



MULTIPHASE TWIN SCREW PUMPS



CALDER

MP SERIES
MP01 Rev. 2.0a

MULTIPHASE TWIN SCREW PUMPS: BOOSTING MULTIPHASE FLUID FLUID HANDLED: GAS + HYDROCARBONS / CRUDE OIL + WATER

3P Prinz Multiphase Pumps can be supplied in several customized executions to handle aggressive fluids with:

- › High Concentration of H₂S (Sour Gas), CO₂ and H₂O (Wet Gas)
- › High Content of Chlorides and Sulphides
- › Content of Sand / Solid Particles

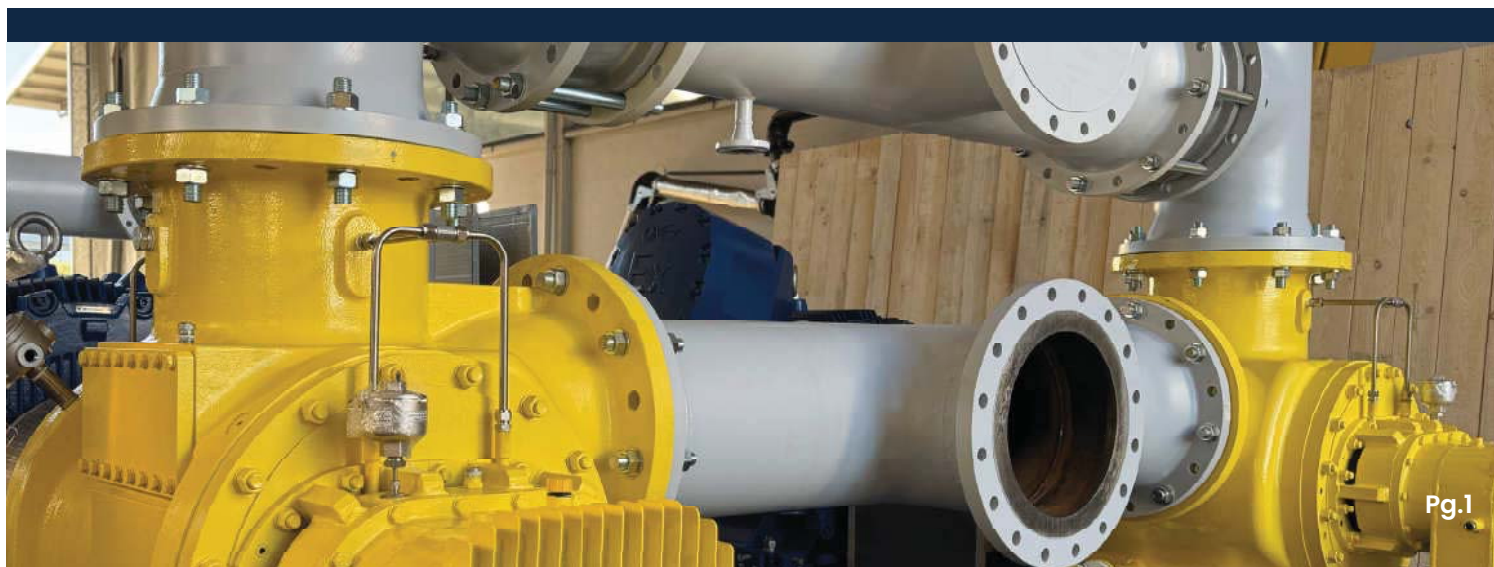
APPLICATIONS IN THE OIL&GAS UPSTREAM SECTOR:

- › Oil&gas Wells with unstable or uncertain flow
- › Oil & Gas Streams before treatment
- › Small Gas Productions which would be normally flared
- › Life extension of Mature / Old Fields
- › Improvement of the Flexibility of Oil and Gas Processing Station
- › Simplification of the Layout of the Processing Facility and Well Clusters
- › Providing a faster return of the Investment

