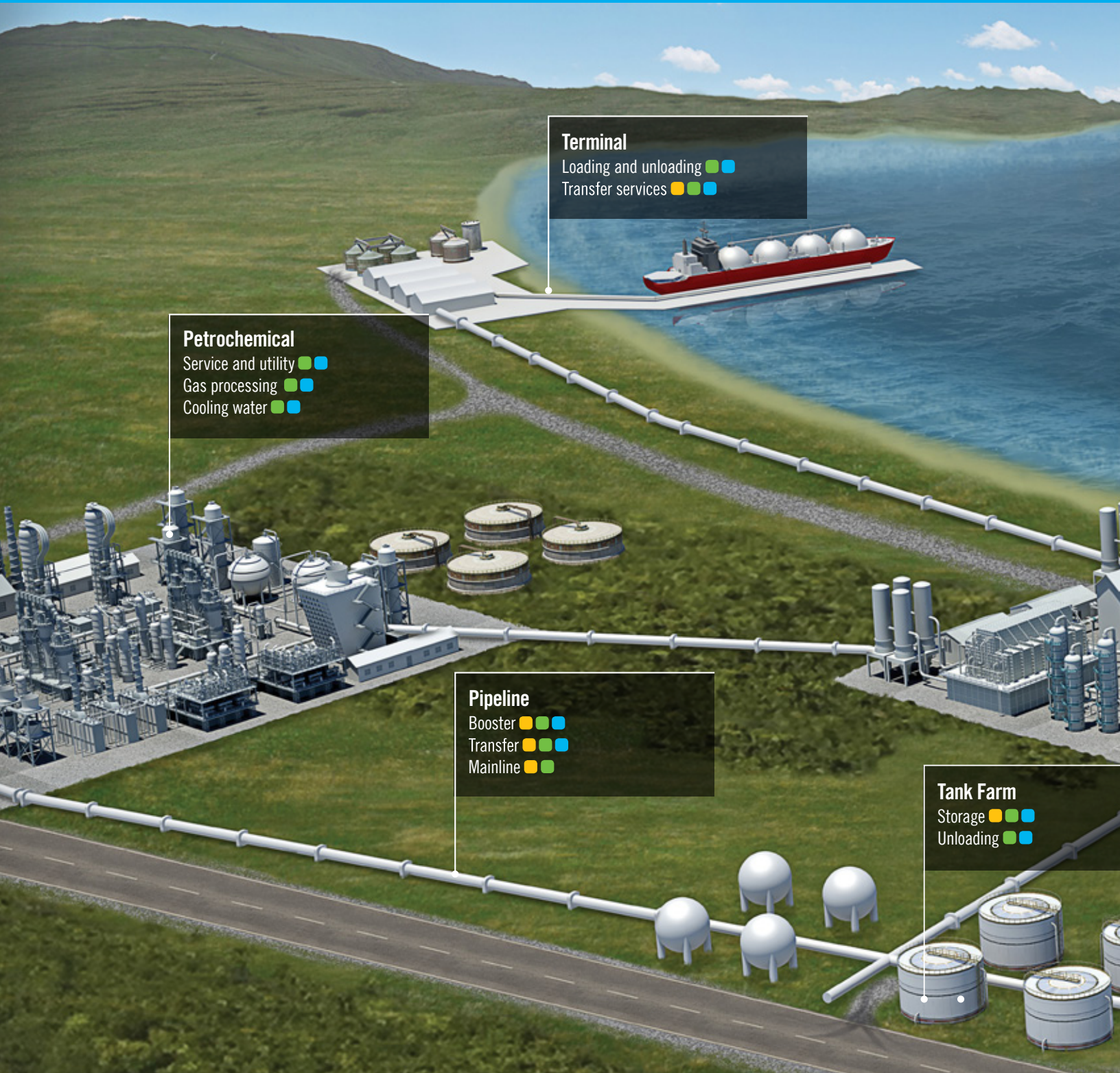
Trillium Flow Technologies' pumps are compliant with the latest API 610 Standard and have been engineered to meet the demands of the Oils & Gas industry, we maintain our high standard of quality and reliability by performing in-house pump testing.

