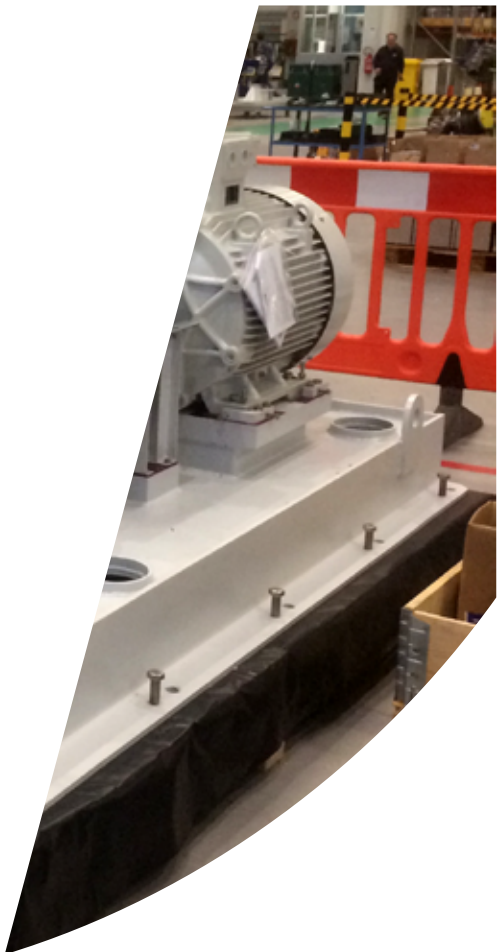
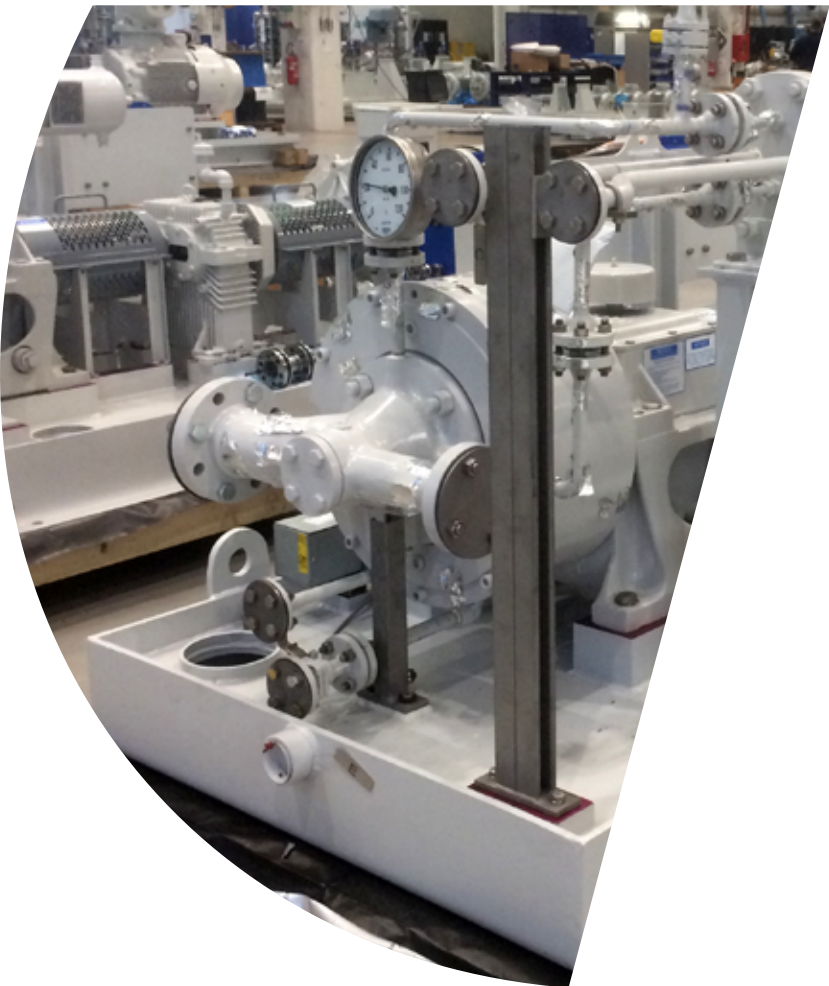


# LOW-FLOW HIGH-HEAD PUMPS FOR OIL & GAS AND PETROCHEMICAL MARKETS



# A COMPLETE PORTFOLIO FOR OIL & GAS AND PETROCHEMICAL APPLICATIONS

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.