BENEFITS OF 3P PRINZ MULTIPHASE TWIN SCREW PUMPS

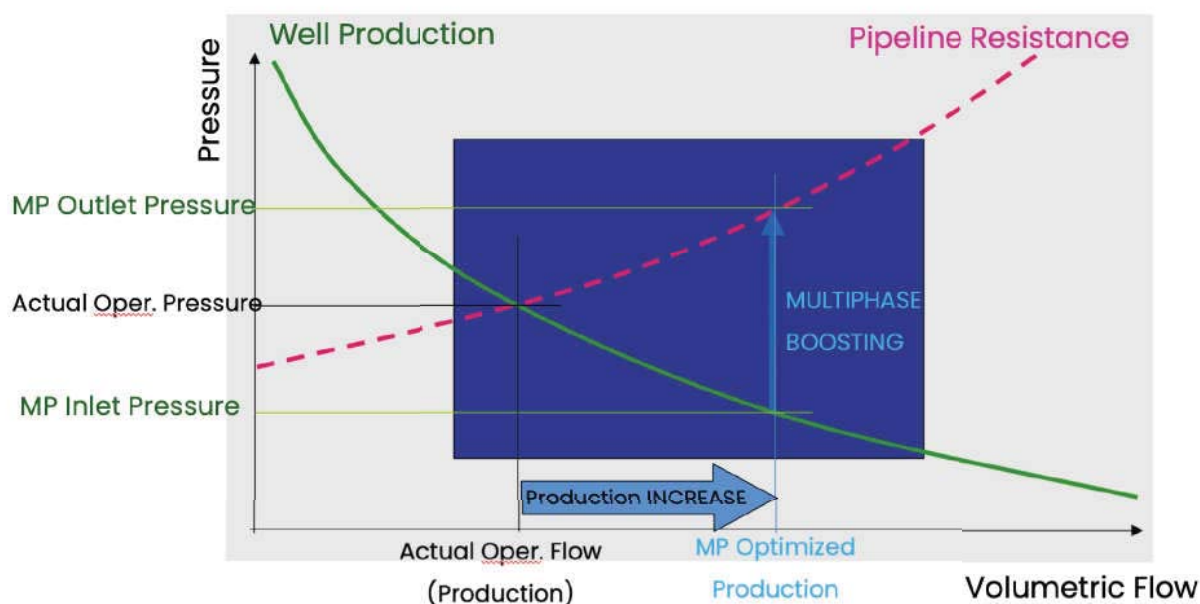
Multiphase Twin Screw Pumps add energy to the stream coming from the well, with the target of:

- › Increase pressure of the untreated well stream, to boost production
- › Draw down the wellhead pressure, to improve production
- › Increase the pipeline flow
- › Separate the well production from pipeline layout
- › Possibility of using the pumped gas for generating energy, without flaring it locally, reducing CO₂ emissions to atmosphere
- › Possibility of using small marginal fields and gathering their production to a main station
- › Possibility of improving productivity on mature oil and gas fields, particularly when lift pressure is low
- › New fields developed entirely on multiphase pumping technology
- › Capability of Handling Oil&Gas Fields with high and very high Gas Volume Fraction (GVF), up to 100% GVF case.

