

3616 Engine Specifications**3 Nos**

| | |
|--------------------------------------|--|
| Make | Caterpillar |
| Model | 3616 |
| Year of Manufacturing | 1994 |
| Year of Installation | 1995 |
| Power | 4828 Hp,3600 KW |
| Fuel timing | 119.08mm |
| Operating Speed (rpm) | 750 |
| Idle Speed (rpm) | 350 |
| Number of Cylinders | 50 degree Vee-16 |
| Bore | 280 mm (11.0 in.) |
| Stroke | 300 mm (11.8 in.) |
| Type | 4-stroke cycle Turbocharged-Aftercooled |
| Compression Ratio | 13:01 |
| Displacement | 296 L (18,036 cu in.) |
| Rotation (Viewed from flywheel) | CW Optional |
| Injection Method | Unit Injectors |
| Fuel | Diesel/ Bancker C |
| Cooling System | Two Gear Driven Pumps separate circuit |
| Coolant Static Head | 7 m (24 ft.) H ₂ O ext. restriction @ 900 rpm |
| Allowable Exhaust | 250 mm (10 in.) H ₂ O |
| System Back Pressure | |
| Maximum Inlet System Restriction | 380 mm (15 in.) H ₂ O |
| Air Cleaners | Remote Unit |
| Engine Weight | 29 982 kg. |
| (Dry with Attachments) | (65,900 ibs) |
| Engine Weight | 31 615 kg |
| (With fluid and attachments) | (69,700 ibs) |
| Displacement / | 18.47 L |
| Cylinder | (1,127.3 cu in.) |
| Mean Piston Velocity | 9 m/s (1,772 fpm) |
| Total Hrs logged till date | 11870 Hrs,18687Hrs, 24876Hrs.(D.G.no No 1,2 |
| Last Major Maintenance(4000Hrs) done | 6196Hrs,15865Hrs,21465Hrs(D.G No 1,2,3 resp |

Alternator

Technical data and performance

3 Nos

| | |
|-------------------------|-----------------------------------|
| Make | Ls.Leroy Somer |
| Type | LSA 56 , VL 10/8P |
| Year of Manufacturing | 1996,1994,1994(Set no 1,2,3 resp) |
| Synchronous | 3 Phases |
| No of pole | 8 |
| Connections | Star |
| Rated output | 4375 kVA |
| Voltage | 6600 V |
| Frequency | 50 Hz |
| Power Factor | 0.8 |
| Speed | 750 Tr / min |
| Protection | IP 23 |
| Inlet filters | Yers |
| Insulation | cl : F |
| Temperatue rise | cl : F |
| Ambient temperature | 40 °C |
| Cooling | IC 01 |
| Excitation | Brushless |
| Voltage regulation | R.B.S. |
| Equipment plate | Short circuit comp. |
| Construction type | Double bearing |
| Bearing type | Sleeve bearing |
| Weight of rotor | 6275 kg. |
| Total weight | 15300 kg |
| Stator heat protection | SME 202 |
| Quantity | 6 |
| Bearing heat protection | SME 202 |
| Quantity | 1 |

Purfier Lub Oil

Technical data MMPX 304

3 Nos

| | | |
|---------------------------------|---|-------------------------------|
| Make | : | Alfa laval |
| Rated capacity throughput | : | 2900 l/hr |
| Lub oil throughput R&O type | : | 1000 l/hr |
| Running up time | : | Approx. 2 min |
| Stopping time | : | Approx. 15-20 min |
| Electric motor | : | 3 Kw |
| Speed | | |
| - Drive motor | : | 3000 rpm |
| - Bowl spindle | : | 9510 rpm |
| Sludge and water space | : | 1.05 litres |
| Power consumption | | |
| - idling | : | 0.9 kW |
| - running (HFO) | : | 1.8 kW |
| - running (MDO) | : | 2.0 kW |
| Operating water | | |
| Pressure : | : | 150 - 600 kPa (1.5 - 6 bar) |
| Total consumption per discharge | : | 3 l |

INJECTOR TIP MODULE

Technical data M6-MFM

| | | |
|-------------------|---|------------|
| Make | : | Alfa laval |
| Motor | : | 2.2 KW |
| Max work pressure | : | 10 Bar |