- 3D solid modeling
- In-house computational fluid dynamic analysis
- Customized hydraulic and mechanical design
- Low vibration design
- In-house FEA stress and deflection analysis
- In-house natural frequency analysis



# MEETING THE NEEDS OF OUR OIL & GAS CUSTOMERS

The three production segments in the Oil & Gas Industry; **upstream**, **midstream** and **downstream** – create many unique fluid-transfer processes that can benefit from the implementation of Trillium Flow Technologies. This application map highlights the upstream, midstream and downstream sectors and where each of the Trillium pump brands perform best.



**Terminal**  
 Loading and unloading ■■■  
 Transfer services ■■■

**Petrochemical**  
 Service and utility ■■■  
 Gas processing ■■■  
 Cooling water ■■■

**Pipeline**  
 Booster ■■■  
 Transfer ■■■  
 Mainline ■■■

**Tank Farm**  
 Storage ■■■  
 Unloading ■■■

Roto-Jet®
  Gabbioneta Pumps™
  Floway®



**FPSO**

- Ballast ■ ■
- Firewater ■ ■

**Refining**

- Charge process feed ■ ■ ■
- Reactor feed ■ ■
- Boiler feed ■ ■
- Cooling water ■ ■
- Water wash ■
- Depropanizer ■ ■
- Dethanizer ■ ■

**Offshore**

- Seawater lift ■
- Firewater ■ ■ ■
- Process/Production ■ ■ ■

**Onshore**

- Firewater ■ ■
- Water injection ■ ■

## TRILLIUM FLOW TECHNOLOGIES' PUMPS FOR OIL & GAS APPLICATIONS

There are many entry points to the Oil & Gas production and supply chain – and most of them require some form of pump-activated fluid transfer to keep production reliable, on schedule and on budget. Recognizing this, Trillium Flow Technologies has engineered its pumps with unique features and benefits which can help satisfy the needs of each of the three main sectors in Oil & Gas production: upstream exploration, midstream transport and downstream refining/petrochemical processing.

APPLICATIONS:		CLASSIFICATION OF PUMPS						
		OH2	OH3	OH5	BB1	BB2	BB3	BB5
		PUMP MODEL						
		R RL ROTO-JET®	BS-D DSIL	BS	AXD AXDD	DSA DH DDH	AHP AHP DS	AHPB AHPB DS
UPSTREAM	Offshore Seawater Lift							
	Ballast	✓	✓	✓	✓			
	Fire Water	✓			✓			
	Water Injection						✓	✓
	Process Pumps	✓	✓	✓	✓	✓	✓	✓
	Production Pumps	✓			✓	✓	✓	✓
MIDSTREAM	Transfer / Storage				✓	✓	✓	✓
	Loading / Unloading	✓		✓	✓	✓	✓	
	Main Line				✓	✓	✓	✓
	Terminal	✓	✓	✓				
	Booster	✓			✓	✓	✓	✓
	Tank Farms	✓			✓	✓	✓	
DOWN STREAM	Charge / Process Feed	✓			✓	✓	✓	✓
	Service / Utility	✓			✓	✓		
	Gas Processing	✓			✓	✓	✓	✓
	Boilerfeed	✓			✓	✓	✓	✓
	Cooling Water	✓			✓	✓	✓	
	Reactor Feed	✓				✓	✓	✓

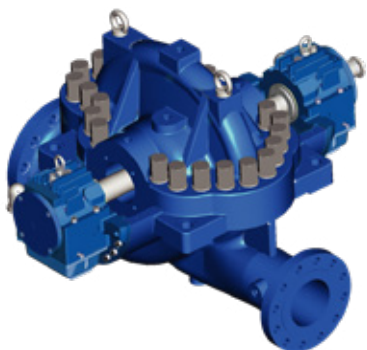


APPLICATIONS:		CLASSIFICATION OF PUMPS					
		VS1	VS2	VS4	VS6	VS7	
		PUMP MODEL					
		VBN VBN DS VHP	VD VLD	VI	VBN VBN DS VHP	VD VLD	RO-FT Roto-Jet®
UPSTREAM	Offshore Seawater Lift	✓	✓		✓		
	Ballast	✓			✓		
	Fire Water	✓			✓		
	Water Injection						✓
	Process Pumps	✓	✓	✓	✓	✓	✓
	Production Pumps	✓	✓	✓	✓	✓	
MIDSTREAM	Transfer / Storage	✓		✓	✓		✓
	Loading / Unloading	✓		✓	✓		
	Main Line						
	Terminal	✓			✓		
	Booster	✓			✓		
	Tank Farms	✓		✓	✓		
DOWN STREAM	Charge / Process Feed	✓		✓			✓
	Service / Utility	✓	✓	✓	✓	✓	
	Gas Processing						
	Boilerfeed						✓
	Cooling Water	✓		✓	✓		
	Reactor Feed						✓

## TRILLIUM FLOW TECHNOLOGIES' PRODUCTS FOR THE OIL & GAS INDUSTRY

All of Trillium Flow Technologies' pumps and ancillary equipment for use in Oil & Gas applications have been designed to satisfy the requirements of the various pump classifications within the latest API 610 standard.

### GABBIONETA PUMPS™ AXD/AXDD (BB1)



Axially split, single and two stage, double suction, between bearings

**Capacity:** 53,000 gpm / 12,000 m<sup>3</sup>/h

**Head:** 2,500 ft / 760 m

**Pressure:** 870 psig / 60 bar

**Temp Range:** -22° F (-30° C) to 390° F (200° C)

**Speed:** 3,600 rpm

**Manufacturing Location:** Nova Milanese

### GABBIONETA PUMPS™ DSA (BB2)



Radially split, single stage, double suction, between bearings

**Capacity:** 53,000 gpm / 12,000 m<sup>3</sup>/h

**Head:** 1,250 ft / 380 m

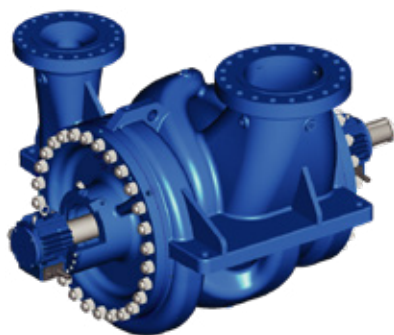
**Pressure:** 1,450 psig / 100 bar

**Temp Range:** -22° F (-30° C) to 850° F (455° C)

**Speed:** 3,600 rpm

**Manufacturing Location:** Nova Milanese

### GABBIONETA PUMPS™ DH/DDH (BB2)



Radially split, single-stage, double suction, between bearings

**Capacity:** 8,800 gpm / 2,000 m<sup>3</sup>/h

**Head:** 2,500 ft / 760 m

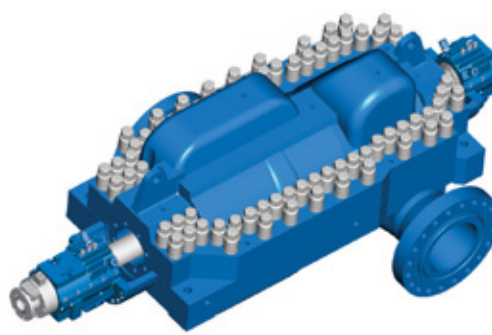
**Pressure:** 2,175 psig / 150 bar

**Temp Range:** -22° F (-30° C) to 850° F (455° C)

**Speed:** 3,600 rpm

**Manufacturing Location:** Nova Milanese

### GABBIONETA PUMPS™ AHP/AHP DS (BB3)



Axially split, volute or diffuser, single or double suction, between bearings

**Capacity:** 8,800 gpm / 2,000 m<sup>3</sup>/h

**Head:** 8,200 ft / 2,500 m

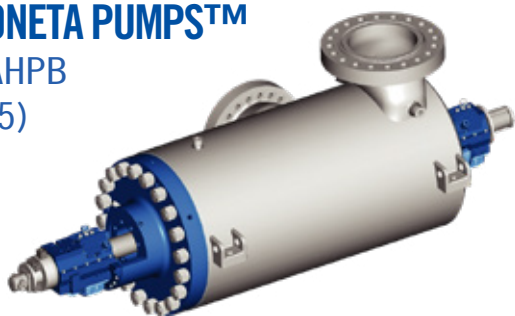
**Pressure:** 2,175 psig / 150 bar

**Temp Range:** -22° F (-30° C) to 390° F (200° C)

**Speed:** 3,600 rpm

**Manufacturing Location:** Nova Milanese



**GABBIONETA PUMPS™**AHPB/AHPB  
DS (BB5)

Radially split, single or double suction, double casing, multi-stage, between bearings

**Capacity:** 8,800 gpm / 2,000 m<sup>3</sup>/h

**Head:** 11,155 ft / 3,400 m

**Pressure:** 5,076 psig / 350 bar

**Temp Range:** -22°F (-30° C) to 750° F (400° C)

**Speed:** 7,000 rpm

**Manufacturing Location:** Nova Milanese

**FLOWAY®**GABBIONETA PUMPS™  
VHP/VBN-DS (VS1) †

Vertically suspended, single casing, diffuser, single or double suction

**Capacity:** 35,000 gpm / 8,000 m<sup>3</sup>/h

**Head:** 6,560 ft / 2,000 m

**Pressure:** 2,900 psig / 200 bar

**Temp Range:** -240°F (-150° C) to 750° F (400° C)

**Speed:** 3,600 rpm

**Manufacturing Location:** Fresno, CA. USA / Nova Milanese

**GABBIONETA PUMPS™**

VD/VLD (VS2)

Vertically suspended, single casing, volute, double suction impeller

**Capacity:** 19,800 gpm / 4,500 m<sup>3</sup>/h

**Head:** 1,640 ft / 500 m

**Pressure:** 870 psig / 60 bar

**Temp Range:** -240°F (-150° C) to 750° F (400° C)

**Speed:** 1,800 rpm

**Manufacturing Location:** Nova Milanese

**FLOWAY®**

VI (VS4)



Vertically suspended, single casing, volute

**Capacity:** 22,000 gpm / 5,000 m<sup>3</sup>/h

**Head:** 985 ft / 300 m

**Pressure:** 580 psig / 40 bar

**Temp Range:** -22°F (-30° C) to 850° F (450° C)

**Speed:** 3,600 rpm

**Manufacturing Location:** Nova Milanese

**FLOWAY®**GABBIONETA PUMPS™  
VHP/VBN-DS (VS6)

Vertically suspended, double casing, diffuser, single or double suction

**Capacity:** 35,000 gpm / 8,000 m<sup>3</sup>/h

**Head:** 6,560 ft / 2,000 m

**Pressure:** 2,900 psig / 200 bar

**Temp Range:** -130°F (-90° C) to 428° F (220° C)

**Speed:** 3,600 rpm

**Manufacturing Location:** Fresno, CA. USA / Nova Milanese

**GABBIONETA PUMPS™**

VD/VLD (VS7)



Vertically suspended, double casing, double suction impeller

**Capacity:** 19,800 gpm / 4,500 m<sup>3</sup>/h

**Head:** 1,640 ft / 500 m

**Pressure:** 870 psig / 60 bar

**Temp Range:** -240°F (-150° C) to 750° F (400° C)

**Speed:** 1,800 rpm

**Manufacturing Location:** Nova Milanese

**GABBIONETA PUMPS™**

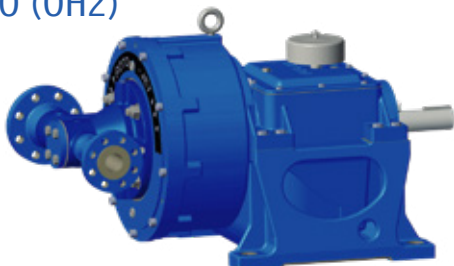
R (OH2)



Centerline mounted, single-stage, overhung

**Capacity:** 11,000 gpm / 2,500 m<sup>3</sup>/h**Head:** 1,250 ft / 380 m**Pressure:** 3,045 psig / 210 bar**Temp Range:** -150°F (-100° C) to 850° F (450° C)**Speed:** 3,600 rpm**Manufacturing Location:** Nova Milanese**ROTO-JET®**

RO (OH2)



Pitot tube, overhung

**Capacity:** 450 gpm / 102 m<sup>3</sup>/h**Head:** 5,200 ft / 1,585 m**Pressure:** 2,290 psig / 158 bar**Temp Range:** 250° F (120° C)**Speed:** 6,300 rpm**Manufacturing Location:** Salt Lake City, Utah, USA**GABBIONETA PUMPS™****BEGEMANN®**

