

# SGT-400 Industrial Gas Turbine

**Power Generation: (ISO) 12.90 MW(e)**

**The SGT-400 combines very high efficiency (nominal 35 %) with excellent emissions performance in a rugged industrial design. This makes it the ideal choice for a wide variety of power generation applications.**

The Siemens twin-shaft industrial gas turbine SGT-400 features a compact gas generator and a two-stage power turbine, incorporating the latest aero-dynamic and combustion technologies. The turbine has a simple-cycle efficiency of nominally 35 %.

For industrial cogeneration, the high steam-raising capability of more than 27 tonnes per hour contributes towards achieving overall plant efficiencies of 80 % or higher. In addition, the compact arrangement, on-site maintainability and inherent reliability of the SGT-400 have made it an ideal gas turbine for the demanding oil and gas industry.

Incorporating proven gas turbine technology, the SGT-400 offers cost-effective power for a wide range of duties, including:

### Industrial Power Generation

- Simple-cycle and combined-cycle power plants for base load, standby power and peak lopping
- Cogeneration for industrial plants with high heat load and district heating schemes

### Power Generation in the Oil and Gas Industry

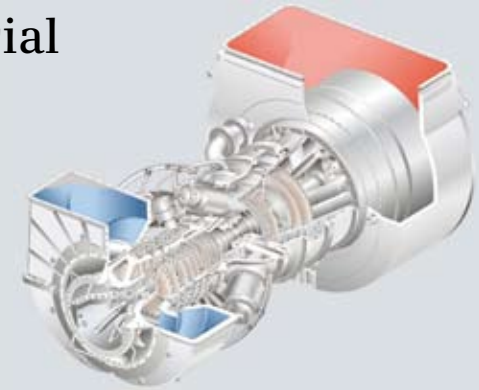
- Offshore: on oil platforms and FPSO (Floating Production, Storage & Offloading) vessels
- Onshore: for oil field service, refinery application, emergency and standby power generation,
- Including highly efficient cogeneration solutions for oil and gas applications

**Industrial Gas Turbines**

Answers for energy.

SIEMENS

# SGT-400 Industrial Gas Turbine



*SGT-400 core engine test facility.*

## Technical specifications

### Overview

- Twin-shaft, industrial
- Power generation: 12.90 MW(e)
- Frequency: 50 or 60 Hz
- Electrical efficiency: 34.8 %
- Heat rate: 10,355 kJ/kWh (9,815 Btu/kWh)
- Compressor pressure ratio: 16.8:1
- Exhaust gas flow: 39.4 kg/s (86.8 lb/s)
- Exhaust temperature: 555° C (1,031° F)
- Typical emissions: $NO_x$ <15 ppmV and CO <10 ppmV (corrected to 15 % $O_2$ dry)
- Medium-calorific value fuels capability (>25 MJ/$Nm^3$ Wobbe index)

### Axial Compressor

- 11-stage with variable inlet guide vanes
- Air flow: (ISO) 38.9 kg/s
- Nominal speed: 14,100 rpm

### Combustion

- 6 reverse-flow cannular combustion chambers
- Dry Low Emissions (DLE) system
- High-energy ignitor system

### Turbine

- 2-stage overhung compressor turbine
  - Both stages are air-cooled
- 2-stage high-efficiency power turbine
  - Rotor blades have interlocking shrouds for mechanical integrity

### Bearings

- Tilt-pad radial and thrust
- Standard vibration- and temperature-monitoring

### Main reduction gearbox

- Speeds of 1,500rpm and 1,800rpm

### Generator

- Voltages: 6 to 13.8 kV
- Frequency: 50 or 60 Hz

### Package

- Fabricated steel underbase
  - Integral oil tank
  - Multi-point mounting
  - Optional 3-point mounting
- Modular fluid systems incorporating:
  - Lubricating oil system
  - Auxiliary gearbox-driven main pump
  - AC motor-driven auxiliary pump
  - DC motor-driven emergency pump
- Oil cooler and oil heater
- Electrically driven hydraulic start system
- Hydrocarbon drains tank on package
- Control system
  - Siemens SIMATIC PLC-based with distributed control and processing capability installed on package
  - Optional Allen-Bradley system
  - Optional off-package systems
- Vibration monitoring system
  - BN1701: Standard
  - BN3500: Optional
- Fire and gas detection equipment
- Fire suppression equipment
- On- and off-line compressor cleaning options available
- Combustion-air inlet-filtration options:
  - Simple static
  - Pulse cleaning
  - HEPA
- Enclosure
  - Painted carbon steel or stainless steel
  - Noise level options (85 dB(A) standard)