Purifier Bunker C
Technical data MOPX 205

2 Nos

| | |
|--|------------------|
| Make | Alfa laval |
| Throughput rated capacity | 5600 l/h |
| Heavy fuel oil ² throughput capacity at viscosity cSt/30'C | 3500 l/h |
| Speed | 50 Hz |
| - Drive motor | 1420-1500 rpm |
| - Bowl spindle | max.7605 rpm |
| Starting-up/Stopping time | |
| Starting time | approx 2 minutes |
| Stopping time | > 4 minutes |
| Sludge and water space | 1.3 litres |
| Built-on feed pump capacity | 2420 l/h |
| Suction lift | Max. 40 kPa |
| Delivery head | Max. 150 kPa |
| Built in oil outlet disc pump | |
| Electric motor (at 50 Hz) | Min. Size 4 Kw |
| Power consumption | |
| - running (Heavy Fuel Oil) | 2.4 kW |
| Operating water | |
| Total water consumption per discharge | 6 litres |
| Shipping data | |
| Weights : net 400 kg, gross 530 kg | |
| Volume : 1.55 m ³ | |
| Fuel transfer pump | |

Booster Modle
(Viscochief)

1 Nos

| | |
|--|---|
| Make | Alfa-Laval |
| Module type | SBM 45N-25N EE |
| Alfa Laval Oy module No. | 280860-65 |
| Total power | 7400 Kw |
| Max fuel consumption | 1600 l/h |
| Heavy fuel viscosity | 280 cSt/50°C |
| Heavy fuel day tank temp | 60 °C |
| Heavy fuel flow to engines | 8260 l/h |
| Electric power supply | 380/50 V/Hz |
| Heating medium | Electrical |
| EL. Consumption | 72 Kw |
| Viscochief | |
| Make | Alfa-Laval |
| Model | EVT-10C |
| Power supply | 24/48VAC |
| Power consumption | Maximum 8VA |
| Ambient temperature | Maximum 70°C |
| Working pressure | Maximum 4MPa(40Bar) |
| Testing pressure | Maximum 6MPa(60Bar) |
| Enclosure | IP55 |
| Output | 4-20mA |
| Measuring rang | 0-50cSt |
| Material | Housing-Nodular cast iron |
| Mounting style | Avoid air pocket |
| Flang connections | according to DIN2633orJIS B2210(20K) |
| Viscosity control unit (Remote/Local) | |
| Make | Alfa-Laval |
| Model | VCU-160 R/L |
| Power supply | 110,127,220 VAC;50/60Hz |
| Power consumption | Maximum75VA |
| Ambient temperature | 55°C |
| Enclosure | VCU-160 R:IP20 VCU-160 I:IP54 |
| Electric preheater | |
| Make | A/S Vesta |
| Model | EO 72 |
| Serial No | 301624/1-2 |
| Working pressure shell | 10Bar |
| Working temperature shell | 150°C |
| Power rate | 72Kw |
| Power supply | 3x380V, 50Hz |
| Intended for | Alfa-Laval ind.PL-51 SF-02271-Espoo Phu |

COOLING SYSTEM

3 Nos

| | |
|----------------------|----------------------------|
| Cooling tower | CMB-W-300 Cooling man make |
| Motor | 10 HPX4 Pole |
| Fan Ass'y | 2400MM DIA.X4 BLADES |
| Sprinkler head | CSH-200 |
| Air volume | 2200 mm /min(CFM) |
| Nominal water flow | 3900 l/min |
| Raw water pump | |

AIR COMPRESSORS

| | |
|---------------------|---|
| Electric Compressor | Atlas copco Type.LT55 30U S/N.AIW046442 1500 rpm 5.5 Kw.30 bar. |
| Electric driven | Leroy somer motor S/N.756501JA014 5.5 Kw, 380V,50 Hz,1420rpm, |
| Engine Compressor | Atlas copco Type.LT730 S/N.AM295298 1800 rpm 30 bar |
| Engine driven | Yanmar engine Model.TF110 S/N.014188 7.5Kw,2400 rpm |

AUXILIARY TANK CAPACITY

| | |
|-----------------------------|-----------|
| Daily tank | 20000 Ltr |
| Setting tank No.1 | 20000 Ltr |
| Setting tank No.2 | 20000 Ltr |
| Setting tank No3 | 20000 Ltr |
| Diesel tank | 5000 Ltr |
| Lube oil tank | 5000 Ltr |
| Aircompressor tank No.1,2,3 | 30 Bar |
| Lube oil injector | 600 Ltr |

