

Pump Quotation - Technical
Offer: N150825J-01 Rev 1

NEMO® pump with base plate and drive: NM148SY04S24Z

The physical characteristics of the pumped product, the application details, as well as the General Operating Conditions detailed in our offer have been taken from your inquiry or where not specified have been assumed by us. In the event of an order we would ask you to check any assumptions and all details as they will become contractually binding along with the selection of pump model, Drive, all specifications, and materials of construction, based on these details.

Multiphase (Oil, Water and Gas) Calculation Results

Project:	Tundra - Current Production (20 PSI Suction)
Offer No.	

Operation Condition

Capacity of Gas	m³/h	104.00
Capacity of Oil	m³/h	4.06
Capacity of Oil + Water	m³/h	14.13
Inlet temperature	°C	10.00
Inlet Pressure	barg	1.40
Discharge Pressure	barg	13.80

Result of calculation

Inlet temperature	°C	10.00
Inlet Pressure	barg	1.40
Discharge Pressure	barg	13.80
Differential pressure	bar	12.40
GOR	Nm³/m³	25.62
Total capacity of Oil +Water+Gas	m³/h	57.03
Gas Frac.	%	75.22%
Compress. Ratio		6.2

Offer: N150825J-01 REV 1
 Date: September 23, 2015

Customer No.: TUNDRA

Multiphase (Oil, Water and Gas) Calculation Results

Project:	Tundra - Current Production (10 PSI Suction)
Offer No.	

Operation Condition

Capacity of Gas	m³/h	104.00
Capacity of Oil	m³/h	4.06
Capacity of Oil + Water	m³/h	14.13
Inlet temperature	°C	10.00
Inlet Pressure	barg	0.70
Discharge Pressure	barg	13.80

Result of calculation

Inlet temperature	°C	10.00
Inlet Pressure	barg	0.70
Discharge Pressure	barg	13.80
Differential pressure	bar	13.10
GOR	Nm³/m³	25.62
Total capacity of Oil +Water+Gas	m³/h	74.56
Gas Frac.	%	81.05%
Compress. Ratio		8.7

Offer: N150825J-01 REV 1
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Customer No.: TUNDRA

Multiphase (Oil, Water and Gas) Calculation Results

Project:	Tundra - Future Approved Wells (2015) (20 PSI Suction)
Offer No.	

Operation Condition

Capacity of Gas	m³/h	146.00
Capacity of Oil	m³/h	6.88
Capacity of Oil + Water	m³/h	20.71
Inlet temperature	°C	10.00
Inlet Pressure	barg	1.40
Discharge Pressure	barg	13.80

Result of calculation

Inlet temperature	°C	10.00
Inlet Pressure	barg	1.40
Discharge Pressure	barg	13.80
Differential pressure	bar	12.40
GOR	Nm³/m³	21.22
Total capacity of Oil +Water+Gas	m³/h	80.94
Gas Frac.	%	74.41%
Compress. Ratio		6.2

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Offer No.	

Operation Condition

Capacity of Gas	m³/h	146.00
Capacity of Oil	m³/h	6.88
Capacity of Oil + Water	m³/h	20.71
Inlet temperature	°C	10.00
Inlet Pressure	barg	0.70
Discharge Pressure	barg	13.80

Result of calculation

Inlet temperature	°C	10.00
Inlet Pressure	barg	0.70
Discharge Pressure	barg	13.80
Differential pressure	bar	13.10
GOR	Nm³/m³	21.22
Total capacity of Oil +Water+Gas	m³/h	105.55
Gas Frac.	%	80.38%
Compress. Ratio		8.7

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Customer No.: TUNDRA

Multiphase (Oil, Water and Gas) Calculation Results

Project:	Tundra - Fairway Unit (Estimates) (20 PSI Suction)
Offer No.	

