



Siemens Steam Turbine SST-3000 Series

for combined cycle applications

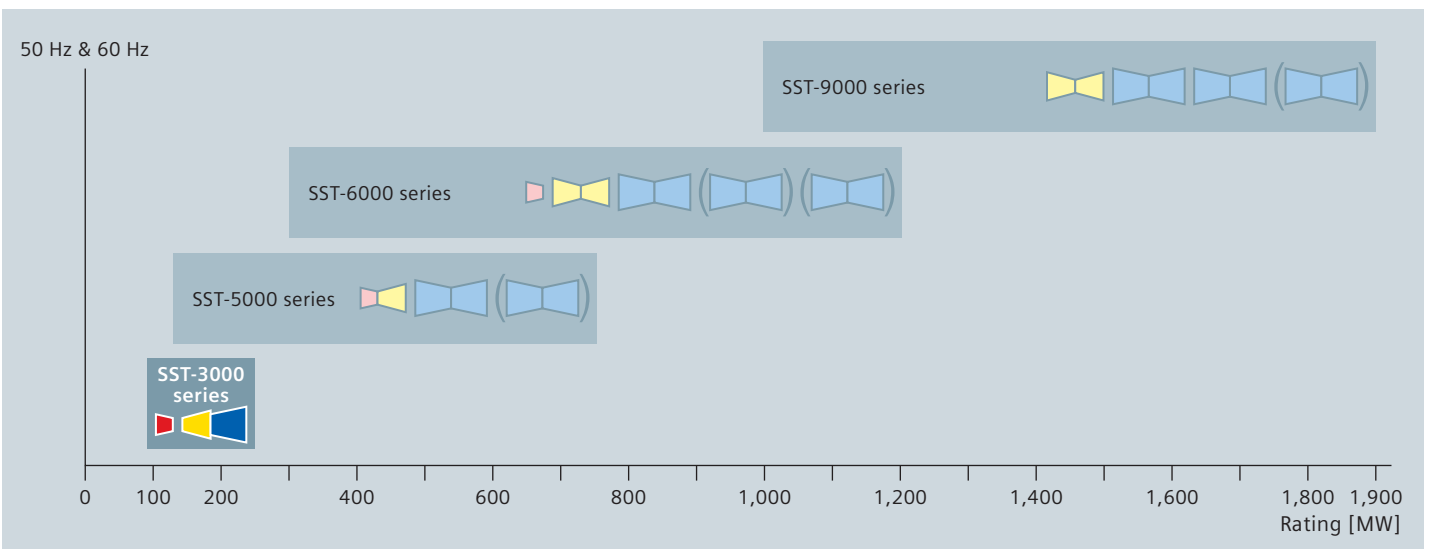
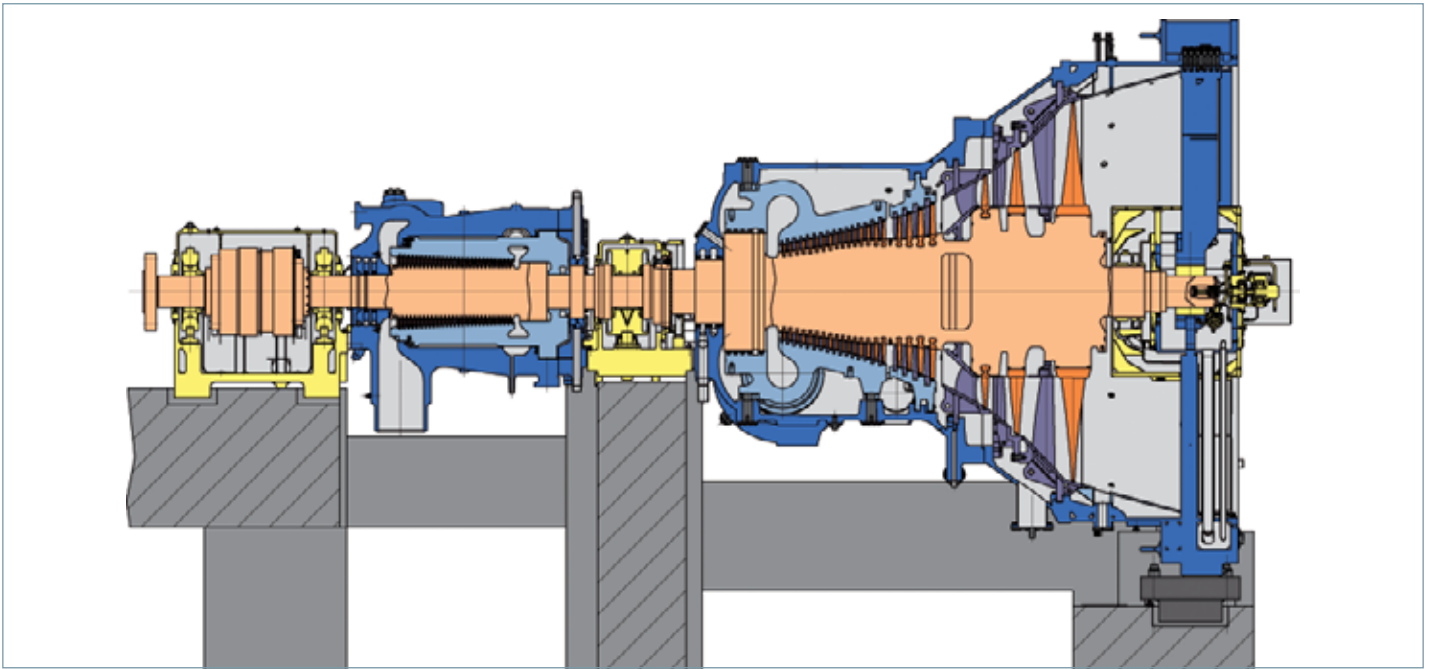


