17.4 MW 2007 New Siemens SGT500 Natural Gas Generator Sets

Harnessing Energy for Life

usp&e

Harnessing Energy for Life

Description & Additional Notes

17.4 MW 2007 New Siemens SGT500 Natural Gas Generator Sets

SGT-500 Industrial Gas Turbine

Power Generation: (ISO) 18.47 MW(e) Base Load, 19.38 MW(e) Peak Load

The Siemens SGT-500 industrial gas turbine is a highly dependable gas turbine with excellent fuel flexibility. It combines the reliability and robustness of an industrial design and low emission levels of the latest turbine technology for a wide variety of fuels and applications at low operational costs.

The SGT-500 gas turbine has been serving the industrial power generation segment for over 50 years. Introduced in 1955, the turbine was designed for heavy oil operation under tough conditions. It is used widely in industrial power generation, marine as well as oil and gas applications, whether onshore or offshore, floating or fixed.

Due to its large roomy combustors and low firing temperature, the SGT-500 has the capability to operate on a wide range of fuels. Experience includes gas and heavy fuel oils, naphtha, crude oil, high aromatic and hydrogen-rich gases, as well as gases with high content of sulfuric acid.

In addition, the combustor and fuel system have the potential for easy adaptation to additional liquid and gaseous fuels, including the growing flora of environmentally friendly fuels. The SGT-500 can be equipped with several emissions reduction alternatives, including Dry Low Emissions (DLE) combustion.

Outstanding operational reliability

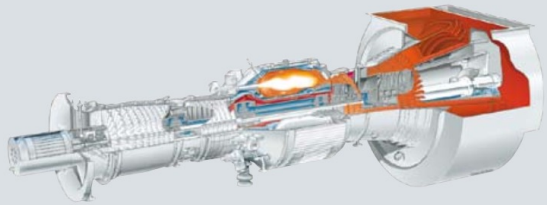
With world class start-up and operation reliability performance, the SGT-500 is an excellent solution for emergency power applications. Its low firing temperature contributes to an impressive maintenance program. At operation on full load the standard time between major overhauls is 80,000 hours. At 94 % load the interval can be extended to 160 000 hours, equal to 18 years of operation.

usp&e

Harnessing Energy for Life

Description & Additional Notes

17.4 MW 2007 New Siemens SGT500 Natural Gas Generator Sets



Technical specifications

Overview

- Power generation: 18.47 MW(e)
- Electrical efficiency: 32.9 %
- Heat rate: 10,946 kJ/kWh (10,375 Btu/kWh)
- Power turbine speed: 3,600 rpm
- Compressor pressure ratio: 13:1
- Exhaust gas flow: 96.4 kg/s (212.6 lb/s)
- Exhaust temperature: 376° C (709° F)
- NO_x emissions (with DLE corrected to 15 % O_2 dry)
  - Natural gas: ≤ 42 ppmV

Axial Compressor

- Two multi-stage (10 + 8 LP/HP) axial flow compressors
- Compressor rotors of bolted design
- Corrosion-coating available

Combustion

- 7 can-annular combustion chambers
- Conventional combustion system
  - Steam or water injection for emissions control and power augmentation
- Dry Low Emissions (DLE) combustion system option (gas only)

Turbine

- Two compressor turbines (1 + 2 HP/LP)
- Free power turbine of axial-flow design
- 3-stage 3,600 rpm turbine

Fuel System

- Natural gas - Liquid fuel - Dual fuel - Heavy fuel
  - Other fuel capability available on request
- Fuel-changeover capability at any load
- Load-rejection capability
- Fuel-supply pressure requirement: 18.0 bar(a) ±0.5 bar (261 ±7 psi(a))

Bearings

- Hydrodynamic radial- and thrust bearings of tilting pad type
- Vibration and temperature monitoring

Lubrication

- Lubricating oil tank integrated into gas turbine skid
- AC-driven auxiliary pump
- DC-driven emergency pump
- AC-driven lube oil pumps with DC backup
- Air- or water-cooled lube oil coolers

Gearbox

- Parallel-shaft gear of double helical design
- High-speed shaft 3,600 rpm (nominal speed for PG)
- Low-speed shaft 1,500 rpm (50 Hz) or 1,800 rpm (60 Hz)
- 4 radial bearings of sleeve type

Generator

- 4-pole design
- Rated voltage: 10.5 kV/11.0 kV/13.8 kV
- 50 Hz or 60 Hz
- Protection IP54
- PMG for excitation power supply
- Complies with IEC/EN 60034-1 standard

