

(CUSTOMER)

SIEMENS

(PROJECT)

1. Scope of Supply

SIEMENS Industrial Turbomachinery Limited offer to design, manufacture, package and dispatch the following equipment listed within this scope of supply.

SIEMENS SGT-600 Gas Turbine Package, comprising:

1.2 Gas Turbine Package

1.2.1 Gas Turbine Engine

- SGT 600 Gas turbine engine – ISO Rating 24,5 MWe – two-stage uncooled variable free power turbine offers nominal shaft speed up-to 7,700 rpm
- Gas generator
- Air inlet casing
- Compressor rotor
- Compressor stator with variable Guide Vanes (VGV)
- Centre casing
- Combustion system – Dry Low Emissions (DLE) for dual fuels
- Compressor turbine rotor
- Compressor turbine stator
- Power turbine
- Hot gas interdict
- Power Turbine rotor
- Power turbine stator
- Output shaft drive
- Exhaust outlet casing
- Engine arranged for hot end drive
- Engine bearing temperature and vibration instrumentation

1.2.2 Underbase

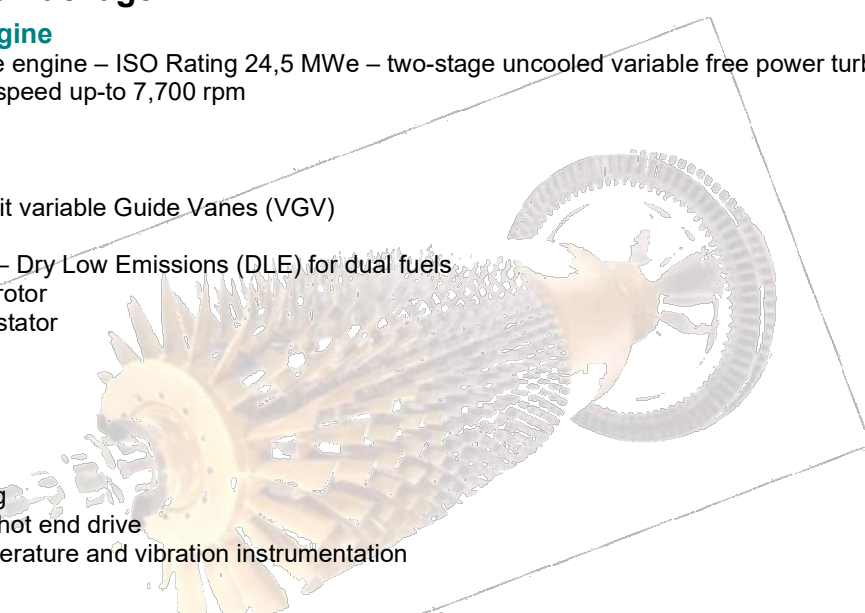
- Underbase – fabricated carbon steel construction, arranged for - multi point mounting
- Mounting assemblies for the gas turbine core, auxiliary gearbox, auxiliaries, and main gearbox
- Driven unit – separate underbase
- Integral lubrication oil tank – carbon steel

1.2.3 Start System


- Hydraulic Motor and Pump - AC electric motor driven

1.2.4 Gears, Couplings and Guards

- Gearbox seismic vibration instrumentation
- Auxiliary gearbox incorporating drives to start system and lubricating oil pump
- Drive coupling – high speed – flexible element dry type – turbine to gearbox
- Drive coupling – low speed – flexible element dry type – gearbox to AC generator
- Coupling guard – high speed – (carbon steel) – turbine to gearbox
- Coupling guard – low speed – (carbon steel) – gearbox to driven unit



<p align="center">Unrestricted SGT-600 Package IP - QNxxxx</p>	<p align="center">Page 2 of 13</p>	<p align="center">Budgetary Information</p>
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1.2.5 Lubricating Oil System

- Integral mineral oil lubricating system serving the gas turbine, gearbox and driven unit
- Lubricating oil pump main – gas turbine gearbox driven
- Lubricating oil pump auxiliary – AC motor driven
- Lubricating oil pump emergency – DC motor driven
- Lubricating oil system filter
- Duplex filter arrangement
- Continuous flow transfer valves
- Conforms to API 614
- Filter body – carbon steel
- Differential pressure indicator
- Temperature and Smart type pressure & level transmitters – aluminum bodies
- Lubricating oil tank immersion heater
- Lubricating oil system breather
- Lubricating oil breather oil mist eliminator
- Lubricating oil breather ducting – austenitic stainless steel
- Lubricating oil system cooler
- Airblast simplex lubricating oil cooler – package roof mounted
- Cooler fan – single (100% duty)
- Suitable for a non - hazardous area
- Lubricating oil cooler piping supply and return – austenitic stainless steel

1.2.6 Gas Fuel System

- Pilot fuel flow control system with actuator and integrated pressure transmitters
- Main fuel flow control system with actuator and integrated pressure transmitters
- Rapid acting gas shut – off – valves (2-off)
- Temperature transmitter – aluminum body
- Gas fuel block and vent valve assembly – off package

1.2.7 Acoustic Enclosure

- Ventilation air inlet filter pad type
- Enclosure ventilation inlet and outlet dampers – air operated
- Ventilation fan – single – AC electric driven – Zone 2
- Ventilation air system – negative pressure
- Ventilation air silencer
- Ventilation air inlet and outlet ducting
- Integral support for turbine enclosure ventilation system

1.2.8 Acoustic Enclosure Ventilation System

- Ventilation air inlet grille
- Ventilation inlet and outlet dampers – galvanized carbon steel – instrument air operated
- Ventilation fan – single – AC electric motor driven – Zone 2
- Ventilation air system – negative pressure
- Ventilation air silencer – galvanized carbon steel
- Ventilation air inlet and outlet ducting – galvanized carbon steel
- Integral support for turbine enclosure ventilation system