Operation Condition

Capacity of Gas	m³/h	187.50
Capacity of Oil	m³/h	9.50
Capacity of Oil + Water	m³/h	31.58
Inlet temperature	°C	10.00
Inlet Pressure	barg	1.40
Discharge Pressure	barg	13.80

Result of calculation

Inlet temperature	°C	10.00
Inlet Pressure	barg	1.40
Discharge Pressure	barg	13.80
Differential pressure	bar	12.40
GOR	Nm³/m³	19.74
Total capacity of Oil +Water+Gas	m³/h	108.93
Gas Frac.	%	71.01%
Compress. Ratio		6.2

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Multiphase (Oil, Water and Gas) Calculation Results

Project:	Tundra - Fairway Unit (Estimates) (10 PSI Suction)
Offer No.	

Operation Condition

Capacity of Gas	m ³ /h	187.50
Capacity of Oil	m ³ /h	9.50
Capacity of Oil + Water	m ³ /h	31.58
Inlet temperature	°C	10.00
Inlet Pressure	barg	0.70
Discharge Pressure	barg	13.80

Result of calculation

Inlet temperature	°C	10.00
Inlet Pressure	barg	0.70
Discharge Pressure	barg	13.80
Differential pressure	bar	13.10
GOR	Nm ³ /m ³	19.74
Total capacity of Oil +Water+Gas	m ³ /h	140.54
Gas Frac.	%	77.53%
Compress. Ratio		8.7

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Customer No.: TUNDRA

Multiphase (Oil, Water and Gas) Calculation Results

Project:	Tundra - 5decs/day (Estimates) (20 PSI Suction)
Offer No.	

Operation Condition

Capacity of Gas	m ³ /h	208.33
Capacity of Oil	m ³ /h	10.42
Capacity of Oil + Water	m ³ /h	40.00
Inlet temperature	°C	10.00
Inlet Pressure	barg	1.40
Discharge Pressure	barg	13.80

Result of calculation

Inlet temperature	°C	10.00
Inlet Pressure	barg	1.40
Discharge Pressure	barg	13.80
Differential pressure	bar	12.40
GOR	Nm ³ /m ³	19.99
Total capacity of Oil +Water+Gas	m ³ /h	125.94
Gas Frac.	%	68.24%
Compress. Ratio		6.2

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Multiphase (Oil, Water and Gas) Calculation Results

Project:	Tundra - 5decs/day (Estimates) (10 PSI Suction)
Offer No.	

Operation Condition

Capacity of Gas	m ³ /h	208.33
Capacity of Oil	m ³ /h	10.42
Capacity of Oil + Water	m ³ /h	40.00
Inlet temperature	°C	10.00
Inlet Pressure	barg	0.70
Discharge Pressure	barg	13.80

Result of calculation

Inlet temperature	°C	10.00
Inlet Pressure	barg	0.70
Discharge Pressure	barg	13.80
Differential pressure	bar	13.10
GOR	Nm ³ /m ³	19.99
Total capacity of Oil +Water+Gas	m ³ /h	161.06
Gas Frac.	%	75.16%
Compress. Ratio		8.7

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Product:		Multiphase (Oil/Water/Gas) Mixture
Composition		Traces of H2S / 5-6% Chlorides
Particle size	inch	Some sand
pH value	approx.	No Advise
Solids content (w/w)	approx.	% TS Some sand

Operating Condition Summary:

Application details:		Content	current production		Future approved Wells		Fairway Unit		5decs/day forecast	
Flow rate (Q)	approx.	m3/hr	57.03	74.56	80.94	105.55	108.93	140.54	125.94	161.06
Differential pressure	approx.	bar	12.40	13.10	12.40	13.10	12.40	13.40	12.40	13.40
Suction pressure	assumed	barg	1.40	.70	1.40	.70	1.40	.70	1.40	.70
Discharge pressure	approx.	barg	13.80	13.80	13.80	13.80	13.80	13.80	13.80	13.80
Pump operating speed	approx.	RPM	75	110	119	141	146	185	170	210
Sliding velocity	approx.	m/s	0.70	0.9	.95	1.7	1.8	2.2	2.1	2.5
NPSHr	approx.	m	1.4	1.4	1.4	1.4	1.4	1.7	1.6	1.7
Frequency	approx.	Hz	17	25	27	32	34	43	39	43
Power required at drive shaft	approx.	kW	22	28	40	50	52	60	54	72
Running torque	approx.	N-m	3492	3492	3492	3492	3492	3492	3492	3492
Starting torque	approx.	N-m	6700	6700	6700	6700	6700	6700	6700	6700
Operating temperature	assumed	°C	10	10	10	10	10	10	10	10