All of Trillium Flow Technologies' pumps are tested in accordance to API 610 standard to ensure they meet the demands of high-volume, high-pressure, fluid transfer applications common in oil & gas and petrochemical production.

**Oil & Gas**  
Upstream



**Oil & Gas**  
Midstream



**Oil & Gas**  
Downstream, Refinery



**Liquefied Natural Gas**

Liquefaction Plants,  
Regasification Units



**Floating Units**

FPSO - Floating Production Storage and Offloading Unit  
FLNG - Floating Liquefied Natural Gas  
FSRU - Floating Storage and Regeneration Units



**Petrochemical,  
Fertilizer**



## OVERHUNG HORIZONTAL

**API 610 OH2**

**Capacity:** up to 2,500 m<sup>3</sup>/h / 11,000 gpm

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

**Pressure:** up to 210 barg / 3,045 psig

**Temp Range:** -100°C (-150°F) to 450°C (850°F)

**Speed:** up to 3,600 rpm



**GABBIONETA PUMPS®**

## BETWEEN BEARINGS

**API 610 BB1 – BB2**

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

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

**Pressure:** up to 150 barg / 2,175 psig

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

**Speed:** up to 3,600 rpm



**GABBIONETA PUMPS®**

## VERTICAL

**API 610 VS1/VS6 – VS2/VS7 – VS4**

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

**Head:** up to 2000 m / 6,560 ft

**Pressure:** up to 200 barg / 2,900 psig

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

**Speed:** up to 3,600 rpm



**GABBIONETA PUMPS® | FLOWAY®**

## OVERHUNG VERTICAL IN-LINE

**API 610 OH3 – OH5**

**Capacity:** up to 6,000 m<sup>3</sup>/h / 26,500 gpm

**Head:** up to 300 m / 984 ft

**Pressure:** up to 100 barg / 1,450 psig

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

