Overview

The SST-600 is a single-casing steam turbine, designed as a direct coupled generator or mechanical drive up to 150 MW. The highly customized turbine provides for an outstanding efficiency, fast start-up times and a high reliability and availability. It meets all customer requirements for economic installation and operation and provides an excellent flexibility for complex industrial processes.

The SST-600 steam turbine can be used for both condensing and back-pressure applications. It is built up from pre-designed modules combined to a single unit for optimum matching of the required parameters. The turbine can be arranged on skids or a foundation or as a package. The SST-600 steam turbine design is in accordance with DIN or API standards.

The robust and proven SST-600 steam turbine covers a wide range of applications, such as:

- Biomass plants, waste to energy, e.g. waste incinerators
- Cogeneration/Combined heat and power (CHP) plants
- Combined cycle power plants
- Concentrated solar power (CSP) plants
- District heating plants
- Heat-recovery
- Industrial power plants, e.g. captive power plants in the chemical industry, manufacturing industries, paper mills, mines, metal and cement plants
- Ships/Offshore

Turbine layout
**Technical data**
- Power output 50 or 60 Hz, up to 150 MW
- Speed from 3,000 to 18,000 rpm
- Live steam conditions:
  - Pressure up to 165 bar/2,395 psi
  - Temperature up to 565 °C/1,049 °F
- Up to 7 bleeds at various pressure levels
- Up to 2 controlled extraction –
  - Pressure up to 72 bar/1,044 psi
- Exhaust steam conditions
  - Back-pressure up to 72 bar/1,044 psi or Condensing

All data are approximate and project-related.

**SST-600 Design Options**

The SST-600 is a single casing turbine with front admission that is suitable for condensing operation as well as for back-pressure operation up to 72 bar. Features such as a horizontal casing split, independently accessible bearings etc., ensure easy and rapid maintenance. Additionally, the guide blade carriers enable easy maintainability or further modifications of the steam path.

The SST-600 steam turbine is available in two design options: The innovative, improved Enhanced Platform technology and its predecessor, the well-established and proven Siemens Building Block design.

**SST-600 – Enhanced Platform Design**
- Single casing, front admission
- Customized steam path
- Axial or radial exhaust
- Flexible
- Modular
- Direct coupled or geared
- Remote control
- Proven, reliable and flexible design
- Improved HP and IP blading
- Increased efficiency (lower flow losses)
- Optimized performance
- Reduced start-up times due to quicker turbine heat-up
- Faster load changes
- Enhanced availability due to simplified maintenance
- Redesigned valve / casing arrangement to optimize internal and external sealing behavior
- Compacter design for simplified transportation

*Now standard design for the SST-600

**SST-600 – Building Block Design**
- Single casing, front admission
- Customized steam path
- Axial or radial exhaust
- Flexible
- Modular
- Direct coupled or geared
- Remote control
- Proven, reliable and flexible design
Siemens SST-600 Enhanced Platform turbine during load and performance tests.

**SST-600 Enhanced Platform**

The advanced and innovative SST-600 Enhanced Platform design combines the best of the existing Siemens steam turbine technologies from the SST-300, SST-400, SST-600, and SST-800 turbine families, e.g., it incorporates features from the proven, well-established Siemens Building Block design as well as from acquired steam turbine technology. The result is a highly customized turbine which meets all customer requirements and is prepared for further development.

**Design Features**

The SST-600 Enhanced Platform allows live steam up to 165 bar and 565 °C and rotational speeds between 3,000 and 18,000 rpm. For double-end drives the maximum power range of 150 MW can be split to divide the power up to 50% per side. The turbine with front steam admission offers the possibility of up to seven bleeds with various pressure levels, or up to five bleeds in combination with two controlled extractions up to 45 bar for internal controlled extraction and 72 bar for external controlled extraction.

The turbine can be arranged on skids or a foundation or as a package.

**Improved Inlet Section**

All alternative designs are created out of pre-designed inlet casings which are combined with various emergency stop valves, control valves, extraction parts, flexible middle sections and exhaust casings. The inlet parts are split into low-pressure and high-pressure, as well as some flexible middle section parts. The improved inlet section, with internally arranged control valves was engineered to get a more compact turbine, compared to the Siemens building block design. The number of valve casings is reduced to two, while nozzle group pipes and flanges were made redundant.

