The SGen-2000H series of hydrogen-cooled, two-pole generators is part of Siemens Generator (SGen™) product line, with ratings up to 600 MVA for steam, gas and combined-cycle applications.

Cooling performance is greatly enhanced through the use of hydrogen as cooling medium compared to air-cooled frames. Due to advanced material technologies and resulting heat transfer benefits, the generator components have been designed to achieve optimal performance while providing safe operation and reliability. In addition, frictional losses are significantly lower than those with air, thus improving the overall generator efficiency and performance.

Our innovative design philosophy strives to continually improve world-class generators in order to meet our customers varying requirements and provide utmost reliability and efficiency.
The generator stator winding assembly is manufactured with Vacuum Pressure Impregnation (VPI) technology or Global Vacuum Pressure Impregnation (GVPI). (G)VPI features advanced epoxy-mica (MICALASTIC®) insulation systems to ensure insulation integrity, to reduce the possibility of loose end-winding components and to reduce moisture and surface contamination, resulting in stator winding with high voltage endurance.

Thin laminations of high-grade, low-loss silicon steel are consolidated to form the stator core. Each lamination is electrically insulated with high-temperature capability material. The laminations are stacked to form the stator core with finger-plates and heavy end-plates at each end. Key bars and insulated through-bolts are used to maintain core integrity and tightness. The resultant stator core assembly features long lasting tightness, mechanical robustness, and excellent heat transfer characteristics, as well as multi zone cooling to reach highest efficiencies.

An optimized rotor slot design provides uniform cooling flow through the rotor while also improving overall dynamic stability. A single-stage blower at each end of the generator results in a uniform thermal load in the generator rotor.

The patented RIGI-FLEX™ end-winding support system has been in successful operation since the 1980s. This well proven bracing system provides rigidity to withstand transient fault loads combined with flexibility to withstand normal operation cyclic thermal expansion and contraction which occurs during start-ups and load changes.

A patented core spring mounting system is used to reduce the noise level and transient forces. The design isolates the double operating frequency core vibration and reduces electrical transient forces on the generator frame and foundation.

Innovative design for world-class performance in power generation: The SGen-2000H generator series

Customer Benefits
- World class efficiency of up to 99%
- Hydrogen seal with carbon elements requires minimal seal oil and has outstanding emergency operating characteristics
- Uniform temperature profile promotes reliability
- Simplified field installation
- Transport dimensions suitable for rail transport in most countries
- Design based on field-proven generator component designs

Siemens has been continuously improving the hydrogen-cooled generator fleet by implementing proven design solutions backed up by over 60 years of industry experience.

Additional improvements include:
- Advanced Performance Plus™ seal system
- Totally enclosed system minimizes the risk of contamination inside the generator
- Integrated & Compact Omega™ Coolers
# Technical data

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Model</th>
<th>Power factor</th>
<th>Apparent power</th>
<th>Efficiency</th>
<th>Terminal voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 Hz</td>
<td>SGen5-2000H</td>
<td>0.80</td>
<td>350 MVA to ~600 MVA</td>
<td>up to 99 %</td>
<td>16.5 kV to 22 kV</td>
</tr>
<tr>
<td>60 Hz</td>
<td>SGen6-2000H</td>
<td>0.85</td>
<td>310 MVA to ~600 MVA</td>
<td>up to 99 %</td>
<td>19 kV to 23 kV</td>
</tr>
</tbody>
</table>

**Coolant**
- Hydrogen at 4 to 5 bar

**Design**
- In accordance with IEC and ANSI standards and EU Directives

**Thermal Classification**
- Class F insulation system

**Type of enclosure**
- IP64 (IEC34-5); suitable for outdoor installation

**Excitation**
- Static

**Transport dimensions**
- Suitable for rail transport in most countries

**Vibration limits**
- According ISO for multi & single shaft application

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**Diagram:**
1. Excitation End
2. Outer (Oil) Seal
3. Bearing Oil Catcher
4. Rotor Shaft
5. Carbon Seal Bracket
6. Carbon Seal
7. Bearing
8. Blower Hub
9. Blower Shroud
10. Omega Cooler
11. Rotating Blades
12. Stator Windings
13. Finger Plates
14. Winding Brace
15. Patented Core Spring Mounted System
The hydrogen-cooled SGen-2000H generator series: References

Our hydrogen-cooled two-pole generator series exceeds an availability of 99.5% and counts with more than 700 units in successful operation for the fleet leader, which have earned Siemens a flawless reputation in the field of reliable power generation of steam and gas turbine applications. Therefore, the following references are only a few examples to illustrate the vast potentials of the SGen-2000H generator series. Successful operation is granted either in baseload, intermediate or peaking regimes.

**Hemweg, Netherlands**
Combined Cycle Power Plant

**Performance**
- Net plant output: 430 MW
- Commercial operation: 2012

**Major components**
- Generator: 1x SGen5-2000H
- Steam turbine: 1x SST5-3000
- Gas turbine: 1x SG10-4000F

**Dangjin 3, South Korea**
Combined Cycle Power Plant

**Performance**
- Net plant output: 415 MW
- Commercial operation: 2013

**Major components**
- Generator: 1x SGen6-2000H
- Steam turbine: 1x SST6-5000
- Gas turbine: 1x SG6T6-8000H

**Baosteel, Shanghai**
Steam Power Plant

**Performance**
- Net plant output: 350 MW
- Commercial operation: 2009

**Major components**
- Generator: 1x SGen5-2000H
- Steam turbine: 1x SST5-5000