SST5-3000 steam turbine in the combined cycle power plant (CCPP) Ribatejo, Portugal

In our Siemens Steam Turbine (SST™) portfolio, we offer with the SST-3000 series steam turbine a compact arrangement, that features a two-cylinder design with an axial exhaust for application in combined cycle power plants with the latest gas turbine technology.

Turbine modules of different sizes provide a broad range of power ratings. To meet specific project requirements, Siemens selects the appropriate modules and custom engineers the individual blade path.

Proven pre-engineered modules reduce site assembly and commissioning times as well as technical risk. High reliability and availability is demonstrated in a forced outage rate that is less than half of the North American Electric Reliability Council (NERC) average.

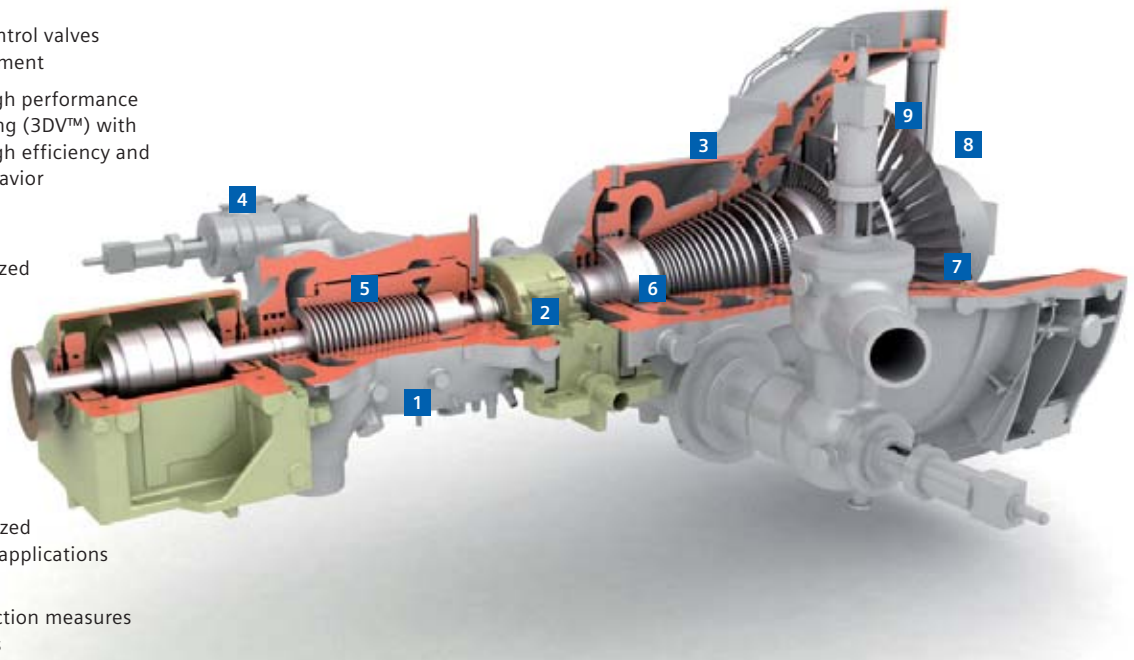


Turbine series	Separate high-pressure (H) cylinder and combined intermediate-pressure/low-pressure (IL) cylinder with single flow axial exhaust for 50 Hz and 60 Hz
Plant type	Combined cycle power plant
Output range	90 MW to 250 MW
Main steam (Typical parameters)	Temperature: up to 565 °C / 1,049 °F Pressure: up to 177 bar / 2,567 psi
Reheat steam (Typical parameters)	Temperature: up to 565 °C / 1,049 °F
Exhaust areas	50 Hz: 5 m ² to 16 m ² 27.5 inches to 56 inches* 60 Hz: 4.4 m ² to 11.1 m ² 24 inches to 47 inches*
* Last blade profile length	

Leading technology for efficient, flexible and reliable power generation

The SST-3000 series steam turbine

- 1 Factory assembled barrel-type high pressure casing for even expansion and optimized radial clearances
- 2 Combined journal-thrust bearing between high pressure and intermediate pressure section for reduced differential expansion
- 3 Compact combined intermediate pressure/low pressure section with straight-flow design for maximum efficiency
- 4 Combined stop and control valves in single valve arrangement
- 5 Fully 3-dimensional high performance variable reaction blading (3DV™) with integral shrouds for high efficiency and excellent damping behavior
- 6 Welded intermediate pressure/low pressure shaft design for optimized material application
- 7 Broad range of state-of-the-art high-performance low pressure blades for different exhaust area sizes
- 8 Axial exhaust and standard blades optimized for high back pressure applications (e.g. dry condenser)
