180K LN2 CONVERTERSINGLE PUMP
SOUNDPROOFED LN2 UNIT
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**STOCK UNIT**

1. **Engine**

   **Make**: Caterpillar 3406  
   **Model**: 490 BHP at 2100 RPM (365 kW).

   Engine supplied complete with the following components:

   - SAE 1 Flywheel and housing
   - Remote mounted lube oil filter
   - Water cooled exhaust manifolds
   - Water cooled turbo charger
   - Mechanical variable speed governor

2. **Gearbox**

   A Durst hydraulic pump drive gearbox with flywheel mounted drive plate, SAE adapters to suit Parker hydraulic pumps.

3. **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 1 1/4” ports

4. **Air System**

   A 13/16 CFM compressor will be driven via the engine and will be supplied with an air intake filter and regulator. An air receiver will be used; approx. volume will be 220 liters 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, 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 maker’s plate in a visible position.
5. **Radiator**

The radiator will have a fully solder dipped core assembly for offshore use, all moving parts will be covered by appropriate guards.

6. **Fuel Reservoir**

The fuel reservoir capacity will be 150 US Gallons, a filler breather, sight level gauge, isolating valves and a drain valve will be supplied.

7. **Pyroban Zone II Kit**

The following components will be supplied:

- An air inlet shut down valve will be supplied
- The air inlet flame trap will be located downstream of the turbo
- Water cooled exhaust flexible pipe, turbocharger outlet to exhaust gas cooler
- Side mounted exhaust gas cooler, complete with exhaust inlet plenum chamber and double exhaust outlet box
- Exhaust flametrap, plate type, stainless steel construction, quantity 2
- Flametrap dummy elements, quantity 2
- Crankcase breather flametrap
- Screw fitting dipstick
- Screw fitting oil filler cap
8. Hydraulic System

Parker hydraulic pumps, motors and relief valves will be used wherever possible. A plate type 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 fitted with the following:-
Suction Strainers,
Isolating Valves
Return Line Filters
Filler Breather
Level/Temperature Gauge

9. Water Pump

A water pump will be used for the vaporiser water system and driven via a Parker hydraulic motor.

10. Cryogenic High Pressure

A single CS&P ICPE 200 triplex pump will be supplied c/w 15/8” cold ends.

A pot type vaporiser coil would be used which is BV certified. A 2 x 1 SPM low torque valve will be supplied.

Tempering valve, high-pressure bleed valve, check valves and pipework will be rated to 20,000 psi medium pressure.

An 11,000 psi relief valve will be installed on the gas discharge line. GN2 Discharge Temperature at 3000SCFM 21 Deg C ( 70 Deg F )

Max working pressure will be 10,000 psi and maximum flow will be 3000 SCFM @ 6000 psi
11. **Cryogenic Low Pressure**

The low pressure system will incorporate the following:-

- Inlet Strainer
- LN2 Isolating/Vent Valves
- Brass Flap Type Return Check Valves
- 150 PSI Relief Valves
- 1½” x 2½” x 6” Boost Pump Assembly

12. **Control Panel**

The control panel, box and cover will be manufactured from stainless steel.

The following gauges and controls will be situated in the control panel to enable operation and monitoring of the unit:-

- 6” GN2 Discharge Pressure Gauge
- 4” LN2 Discharge Pressure Gauge
- NU-Flo SCFM Counter
- 4” GN2 Discharge Temperature Gauge
- Pump Control Valve
- Pump Hydraulic Pressure Gauge
- 4” Hydraulic Oil Temperature Gauge
- 4” Hydraulic Load Pressure Gauge
- Hydraulic Load Control Valve
- Emergency Stop Button
- Shutdown Commissioning Valve
- 4” LN2 Circuit Water Temperature Gauge
- 4” Coolant Pressure Gauge
- 4” LN2 Boost Pressure Gauge
- 2½” Boost Pump Hydraulic Pressure Gauge
- Boost Pump Control
- 2½” Air Pressure Gauge
- 2½” Exhaust Temperature Gauge
13. **Acoustic Enclosure**

The acoustic enclosure will be the container type. There will be two doors on each side and two doors at one end to enable inspection and maintenance to be carried out.

The inspection doors can be opened from the inside. Door stops are fitted to each door and this will protect the door from damage. The acoustic material will be 100mm thick. Plastic or stainless steel perforated sheet will cover the acoustic material. The hinges and door handles will be manufactured from stainless steel and will be the container flush fitting type.

The air inlet and outlet will be via roof mounted louvers. The cryogenic components will be outside the acoustic enclosure. *Please note that this unit is available to have the option of soundproofing or non – soundproofing. Currently the unit is non-soundproofed.*

14. **Skid / Frame**

The skid and frame will be manufactured from steel box section. The lifting points will be positioned on the inside to prevent damage.

