

# SULZER

## General Information

**These** Sulzer Generator units have been working under supervision of \_\_\_\_\_, the world wide major company for producing oil. It is well known that all power stations work and belong to \_\_\_\_\_ are receiving excellent care and regular programmed maintenance ( Defensive Maintenance ) during the service as per \_\_\_\_\_ maintenance system which based on operating hours.

**These** Sulzer 4 units has been worked in \_\_\_\_\_ under supervision of \_\_\_\_\_ before they were out of service due to the change in Frequency from 50Hz to 60Hz in all over \_\_\_\_\_

**They** left out the service in its excellent condition because of the best care and unlimited maintenance expenses given by \_\_\_\_\_ in order to keep them in very good condition and best performance.

**We** are the only owner of these 4 units.

**These** 4 units are in very good condition and well stored in our yards at \_\_\_\_\_

**For** more information we refer you to attached specification data sheet.

## Specification and Operation

**They** are SULZER engines.

These diesel engines start and stop on distillate fuel but they run on crude oil fuel. For each set there is a complete system for fuel treatment in which the crude oil is preheated to be easily injected through the injectors.

**Engine** No. 8 & 9 has **8 pistons** each and No. 10 & 11 has **10 pistons**. All the engine cylinders were rigidly fixed in a compact chassis which works as crankshaft housing.

**The** engines are water cooled through an independent cooling system. The lubrication is cooled through heat exchanger out side the engines.

Recycling piping networks were developed for water, oil and fuel independently.

**The ALTERNATORS** are siemens. They are directly connected to the engines. Two block bearings are fixed for system centering.

Separate control pannels were provided which control the generation system and controlling the loads. Each units has its own control pannel, the four were controlled together. The following table summerizes the specification for generating sets:

**Sulzer - Siemens 4 Units general Specifications data sheet**

**DIESEL ENGINE**

Description	1	2	3 & 4
<b>1. MADE</b>	<b>SULZER</b>	<b>SULZER</b>	<b>SULZER</b>
<b>2. TYPE</b>	<b>52795 12 T.A.F 48</b>	<b>52785 10 T.A.F. 48</b>	<b>52680 8 T.A.F 48</b>
<b>3. R.P.M.</b>	<b>250</b>	<b>250</b>	<b>250</b>
<b>4. RATED OUT PUT</b>	<b>5280 BHP</b>	<b>4400 BHP</b>	<b>3520 BHP</b>

**ALTERNATOR**

<b>1. MADE</b>	<b>SIEMENS</b>	<b>SIEMENS</b>	<b>SIEMENS</b>
<b>2. V.D.E</b>		<b>0530/69</b>	<b>0530/69</b>
<b>3. TYPE</b>	<b>IDK 616 6DE 12.Z 1973</b>	<b>IDK 5919 6DE 12.Z 1973</b>	<b>IDK 5919 6DE 12.Z 1970</b>
<b>4. PHASE</b>	<b>3 PH</b>	<b>3 PH</b>	<b>3 PH</b>
<b>5. SERIAL NUMBER</b>	<b>D 7320041601</b>	<b>D 7320041501</b>	<b>D6920036802</b>
<b>6. VOLTAGE</b>	<b>11000V</b>	<b>11000V</b>	<b>11000V</b>
<b>7. AMP</b>	<b>226</b>	<b>118</b>	<b>149.5</b>
<b>8. K.V.A.</b>	<b>4300</b>	<b>3580</b>	<b>2850</b>
<b>9. C &amp; F</b>	<b>0.8</b>	<b>0.8</b>	<b>0.8</b>
<b>10. R.P.M.</b>	<b>250</b>	<b>250</b>	<b>250</b>
<b>11. EXICITATION VOLTAGE</b>	<b>115</b>	<b>130</b>	<b>102</b>
<b>12. AMP</b>	<b>260</b>	<b>293</b>	<b>252</b>
<b>13. INSULATION CLASS</b>	<b>F/B1P11-B00</b>	<b>F/B1P11-B00</b>	<b>B-P11</b>
<b>14. AMBIENT TEM</b>	<b>52°C</b>	<b>52°C</b>	<b>52°C</b>
<b>15. FREQUENCY</b>	<b>50 C/F</b>	<b>50 C/F</b>	<b>50 C/F</b>

<b>Operating Hours</b>	These Sulzer 4 units worked as substitution stations in peak time for 5 years approximately 3 to 4 Hours Per a day.
<b>Last overhaul</b>	These Sulzer 4 units has been out of service in its excellent condition because of regular programmed maintenance ( defensive maintenance ) they received during service as per _____ Maintenance System which based on operating hours.

