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5 x Solar Turbomach Taurus T60 (5.67MW ISO) Dual Fuel (Gas & HSD) Water Injection

Year: 2009 & 2010 - All GTGs are unused.

The above 5 Turbines were set down on the Foundations, but never started.





Gas Turbine Generator Module

Industrial Gas Turbine Taurus 60 (T60-7901), Compressor assembly, Turbine and combustor assembly, Combustion system

Reduction Gear: Two stage, star compound epicyclic type

Coupling & AC Synchronous Generator 50 Hz, 11 kV, Brushless excitation system
Protection IP21, Insulation class H, Temperature Rise class F, Self-ventilated air cooled
Accessories and instrumentation

Starting System Hydraulic start motor, Hydraulic oil filter, Hydraulic pump

Dual Fuel System - Natural Gas Fuel System- Gas filter, Fuel shutoff valves, Fuel control valve, Fuel manifold, Instrumentation, Internal piping, Gas flow meter

Liquid Fuel System - Duplex filter, High pressure speed controlled pump, Filter, Fuel shutoff valves, Fuel manifold, Air assist system, Drain tank, Instrumentation, Internal piping,

Water Injection System - Water inlet filter, Motor driven pump, Valves and control devices,

Lubrication System - Lube-oil tank, Lube-oil heater, Main lube-oil pump, Pre/post lube-oil pump, Lube oil cooler, duplex lube-oil filter, Electrostatic vapour extractor, Indicators and instrumentation Internal piping

GT Compressor Washing System off-line and on-line, Water tank, Water manifold, Instrumentation & Internal piping, On-line washing system,

Base Frame w Vibration Dampers 6

Sound Enclosure 85 dB(A) at 1m ,green field conditions Air filter housing, Alarms & Instrumentation

Ventilation air filter system: Electric Motor driven air blowers, Pneumatically driven air shutters

TUMATRONIC S4 Turbine Control System - Backup Failsafe PLC, PC "Real time", PC HMI with touch screen TFT, Profibus acquisition modules

Generator Control, Synchro. & Auxiliary System - Generator measurement unit, Generator voltage regulation, Generator protection, SPM Synchroniser, Vibration monitoring system, Gas leakage detection system, CosPhi Card

Control System Interface - Signal exchange, Standard connection with supervisory control systems, Desktop remote PC - installed in customer control room, Client supervision control system interface, data processing excluded

AC Supply System, DC Supply System Starting Cubicle
24 V/DC battery charger, 24 V batteries 1 set, 24 V distribution bus

Fire Detection & Extinguishing Equipment - Electronic control unit, Infra-red detectors, Release push-button, Horn & light signalisation, Spray nozzles, CO2 bottles

TECHNICAL PERFORMANCE PARAMETERS

Gas Turbine Generator Set Mode T60 Fuel Natural Gas

Fuel Composition	Methane (CH ₄) % Vol. 84.4999
	Ethane (C ₂ H ₅) “ 9.0000
	Propane (C ₃ H ₈) “ 3.0000

I – Butane (C₄H₁₀) “ 2.0000
I - Pentane (C₅H₁₂) “ 0.2500
Nitrogen (N₂) “ 1.2500
Sulphur Di Oxide (SO₂) “ 0.0001

Reference Conditions

Site Altitude m.a.s.l. 230; Relative Humidity % 60
Engine air inlet temperature °C 15
Inlet duct pressure loss mm H₂O 75
Exhaust duct pressure loss mm H₂O 250
Frequency 50 Hz Power factor 0.80 (lagging)
Generator Voltage 11 kV Min. fuel gas pressure 1500 kPa(g)

Guaranteed Gas Turbine Performances (without water injection)

Electric power at alternator terminals kW 5'165; Heat Rate kJ/kWh 11'845

Nominal Exhaust Data at Full load

Exhaust gas temperature °C 508; Exhaust gas flow Kg/h 73989 Exhaust heat cooled to 170°C
KWth 7583

Guaranteed Emissions at full load

NO_x emissions with water injection < 100 ppmv @ 15%O₂ CO emissions < 50 ppmv @
15%O₂,

Sound Guarantees Sound pressure level at 1 meter distance dBA 85

Notes

1. The fuel composition will be as above and in accordance with Solar Fuel Specifications – ES-9-98.
2. The performance test of the Gas Turbine is based on ISO 2314 and PCT 1985-22.
3. The turbine compressor will be cleaned prior to the performance test. Air filters shall be in new and clean condition.
4. The plant is operated in continuous duty, under normal operating conditions.
5. For NO_x guarantee water to fuel ratio is 0.3 kgH₂O/kg fuel and the GT is at Full Load.
6. NO_x is measured as NO and is based upon 1/2 hour measuring average value.
7. CO is based upon 1/2 hour measuring average value.

8. For sound guarantee the sound level is measured from 1 m. from equipment, 1.5m above ground level and the background noise level must be at least 10 Dba lower than the guaranteed value.
9. If the ambient conditions are other than the reference conditions, the measured values will be corrected using the correction curves and detailed performance test procedure described in supplier's offer.
- 10 Power and Heat Rate are calculated as average upon the plant GTs.

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