Assembly specification	
installation	horizontal

General operating conditions	
Installation area	inside
ambient Temperature	approx. 10°C
humidity	up to 75%
application type	Continuous operation
operating hours	24 hours/day
service voltage	3/60/575

Painting	coating system	Netzsch Standard
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Operating and Maintenance Instructions	
Standard documentation in accordance with the 98/37/EG Machinery Directive.	
Special documentation is available on request and would be charged for.	
number	1
medium	Paper
language for O&M's and spare parts list	English
dispatch method	shipped with pump

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NEMO® NM148SY04S24Z Pump



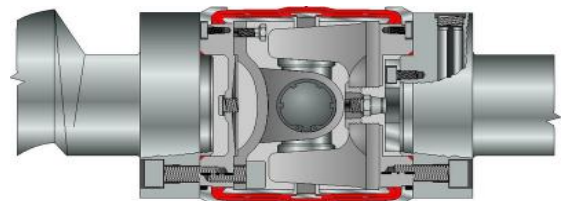
Characteristics and benefits of the NEMO_ SY pump:

- Reliable and sophisticated construction
- Modular construction system
- 4 different stator – rotor geometries available (for optimal meeting your request)
- Low investment and operating costs
- Low Maintenance expenses

General characteristics	
name plate on the pump	in English (Stainless steel)
direction of rotation	to the left, counter clockwise (as viewed from drive end)
Pump Pedestal	
material	Cast iron 0.6025
Pump housing / End connection	
housing material	1020 Carbon Steel
flange position	vertical upwards
function of housing connection	suction connection
suction flange design	ANSI B16.5
nom. dia. & pressure for pump housing	10"-150#ANSI RF FLANGE
discharge flange design	ANSI B16.5
nom. dia. & pressure of discharge flange	10"-300#ANSI RF FLANGE
Function of end connection	pressure connection
housing seals	FPM
Shaft seal	
manmufacturer	Netzsch
shaft seal materials	U2U22VGG Tungsten Carbide + 8%nickel Faces Viton Elastomers
Type	AISI 316 Stainless Steel Springs NDB115VS
Rotating parts	
rotating parts materials	Stainless Steel

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Joints	joint type sealing type joint sealing material joint lubrication	Pinion joint (Z) Double sealed Viton/316 Stainless Steel	
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Rotor	rotor material temperature range	TST Tungsten Carbide standard
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Stator	stator material accessories	NEMOLAST® S61T – HNBR Temp. Thermistor (Rosemount 644 Transmitter)
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Drive

Helical gear reducer	
manufacturer	Nord
type	S92-W
gear ratio	6.19
speed @ 60 Hz	261
mounting position	M1
Motor mfr.	TECO Westinghouse AEHHXU
Type/Cat#	TEFC – Explosion Proof – NEMA Premium Efficiency 44T CSA Approved
motor HP	125
winding voltage	575
voltage range	+/- 10%
frequency	60 Hz
minimum frequency	6 Hz (at const. Torque)
maximum frequency	60 Hz
number of poles	4
number of phases	3
Motor speed	1750 rpm
protection type	IP54 – TEXP Class 1, Div 1 Zone 2 T3
insulation class	F

Baseplate

assembly specification - material Standard Oilfield Baseplate

Coupling

Rotex or equivalent between motor and Geareducer & between Gear Reducer and Pump, with Guard of non-sparking material