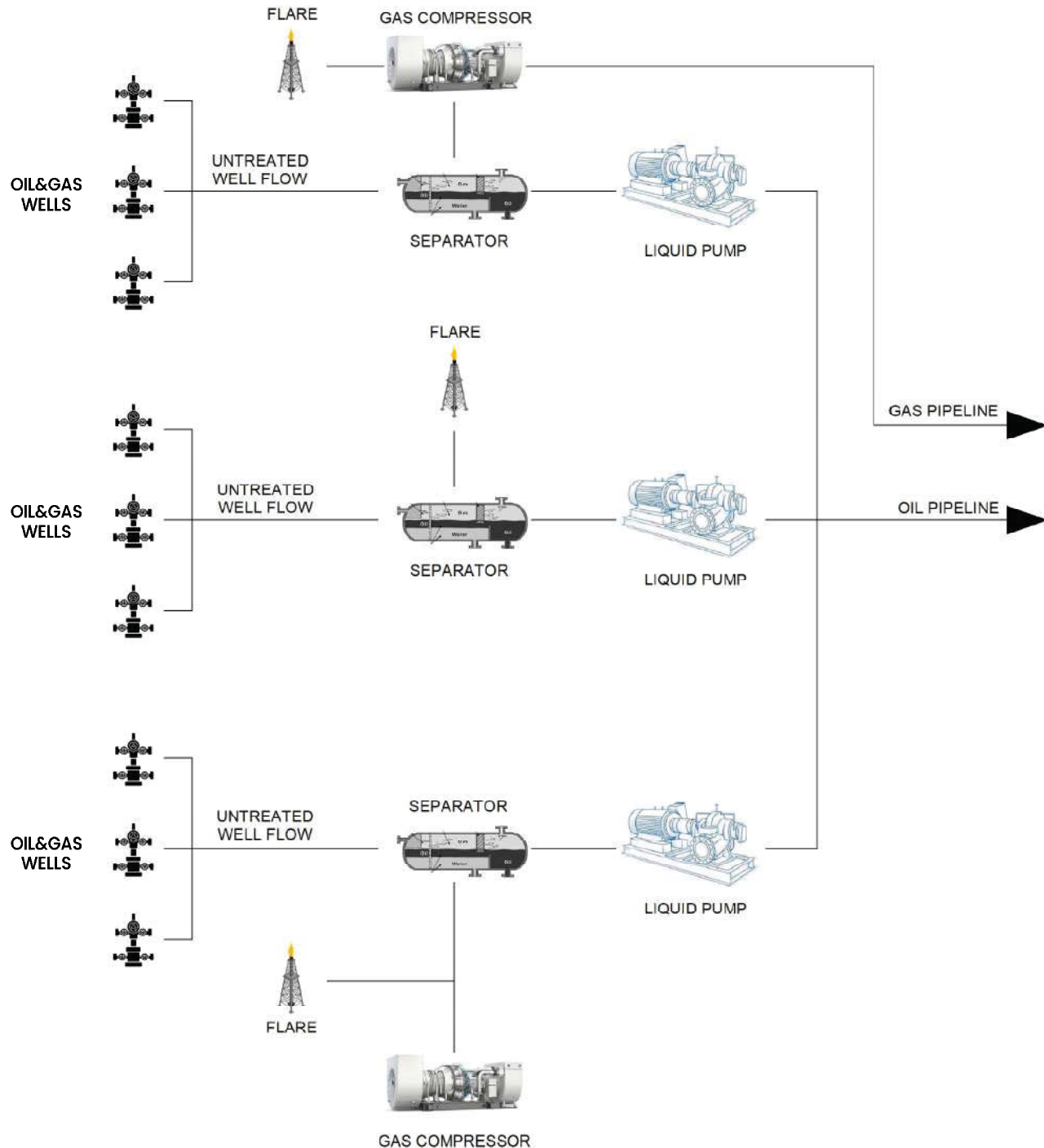


3P PRINZ MULTIPHASE TWIN SCREW PUMPS MP SERIES

- > Maximum design pressure: 149 barg [2170 psig]
- > Casing and Flanges rating: max ANSI 900
- > Flow rates (liquid equivalent): up to 3500 m³/h [15400 GPM / 22015 US BOPD]
- > Viscosity of the pumped fluid: up to 5.000 cSt
- > Pipe Nominal Size DN: from 50 to 750 [from 2" up to 30"]
- > Rotation speed: from 200 up to 2200 rpm
- > Temperature range: -46 / +100 °C [-51 / +212 °F] - ON REQUEST -60°C / +120°C [-76 / +248 °F]
- > Bearing types: External Bearings and Gears in oil bath, with External Lubrication Oil Cooling System