## **Present Report**

### **1. Physical Inspection Findings**

It is reported that:

- a. The diesel engines had overhauling maintenance and checkups before dis-assembling.
- b. The diesel engines were disconnected from the alternators, carefully painted with antirust paint (two coats) and shipped from \_\_\_\_\_ to \_\_\_\_\_.

From the physical inspection the following were noted

#### **A- Diesel Engines**

1. It is clear that the four diesel engines were carefully painted. Although more than four years passed since the engines were stored but they are clean and no rust existance at all.
2. The engines were inspected carefully to see any damages and or cracks had ocured due to handling and shipping.  
Result No crack, No damage.
3. The four engines were put on concrete saddles especially casted for this job.  
The saddles are 60 cm above the ground level. No sand was accumulated on the engines.
4. The engines were covered perfect.

#### **Result**

In general, vissually, the engines were perfectly shipped and stored.

### **B- Alternators and Controls**

1. They were disassembled (stators & rotors) but all of them were covered and kept in good shape.
2. The isolators seen to be partly affected by heat
3. Some bearings got rusted
4. Pannel boards are completely damaged.

### **Results**

In general, the alternators in order to operate with high efficiency should be maintained (see the recommendations chapter)

### **C-Auxiliary System**

This covers the fuel treatment, lubrication and cooling systems.

1. The systems were disassembled in pieces
2. All parts are kept outside, uncovered
3. Most of the pipe, steel sheets and bolts were rusted

### **Result**

The systems needed to be rebuilt again.

## **2. Recommendations**

### **A - D. Engines**

1. The engines should be overhauled checking for bearings, cylinder liners, valves springs set etc.
2. Piping inlets for water oil and fuel should be cleaned.
3. Keen inspection & testing should be done on all engines past before reassembling to achieve good engine performance

### **B - Alternators**

1. Flush, clean and paint all the outside parts
2. Repair the loose ties.
3. Revarnish the windings.
4. Check for Isolation.
5. Check for resistance
6. Paint the windings, the rotor with red isolation enamel
7. Test the :
  - a - Megger
  - b - Resistance
  - c - Phase balance (run test)
8. Rebuilt new pannel boards
9. Clean, reassembl, paint and test the compressor and the Gear box running units.

### **C - Auxiliary Equipments**

1. Rewind all the motors (more than 30 electric motors).
2. All pump sets should be overhauled and new repairing kits should be fixed. (More than 20 pumps).
3. All pipes should be replaced by new pipes.
4. Pipe fittings should be changed.
5. Piping controls to be checked and replace what are damaged.

## **3. Conclusion**

### **A - Diesel Engines**

The diesel engine is the most important part of the generating sets. It is clear that all the four diesel engines are in a very good condition. All jobs that are recommended to be done on these engines are required to insure the safety of the engines and to give good performance.

There is no single serious problem for the four diesel engines.

**Moreover** there are 12 containers full of the most important spare parts of the engines, such as cylinders, springs valves, ring-bearings, pistons...etc

That means the overhaul required for the four engines may not need any spare from outside.

### **B - Alternators**

No serious damage is mentioned. The recommended jobs are almost maintenance jobs. All these jobs can be done in \_\_\_\_\_, and the four alternators can be shipped from \_\_\_\_\_ maintained, tested and ready for operations.

### **C - Auxiliary equipments**

As recommended these systems should be rebuilt again. All materials required to complete this job are available in \_\_\_\_\_.

The auxiliary equipment can be rebuilt, tested and shipped ready for operation.

No doubts that the 4 generating sets can be put in operation efficiently with a very low cost and they can give the required power.

There are many workshops in \_\_\_\_\_ of good facilities and high skilled staff. The owner himself can carry out most of the recommended jobs. These facilities will help definitely in putting the generating sets in shape in short time and at lowest cost.

## Weight & Dimentions

### UNIT 1

Part	Weight in Tons	Height in Meters	Breadth in Meters	Length in Meters
SULZER ENGINE	100.00	3.80	2.80	11.60
SIEMENS GENERATOR ROTORS	35.00	5.60	5.20	5.20

### UNIT 2

Part	Weight in Tons	Height in Meters	Breadth in Meters	Length in Meters
SULZER ENGINE	85.00	3.80	2.80	9.80
SIEMENS GENERATOR ROTORS	35.00	5.60	5.20	5.20

### UNIT 3

Part	Weight in Tons	Height in Meters	Breadth in Meters	Length in Meters
SULZER ENGINE	70.00	3.80	2.80	8.00
SIEMENS GENERATOR ROTORS	35.00	5.60	5.20	5.20

### UNIT 4

Part	Weight in Tons	Height in Meters	Breadth in Meters	Length in Meters
SULZER ENGINE	70.00	3.80	2.80	8.00
SIEMENS GENERATOR ROTORS	35.00	5.60	5.20	5.20