CONTROL PANEL

| | | 3 Nos |
|---------------------------------------|--|--------------|
| Generator control panel | Unilib make | 3 Nos |
| The panel have full Protection device | | |
| Deferential transformer | Basler electric Model.BE1-87T | |
| Deferential Alternator | Basler electric Model.BE1-87G | |
| Ground fault | Basler electric Model.BE1-50G | |
| Reverse power | Basler electric Model.BE1-32R | |
| Reverse reactive power | Basler electric Model.BE1-32R | |
| Under/Over voltage | Basler electric Model.BE1-27/59 | |
| Over current on each phase | Basler electric Model.BE1-50/51B-103 | |
| Frequency relay | Type.252-Phuw Crompton make | |
| The control is by PLC | Idec FA-2Junior | |
| Governor | KG30-04-FB Fritz Heinzmann make range 1500-4250 Hz 24V. | |
| Synchronizer load sharing | LMG03 Fritz Heinzmann make range 115/220V. | |
| Actuator | STG30-01 Fritz Heinzmann make | |
| Automatic voltage regulator | RBS600 Leroy somer make 3 Ph,100W,380/400-100/110V ,50/60Hz | |
| Fault/alarm annunciator | 38 Nos | |
| | | |
| Master control panel | Unilib make | 1 Nos |
| Over current | Basler electric Model.BE1-50/51B-103 | |
| Frequency relay | Type.252-Phuw Crompton make | |
| The control is by PLC | Idec FA-2Junior | |
| Fault/alarm annunciator | 33 Nos | |

SWITCHGEAR

Generator switchgear (3 Nos)

ABB make
SF6 CB. 1250A,25 KA ,24KV ,50 Hz
Sace Ha2/ZC-24-12-25 ABB
O/V relay K2CA-D03-R2 Omron

Feeder switchgear (1 Nos)

ABB make
SF6 CB. 1250A,25 KA ,24KV,50Hz
Sace Ha2/ZC-24-12-25 ABB
O/V relay K2CA-D03-R2 Omron

Station switchgear (1Nos)

ABB Make
Load break SW. 16 KA ,630A

BATTERY CHARGER

110 VDC Battery

Valve regulated lead acid battery
NP65-12 ,12V,65AH Yuasa make
9 Nos

24 VDC Batter

Valve regulated lead acid battery
NP65-12 ,12V,65AH Yuasa make
2 Nos

TRANSFORMER

| | |
|----------------------------|-----------|
| Step up transformer | 3 Nos |
| Make | Tira thai |
| Rating | 4500 KVA |
| Primary voltage | 6600V |
| Secondary voltage | 22000V |
| Cooling | ONAN |
| Connection | Yd1 |

Auxiliary Transformer

| | |
|-------------------|-----------|
| Step down | 1 Nos |
| Make | Tira thai |
| Rating | 800 KVA |
| Primary voltage | 22000V |
| Secondary voltage | 400/230V |
| Cooling | ONAN |
| Connection | Dyn11 |

MDB

Feeder list

| | | |
|----------------------------|------|------|
| Cooling pump starter | 160A | 4Nos |
| Heater | 80A | 3Nos |
| Water booster pump starter | 15A | 1Nos |
| HFO pump starter | 63A | 2Nos |
| Cooling fan starter | 63A | 4Nos |
| Lube oil pump starter | 15A | 4Nos |
| Aircompressor | 25A | 2Nos |
| Ventilation fan starter | 25A | 4Nos |
| Vokes filter | 25A | 4Nos |
| Jecket water heater | 80A | 4Nos |
| Lub oil moduel | 25A | 4Nos |
| Tip cooling moduel | 15A | 4Nos |
| HFO booster | 200A | 1Nos |
| HFO Separator | 250A | 1Nos |
| Lighting panel | 250A | 1Nos |
| Spare | 250A | 2Nos |

CT/PT PANEL

3Nos

| | |
|----------------------------|-----------------------------------|
| Potential transformer (PT) | 6.6Kv/110V, 200VA Mitsubishi make |
| Diff Transformer CT. | 500/5A, 20VA,Class1 Nitech make |
| Diff Gen CT. | 500/5A, 20VA,Class1 Nitech make |
| CT. Rod | 1250A ABB make |

RESISTOR PANEL

3Nos

| | |
|----------------------------|--------------------|
| Neutral grounding resistor | |
| System voltage | 6.3Kv |
| Line to neutral voltage | 3637V |
| Initial amp | 300A |
| Max time on | 10 Deg. C |
| Ohms@25'C | 12.1 Ohms |
| Max temp rise | 750'C |
| Ground CT. | 60/5A 15VA 5P5 |
| Protection/Metering CT | 500/5A 40VA 5P10 |
| Diff Gen CT | 500/5A 20VA Class1 |

EARTH BOX

1Nos

| | |
|------------|------------------------------|
| Ground CT. | 60/5A ,15VA, 5P5 Nitech make |
|------------|------------------------------|

GENERAL INFORMATION

TOOLS & TACKLES REQUIRED FOR MAINTENANCE ARE AVAILABLE
MANUAL FOR OPERATION & MAINTENANCE,SPECIFICATIONS OF ALL EQUIPMENTS AVAILABLE
ALL MAINTENANCE WAS DONE UNDER SUPERVISION OF METRO MACHINARY STRICTLY AS PER
RECOMENDEDSCHEDULE