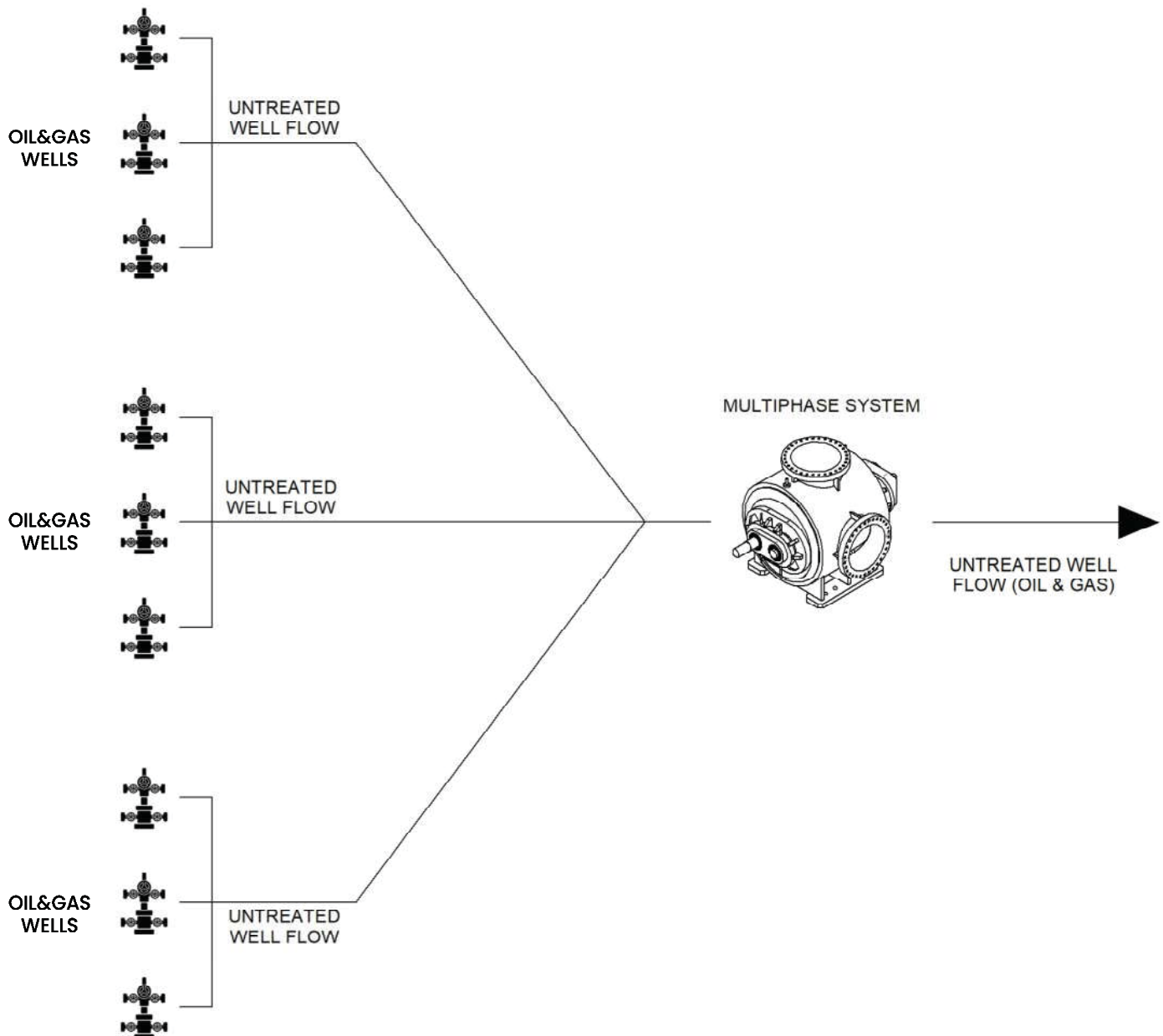
CONVENTIONAL PUMPS CONFIGURATION



Conventional Oil & Gas Pumping Solution

Traditional field installations rely on multiple stages of separation and compression to handle the mixed flow of oil, gas, and water from the well. This configuration typically requires more rotating equipment and auxiliary systems, leading to higher total cost of ownership and greater maintenance needs. In mature oil and gas wells, the wellhead pressure decreases, decreasing consequently the flow rate and the productivity. Moreover, the presence of flaring to burn off excess gas results in wasted energy and increased environmental impact. Overall, this approach offers limited process flexibility and higher operational complexity, with slower returns on investment.