Approximate weight of pump assembly	3000 Kgs
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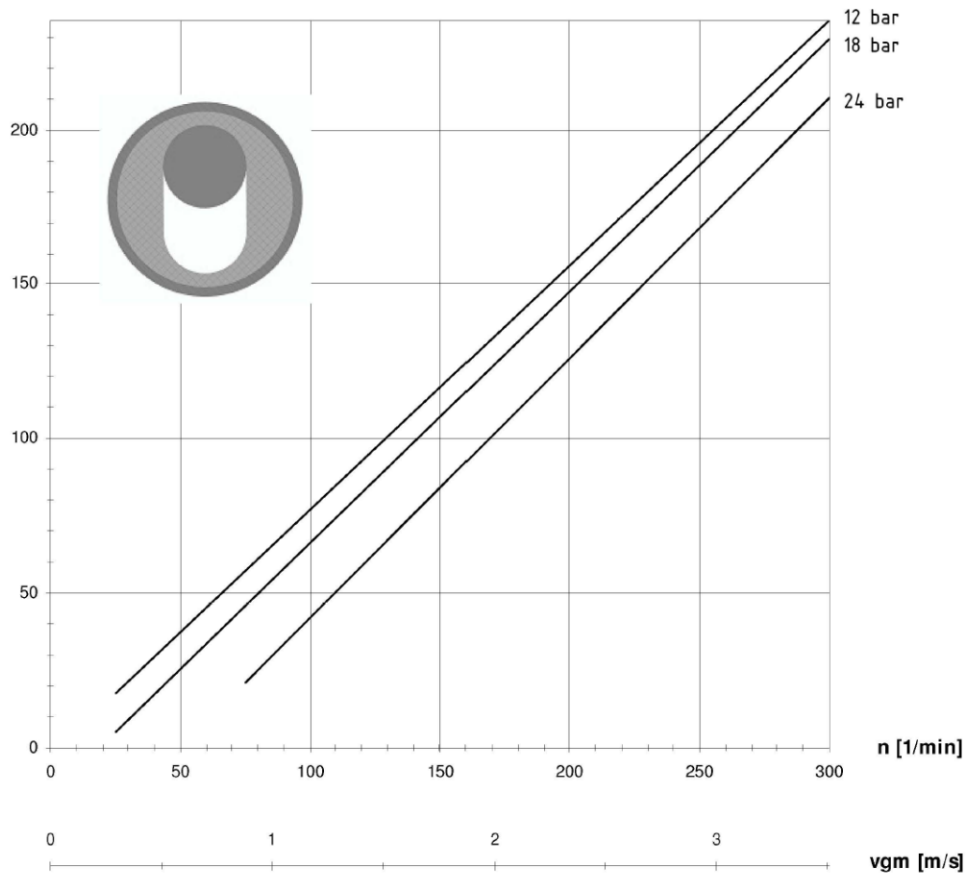
Performance curve:

NM148--04S

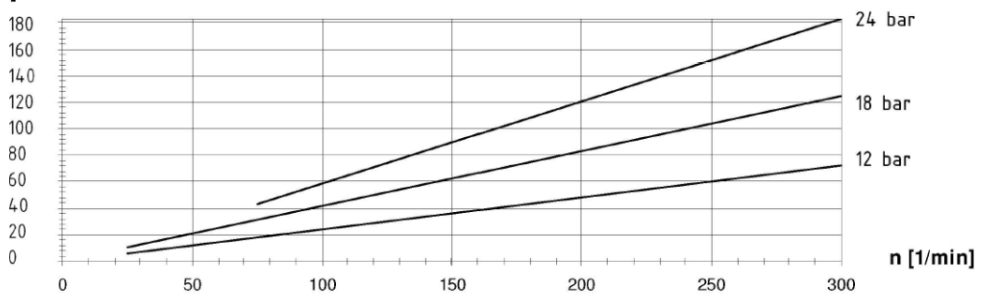
Förderkennlinie / Performance Curve
 Statorwerkstoff / elastomer quality: standard



Q [m³/h]



P [kW]



Losbrechmoment / starting torque T(L) = 6700 Nm

Druck / pressure	T
12 bar	2793 Nm
18 bar	4190 Nm
24 bar	5586 Nm

Gültigkeit für Wasser (1 cP) bei 20 °C. Toleranzen nach VDMA 24284 (+10%/-5%).
 Valid for water (1 cP) at 20 °C (70 °F). Tolerances are in accordance with VDMA 24284 (+10%/-5%).

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Example Assembly Drawing:

