K-100 WORKOVER RIG SPECIFICATIONS
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INTRODUCTION

The K100 workover rig is a Kremco-style self-propelled back-in carrier. It is designed to be used with a variety of equipments such as the drawworks, the rotary table, the mast, the parallelogram substructure, as well as the folding walkways on each side of the rig. The carrier frame is fabricated utilizing structural steel beams, square, and rectangular hollow structural steel sections.

Technical data

Max. working hook load: 250,000 lbs.
Working depth:
  - for drilling:
    - with 3-1/2” DP 6,696 ft
    - with 2-7/8” DP 9,840 ft
  - for workover:
    - 2-7/8” tubing NU 13,000 ft
    - 3-1/2” tubing EUE 8,268 ft
Used double stands max. length 60 ft
Truck max. speed 31.07 mph
Max. width during transportation 12’ – 4-1/2” (3,772 mm)
Max. height during transportation with monkey board 14’ – 9-9/16” (4,510 mm)
Max length during transportation 73’ – 5-3/16” (22,382 mm)

CHAPTER 1. MAIN DRILLING RIG

1.1. DRAWWORKS

Quantity - 1.
The K600 well servicing/workover drawworks has a drum that is dynamically balanced to ensure even and positive braking. The main drum is supplied with Lebus Grooving to provide proper wireline spooling. Hoist bearings and brake mechanisms are lubricated with a centralized alemite system. Chain lubrication is accomplished with an oil bath system located in fully enclosed chain guards. All components are independently assembled using only parts that have passed quality control and inspection departments.

General Specifications
Model: K600
Max. Horse Power Rating: 600
Wire Line Size: 1-1/8”
Main Drum Size (Bare): 18” x 36-3/4”

Dimensions
Overall Length: 11’ – 11-3/16” (3,637 mm)
Overall Width: 8’ – 0-9/16” (2,453 mm)
Overall Height: 4’ – 9-5/8” (1,464 mm)

1.2. HYDRAULIC BRAKE SYSTEM, McKinney Machine 22 CCW

Quantity - 1.
It is composed mainly of:
- hydraulic brake McKinney Machine 22 CCW
- air clutch “Eaton”

Hydraulic brake drive is performed from the draw works, thru a chain transmission on three places and thru an idle running clutch.

Connection between hydraulic brake, draw works brake drums and their water supply system is performed with some joints and quick joint hoses.
- Rotor working dimension 22 in
- Max. rotation 1000 rpm
- Inlet joint 2 x 2 in
- Outlet joint 2 x 1,5 in

1.3. HYDRAULIC BRAKE AND DRAWWORKS DRUM BRAKE DRUMS WATER SUPPLY SYSTEM

Quantity - 1
Circulation water through the brake rim cooling system at all times during a round trip or when the rate of line feed off is very high. When drawworks in operation, cooling water is supplied to the hydromatic brake and to the drum’s brake rim.
The system is composed from a tank, pipe system and other parts.
- Water tank volume: -max. 300 gal
- Working fluid: softened water (for negative temperature it shall be mixed with antifreeze)

1.4. MAIN BEVEL GEAR

Quantity - 1
KREMCO RAGB-HD bevel gear is a tooth wheel transmission with bevel-gear wheels with curved teeth, that takeover the driving movement from the rig summation box thru a cardan axle and sends it to the rig drawworks thru a triple chain with rollers and short links.

In composed from two housings where are mounted on bearings the two shafts the entry shaft and the outlet one. On the shaft are mounted the bevel-gear wheels.
The two housings communicate between them at their downside section thru a connecting pipe so there is only one oil bath. The main housing is provided with a level indicator and an oil drainage plug.
1.5. REVERSE BEVEL GEAR (for rotary table drive)

Quantity - 1

Reverse bevel gear RD-1.0 is a tooth wheel transmission with bevel-gear wheels with curved teeth, that takes over the driving movement from the rig drawworks thru a double chain with rollers and short links, and sends it to the rotary table, thru table transmission I, a cardan shaft and table transmission II that is directly flanged on the rotary table ZP-175 entry shaft.

Reverse bevel gear can transmit the movement towards the table in both ways. The reverse movement is performed thru entry shaft tooth wheel gear decoupling located between the two bevel-gear wheels with curved teeth and coupled (driven) to the crown that assures the rotation towards left or right. It can be performed by driving the lever located on the reverse bevel gear housing.

Reverse bevel gear driving can be made with an air below clutch PQ214 type, controlled from the drillers console.

Reverse bevel gear greasing shall be made thru barbotage, performed in its interior with an oil spray that assures gear and bearings proper greasing.

Unit case is provided with an oil level indicator and an oil drainage plug.

1.6. CHAIN TRANSMISSION to rotary table

Quantity - 1

The Kremco heavy duty torque tube rotary drive is equipped with a reversing gear box, twin disc clutch, drive line to the rear of the rig, and a control valve in the operator’s panel. The control valve in the operator’s panel controls the rotary drive clutch and the rotary inertia brake. The two dual shaft rotary drive chain cases incorporates sprockets, chains, input flanges, output flanges, and a pressure lube system. The lower chain case is mounted on the back of the carrier. The upper chain case is mounted to the rotary table in the substructure. There is a drive line between the two chain cases.