## Gas turbine

### Key features

- High simple-cycle and cogeneration efficiencies, cutting fuel costs
- Dual-fuel Dry Low Emissions (DLE) combustion system, meeting stringent legislation
- Twin-shaft arrangement for both power generation and mechanical drive, allowing commonality of parts in mixed duty installations

### Maintenance

- Site maintainability or optional rapid core exchange as required by customer
- Designed for maintenance:
  - Horizontally split compressor casing
  - Horizontally and vertically split inlet casing
  - Combustion chambers, flame tubes and ignitors easily accessible for inspection
  - Large side-doors on enclosure for equipment change-out
  - Gas generator and power turbine removal on either side of package
- Multiple boroscope-inspection ports

*SGT-400 package.*

*Sewage-sludge drying plant for the City of Athens, on Psyttalia island.*

## Package

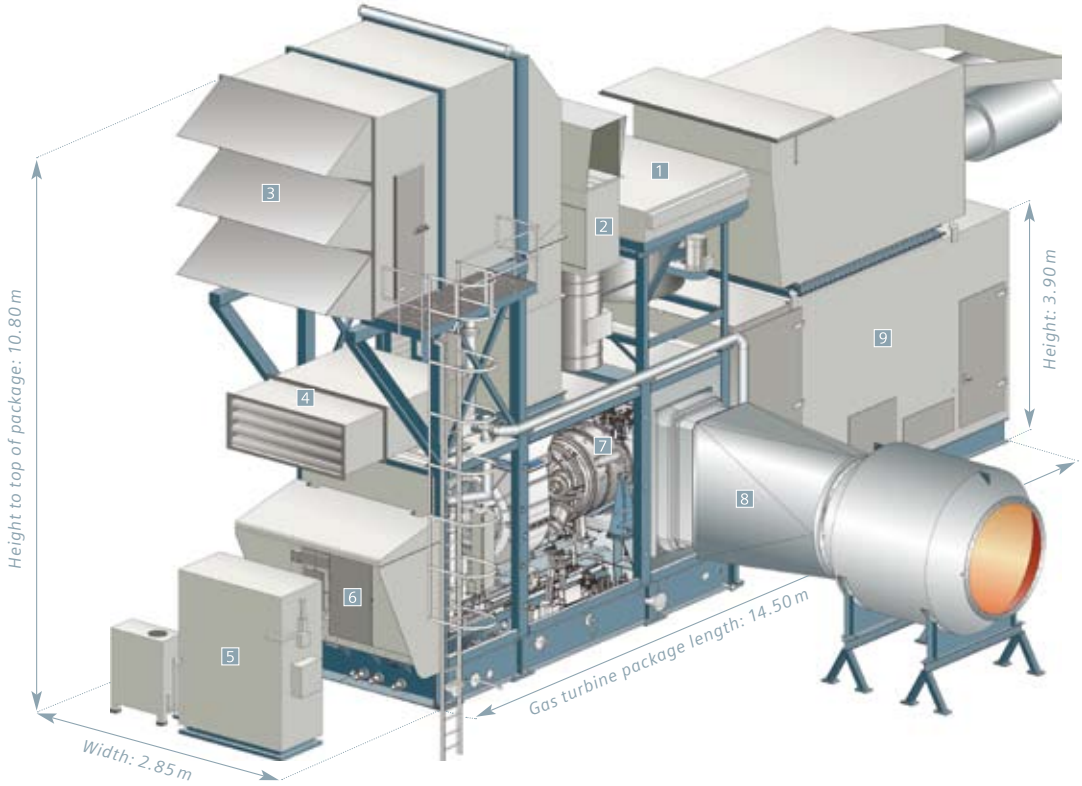
### Key features

- Short installation time
- Compact package size, high power-to-weight ratio
- Factory testing:
  - Core engine
  - Functional testing of modules as standard
  - Pre-commissioning of package
  - Optional core customer-witness test
  - Optional complete package test
- Minimized customer interfaces