- 9 Efficient erosion protection measures for low pressure blades



Customer benefits

- Compact two-cylinder design for low-level arrangement and axial exhaust
- Highest element efficiencies due to advanced blading technology 3DV™ profiles – variable reaction-type blading
- Designed for short start-up times and operational flexibility
- Standardized auxiliary modules for optimized plant layout and short installation times
- High availability and reduced maintenance costs with 10-year major inspection intervals
- Proven design for applications in single-shaft and multi-shaft combined cycle configurations

SST-3000 series steam turbine: References

With almost 1,000 large scale steam turbine units in operation, the Siemens fleet contributes about 380 GW of power generation capacity, representing 17% of the world's operating fleet. The following references show examples of combined cycle power plant applications with SST-3000 series steam turbines.



Santa Rita/San Lorenzo, Philippines Single-shaft Combined Cycle Power Plant	
Performance:	
Net plant output:	4 x 238 MW/2 x 253 MW
Commercial operation:	2000/2002
Major components:	
Gas turbine:	SGT6-4000F
Steam turbine:	SST6-3000 1 x 6.9 m ² exhaust (32 inches)
Generator:	Hydrogen-cooled series
Steam cycle parameters:	
Triple-pressure reheat	
Main steam:	105 bar/1,523 psi 538 °C/1,000 °F
Reheat steam:	538 °C/1,000 °F
Steam turbine power output:	92 MW



Athens, USA Multi-shaft Combined Cycle Power Plant	
Performance:	
Net plant output:	3 x 383 MW
Commercial operation:	2004
Major components:	
Gas turbine:	SGT6-6000G
Steam turbine:	SST6-3000 1 x 10.3 m ² exhaust (42 inches)
Generator:	Hydrogen- and air-cooled series
Steam cycle parameters:	
Triple-pressure reheat	
Main steam:	125 bar/1,813 psi 565 °C/1,049 °F
Reheat steam:	565 °C/1,049 °F
Steam turbine power output:	133 MW



Ribatejo, Portugal Single-shaft Combined Cycle Power Plant	
Performance:	
Net plant output:	397 MW
Commercial operation:	2006
Major components:	
Gas turbine:	SGT5-4000F
Steam turbine:	SST5-3000 1 x 12.5 m ² exhaust (45.1 inches)
Generator:	Hydrogen-/water-cooled series
Steam cycle parameters:	
Triple-pressure reheat	
Main steam:	125 bar/1,813 psi 565 °C/1,049 °F
Reheat steam:	555 °C/1,031 °F
Steam turbine power output:	142 MW

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