Starting

- Start and barring motor connected to the LP rotor via a ratchet coupling

Control System

- Siemens Simatic control system
- Distributed inputs/outputs

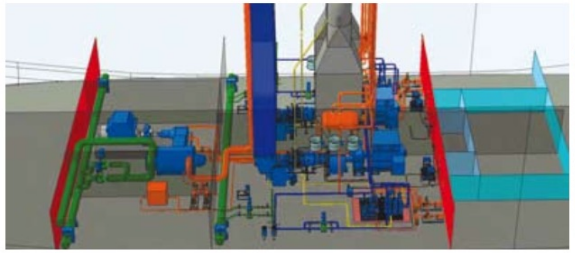
usp&e

Harnessing Energy for Life

Description & Additional Notes

17.4 MW 2007 New Siemens SGT500 Natural Gas Generator Sets

SGT-500 core engine in workshop.



SGT-500 package in combined cycle configuration.

Four SGT-500 units installed in Egypt to power an LNG plant.

Gas turbine:

Key features

- Robust design – long engine life
- High availability/reliability
- Low fuel-gas pressure requirement
- No advanced sealings, resulting in minimal deterioration and maintained efficiency
- Dry Low Emissions (DLE) system option
- Low starting power (<160 kW)
- Fast start capability (~3 minutes)
- Dual-fuel
- Competitive with dual-fuel reciprocating technology
- Marine classified
- No methane slip

Maintenance

- Extremely low and predictable maintenance costs
- Easy on-site maintenance possible - complete modules can be swiftly exchanged
- Direct exchange of gas generator possible - Core can be air-freighted
- First overhaul after 40,000 hours (80,000 hours between major overhauls)
- Lease-engine availability for planned overhauls
- Online wash available
- Standardized concepts for time-based and cycle-based maintenance
- Staff training in operation and maintenance
- 24/7 Siemens support
- Remote diagnostics

Package:

Key features

- Compact layout
- State-of-the-art control system fulfills all requirements for control and safety
- Can easily communicate with other control systems
- DNV, LR and ABS certified packages
- Marine package with auxiliary drive system on lightweight frame
- FPSO package (Floating Production, Storage and Offloading) option
- ATEX package option