Lower Rotary Chaincase Assembly
It receives the movement from the reverse bevel gear thru a cardan shaft
Make: National Oilwell Varco
Model: 65RSA409
Length: 6’ – 11-1/4” (2,114 mm)
Width: 3’ – 1-11/16” (957 mm)
Height: 2’ – 8-15/16” (837 mm)

Upper Rotary Chaincase Assembly
Upper Rotary Chaincase Assembly is a chain transmission, flanged on the ZP-175, that receives the movement from table transmission I, thru a cardan shaft and send it directly to the rotary table ZP-175.
Make: National Oilwell Varco
Model: 75RSA410
Length: 11’-2-5/16” (3,411 mm)
Width: 3’-0-1/16” (916 mm)
Height: 2’-8-13/16” (833 mm)

1.7. TELESCOPIC MAST

Quantity - 1 (Kremco 118 ft – 250,000 lb)

Workover mast incorporates two single acting, telescoping cylinders, hydraulic ram and an automatically erecting and folding racking board. Raising rams are equipped with safety chokes that will prevent the rams from losing pressure in the event of an abrupt loss of hydraulic pressure. The racking board is an end racking type with folding centre walkway. The racking board has multiple mounting positions and is equipped with adjustable fingers. The mast comes complete with a ladder from the drill floor to the crown frame assembly. The crown frame assembly includes a safety platform and handrails. The mast also includes a block cradle, tong counterweights and one lot of guylines, thimbles, clips, turnbuckles, tail chains and cable for the monkey boards, crown and escape line.

General Specifications

Model: 118’ – 250,000
No. of Lines to Block: 8
Drilling Size: Ø 1-1/8”
Fleetline Sheaves: 30” (762 mm)
Deadline Sheave: 30” (762 mm)
Fastline Sheave: 36” (914 mm)

Racking Board Capacities

2-7/8” Drill Pipe 9,840 ft (3,000 m)

Maximum Rated Static Hook Load

8 Lines: 250,000 lbs. (110 tonnes)

Dimensions

Clear Height: 118’ (36 m)
Total Weight: 43,803 lbs. (19,869)

1.8. ANCHORING

Quantity - 1 set

The rig is equipped with two chassis anchors and four safety anchors to ground, with anchors to ground stretcher devices.

- 2 chassis anchors guyline (crown block -truck) – 7/8” – 120’
- 4 guyline (crown block–ground) – 5/8” – 220’
- 2 guyline from monkey board to ground anchors – 5/8” – 160’

Chassis anchors to ground anchors are provided with stretchers with left-right bolt, and the other anchors with stretcher devices with chain.

1.9. MAST LOCKING EMERGENCY SIGNALING

Quantity - 1

The system exists and is put into service by the two bolts between the downside and the topside sections, when they are operating. Mast two sections unlocking to descend the topside section is acoustically signaled.

1.10. TUBULAR MAKE UP & BREAK OUT AND SPINNER DEVICE

Quantity - 1

The device is composed from two mechanisms for tubular make up & break out and spinner.

1. Make up & break out mechanism, used mainly for tubular make up at a controlled torque and break out of gaskets during hoisting operations.

2. Tubular spinner mechanism used to spin the joints after using the make up & break out device.

The two cylinders of the mechanisms and of the sheaves system are mounted on the mast downside section. Mechanism driving shall be performed from the driller’s console.

- Make up & break out mechanism, 1 pc.
  - hydraulic cylinder 5”x 60”
  - hydraulic working pressure 2000 PSI
  - wire line pull power 31000 Lb

- Tubular spinner mechanism, 1 pc.
  - hydraulic cylinder stroke 5”x 60”
  - hydraulic working pressure 2000 PSI
  - wire line pull power 5166 Lb
  - hydraulic cylinder stroke multiplying rate, performed thru a sheaves system 1 : 6

1.11. CROW BLOCK PROTECTOR

Quantity - 1

Stroke limiter is designed for shutting down the main drum and limiting traveler block strokes. It is mounted on the drawworks for enabling main drum brakes, if required.
1.12. DEADLINE ANCHOR

**Quantity - 1**

The LRH045CHS floor mounted deadline anchor is designed to provide a practical method for securing the deadline and for slipping the line at regular intervals. The reaction to the wireline tension is transferred to a hydraulic load cell (not included) mounted between the base frame and the wireline drum frame. The pressure in the load cell can then be measured and transmitted to a weight indicator (not included) located on the driller’s control console. The anchor is made of fabricated steel plate and uses tapered roller bearings on an alloy shaft to ensure positive, reliable transmission of the deadline load signal to the sensor. The anchor comes complete with one set of brass wireline clamping inserts made for the appropriate wireline diameter.

**General Specifications**

<table>
<thead>
<tr>
<th>Model:</th>
<th>LRH045CHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireline Size:</td>
<td>1-1/8”</td>
</tr>
</tbody>
</table>

1.13. DIESEL ENGINE

**Quantity - 1**

CATERPILLAR Diesel engine C-15- DIT-ATAAC.

- Power/rotation: 525 HP / 2100 rpm.
- With electric start.

Diesel engine with four strokes with 6 in-line cylinders with turbocharger and air cooling system. The engine includes the following auxiliary equipment: rotation regulator, fuel-air mix electronic adjustment, engine electronic control system (ECM) engine monitoring system, high resistant heater, fan for hard working conditions, flexible fuel joints, engine standard control meters, engine safety protection at oil low pressure and cooling liquid high temperature, oil cooler, starter 24 VDC, ampere meter, active current generator, two batteries of 12 V, air inlet lever for emergency engine stop with electric start.

