Haico Oilfield fzco
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# 180K Nitrogen Pumping Unit
# Non Sound Proof Technical Specification

The Nitrogen Converter is to be designed for the following operating parameters:

- Area Classification Zone 2
- Design temperature load bearing/pressure retaining –20 Deg to + 50 Deg C.
- Design temperature machinery –20 Deg to + 50 Deg C.
- DNV 2.7.1offshore certified skid and lifting specs.

**1.0 Diesel Engine (NEW)**

**Caterpillar Engine: D3406 DITA**

Rating: 490 BHP @2100rpm
3406DITA direct injection diesel engine comprising 6 in-line cylinders, 4-stroke cycle, and direct
Injection turbocharged, after cooled, heavy-duty, diesel engine.
Bore 137 mm
Stroke 152 mm
Rotation (from flywheel end) counters clockwise
Displacement 14.6 liters
Capacity for Liquids:-
Cooling System (engine only) 128 liters (approx.)
Lube Oil System (refill) 34.1 liters
Weight (Dry, engine only) 1350 kg approx.
Air Inlet System
Air cleaner, regular duty dry, panel type with service indicator.
Single Turbocharger (water-cooled).
After cooler
Air inlet shutoff valve.
Air Compressor
12 cfm Air compressor.
Control System
Governor (hydra - mechanical).
Governor control, vernier and positive lock

**2.0 Gearbox**

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- Funk 2 pad hydraulic pump drive gearbox
- Funk Gearbox will be enclosed coupled on engine flywheel

**3.0 Start System**
Ingersoll Rand air starter motor model 150 BMG.
Ingersoll Rand SRV 125 solenoid valve.
Starter lubrication via a Norgren water trap/lubricator F15 Series with 1¼" ports.

**3.1 Air System**
A 12 CFM compressor will be driven via the engine and will be supplied with an air intake filter and regulator. A Cool Technology air receiver will be used approx. volume will be 160 liter capacity. A 150 psi relief valve will be installed to protect the receiver from over pressurizing. A crows foot will be installed at skid level for filling the air receiver and a shut off valve and bleed valve will be installed to enable the supply line to be vented. The air receiver will be installed with the makers plate in a visible position..

**4.0 Radiator/Fan**
The radiator will have a fully solder dipped core assembly for offshore use. All moving parts will be covered by appropriate guards. An anti-static type fan will be supplied.

**5.0 Fuel Reservoir**
The fuel reservoir capacity will be 150 US Gallons that will last for more than 10 running hours for the engine and will come complete with filler breather, sight level gauge, isolating and drain valves.

**6.0 Pyroban Zone 2 System - Exhaust Gas Cooling**
A Pyroban exhaust gas cooling kit would be used.
The following components will be supplied:
Exhaust gas coolers, clean cap type Stainless steel certified exhaust spark arrestors.
Exhaust dummy elements.

**7.0 Engine Safety and Shut down System**
The safety and emergency system will operate on the loss of air. The engine will stop by shutting off the diesel fuel rack and closing the air intake valve.
Shut down operation will occur on the following components:
Low lube oil pressure.
Engine over speed shut down.
High coolant temperature.
Emergency Stop.
Engine/system safety devices panel.
GN2 pump over pressure trip by hydraulic motor drive, once this occur, the installed trigger valve will be trigged and function off the hydraulic pressure in-order to free drive

the hydraulic pump and the triplex pump will be freed off, therefore N2 pressure will be reduced.

**8.0 Hydraulic System**

Denison hydraulic pumps, motors and relief valves will be used wherever possible.
An oil/water heat exchanger will be used for the heat recovery system to ensure good recovery from the hydraulic load system.
The hydraulic reservoir will be sized to suit the hydraulic pump flows. The reservoir will be manufactured from stainless steel and will incorporate the following:
Suction strainers.
Isolating valves.
Return filters.
Filler breather.
Level/temperature gauge.
Main valve.

**9.0 Cryogenic High Pressure System**

ACD triplex. high pressure pump will be supplied with 1.625" cold ends, (type 3-GUPD)

Max. Pressure:10,000 psi.
Flow Rate: 3,000 SCFM.
All pipe work and valves will be rated for 10,000 psi working. The HP pipe work will terminate at a discharge valve with a 1502 2" thread.

Triplex Pump
Flow: 3,000 SCFM.
Pressure: 10,000 psi.
Discharge Temperature: 70ºF.

**10.0 Cryogenic Low Pressure System**

The low pressure system will be manufactured from 316 stainless steel pipework and will incorporate isolating valves, check valves, relief valves and 1½" x 2½" x 6" boost pump.
Piping, LN 2priming vent line will piped into Exhaust outlet line.

**11.0 Control Panel**

A stainless steel control panel will be supplied complete with all necessary gauges and controls to operate and monitor the unit.

**12.0 Skid/Frame**

Assembly : That will built and assembly to a offshore single skid design, the Diesel

hydraulic power pack is remove able from this main skid for require services or maintenance. One set of anti vibration dampener will be installed underneath of the diesel power pack for resistance of vibration.
No part of the equipment shall overhang the skid edge.
Design: The skid/frame will be to DNV 2.7-1, 'Offshore Freight Containers Design and Certification'. Four of lifting pad will be fabricated at top of all four corners, a set of 4 leg lifting slings c/w nut/bolt type shackles to be supplied with test certificate.

**13.0 Painting**
Blasting/painting to offshore paint specification and in accordance with Client requested.

**14.0 Third Party Inspection**
Third party inspection will be overseen by DNV/ABS/BV

**15.0 Certification Manual**
Two copies of the certification manual will be supplied.
Parts Book/Maintenance Manual
Two copies of the parts book/maintenance manual will be supplied.
Two copies of operating Manual.

**16.0 Warranty Period:**
There will be 1 year Warrantee shall be provided from the date of testing & commissioning of the pump unit at Haicoyard.

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