MULTIPHASE PUMPS CONFIGURATION

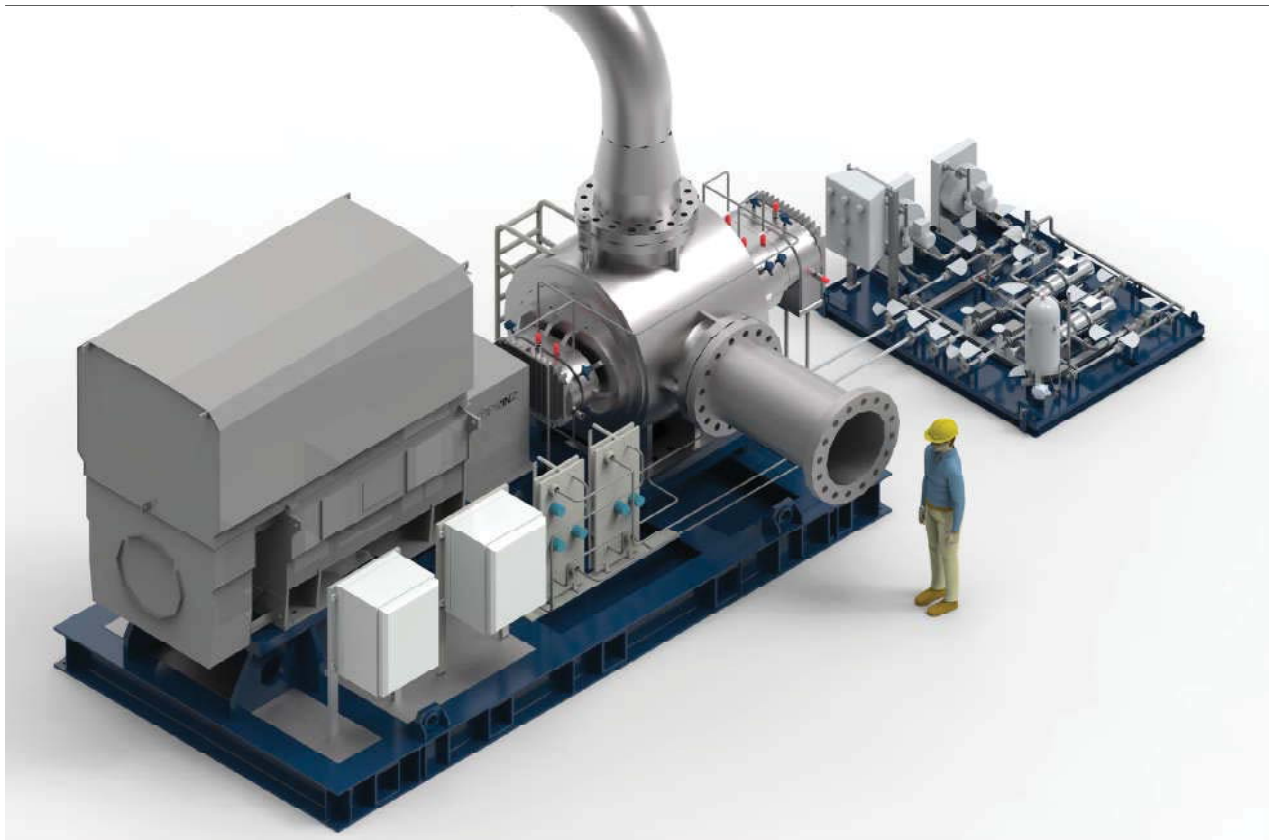


Multiphase Screw Pump Solution

The use of multiphase twin screw pumps streamlines the entire process by handling oil, gas, and water simultaneously, eliminating the need for complex separation stages. This simplified layout—with fewer installed components—reduces both capital and operating costs, while increasing overall system efficiency. Multiphase Twin Screw Pumps, particularly on fields with low wellhead pressure, increase the flow and improve the well productivity (see graph on the page 3)

End-users benefit from greater process flexibility, longer production cycles from existing wells, and faster payback due to higher flow rates and reduced downtime. The result is a cleaner, more efficient, and cost-effective solution for modern oilfield operations.

MULTIPHASE PUMPS



An analysis of the application shall be executed in order to confirm suitability:

- › Type of application (Upstream or Downstream, Temporary or Continuous)
- › Availability of all the Process Parameters
- › How the Gas is mixed in the Fluid: Dissolved? Gas Bubbles? Gas Slugs?
- › Max Gas Void Fraction.

Twin Screw Pumps can handle a reasonable percentage of Gas dissolved in the liquid. Depending on the application, they can handle up to 60% of Gas without additional liquid recirculation devices!



PUMP TYPE	MULTIPHASE TWIN SCREW PUMPS – Nº 4 MECHANICAL SEAL		
Pump Series MAX GVF (Gas Void Fraction)	MP Series: up to 99% GVF		
Installation Options:	Horizontal		
Executions:	Standard & API 676 – External Timing Gears and Bearings		
Optimized for Applications in:	Oil&Gas		
Suitable to Fluid having the following properties:	Abrasive and not Abrasive		
	Corrosive: Acid / Aggressive / High Concentration of H2S (Sour Gas), CO2 and H2O (Wet Gas) / High Content of Chlorides and Sulphides / Alkaline. And Not Corrosive		
	Very Low / Low / Medium / High Viscosities		
	Not Lubricating or Lubricating		
	Up to 99% Gas Void Fraction / GVF; on request up to 100% GVF for limited period		
	Content of Sand / Solid Particles Special Hardening available (Tungsten Carbide Coating & Ceramic Coating)		
Advantages of the Operating Principle:	Capability of handling a Wide Range of viscosities and pressures = one pump for different GVF cases and many flow rates!		
	High Suction Lift Capability – the pump NPSH being very low – down to 1,5 meters.		
	Self Priming without any auxiliary devices.		
	Capable to pump very viscous fluids thanks to its smooth axial and low-pulsation movement.		
	Pulsations are minimized and flow rate is uniform, allowing to handle fluids that are very viscous and sensitive to shear stresses or turbulences, thanks to the low internal velocities given by the screws movement.		
	High Rotating Speeds are possible thanks to the low inertia of the screws.		
	Screws are contact-less so wear-out is minimized and Pump Life is extended.		
	Flow rate is almost constant even when pressure changes.		
	Capable of Pumping Gas mixed with Liquid.		
	Capability of Dry Running for a limited period and in particular conditions.		
	Low noise level & Low vibration.		
Pump Series	MP Series:		
Maximum design pressure:	149 barg [2170 psig]		
	Pressure and Flanges Rating: ANSI 300 / 600 / 900		
Flow rates (liquid equivalent):	Up to 3500 m3/h [15400 gpm] [22015 USBOPD]		
Viscosity of the pumped fluid:	Up to 5.000 cSt		
Pipe Nominal Size DN:	from 50 to 750 [from 2" up to 30"]		
Rotation speed:	from 200 up to 2200 rpm		
Temperature range:	-46 / +100 °C [-51 / +212 °F] – ON REQUEST -60°C / +160°C [-76 / +320 °F]		
Pulsations:	Minimized (almost zero)		
Bearing types:	External Bearings and Gears in oil bath, , with or without External Lubrication Oil Cooling System		
Liquid Recirculation Options:	- No Recirculation - Internal Liquid Recirculation Valve - External Liquid Recirculation		
Standard Materials:	Casing / Liner	Screws	Shafts
	Carbon Steel (Cast or Fabricated)	Hardened Carbon Steel	High Strength Low Alloy Steel
	Low Temperature Carbon Steel (Cast or Fabricated)	High Strength Low Alloy Steel	Stainless Steel AISI 420
	12% Cr Stainless Steel (Cast or Fabricated)	Stainless Steel AISI 420	Stainless Steel 17-4 PH
	Stainless Steel AISI S316/S316L (Cast or Fabricated)	Stainless Steel AISI S316/S316L	Stainless Steel XM-19
	Stainless Steel AISI S316/S316L (Cast or Fabricated)	Stainless Steel 17-4 PH or AISI 431	Duplex & Super Duplex St. Steel
	Duplex & Super Duplex St. Steel (Cast or Fabricated)	Duplex & Super Duplex St. Steel	Monel, Inconel®, Hastelloy
	Inconel Weld Overlay (cladding)	Monel, Inconel®, Hastelloy	HVOF Spray Coating /Tungsten Carbide Coating
	Monel, Inconel®, Hastelloy	HVOF Spray Coating /Tungsten Carbide Coating	Chromium Plating
	Ni-Resist	CRA Weld Overlay	CRA Weld Overlay
	Ceramic Coating	Nitriding	Nitriding
Customized materials:	Other Alloys and Material Combinations are available on request		
	NORSOK Compliant Materials are available on request		
Main Application Fields:	OIL & GAS UPSTREAM / MIDSTREAM: FPSOs, Offshore Platforms, Oil Fields, Oil Pipelines, Tank stripping/Downstream Multiphase		



Calder Ltd
Prescott Drive
Worcester
WR4 9NE
United Kingdom

+44 1905751790
sales@calder.co.uk

CALDER

Exclusive agent for the UK and Norway