Fork lift pockets will be situated through the main skid members. The forklift pockets will be 350mm x 150mm in size.

14.1 **Drip Tray**

The complete base of the skid will be sheeted in and fully welded to act as a drip tray. The depth of the drip tray will be 2”/50mm. Drip tray drain points will be situated on the main skid members.
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15. Specifications

15.1 Skid and Frame

The design of the unit will meet the requirements of DNV Certification Note 2.7-1 ‘Offshore Freight Containers Design and Certification’.

All structural and lifting equipment will be fully tested and certified by DNV.

All structural steel will be rated for use at -20°C.

15.2 Diesel Engine

The engine will conform to ATEX, BP 200 ‘Requirements For The Protection of Diesel Engines Operating in Zone II Hazardous Areas’, and EEMUA No.107 (previously OCMA MEC 1).

Note

Please note that to conform to the ATEX requirement, the exhaust flametrap would require to be installed when in a Zone II area.

15.3 Triplex Pump Specifications

Make: C.S.&P
Model: ICPE 200
Cold End: 15/8”

Max. Working Pressure

10,000 PSI

Max. Output Flow

3000 SCFM @ 6,000 PSI
GN2 Discharge temperature at 3000 SCFM 21°C - 70°F
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15.4 Paint Specification

All bare steel work will be blasted to SA 2.5
Zinc rich primer base coat
Light epoxy high build intermediate coat
Polyurethane gloss top coat

This paint specification is our standard Offshore specification. The unit can be painted to your individual paint specification at your request.

15.5 Hose Specification

Single wire hose to SAE 100 R1T
Two wire hose to SAE 100 R2T
Multi spiral hose to SAE 100 R9R/10 R10
Fittings plated and pallet swaged

Hose and hose ends will be the Parker type

No cloth covered hose will be used.

15.6 Hydraulic Adapter Specification

Steel adapters will be manufactured to the following specifications:

BSP adapters to BS 5200-1975
JIC and SAE threads to BS 1580
NPT threads to American Standard B-21
Electro plating to BS 1706 N23

15.7 Unit Weight / Dimensions

Length : 4,700 mm
Width : 2,438 mm
Height : 2,605 mm
Weight : 13,000 Kgs
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<table>
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<tr>
<th>Third Party Specification</th>
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<tr>
<td>All fabrication and testing will be overseen on behalf by DNV.</td>
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<tr>
<th>Certification Manual</th>
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<td>Two copies of the certification manual will be supplied each copy will include the following:</td>
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<tr>
<td>- All Certifying Authority documentation</td>
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<td>- Material traceability and certification</td>
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<td>- Component certification where possible</td>
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<tr>
<th>Parts / Maintenance Manual</th>
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<td>Two copies of the parts book and maintenance manual will be supplied.</td>
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<th>Duty</th>
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<td>Please note all duty is included in the cost.</td>
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<td>The unit will be F.C.G. status.</td>
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<th>Cost</th>
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Delivery

The stock unit would be approximately 8-10 working weeks from receipt of confirmed order. The delivery quoted will be dependent on the unit final specification at time of order.

Notes

Please note that the delivery quoted is based on third party supplying products on a predetermined time scale, which will need to be confirmed at time of order. As a result, this could impact our overall delivery. Delivery will also be dependent on our current workload at time of order.

Price Includes

The above cost will include the following:-

– Slings and shackles

Validity

This offer will remain valid for acceptance for a period of 45 days.
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Price Excludes

The above cost will exclude the following:-

- Delivery
- LN2 for testing
- Pyroban 3GP System – However, this can be installed at an additional cost

Terms & Conditions

The price offered has been calculated assuming a stage payment structure is adopted. Unless otherwise agreed, the structure will be as follows: -

50% upon receipt of purchase order
50% upon satisfactory factory acceptance test & prior to despatch

Liquidation Damages

Unless otherwise agreed it is assumed, that should this offer result in a contract being placed, there will be no liquidated damages or penalties imposed onto Hendriks Oilfield Services.

Cancellation Terms

Please be advised that should an order be placed for the above and then subsequently cancelled at any time throughout the build process, cancellation charges will be applicable. These charges will be confirmed at time of order.

Warranty

For New Products, guarantees, all parts and equipment that are manufactured or supplied by our factory for a period of 12 months from the date of acceptance. The warranty covers all defects that are due to defective construction, defective installation, defective material or poor workmanship. Warranty does not provide for the costs associated with travel and subsistence and these will fall to the Customer’s account.