<table>
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<tr>
<th>Model no.:</th>
<th>C-15- DIT-ATAAC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinders no.:</td>
<td>6</td>
</tr>
<tr>
<td>Engine type:</td>
<td>with four strokes</td>
</tr>
<tr>
<td>Cylinder capacity:</td>
<td>3.857 gal</td>
</tr>
</tbody>
</table>

1.14. ENGINE PROTECTION

**Quantity - 1 set**

Metallic engine hood is mounted on the engine topside, with side protections from tarpaulins.
1.15. HYDROMECHANIC TRANSMISSION

**Quantity - 1**

ALLISON H 5610 A type, with build-in hydraulic converter, with one gear, with electronic control.

ALLISON transmission is provided with a gear box with 5 gears forward and 1 backward. During rig transportation, ALLISON transmission operates automatically, and at the well manually, gear by gear.

1.16. DRIVING

Distribution box - totalizes the power of the Caterpillar engine C-15- DIT-ATAAC and is provided with:
- two for truck front and two truck rear driving axles
- one for rig components driving chassis mounted during drilling or intervention operations.

1.17. HYDRAULIC PUMPS DRIVING PTO

**Quantity - 1.**

PTOs are mounted on the summation box and are used for hydraulic pumps driving.

Model no. 852XB.

1.18. HYDRAULIC SYSTEM

**Quantity - 1 set**

Hydraulic system, equipped according to the drilling rig design.

Max. working pressure
- hydraulic circuit for levelling 2000 PSI
- hydraulic circuit for main parts driving 2000 PSI

The hydraulic pump with axial pistons mounted on the summation box, for rig leveling (horizontalization, mast folding and telescoping) and for rig mechanisms driving (hydraulic winch, tubular make up & break out and spinner device and a tongs supply PTO).

One pump flow is of 50 gal/min at max.

The rig is provided with safety valves, control distributors, oil filters, hydraulic hoses and high pressure pipes, fittings, etc.
1.19. AIR SYSTEM

**Quantity - 1 set**

*Air system*, equipped according to the drilling rig design

- Working pressure 130 ÷ 145 PSI
- Air source - from Quincy 325 compressor

The air system includes the following:
- Air lines from the rig mounted compressors to the consumers
- Air lines, between air preparing unit and the consumers (rig and unitized pumps). At their ends they shall be provided with quick joints;
- Air bringing to entire rig control panels is performed thru rubber hoses and metallic tubes.
- Air system is provided with an air dryer, CRD62 type and an air device, “Antifreeze with alcohol” type for alcohol introduction (at rig low temperature operation) and includes high performance air devices (safety valves, valves, distributors, air filters, gauges, distribution valves, etc).
- The air system is provided with air tanks for the truck and the drilling rig. Air tank for the rig is mounted on the truck frame. 60 gal.

1.20. AIR DRYER

**Quantity - 1 (CRD62 type)**

Eliminates the air system moisture operating like a filter, the air dryer has the purpose to retain wet particles from the air to prevent air system condensation phenomenon. It is connected to the wire system of 12 V.

The dryer is mounted with all necessary connections at main air tank.

A dryer is mounted in the air network of the truck air brake system and one in the proper rig air system.

1.21. DRILLER CONSOLE

**Quantity - 1**

The following control devices and control meters are located in the driller’s console.

**Control devices:**
- Drawworks brake lever, located near console;
- Drawworks drum control distributor lever;
- Engine acceleration adjusting valve;
- ALLISON transmissions gear switch;
- CATERPILLAR engines emergency disengaging lever;
- Auxiliary winch control device;
- Hydraulic breaker control device.
Control meters:
- Rig system air pressure gauge;
- Hydromechanic transmission temperature and oil pressure indicators;
- Emergency and warning lamps for engine running;
- Indicators of engine cooling liquid temperature and oil pressure;

All air control devices are located in the drillers console, with easy access. All control devices have identification plates. Drillers console is located in a manner to assure a view to the traveler block, the derrick floor and the monkey board.

1.22. ENGINE SAFETY STOP VALVE

**Quantity - 1 (EKV type)**
Engine safety stop valve is placed at operator’s working place. It is designed for engine stop only in emergency situations.

1.23. HOOK LOAD LIMITING DEVICE

**Quantity - 1 (HLD type)**
Hook load limiting device is mounted for mast overload prevention. It is connected with the weight indicator. Load limiter receives signal from the indicator and then disengaged the drawworks clutch, reduces engine idle running rotation and brakes automatically the drawworks main drum.

1.24. CHASSIS FRAME

**Quantity - 1**
The high resistance frame is made from steel beams. Front and rear protection bars are extremely resistant with extremely resistant front and rear draw hook fastened thru welding on the truck frame. Mud flaps are located on the front and rear sections behind the wheels.

On the frame are mounted on the front section a support for mast transportation extremely resistant as well as an extremely resistant beam for mast raising cylinder fastening.

1.25. TRUCK, wheel formula 10 x 8

**Quantity - 1**
- Type: MR-10X8-CA
- Wheel formula: 10 x 8
1.26. TRUCK CABIN

Quantity - 1
In truck included.
Cabin with one place, with windshield, with exterior double rear mirrors, with fan to prevent cabin windows steaming, with glasses at every window, with steering devices, with Allison transmission gear switch devices, engine control devices, turn-key, engine stop mechanism, engine water temperature gauge and engine oil gauge. In the cabin are mounted other CATERPILLAR engine and ALLISON transmission proper operation control devices, as well as for truck-rig assembly, during transportation.