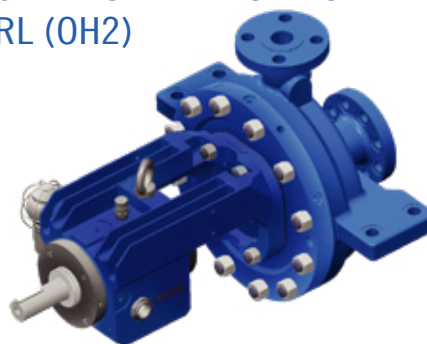
BS (OH5)



Vertical in-line, single-stage, close coupled, overhung

**Capacity:** 2,200 gpm / 500 m<sup>3</sup>/h**Head:** 1,000 ft / 300 m**Pressure:** 928 psig / 64 bar**Temp Range:** -40°F (-40° C) to 480° F (250° C)**Speed:** 3,600 rpm**Manufacturing Location:** Nova Milanese**GABBIONETA PUMPS™**

RL (OH2)



Centerline mounted, single-stage, low flow Barske type

**Capacity:** 65 gpm / 15 m<sup>3</sup>/h**Head:** 656 ft / 200 m**Pressure:** 580 psig / 40 bar**Temp Range:** -150°F (-100° C) to 850° F (450° C)**Speed:** 3,600 rpm**Manufacturing Location:** Nova Milanese**GABBIONETA PUMPS™ BEGEMANN®**

BSD/DSIL

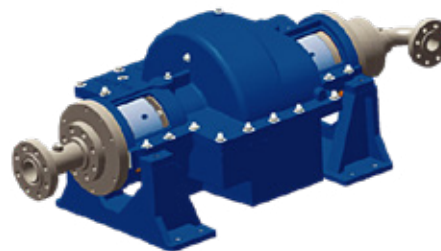
(OH3)



Vertical in-line, single-stage, single or double suction

**Capacity:** 26,500 gpm / 6,000 m<sup>3</sup>/h**Head:** 1,150 ft / 350 m**Pressure:** 1,450 psig / 100 bar**Temp Range:** -240°F (-150° C) to 750° F (400° C)**Speed:** 3,600 rpm**Manufacturing Location:** Nova Milanese**ROTO-JET®**

RO-FT



Pitot tube, between bearings

**Capacity:** 450 gpm / 102 m<sup>3</sup>/h**Head:** 4,920 ft / 1,500 m**Pressure:** 2,175 psig / 150 bar**Temp Range:** 250° F (120° C)**Speed:** 6,000 rpm**Manufacturing Location:** Salt Lake City, Utah, USA

## COMMITTED TO SERVING OUR CUSTOMERS

Trillium Flow Technologies is committed to delivering market-leading products and services that meet the unique technical and commercial challenges encountered across the full breadth of the Oil & Gas production and supply chain. Our mission is to be wherever our customers need us, whenever they need us—this commitment is central to the after-market field services we offer.

### TRILLIUM FLOW TECHNOLOGIES GLOBAL NETWORK

#### SALES OFFICES

- Fresno, California, USA
- Deer Park, Texas, USA
- Houston, Texas, USA
- Ipswich, Massachusetts, USA
- Calgary, Alberta, Canada
- Montreal, Quebec, Canada
- Billingham, England
- Bedford, England
- Abu Dhabi, U.A.E.
- Vendin Le Vieil, France
- Saint Victoret, France
- Nova Milanese, Italy
- Bangkok, Thailand
- Kuala Lumpur, Malaysia
- Johannesburg, Africa
- Suzhou, China
- Shanghai, China
- Beijing, China
- Ansan, Korea
- Perth, Australia
- Terrigal, Australia

#### SERVICE CENTERS

- Fresno, California, USA
- Deer Park, Texas, USA
- Houston, Texas, USA
- Ipswich, Massachusetts, USA
- Mississauga, Ontario, Canada
- Montreal, Quebec, Canada
- Alloa, Scotland
- Bedford, England
- Vendin Le Vieil, France
- Saint Victoret, France
- Nova Milanese, Italy

#### MANUFACTURING FACILITIES

- Fresno, California, USA
- Ipswich, Massachusetts, USA
- Elland, England
- Nova Milanese, Italy
- Ansan, Korea
- Suzhou, China
- Vendin Le Vieil, France
- Saint Victoret, France

#### ENGINEERING TECH. CENTERS

- Bangalore, India

Our global footprint allows our technicians and field-service teams to deliver exceptional on-site service. From installation and on-site testing, to maintenance and operations training, we are with our customers every step of the way.



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