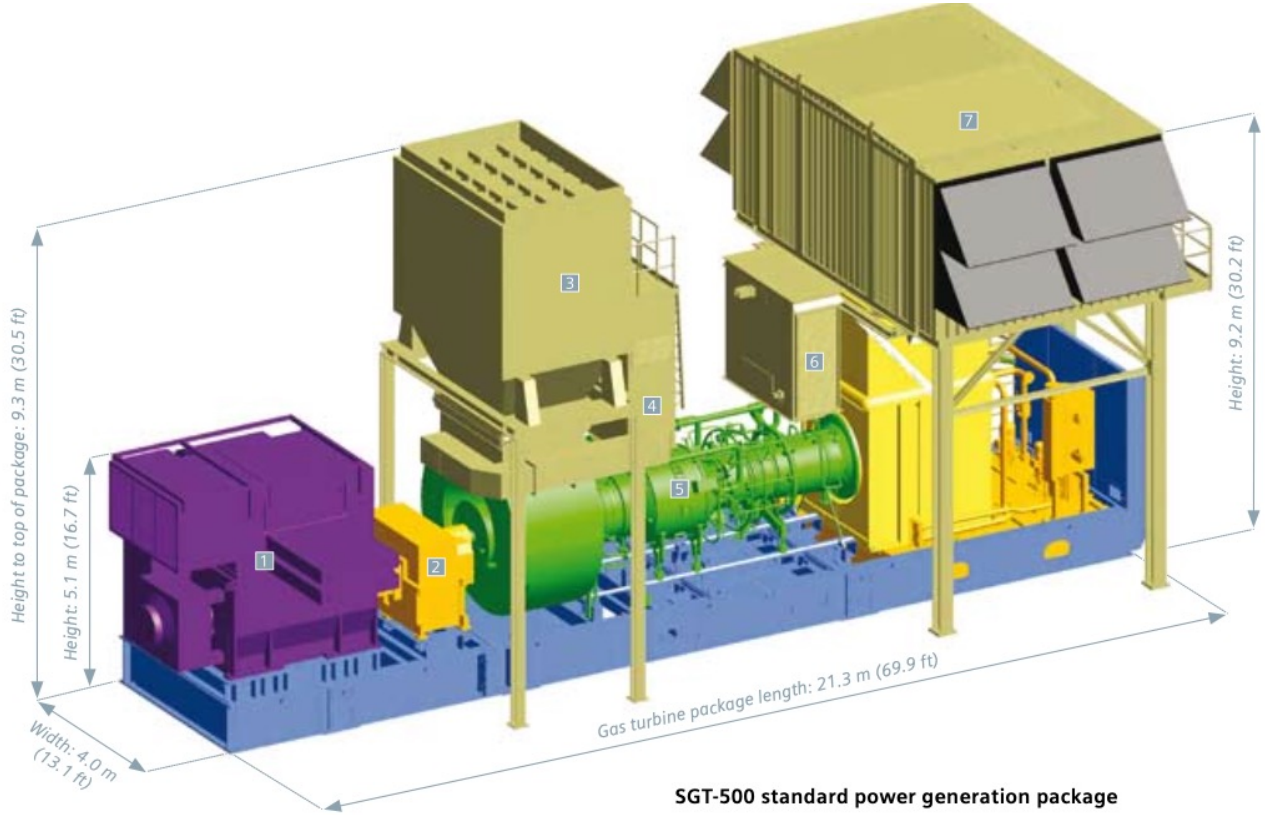
Cogeneration and combined cycle

The SGT-500 is easily adapted to any cogeneration or combined-cycle plant layout. It has very low environmental impact in both configurations. Thanks to high air flow, the SGT-500 has excellent steam-raising capability which yields high total efficiency in cogeneration.

In combined cycle, the SGT-500 has very high total efficiency independent of the fuel used. When using HFO (heavy fuel oil) the SGT-500 offers outstanding emission performance and half the maintenance cost compared to competing technologies.

Description & Additional Notes

17.4 MW 2007 New Siemens SGT500 Natural Gas Generator Sets



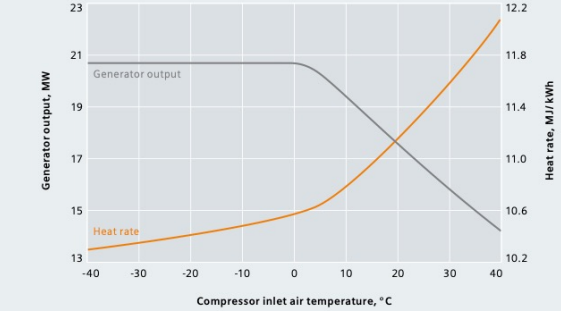
SGT-500 standard power generation package

1 AC generator
2 Speed reduction gear
3 Combustion exhaust
4 Enclosure air outlet
5 Core engine
6 Enclosure air inlet
7 Combustion air inlet

Description & Additional Notes

17.4 MW 2007 New Siemens SGT500 Natural Gas Generator Sets

SGT-500 Performance



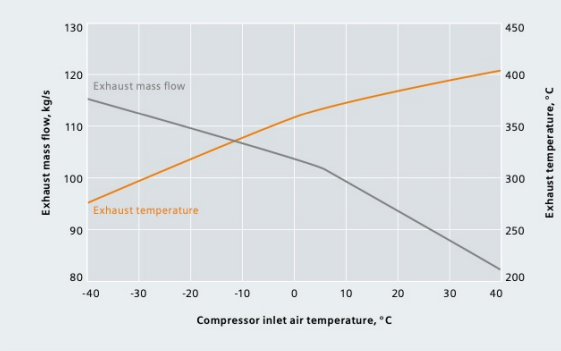
Nominal generator output and heat rate

Conditions/assumptions:

Fuel:	Natural Gas LHV, 46,798 kJ/kg (20,118 Btu/lb)
Altitude:	Sea level
Ambient pressure:	1,013 bar (a) (14.7 psi (a))
Relative humidity:	60 %
Inlet pressure loss:	5 mbar (2" H_2O
Outlet pressure loss:	5 mbar (2" H_2O)
Fuel temperature:	5° C (41° F)

Diagram conversion factors:

To convert	To	Multiply by
°C	°F	(°Cx9/5)+32
MJ/kWh	Btu	949



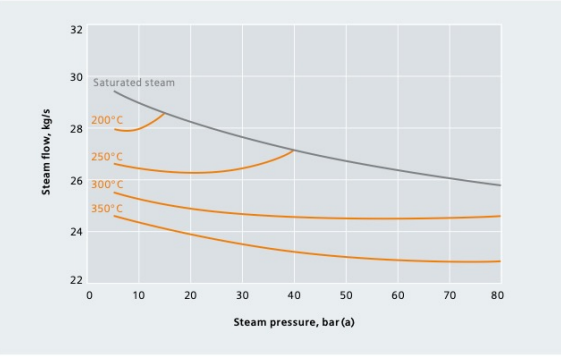
Nominal exhaust mass flow and temperature

Conditions/assumptions:

Fuel:	Natural Gas LHV, 46,798 kJ/kg (20,118 Btu/lb)
Altitude:	Sea level
Ambient pressure:	1,013 bar(a) (14.7 psi(a))
Relative humidity:	60 %
Inlet pressure loss:	5 mbar (2" H_2O)
Outlet pressure loss:	5 mbar (2" H_2O)
Fuel temperature:	5° C (41° F)

Diagram conversion factors:

To convert	To	Multiply by
°C	°F	(°Cx9/5)+32



Supplementary-fired heat-recovery steam generation

Conditions/assumptions:

Fuel:	Natural Gas LHV, 46,798 kJ/kg (20,118 Btu/lb)
Altitude:	Sea level
Ambient pressure:	1,013 bar(a) (14.7 psi(a))
Ambient temperature:	15° C (59° F)
Relative humidity:	60 %
Boiler pinch point:	8K (14F)
Boiler approach point:	5K (9F)
Inlet pressure loss:	5 mbar (2" H_2O)
Outlet pressure loss:	25 mbar (10" H_2O)

Diagram conversion factors:

To convert	To	Multiply by
°C	°F	(°Cx9/5)+32
kg/s	lb/s	2.2046
bar	psi	14.5

usp&e

Harnessing Energy for Life

Description & Additional Notes

17.4 MW 2007 New Siemens SGT500 Natural Gas Generator Sets

Two (2) Units available

Marine Rated – Det Norske Veritas Certificates

New surplus - Never Used

Zero hours

The units were manufactured in 2007 and have been stored to OEM specifications since then.

- **Power Output 18.47mw each**
- **Dual Fuel Gas & Liquid.**
- **Frequency 50/60 HZ**

Both units are UNUSED and were part of an FPSO project that was cancelled and never used. The units were removed from the FPSO few month ago and available for sale subject to remaining unsold.

Single-shaft, industrial gas turbine
Dual (Natural gas & Diesel) -fuel

Brand - Siemens (GT)

Power generation: Probably can be a little more
17.4 MW on Natural Gas
17.0 MW on Diesel

Specific fuel consumption 221 g/kWh on Natural Gas
262 g/kWh on Diesel

Heat rate: 11,066 kJ/kWh on Natural Gas
11,200 kJ/kWh on Diesel

Generator

ABB Electric Generator

Made in 2007

Type AMS 900 LH

Voltage – 13.8 kV

20400 kVA at 35 C

Frequency - 60 Hz

1800 RPM

0.8 Power Factor

Flender Graffenstaden Gear Box

Made in France

22500 KW

Flenco Group Lube Oil System

Marine Rated

Specifications

Manufacturer	Siemens
Model	SGT500
Year	2007
Condition	New
Location	Europe
Price	USD $11,615,000.00
Category	Natural Gas Generators
Subcategories	• 10 – 99 MW
Stock Number	USP010075
Wattage	17.4 MW
Hours	Zero
Frequency	50/60hz
Fuel type	Natural Gas
Voltage	13.8 kV
Balance of Plant Available? (BOP)	-

Asset Images

- **Images may be representative, and actuals can be supplied upon request.**

Asset Images

- **Images may be representative, and actuals can be supplied upon request.**

Asset Images

- **Images may be representative, and actuals can be supplied upon request.**

Asset Images

- **Images may be representative, and actuals can be supplied upon request.**

Asset Images

- **Images may be representative, and actuals can be supplied upon request.**

Asset Images

- **Images may be representative, and actuals can be supplied upon request.**

Asset Images

- **Images may be representative, and actuals can be supplied upon request.**

Asset Images

- **Images may be representative, and actuals can be supplied upon request.**

Asset Images

- **Images may be representative, and actuals can be supplied upon request.**

Asset Images

- **Images may be representative, and actuals can be supplied upon request.**

Harnessing Energy for Life