1.2.9 Gas Detection System

- Gas detection equipment comprising
- 2 – I.R. point gas detectors (vent outlet)

1.2.10 Fire Protection System

- Fire protection system comprising
- 3 – I.R. multi spectrum flame detectors
- 2 – Heat detectors
- Single sounder / beacon (end of package)
- 1 – Beacon (inside package)
- Status indicator (end of package)
- 1 – MAC (Manual Alarm Contact)

1.2.11 Fire Extinguishing

- Fire shot CO2 fire protection system – in accordance with NFPA 12
- Cylinders housed in a weatherproof cabinet
- Extinguisher system distribution pipework and nozzles
- Piping from cabinet to package

1.2.12 Combustion Air Inlet System

- Combustion air filter – simple static element – painted carbon steel
- Combustion air filter – weather hood
- Combustion air filter – mist eliminator
- Combustion air filter – EPA filter stage
- Combustion air silencer – painted carbon steel
- Combustion air inlet ducting – painted carbon steel
- Integral support for combustion air inlet system
- Maintenance access platform and ladder – combustion air filter

1.2.13 Combustion Exhaust System

- Exhaust diffuser – ferritic stainless steel – horizontal orientation
- Exhaust silencer – ferritic stainless steel hot section – coated carbon steel outer casing
- Exhaust stack – ferritic stainless steel – floor standing vertical orientation – 15 m height
- (as per SIEMENS Energy standard design)
- Thermal insulation and aluminum cladding – personnel protection only

1.2.14 Package Electrical Systems

- Integral Local Electrical Room (LER)
- Designed to provide environmental protection for the SGT-600 package control panels and its operators.
- Fully equipped with lighting, power and environmental controls consisting of:
- 400 V AC – Package motors and heaters supply
- 230V 50Hz distribution board
- Internal and external lighting
- Industrial 230 V 50 Hz outlet
- Air conditioning/heat pump unit capable of maintaining control room at 20°C in all ambient conditions
- A baseplate designed to support the control panel shelter and internal tread plates which will attach to the end of the SGT-600 package driver unit baseplate to allow for a single point lift of the driver package
- A single control panel cubicle with support frame
- The combined control panel will consist of a battery charger, unit control panel for turbine and generator control and monitoring and motor control center
- Batteries – VRLA type, sized to ensure a safe run-down of the turbine and driven unit in an emergency case

1.2.15 Package Auxiliaries

- Turbine compressor – mobile cleaning system – 316 stainless steel tank – on and off-line wash
- Drain tanks on package
- Auxiliary module pressure & level transmitters – Smart type – aluminum bodies
- Instrument tagging – rrow tags – SIEMENS standard P&ID references
- Package finish according to SIEMENS onshore standard

1.3 Control System

1.3.1 Package Control System Hardware

- Control system mounted within integral LER
- Unit Control System section – simplex, incorporating a SIEMENS SIMATIC PLC platform
- Control and monitoring of the package systems
- Standard start-stop and load control functions – on-package control panel
- HMI PC panel mounted
- Operator display language – English
- Machinery vibration monitoring

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- Ethernet TCP/IP communications data link to DCS
- Generator Control Panel section containing
- Automatic voltage regulator
- Synchronizing facility – automatic & manual with check synchronizer
- Generator metering equipment and electrical protection

1.3.2 SIEMENS Turbomachinery Applications-Remote Monitoring System-STA RMSTM

- STA-RMS allows improved support for engine operators
- Required operation during warranty period and thereafter with Long Term Programs (LTP) service contracts
- SIEMENS common Remote Service Platform secure communication through Virtual Private Network (VPN) via customer's internet service
- STA-RMS primary functions:
- Automatic transfer of engine operation data to Remote Diagnostic Center allowing:
- Routine monitoring
- Predictive trending
- Anomaly detection
- Improved downtime prediction and scheduling
- Access to historic data
- Fleet and unit performance reports
- Remote access to the Human Machine interface allowing:
- Direct operation of the Human Machine Interface by SIEMENS' support personnel
- Software updates during fault rectification helpdesk call
- Faster troubleshooting and support

1.4 Testing

1.4.1 Testing Gas Turbine

- Gas turbine core engine test – SE standard – the core has already been tested. Test data available

1.4.2 Driven Unit Test

- Manufacturer's works acceptance test data of Gas Turbine. Pre-tested.

1.5 Installation and Maintenance

- Roll-off equipment – Gas turbine power turbine
- Roll-off trolley – Gas Turbine core engine removal
- Maintenance equipment
- Power turbine barring gear
- Core lifting equipment
- Semi-gantry crane
- Auxiliary gearbox support
- Installation tool kit comprising of a cabinet containing common hand tools
- Holding down fixings – GT and driven unit package
- Holding down fixings – off-package equipment
- Selection of paints for site repairs

1.6 Drawings and Documentation

- Standard set of certified information and approval drawings in English language
- Existing drawings are to be reviewed and issued with relevant modifications or a project specific cover
- Operator manual – English language – CD only
- Maintenance manual – English language – CD only
- Driven unit manual – English language – CD only

1.7 Packing and Delivery

1.7.1 Packing

- Packing and preservation to suit destination and transport method

1.7.2 Delivery Terms

- Delivered, FCA, Siemens manufacturing facility, in accordance with ICC INCOTERMS 2010 Edition

1.8 Training

- *(Not included in this Budgetary Tender)*

1.9 Spares

1.9.1 Commissioning Equipment and Tools

- Commissioning Equipment and Tools

1.9.2 Commissioning Spares

- Commissioning Spares

1.10 Quality Assurance

- Contract quality assurance program – English language

2. Exclusions

All items not specifically listed in this Tender