



Taurus T60 (5.67MW ISO)  
Dual Fuel (Gas & HSD) Water Injection

Year : 2009 & 2010 - All GTGs are unused.

3 Turbines are in original packing & 3 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

<b>Fuel Composition</b>	Methane (CH <sub>4</sub> ) % Vol.	84.4999
	Ethane (C <sub>2</sub> H <sub>6</sub> ) "	9.0000
	Propane (C <sub>3</sub> H <sub>8</sub> ) "	3.0000
	I – Butane (C <sub>4</sub> H <sub>10</sub> ) "	2.0000
	I - Pentane (C <sub>5</sub> H <sub>12</sub> ) "	0.2500
	Nitrogen (N <sub>2</sub> ) "	1.2500
	Sulphur Di Oxide (SO <sub>2</sub> ) "	0.0001

<b>Reference Conditions</b>	Site Altitude m.a.s.l.	230;	Relative Humidity %	60
	Engine air inlet temperature	°C	15	
	Inlet duct pressure loss	mm H <sub>2</sub> O	75	
	Exhaust duct pressure loss	mm H <sub>2</sub> O	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<sub>x</sub> emissions with water injection < 100 ppmv @ 15%O<sub>2</sub>

CO emissions < 50 ppmv @ 15%O<sub>2</sub>,

**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<sub>x</sub> guarantee water to fuel ratio is 0.3 kgH<sub>2</sub>O/kg fuel and the GT is at Full Load
6. NO<sub>x</sub> 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