1.27. FUEL TANK

Quantity - 2 (FT- 500L)
Two fuel tanks of 132 gal with drainage point, truck mounted.

1.28. HYDRAULIC WINCH

Quantity - 2 (“BRADEN” BG8A-59020-10)
Auxiliary winch, with a capacity of 8000 Lb, with drawworks on mast provision, with wire line sheave crown block frame mounted.
- max. working pressure 2000 PSI
- used wire line 9/16”

1.29. TOOLS BOX

Quantity - 1
Tool box, with two compartments, is mounted under the truck platform.

1.30. TIRES TOOLS SET

Quantity - 1
Tires tools set includes keys for nuts for tire dismounting and its replacement with the one from the spare wheels/tires assembly.

1.31. MAIN WIRE LINE

Main wire line 1-1/8”; 6x19 -1960 N/mm².
1.32. ESCAPE DEVICE

Quantity - 1
Mast emergency descent with anchor and wire line. It shall be mounted at monkey board exit.

1.33. MAST CLIMBING FALL PROTECTION DEVICE

Quantity - 1 (MED-EL)
Mast climbing fall protection device, including:
- hanging device;
- safety belt harness type;
- retractable fall stopper.

1.34. FALL PROTECTION SYSTEM

Quantity - 1 (8301007)
The system does not permit derrick pipe fall, in incorrect handlings. It shall be mounted under the monkey board.

1.35. STANDPIPE

Quantity - 1 (SP-4.0 -5000-D1)
Simple standpipe of 4”, mast downside section mounted, with max. working pressure of 5000 PSI (350 bar). Standpipe is provided with standpipe, mast base mounted. Standpipe and manifold include:
- valve 4 x 5000 – 1 pcs.;
- valve 2 x 5000 – 2 pcs.;
- Rotary hose 3 ½ “x 5000 psi x 55’, with quick joints that connects the manifold to the standpipe;
- pipes, tees, elbows, etc;
- skid.
CHAPTER 2. SUBSTRUCTURE AND ADDITIONAL EQUIPMENTS

The K100 workover rig works with a Dreco parallelogram substructure erected with a lifting sling by the travelling block. The substructure is locked into operating position by braces that are pinned into position. The substructure is fabricated from heavy duty structural steel beams and plate in accordance with API specifications.

**General Specifications**

- **Model:** PS-3.05x3.05x6.1
- **Max. Rated Pipe Setback Capacity:** 200,000 lbs. (91 tonnes)
- **Max. Rated Static Rotary Capacity:** 300,000 lbs. (136 tonnes)
- **Max. Combined Rated Static Rotary and Rated Setback Capacity:** 500,000 lbs. (227 tonnes)
- **Total Weight:** 54,065 lbs. (24,523 kg)

**Dimensions**

- **Overall Length (Working):** 32'-5-15/16” (9,904 mm)
- **Overall Length (Transport):** 38'-10-3/16” (11,841 mm)
- **Overall Width (Working):** 16'-4” (4,089 mm)
- **Overall Width (Transport):** 13'-5-13/16” (4,110 mm)
- **Overall Height (Working):** 28'-0-3/4” (8,541 mm)

### 2.1. HOOK BLOCK

**Quantity - 1**

- **Supplier:** National Oilwell Varco
- **Release Date:** February 2008
- **Model:** YG 135
- **Safe Working Load:** 135 Tonne
- **Wire Rope Size:** 1-1/8” (28 mm)
- **Sheaves:** 36” (914 mm)
- **Length with Hook:** 126” (3,200 mm)
- **Width:** 38” (965 mm)
- **Height:** 24” (711 mm)

### 2.2. SWIVEL

**Quantity - 1**

- **Supplier/Manufacturer:** National Oilwell Varco
Model: SL 135-1 Single Purpose
Part Number: 104.17.00
Maximum Static Load: 135 Tonne
Maximum Speed: 300 rpm
Maximum Working Pressure: 35 MPA
Hook Clearance Over Gooseneck: 495 mm
Diameter of Stem: 64 mm
Thread to the Stem (REG): 4-½” Reg LH
Thread to the Kelly (REG): 6-5/8” Reg LH
Gooseneck Thread API: STD 5B 3” – 8 TPI
Dimensions: 2700 mm x 980 mm x 880 mm

2.3. TOP DRIVE TD 150

Quantity - 1
Equipment: Hydraulic Top Drive
Supplier/Manufacturer: National Oilwell Varco
Release Date: February, 2008
Model: TD150
Part Number: M621000054
Maximum Dead Load Capacity: 1,350 kN
Maximum Speed: 300 rpm
Maximum Working Pressure: 35 MPa
Diameter of Stem: 64 dmm
Thread to the Stem (REG): 4-½” (1,232 mm)
Thread to the Kelly (REG): 6-5/8” (1,845 mm)
Gooseneck Thread API: STD 5B 3” – 8 TPI
Overall Length: 99” (2,505 mm)
Overall Width: 33” (840 mm)
Weight: 2,965 lbs. (1,345 kg)

2.4. ROTARY TABLE

Quantity - 1
Rotary table is equipped with a set of detachable kelly bushing, located in the rotary table construction.
Rotary table body is rectangular and has a cover. Rotary table is provided with a bevel gear (pinion and tooth crown) with tooth crown with curve teeth and a lock. Gear greasing is performed with oil.