**Speed:** up to 3,600 rpm



**GABBIONETA PUMPS® | BEGEMANN®**

## MULTISTAGE

**API 610 BB3 – BB5**

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

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

**Pressure:** up to 150 barg / 2,175 psig

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

**Speed:** up to 3,600 rpm



**GABBIONETA PUMPS®**

## LOW-FLOW HIGH-HEAD

**Alternative API OH6**

**Capacity:** up to 102 m<sup>3</sup>/h / 450 gpm

**Head:** up to 1,890 m / 6,200 ft

**Pressure:** up to 56 barg / 800 psig

**Temp Range:** up to 288°C (550°F)

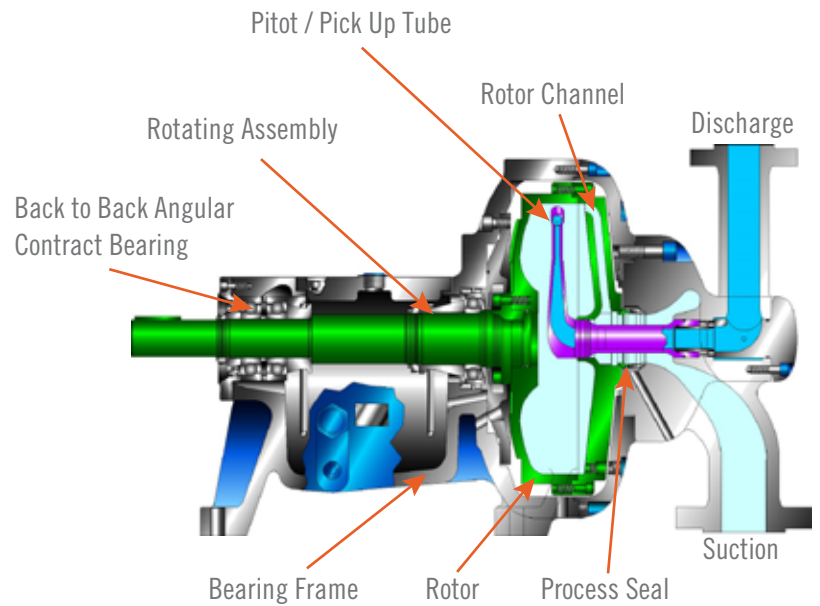
**Speed:** up to 6,321 rpm



**GABBIONETA PUMPS® | ROTO-JET®**

## LOW-FLOW HIGH-HEAD PUMPS

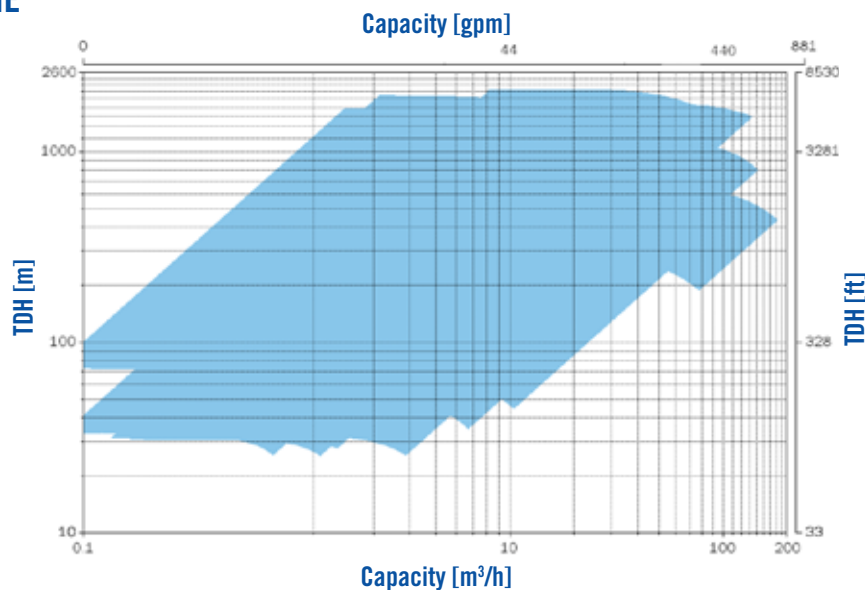
Roto-Jet® pumps, meeting the demanding requirements of API 610, are a robust alternative to API OH6 high-speed, integral, gear-driven, single-stage pumps. Based on the pitot tube principle, the Roto-Jet® pump has two basic working parts; a rotating case and a stationary pick-up tube mounted within the rotating case. The pitot tube technology offers maximum reliability and efficiency for low-flow, high-head pumping services for a variety of tough applications across multiple industries. This technology is offered in three models: RO-FT, RO-H, & R-11.



## ROTO-JET® FEATURES

- Pump with gear-box
- Standard 2/4 pole motor
- API 682 seal flush plans (including gas)
- API 610 baseplate arrangements
- No forced lubrication or cooling required
- Well within API 610 vibration limits
- No restriction on suction or discharge piping arrangements
- Low NPSH throughout operating range
- No restriction on discharge valve location

## HIGH-HEAD LOW-FLOW ROTO-JET® HYDRAULIC COVERAGE



## APPLICATIONS

Caustics Processing  
Amine Treating  
Reflux Streams  
Transfer Services

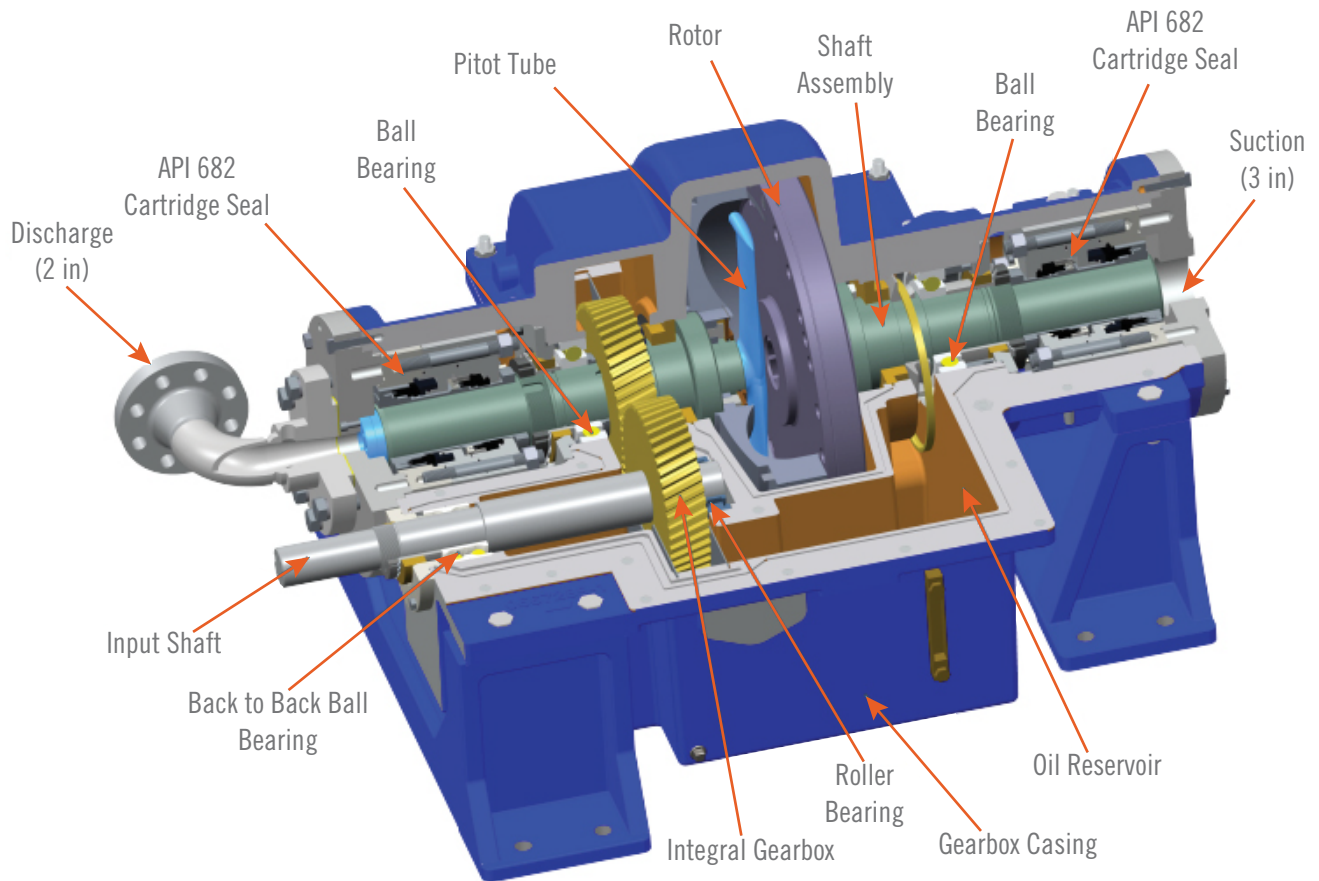
Boiler Feed Water  
Naphtha  
Offshore  
Reactor Feed

Foul Water  
Sour Water  
Depropanizer  
Deethanizer

Diesel, Gasoline, Kerosene  
Condensate & Well  
Injection

## BETWEEN BEARINGS DESIGN

### RO-FT Model



### PERFORMANCE CAPABILITIES

- Max Flow: 102 m<sup>3</sup>/h (450 gpm)
- Max Head: 1,890 m (6,200 ft)
- Max Suction Pressure: 56 barg (800 psig)
- Max Speed: 6,000 rpm
- Max Operating Temperature: 121°C (250°F)
- Max Operating Temperature w/ Flush: 288°C (550°F)
- Max Power: 300 kW (400 hp)

### MAIN FEATURES

- Gearbox isolated from process seal leakage
- No external lube system or cooling required
- Standard API 682 cartridge seals
- No wear rings or close running clearances
- Low NPSH3 without the use of an inducer, throughout operating range
- Pulsation free flow over the entire curve
- Mechanical seals: single, double/tandem, or gas
- API seal flush plans
- Lubrication: splash oil, purge-oil mist, forced
- Baseplates per API 610
- Vibration monitoring per API 670
- Couplings per API 671
- ASME B16.5 and DIN flanges
- Complete unit and auxiliary testing