## Customer Support

### Key features

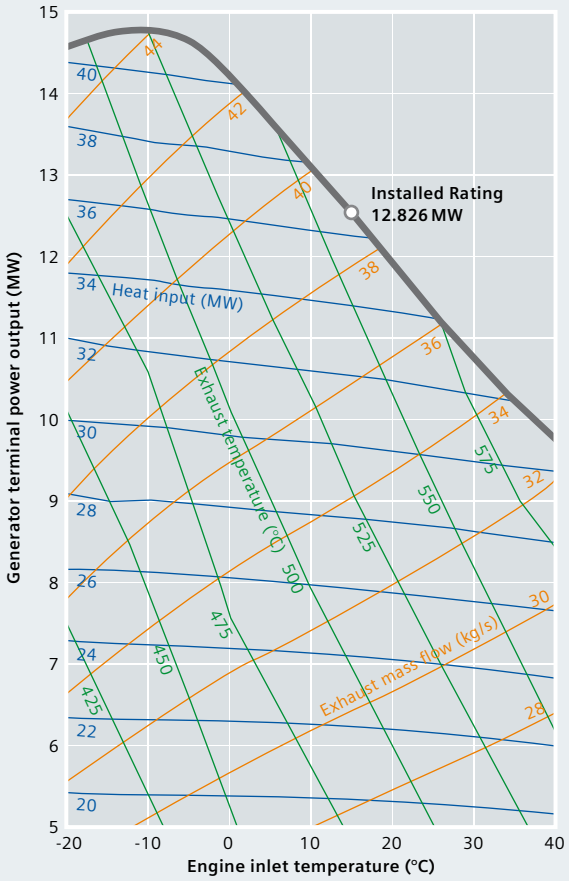
- Global support network of Authorized Service Centers
- Emergency service – 24/7 specialist helpdesk
- Full field service
- Full diagnostic support, remote monitoring
- OEM modernizations and upgrades
- In-house or on-site training programs
- Range of maintenance and service contracts available

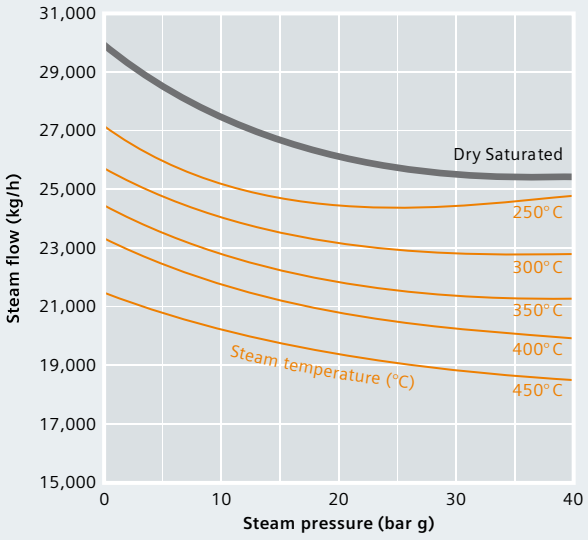



**SGT-400 standard package**

1 Lube oil cooler
2 Enclosure air outlet
3 Combustion air inlet
4 Enclosure air inlet
5 Fire and gas system
6 On-package controls
7 Core engine
8 Combustion exhaust
9 AC generator

# SGT-400 Performance




## Nominal generator output and heat rate

**Conditions/assumptions:**

| | | | |
|---|---|---|---|
| Altitude: | Sea level | Natural gas fuel only. | |
| Ambient pressure: | 101.3 kPa | Gearbox efficiency: | 99.0 % |
| Inlet ducting loss: | 1.0 kPa | Generator efficiency: | 97.2 % |
| Exhaust ducting loss: | 2.0 kPa | Relative humidity: | 60 % |
| (assumes waste-heat recovery) | | No CO-turndown bleed in operation | |

***High ambient PT nozzle*** *– A high ambient temperature (30° C) rating is available to provide higher power at elevated site temperatures using an alternative power-turbine nozzle configuration.*

## Unfired heat-recovery steam generation

**Conditions/assumptions:**

| | |
|---|---|
| Exhaust gas mass flow: | 39.5 kg/s |
| Gas temperature leaving boiler: | 120° C |
| Assumed feed water temperature: | 100° C |
| Exhaust gas temperature: | 573° C |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