- type: ZP-175
- opening 17-½”
- max. rotation 300 rpm
- max. static load 298,000 lb
- rotor rotation max. torque: 10320 ft*lb
CHAPTER 3. PUMP

Quantity - 1

Unitized pump skid mounted
- type: D1917
- drive/ pump: 2 x CAT MR-C11-38-CA engines; 385 HP/2100 rpm
- pump type: PZ7

Mud pump is equipped with a centrifugal pump 6x5x14, driven by an electric motor, that has the purpose to overfeed the triplex mud pump PZ7, for its good operation. The electric motor is power-supplied at 380 V, 3 phases, 50 HP.

<table>
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<tr>
<th>Cylinder Diameter</th>
<th>Stroke (Inches)</th>
<th>Displacement</th>
<th>Maximum Pressure (PSI)</th>
<th>Piston Load (Pounds)</th>
<th>Pump RPM</th>
<th>Jackshaft RPM</th>
<th>Input HP</th>
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<tr>
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<td>259</td>
</tr>
<tr>
<td>3</td>
<td>4–1/2</td>
<td>114.3</td>
<td>7</td>
<td>177.8</td>
<td>1.45</td>
<td>5.49</td>
<td>210</td>
</tr>
</tbody>
</table>

For the purposes of drilling it is possible to install an additional 1000 h.p. pump.
CHAPTER 4. MUD SYSTEM

Quantity - 1 set

Total volume 1352 bbl
From which:
- trip tank 31.5 bbl
- shaker pit 94.3 bbl
- desander pit 94.3 bbl
- desilter pit 94.3 bbl
- suction pit 138.4 bbl
- mixing pit 138.4 bbl
- pill pit 37.7 bbl
- shaker pit 94.3 bbl
- water storage tank: 314.5 bbl
- mud storage tank: 314.5 bbl

4.1. SHALE SHAKER DTS-1400-EN DUAL TANDEM

Quantity - 1
- capacity 750 gal/min
- mesh 50-200 mesh
- electric motor for shaker 2 x 1.8 kW/1500 rpm

4.2. VACUUM DEGASSER

Quantity - 1 (each)
Model 500 Burgess Magna-Vac Degasser (Vacuum Type) and Mechanical Oxygen Scavenger Maximum of 500 gpm Rate. Unit to be Complete with:
• One (1) U.L. Listed 20 HP, 230 or 460V, 3 ph, 60 Hz, 55 Degree C Ambient, Explosion Proof Motor.
• One (1) Centrifugal Vacuum Blower (Maximum Rating for vacuum blower 100 cfm and 8" - 10" hg vacuum)
• Non Gas Locking Center-Vented Centrifugal Pump
• Ability to Run Dry Continuously
• Automatic Lubrication System With 1.9 Gal. (7.4 Liter) Reservoir and Oil Level Sight Glass With Switch Kit for Remotely Monitoring Gearbox Oil Level (UL) IEC-CE

4.3. DESANDER
- type Brandt SRS-2
- working pressure 30 ÷ 50 PSI
- flow at working pressure 1000 gal/min
- mud density \( \gamma = 69 \div 94 \text{ lb/ft}^3 \)
4.4. DESILTER
- Cyclone no.: 2
- Type: SE616
- Working pressure: 30 ÷ 50 PSI
- Flow: 1000 gal/min
- Mud density: $\gamma = 6.9 - 94 \text{ lb/ft}^3$
- Grain size: 1/64” ÷ 1/32”
- Cyclone no.: 16 pcs.

4.5. PROPELLER AGITATORS
- Type: Brandt MA610650HZ
- Propeller size: 42”
- Agitators no.: 4 pcs.

4.6. PROPELLER AGITATOR
- Type: Brandt MA65650HZ
- Agitators no.: 1 pcs.

4.7. ELECTRICAL MISSION MAGNUM PUMP (6X5X14)
- Quantity: 2
- Motor power/rotation: 50 HP/1500 rpm
- Pressure: 3.2 bar
- Voltage/frequency: 380 V/50 Hz

4.8. BOTTOM GUN
- Type: rotary
- Gun no.: 6 pcs.

4.9. MUD HOPPER MH, 6, WVT
- Quantity: 1
CHAPTER 5. GENERATORS

5.1. DIESEL GENERATOR CATERPILLAR 3456

Quantity – 2 pcs.
- type
- power 410 kVA
- voltage/frequency 380 V/50 Hz

5.2. DIESEL GENERATOR CATERPILLAR 3406

Quantity – 1
- type CAT 3406
- power 240 KW
- voltage/frequency 380 V/50 Hz

5.3. DIESEL GENERATOR CAT OLYMPYA

Quantity – 1
- type CAT Olympia 200-4
- power 160 KW
- voltage/frequency 380 V / 50 Hz

5.4. DIESEL GENERATOR CAT C15

Quantity - 2 pcs.
- power 400 KW
- voltage/frequency 380 V/50 Hz
CHAPTER 6. ELECTRIC EQUIPMENT

6.1. ELECTRIC AND ILLUMINATION SYSTEMS

Quantity - 1 (120262)

6.1.1. MAIN SWITCHBOARD
One main switchboard, powered for 400V, 3 phased, 4 strands, 50 Hz from two CATERPILLAR 3456 Generators, 410 kW each. Simple and easy-to-use split wire system allows to supply power to the rig site from any generator or to distribute the load between two generators.