## BETWEEN BEARINGS DESIGN – RO-FT

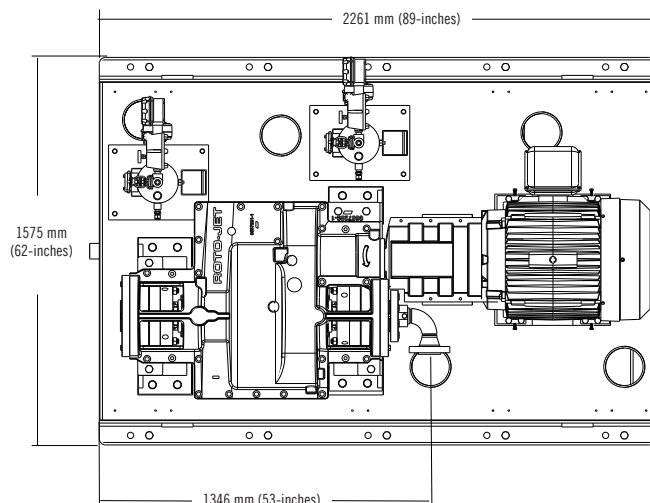
### TYPICAL BETWEEN BEARINGS FOOTPRINT

Overall footprint may vary depending on:

- motor size
- auxiliaries

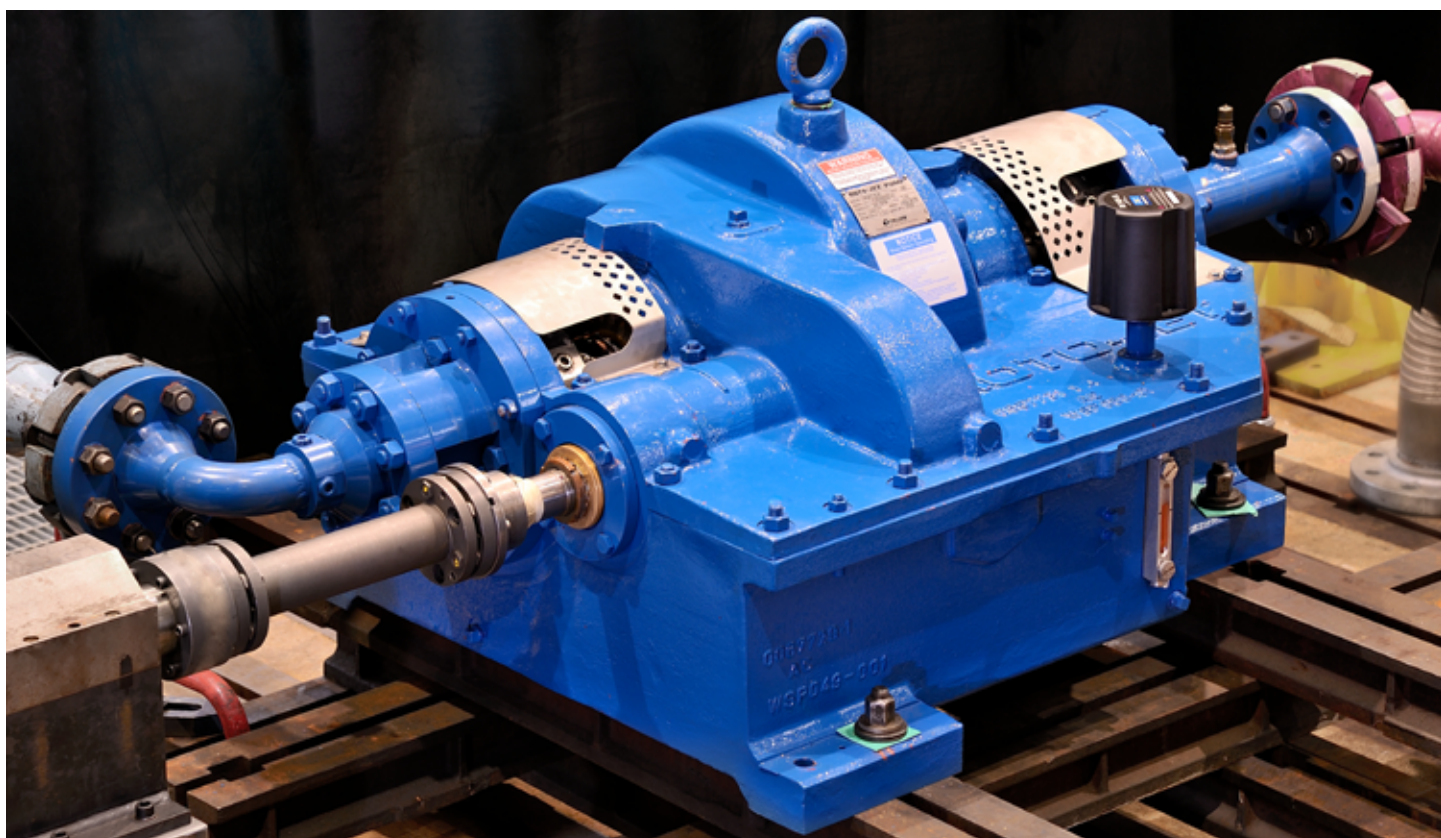
Pump dimensions are the same for all sizes

Footprint dimensions based on LV motor.



