

ACE Group

2 X 76 Mw Gas Turbine Power Plant

Two ASEA Brown Boveri (ABB) Model GT 13D Open Cycle Gas Turbine Generator Sets
Distillate Fuel and capable of HFO after treatment.

50Hz, 10.5kV, 110MVA Generators ISO Rated at 78.28 MW (base) / 85.7 MW (peak).



Two ABB GT 13D open cycle gas turbine generator sets features with:

Two Asea Brown Boveri (ABB) Model GT 13D two bearing support Gas turbine in open cycle, distillate oil firing, single shaft configuration with 50 Hz generator set.

Each unit will be provided the features listed herein:

Air intake filter house
17 stages air compressor
Single combustion chamber with one vertical burner
Water injection for NOx level control
5 stages gas turbine
gas turbine auxiliaries
Exhaust duct and stack
Generator set

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Generator, Unit, Unit Auxiliary & Excitation Transformers

Starting Transformer (for two units)

Control Room with air conditioners package (Control Panels, 3.3kV and 380V switchgears and cards, battery room)

500M3 fuel oil tank and fuel transfer pump house (for two units)

Design Data

ISO rated condition (ambient temperature 15oC, pressure 1013mbar)

Base Load Peak Load

Power Output 78.28MW 85.6MW

Efficiency (refer to generator terminal) 29.09% 29.5%

Exhaust gas temperature ~485 oC ~515 oC

Compressor Ratio 9.8 9.9

Start up Time (to synchronous speed) 6 mins

Total Normal Start Time (to base load) 14.5 mins

Total Fast Start (to base load) 7.5 mins

1. Gas Turbine

Single shaft, 2 bearings supported

Reinforced concrete foundation on ground floor level

17 compressor stage, 5 power turbine stage

One vertical burner combustion chamber

De-NOx water injection system

Designed to run on distillate fuel oil

1.1 Air Inlet System

Air filter house (13.5m about ground level) with up and forward inlet system arrangement.

Inlet Filtration

3 stages air filter (M80, M81 & M90 - Amer-kleen) pads with weather louvers in the front.

Inlet air system pressure gauges

Inlet system differential pressure alarm

Inlet Ducting

Inlet silencer

Inlet expansion joint

Inlet 90o elbow

Inlet transition pieces

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Air Filter House

1.2 Exhaust System

Exhaust diffuser
Expansion Joint
Silencer
Chimney (64.58m above principal datum)
12 Exhaust thermocouples
Thermocouples measurement system
Temperature transmitters

1.3 Fuel Transfer System

500M³ fuel oil tank (8m-diameter, 10m-tank height) with level detection system
Two Duplex fuel filters
Three fuel oil transfer pumps (one for each unit and one for standby)

1.4 Fuel Oil System

Duplex fuel oil filter
Motor drive HP Fuel oil pump
Fuel oil meter
Leakage tank (3000 litres)
Leakage pump

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1.5 Combustion Chamber

One vertical burner with de-NOx water injection combustion chamber

Three flame monitors

Combustion Chamber vibration monitor (B & K Multipurpose Monitor Type 2505)

Propane Ignition system with HV spark plug



Combustion Chamber

1.6 De-NOx Water Injection System

SULZER horizontal, multi stage centrifugal pump

Y-Type strainer

Water Control Valve

Water flow meter

1.7 Water Wash System

Off load compressor wash with a portable jet pump skid and flexible connections.

1.8 Lube, power & HP oil Systems

Shaft driven main lube oil pump

AC Auxiliary power oil pump

Circulating pump

Two HP oil pumps

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DC Emergency oil pump
AC & DC shaft turning pumps
Lube and power oil tank (10,000 litres)
Lube oil filters and control oil filters
Lube oil cooling radiator

1.9 ABB Static Starting Equipment (for two units)

Turbine starter - Static frequency converter
3.3kV / 1.37kV, 3.665 MVA starting Transformer (ONAN)

1.10 Vibration Monitoring

AEG Velocity vibration sensors (Type 8237 / T 60)

1.11 Bearing Temperature Monitoring

RTD (for compressor bearing lube oil drain measurement)
Thermocouples (for turbine, generator bearing metal measurement)

1.12 Control and Monitoring System

Decontic automatic gas turbine control system
Digi-link 4C local / remote monitoring and event logging system

1.13 Fire Protection System

Heat and smoke detection system
Halon 1301 system covering the turbine, generator enclosures, exhaust duct NACEL,
10.5kV CB room.
Manual foam system for combustion chamber and fuel oil tank.
Water spray and hydrant system
Central fire monitoring and alarm panel .
Water spray fire protection control panel .

1.14 Compressed Air System

Two compressors and one air receiver for generator CB, starting isolator and Bus Bar
insulation
One air receiver for station air supply

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1.15 Gas Turbine Packing

Enclosures and Bases

Turbine casing covered with insulation lagging pads

Turbine, compressor and generator compartments enclosed with acoustic covers and ventilation fans

2. Generator

2.1 General Information

2-poles, 3 phases, 50Hz, 10.5kV, 110MVA Generator with two bearing supports and exciter

Totally enclosed water-to-air-cooled generator (TEWAC)

Two generator bearings

Leakage detection and temperature monitoring systems

Two generator cooling water pumps with an expansion tank and cooling water radiator

A temperature controlled generator dehumidifier

Scheme of generator protection system

Neutral grounding with earth fault protection

Generator temperature monitoring system



Generator cooling water skid

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2.2 Excitation Module Features

10.5kV / 0.32kV, 820 kVA Excitation Transformer
Thyristor controlled rectifier units
Automatic Voltage Regulator
Field flashing equipment
De-excitation equipment
Rotor over voltage protection equipment

2.3 Starting Isolator & Generator Circuit Breaker

Starting isolator & generator circuit breaker control panels
10.5kV air operating circuit breaker
Starting isolator
10.5kV CB operating air receiver

3. Electrical Auxiliaries

3.1 Transformer with scheme of electrical protection system

132kV / 10.5kV, 92 MVA Generator Transformer
10.5kV / 3.3kV, 5 MVA Unit Transformer
3.3kV / 400V, 1.0 MVA Unit Auxiliary Transformer
3.3kV / 1.37kV, 3.655 MVA Starting Transformer (For two gas turbine units)

3.2 Direct Current Plant

240V DC battery charger (input rated power 29kVA) with 108 lead cells
24V DC battery charger (input rated power 9kVA/4kVA) with 12 lead cells

3.3 Control Room Package (for each unit)

3.3kV Switch board
380V Unit and common Switch boards
Gas turbine, generator and excitation control and protection Panels
Fire Fighting Panels
Two Air Conditioning units
220V & 24V battery chargers and Battery Room
Starting device control panel and office (for two units)

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Control Room Package



Motor Control Panel

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4.0 Document /Supports

Full set Service manuals, including Operation, Maintenance and Parts Volumes

Full set of drawing

Maintenance record

Commissioning record

Turbine Maintenance tool (for removal or replacement compressor casing and exhaust frames)

Two gas turbine preservation de-humidifiers (one for each unit)

Gas turbine essential stock

Workshop (40'), Goods store (20'), local stores (2 x 40')

essential stores (2 x 40'), and air filter store (40') containers.

Surplus equipment, material, cables at gas turbine site.

5.0 Optional

Turbine Hall frame structure

Overhead crane (55 / 20 ton) at turbine hall

Fire ring main and hydrant system for turbine hall

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