Generator panel includes:

- Main automatic circuit breaker of generator (800AF) 2 pcs.
- Disconnector 1 pcs.
- Mechanical sliding interlocking device 1 pcs.
- Indicator lamp "Power on" 2 pcs.
- Voltmeters 2 pcs.
- Voltmeters switchers 2 pcs.
- Amperemeters 2 pcs.
- Amperemeters switchers 2 pcs.
- Ondometer 2 pcs.
- Transformers, preventers and internal wiring 1 pcs.

6.1.2. MOTORS CONTROL DEVICE
One AC motors control unit for 380V, 3 phases, 4 cores, 50 Hz, is situated near main switchboard. Combined irreversible full-voltage actuators with overloading protection, start/stop control and red “On” indicator lamp.

It comprises the following:
1. Actuators.
2. Automatic circuit breaker for 220/380V.

6.1.3. CABLE CHANNELS
Two sets of brackets along the mud tanks for fixing and protection of cables allows to add or to remove cables quickly without even using tools.
6.2. MAIN ILLUMINATION SYSTEM

Precipitation-proof main illumination system consists of filament lamps and high pressure sodium lamps designed for hard working conditions at the land Drilling Rig.

220 V, 1 phase, 50 Hz

6.2.1. ILLUMINATING EQUIPMENT

S400HPS-1 high pressure explosion-proof sodium searchlights for danger areas of class 1, part 1, group C&D and for outdoors rig up in humid environment, completed with inner connected adjustable ballast, 400W lamps and fastener.

S400HPS-2 high pressure explosion-proof sodium searchlights for danger areas of class 1, part 2, and for outdoors rig up in humid environment. Heat-resistant rough-service lens, completed with inner connected adjustable ballast, 400W lamp and fastener.

Crown block beacon light AOL-150, completed with red lens, 150W filament lamp, dampproof frame and fixing bracket.

SI-150XP explosion-proof lighting fitting of 150W for outer danger areas of class 1, part, completed with transparent bell glass and protective shroud.

SI-150 weather-proof lighting fitting with 150W filament lamp, completed with transparent bell glass and protective shroud.

Main illumination system consists of:

- S400HPS-2 high pressure explosion-proof sodium searchlights 9 pcs.
- S400HPS-1 high pressure explosion-proof sodium searchlights 17 pcs.
- Crown block beacon light AOL-150 1 pcs.
- SI-150 weather-proof lighting fitting 10 pcs.
- SI-150XP explosion-proof lighting fitting 4 pcs.

6.2.2. EMERGENCY LIGHTING SYSTEM

Sockets circuit for 24V DC lamps completed with plugs, cable and fittings for connection of the following 24V, 60W lighting fittings:

- SI-60 weather-proof lighting fitting 4 pcs.
- SI-60XP explosion-proof lighting fitting 9 pcs.
CHAPTER 7. CONTROL DEVICES

Drill data recorder, M/D Totko, with indication for:

- hook load;
- manifold pressure;
- mud pump stroke;
- rotary table torque;
- rotary table rotation;
- tongs torque.
CHAPTER 8. BOP AND HIGH PRESSURE EQUIPMENT

- Double Rams BOP x 13-3/8” x 5000 PSI, UPET ROM 1 set
- Annular Ram BOP x 13-3/8” x 5000 PSI, UPET ROM 1 set
  - 9-5/8” rams 1 set
  - 7” rams 1 set w/ spare parts;
  - 5” rams 1 set w/ spare parts;
  - 4-1/2” rams 1 set w/ spare parts;
  - 3-1/2” rams 1 set w/ spare parts;
  - 2-7/8” rams 1 set w/ spare parts

- BOP control system FKQ-480 – 1 set. The product comply has been fabricated and inspected as per standard of SY/T5053.2-2001 «The control system for surface mounted BOP stacks» and API 16D, so the product is rewarded by inspection certificate and permitted to leave the factory. MSP DRILLEX, China

- Mud/Gas Separator M05.02.06.000 PS, OOO «Zavod Spetcburtehnika» - 1 set;
  - Flow rate, fluids 40 m³/h
  - Flow rate, gas 4000 m³/h
  - Working pressure 0,05 MPa

- Choke Manifold – 1 set;
  - Adaptor Flange 13-5/8” x 3000 PSI x13-5/8” x 5000 PSI 1 pcs;
  - Adaptor Flange 13-5/8” x 5000 PSI – 7-1/16” x 5000 PSI 1 pcs;
  - Adaptor Flange 13-5/8” x 5000 PSI – 11” x 5000 PSI 1 pcs;
  - Line Manifold 2,5” with flange connection 100 m;
  - Kill line 2,5” x 5000 PSI x 12 m;
  - Hydraulic and Manual Valves 5000 PSI x 1 sets;
CHAPTER 9. ADDITIONAL EQUIPMENT

Additional equipments are as follows:
- Fuel storage tank
  40 m³
- Lathe machine
  1 pcs.
- Hoist for ESP cable:
  main shaft max. torque: 2000 n/m;
  cable reel max. diameter: 2000 mm;
  1 pcs.
- Welding unit
  1 pcs.
- Gas-cutting equipment
  1 set
- Nitric bottles for BOPs control panel batteries
  And pump compensator
  as required
- Workshop with a complete set of tools
  1
- Forklift
  1
- Dozer
  1
- Truck crane
  1
- Crew bus
  2 pcs.
- Crew bus 6*6 for field crews change
  1 pcs.
- Cars
  2 pcs.
- high-sided truck mounted crane-manipulator
  1 pcs.
- high-sided truck 6*6
  1 pcs.
CHAPTER 10. SAFETY EQUIPMENT FOR RIG AND CAMP