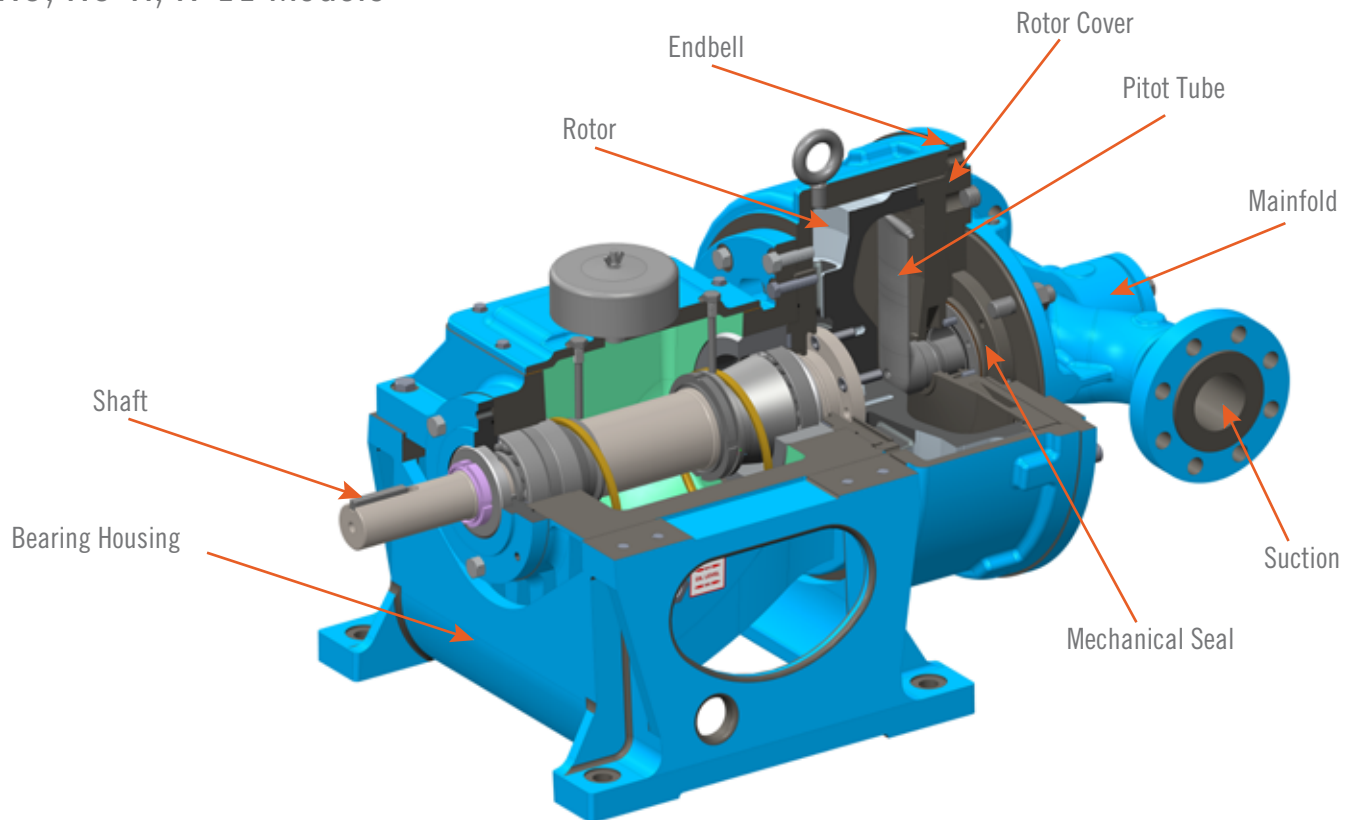
### MATERIALS OF CONSTRUCTION

	S5	S6	S8	C6	A8	D1
<b>PRESSURE CASING</b>	Carbon steel (A216 WCB)			12% CR (A743 CA6NM)	316 AUS (A351 CF30)	Duplex (A351 CD4MCu)
<b>FLANGES</b>	Carbon steel (A216 WCB)			12% CR (A743 CA6NM)	316 AUS (A351 CF30)	Duplex (A351 CD4MCu)
<b>SHAFT ASSEMBLY</b>	Carbon steel (A216 WCB)			12% CR (A743 CA6NM)	316 AUS (A351 CF30)	Duplex (A351 CD4MCu)
<b>INPUT SHAFT</b>				4140 Carbon steel (A193)		
<b>PITOT TUBE</b>				ASTM A747 Grade CBCu-1 or AMS 5383		
<b>GEAR CASING</b>				Carbon steel (A216 WCB)		



## OVERHUNG DESIGN

### RO, RO-H, R-11 Models



	MODEL R11		MODEL RO/RO-H	
MAXIMUM FLOW	34 m <sup>3</sup> /hr	150 gpm	102 m <sup>3</sup> /hr	450 gpm
MAXIMUM HEAD	460 m	1,500 ft	1,585 m	5,200 ft
MAXIMUM SUCTION PRESSURE	14 barg	200 psig	21 barg	300 psig
MAXIMUM SUCTION TEMPERATURE	82°C	180°F	121°C	250°F
MAXIMUM SUCTION TEMPERATURE WITH FLUSH	121°C	250°F	288°C	550°F
MAXIMUM SPEED	4,858 rpm	4,858 rpm	6,321 rpm	6,321 rpm
MAXIMUM POWER	55 kW	75 hp	300 kW	400 hp

## MAIN FEATURES

THESE UNIQUE ATTRIBUTES MAKE THE ROTO-JET® PUMP AN EXCELLENT CHOICE FOR SEVERE LOW-FLOW, HIGH-HEAD APPLICATIONS

- Pulsation free flow over the entire head-flow curve
- Minimal changes in the radial and axial loads as function of the flow rate
- Process seal exposed only to suction pressure which maximizes seal life