**Advantages**

The SST-600 Enhanced Platform is the ideal steam turbine solution for most power generation and mechanical applications for industries, utilities and for the oil and gas market. High performance, outstanding reliability and an improved efficiency ensured by the new blading design and the optimized steam path has been tested and approved in extensive tests with a fully assembled turbine. The symmetrical casing design and the special valve-chest concept combined with the unique Siemens know-how for steam path and blading result in shorter start-up times, faster load changes and an increased availability. The new design allows for simplified installation and extended maintenance intervals.
SST-600 Building Block

The SST-600 Building Block turbine is a single-casing steam turbine, designed for operation with speed ranging from 3,000 to 15,000 rpm for generator or mechanical drive up to 100 MW. It can be used for both condensing and back-pressure applications, either geared or directly coupled. The turbine is built up from pre-designed modules combined to configure a highly customized machine with a high degree of standardization. Turbine auxiliary systems are also pre-designed into modules covering the complete range of turbine sizes.

Advantages

The SST-600 Building Block turbine is a reliable and well-proven machine, with decades of cycling experiences in various installations worldwide. Resonance-proof blades configured into groups mounted into separate blade carriers support the optimization of the complete steam path, which, together with the design of the blades themselves, underpins the turbine's high efficiency.

Standardization of the blading ensures operational reliability. The drum rotor is designed to ensure that it is not sensitive to shaft vibration, reinforcing the reliability of the turbine.

Design Features

The SST-600 Building Block turbine consists of three main modules: inlet, intermediate and exhaust sections. The complex inlet section consists of emergency stop valve, control valve, internal casing with blading and external casing. The intermediate section can be designed for straight flow, or equipped with with one or two internally controlled extractions and number of bleeds as required. The exhaust section is prepared for axial, downward or upward connection for condensing, while for back-pressure application upward or downward connection is provided.
Installation and maintenance

Mounting the turbine on a separate base frame or on the common frame with gearbox enables easy transportation and installation of the turbine at site. The core turbine arrives ready assembled together with the electrical installation, which substantially shortens the time needed for fitting on the foundations as well as connection of the turbine’s I&C systems into the plant circuit. Features such as a horizontal casing split, independently accessible bearings etc. ensure easy and rapid maintenance. Additionally, the guide blade carriers enable easy maintainability or further modifications of the steam path.

Proven Maintenance Concept
The proven Siemens maintenance concept lowers maintenance cost by enabling easy access to the installed components – the turbine, gearbox, generator and auxiliaries. All service solutions are based on long experience of taking care of a substantial global fleet, and this experience is incorporated systematically into the design and manufacturing as well as into the service and maintenance practice. Siemens is able to provide comprehensive spare-part service, repairs and maintenance solutions designed to increase the reliability and availability of the plant. Innovative retrofit solutions return turbines to the state of the art even after a normal operating life. Long-term maintenance contracts assure prolonged plant operation at predefined costs.

Remote monitoring
As all SST-600 turbines are prepared for remote monitoring, Siemens offers service contracts for condition-based maintenance, customized for the specific operating status of each machine to reduce outage and overhaul costs. Using the remote monitoring technology, customers are able to get fast telephone advice and secure remote support, online help, advanced troubleshooting and intervention, provided by specialist personnel who know the plant’s design and understand its operation.
Reference examples

Duisburg, Germany: An SST-600 Enhanced Platform turbine is running in the Siemens test facility

Port Dickson, Malaysia: 44-MW steam turbine package for an oil refinery with turboset and air blower

Linz, Austria: SST-600 steam turbine generating set in a combined cycle district heating plant

Mölndal, Sweden: SST-600 turbine for the biomass fired Riskulla district heating plant

Gemasolar CSP plant in Andalusia, Spain: A 19 MW SST-600 turbine is used in the solar tower plant

Niklasdorf, Austria: Siemens delivered a SST-600 for the Austrian waste incinerator plant