Safety equipment includes the following items:

- 150 lb purple K or equivalent extinguishers  2 ea
- 20 lb CO2 extinguishers  10 ea
- MSA Scott air packs or equivalent with spare bottles and facilities for refills  6 pcs.
- Gas detectors  2 pcs.
- "Draeger" or equivalent H2S detectors  2 pcs.
- Safety shoes, gloves and hats for contractor's employees  as required
- First-aid kits for rig and camp  as required
- Eye protection for contractor's employees.  as required
- Scott air packs or equivalent for rig crew  5 sets (minimum)
## CHAPTER 11. LIFTING EQUIPMENT, DRILLING INSTRUMENT

<table>
<thead>
<tr>
<th>Item</th>
<th>Name</th>
<th>Model</th>
<th>Description</th>
<th>Unit</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4 3/4&quot; Drill Collar Spiral type (10 pcs) ,IF</td>
<td></td>
<td>OD4 3/4&quot;, 9.15m, 3-1/2&quot; IF it includes the elevator groove and slip groove</td>
<td>pcs</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Bit breaker 8-1/2&quot;</td>
<td></td>
<td>8-1/2&quot;</td>
<td>pcs</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Bit breaker 6-1/8&quot;</td>
<td></td>
<td>6 1/8&quot;</td>
<td>pcs</td>
<td>1</td>
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<td>4</td>
<td>Bit breaker 12-1/4&quot;</td>
<td></td>
<td>12 1/4&quot;</td>
<td>pcs</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Drill Collar Elevator 4-3/4&quot;</td>
<td>TA 4 3/4/150</td>
<td>For 4-3/4&quot; DC</td>
<td>pcs</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Drill Pipe Elevator</td>
<td>DDZ3.1/2&quot;/100T</td>
<td>3-1/2&quot;, 100 ton, Center latch, 18 deg</td>
<td>pcs</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Drill Pipe Elevator</td>
<td>DDZ2.7/8&quot;/100T</td>
<td>2-7/8&quot;, 100 ton, Center latch, 18 deg</td>
<td>pcs</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Tubing Elevator</td>
<td>TA 3.1/2&quot;/125T</td>
<td>3-1/2&quot;, Center latch, 90 deg, 125 t</td>
<td>pcs</td>
<td>2</td>
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<tr>
<td>9</td>
<td>Bit sub</td>
<td></td>
<td>4-1/2&quot; REG BOX x 4-1/2&quot; XH BOX. Length:914mm</td>
<td>pcs</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>Bit sub</td>
<td></td>
<td>6-5/8&quot; REG BOX x 6-5/8&quot; REG BOX. Length:914mm</td>
<td>pcs</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>Bit sub</td>
<td></td>
<td>7-5/8&quot; REG BOX x 7-5/8&quot; REG BOX. Length:914mm</td>
<td>pcs</td>
<td>2</td>
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<tr>
<td>12</td>
<td>Subs</td>
<td></td>
<td>2-7/8&quot; EUE PIN x 3-1/2&quot; IF BOX. Length:914mm</td>
<td>pcs</td>
<td>2</td>
</tr>
<tr>
<td>13</td>
<td>Subs</td>
<td></td>
<td>4-1/2&quot; XH BOX x 2-7/8&quot; IF PIN. Length:914mm</td>
<td>pcs</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
<td>Subs</td>
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<td>Subs</td>
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<tr>
<td>16</td>
<td>Subs</td>
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<td>5-1/2&quot; FH PIN x 4-1/2&quot; XH BOX. Length:914mm</td>
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<tr>
<td>17</td>
<td>Subs</td>
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<td>4-1/2 &quot;XH BOX x 2-7/8&quot;EUE PIN Length:914mm</td>
<td>pcs</td>
<td>2</td>
</tr>
<tr>
<td>18</td>
<td>Subs</td>
<td></td>
<td>3-1/2&quot; IF PIN x 4-1/2&quot; XH BOX. Length:914mm</td>
<td>pcs</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Specification</td>
<td>Quantity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Subs</td>
<td>2-7/8&quot; IF PIN x 4-1/2&quot; XH BOX</td>
<td>2</td>
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<td></td>
</tr>
<tr>
<td>20</td>
<td>Subs</td>
<td>4-1/2&quot; XH PIN x 3-1/2&quot; IF BOX Length:914mm</td>
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<td></td>
<td></td>
</tr>
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<td>21</td>
<td>Subs</td>
<td>4-1/2&quot; XH PIN x 2-7/8&quot; IF BOX</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>2-7/8&quot; Drill pipe sub to 2&quot; hammer union</td>
<td>Length 400 mm, hammer union connection: 2-7/8&quot; IF PIN x 2&quot; Figure 1502</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>3-1/2&quot; Drill pipe sub to 2&quot; hammer union</td>
<td>Length 400 mm, hammer union connection: 3-1/2&quot; IF PIN x 2&quot; Figure 1502</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Subs to Plugging-back pressure hose</td>
<td>3-1/2&quot; IF PIN x 2&quot; Figure 1502</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Subs to Plugging-back pressure hose</td>
<td>2-7/8&quot; IF x 2&quot; Figure 1502</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Subs to Plugging-back pressure hose</td>
<td>2-7/8&quot; EUE PIN x 2&quot; Figure 1502</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Square Kelly with Kelly pusher</td>
<td>Square Kelly 5-1/4&quot;, thread 4-1/2 XH, 12mX5000psi Q3 Kelly Spinner</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Crossover from swivel to Kelly</td>