- No wear rings
- High-heads achieved in a single stage at low operating speeds compared to other low-flow, high-head pumps
- Isolated drive train to minimize the risk of bearing contamination

## OVERHUNG DESIGN – RO, RO-H, R-11 MODELS

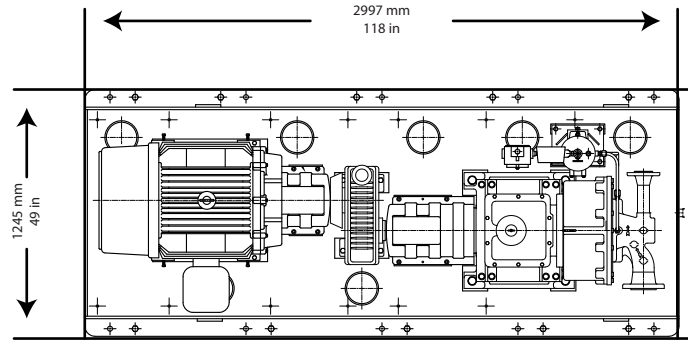
### TYPICAL OVERHUNG FOOTPRINT

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Footprint dimensions based on LV motor.



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<b>PITOT TUBE</b>				ASTM A747 Grade CBCu-1 or AMS 5383		
<b>INPUT SHAFT</b>				4140 Carbon steel (A193)		
<b>BEARING / GEARBOX CASING</b>				Carbon steel (A216 WCB)		



## AFTER MARKET SERVICE

### TRILLIUM FLOW TECHNOLOGIES OFFERS COMPREHENSIVE AFTER MARKET SERVICES

- Post order management
- Remote assistance and technical consultancy for installations, both onshore and offshore
- Technical support on-site
- Warranty extensions
- Long term service agreements
- In-house or on-site training
- On-site diagnosis and problem detection
- OEM spare parts supplier
- Machine revamping and retrofit
- Machine replacement
- Start-up & commissioning
- Pump & system troubleshooting





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Certified: ISO 9001:2015, ISO 14001:2015, ISO 45001:2018, SA 8000

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