



OTECHOS
Centric Reciprocating Pump

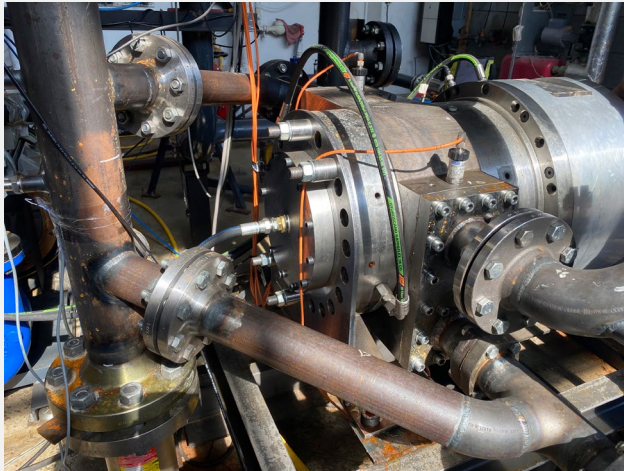
CRP



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OTECHOS
Looking to the future

OTECHOS Centric Reciprocating Pump



More oil and gas with OTECHOS CRP

Simple, multiphase seabed boosting pump

Provides artificial lift
- Higher production rate, accelerated production

Reduces need for gas lift
- More sales gas

Utilizes apower from shore for electrical lift
- Less CO₂ tax

Minimizes need for compressor train extensions
- Less CAPEX for debottlenecking

Less topside equipment
- Simpler tie-in of new satellite fields

Unique displacement pump
- Handles multi-phase well fluid
- Balances production of multiple wells
- Avoids emulsions (as opposed to centrifugal/dynamic pumps)



Centric Reciprocating Technology (Patented)

Unique action: Rotary Displacement Pump

- Front and back rotor has two vanes each, both rotating in the same direction with variable angular velocity 90° out of phase
- Elliptical gears drive the rotors and govern angular velocity via concentric shafts
- Suction and discharge are formed in four voids between vanes. Ports arranged on housing for pump or compressor configuration
- Each chamber expands and contracts twice per revolution. No valves needed
- Each revolution yields 8 full pump strokes

Key properties

- High performance, compact, small footprint
- Positive displacement, self priming, positive suction head
- Robust and reliable, particle resistant, suitable for multi-phase pumping and wet gas compression
- Modular, simple, repair friendly design



OTECHOS CRP compared to...	CRP Features	CRP Advantages
Piston-Cylinder	<ul style="list-style-type: none"> • Balanced • Valveless • Compact 	<ul style="list-style-type: none"> • Less vibrations, noise, loss • Robust to solids, less failure modes • Higher flow rate relative to size, weight
Lobe	<ul style="list-style-type: none"> • Higher pressure • Longer service life 	<ul style="list-style-type: none"> • Wider operational range • Lower Cost of Ownership
Progressive Cavity	<ul style="list-style-type: none"> • No mechanical contact • Compact • Higher pressure 	<ul style="list-style-type: none"> • More robust to particles • Higher flow rate relative to size, weight • Wider operational range
Rotary Vane	<ul style="list-style-type: none"> • Higher pressure • Lower internal friction • Longer service life 	<ul style="list-style-type: none"> • Wider operational range • Higher efficiency • Lower Cost of Ownership
Centrifugal	<ul style="list-style-type: none"> • Lower rpm • Lower fluid velocities • Lower shear 	<ul style="list-style-type: none"> • More durable, higher reliability • Less abrasion from solids • Less emulsions in multi-phase mode

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