<td>6-5/8&quot; REG LH Box x 6-5/8&quot; REG LH Pin</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Subs from top drive to all size of pipe</td>
<td>4-1/2&quot; XH PIN x 2-7/8&quot; IF BOX Length:610mm</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Subs from top drive to all size of pipe</td>
<td>6-5/8&quot; REG PIN x 2-7/8&quot; IF BOX Length:610mm</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Subs from top drive to all size of pipe</td>
<td>7-5/8&quot; REG PIN x 2-7/8&quot; IF BOX Length:610mm</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Subs from top drive to all size of pipe</td>
<td>3-1/2&quot; EUE PIN x 2-7/8&quot; IF BOX Length:610mm</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Safety valve 2-7/8&quot; DP</td>
<td>Drop check valve, NC31 B×P&quot;, 2-7/8&quot; 10000 psi</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Safety valve 3-1/2&quot; DP</td>
<td>Drop check valve, NC38B×P ,3-1/2&quot; 10000 psi</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Ball valve for 2-7/8 DP</td>
<td>Full open safety valve, NC31B×P, 10000 psi</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Ball valve for 3-1/2 DP</td>
<td>Full open safety valve, NC38B×P, 10000 psi</td>
<td>4</td>
<td></td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Manual Tong Model “C”</td>
<td>35K max torque, sizes 2-3/8” to 10-3/4”, full set</td>
<td>pcs</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Work Over Links 150 Ton</td>
<td>1-3/4” x 108” (1 set = 2 links) matched set</td>
<td>pcs</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Pup joint</td>
<td>5 ft 10 ft 15 ft</td>
<td>pcs</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Casing 7” scraper</td>
<td>7” Casing scraper, 3-1/2”IF, Spare parts including 6 blades, 30 springs, For 7” Casing, 26PPF, N80, BTC</td>
<td>pcs</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Side door Elevator Model: SLX100</td>
<td>For 2-3/8” tubing Max. Load: 100T</td>
<td>pcs</td>
<td>2</td>
<td></td>
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<tr>
<td>42</td>
<td>Side door elevator Model: SLX100</td>
<td>For 2-7/8” tubing Max. load: 100T</td>
<td>pcs</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Tubing Slip with spare parts Model: SDS2-3/8”</td>
<td>For 2-3/8” EUE tubing, including slip dies 48 pcs</td>
<td>pair</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Tubing Slip with spare parts Model: SDS2-7/8”</td>
<td>For 2-7/8” EUE tubing, including slip dies 48 pcs</td>
<td>pair</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Ring gasket</td>
<td>R35, R55, R57 multiuse able</td>
<td>set</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Casing scraper with spare parts Model: GGQ245</td>
<td>For 9-5/8” Casing, 40PPF, N80, BTC Spare parts include 6 blades, 30 springs</td>
<td>set</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>Mechanical packer to make pressure test 7” casing with spare parts</td>
<td>MR-3D 7”</td>
<td>set</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>Mechanical packer to make pressure test 9 5/8” casing with spare parts</td>
<td>MR-3D 9-5/8”</td>
<td>set</td>
<td>1</td>
<td></td>
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<tr>
<td>49</td>
<td>Manual Tong Model “SDD”</td>
<td>sizes 4” to 17”, full set 100,000/ft/lbs torque</td>
<td>set</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>-----------------</td>
<td>-----------------------------------------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>Down Hole Motor</td>
<td>Down hole motor C9LZ172×7.0L-3.5 and one year spare parts Angle: 0-3deg, with 2 stabilizer, the type of stabilizer suitable for 8 1/2” drill bit, and stabilizer is replaceable sleeve stabilizer.</td>
<td>pcs</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>2 7/8”DP</td>
<td>OD: 2 7/8”, Length: 9.2m-9.5m G-105, NC31, Wall thickness: 9.19mm, OD of Box and PIN: 4-1/8”, ID of Box and PIN: 2”, 10.4ppf, 18° Beveled shoulder, Length range: R2, Tong space: pin:7” box:9”, Internal coating: TC2000, Wear resistance belt: Arnco-100, Steel thread protector</td>
<td>m</td>
<td>3500</td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>Slip for 4-3/4”DC manual</td>
<td>for 4-3/4”DC, with 3 sets of spare dies</td>
<td>pcs</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>Slip for 4DC manual</td>
<td>for 4”DC, with 3 sets of spare dies</td>
<td>pcs</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>Slip for 4-1/2”DP manual</td>
<td>for 4-1/2”DP, with 3 sets of spare dies</td>
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<tr>
<td>55</td>
<td>Slip for 3-1/2”DP manual</td>
<td>for 3-1/2”DP, with 3 sets of spare dies</td>
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<td>56</td>
<td>Slip for 2-7/8”DP manual</td>
<td>for 2-7/8”DP, with 3 sets of spare dies</td>
<td>pcs</td>
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</tbody>
</table>

Гидравлический ключ CLINCHER модель CLE5500-15G для труб диаметром от 2-1/16” до 5-1/2” / 52,3 мм – 139,7 мм, крутящий момент до 25000 фунтов.фут

- Spare parts available for all the above mentioned equipment for 1 year working.