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Product Improvement Bulletin

Performance Enhancement 33MW rating

SB05/2016/SGT-700

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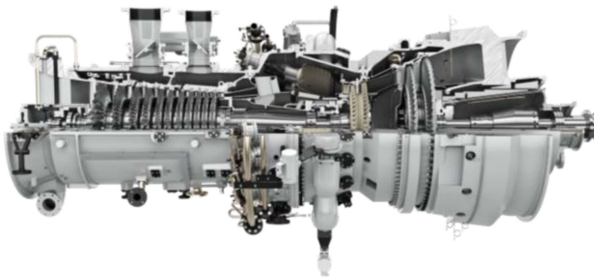
Bulletin applies to

The Power upgrade is applicable to all existing SGT-700 / GT10C units with ratings of 29 and 31 MW in all types of installations. Steam cycles in CC (Combined Cycle) and CHP (Combined Heat and Power) applications need to be able to handle the higher exhaust data.



Reason for Bulletin

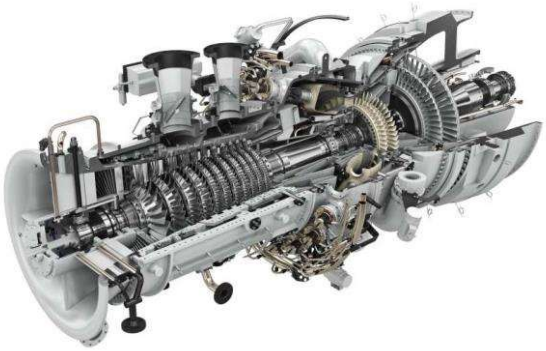
A power upgrade to 33 MW

Siemens Energy is continuously improving its Industrial Gas Turbine portfolio and invests heavily into R&D to bring you top-of-the-line innovations.

As part of our continuous improvement strategy, Siemens Energy is now able to offer a retrofitted upgrade which can increase your SGT-700 Gas Turbine power output up to the latest 33 MW nominal rating. The 33MW variant of the SGT-700 is the latest design and has been in operation since 2011 with an upgrade package now available for all existing customers of SGT-700 units currently of the 29MW or 31MW ratings.

A small increase in MW can have significant benefits

A simple and cost-effective approach to improving power output, lowering relative fuel burn and optimizing your unit for maximized profitability. Should the application be in combined cycle or cogeneration, exhaust data is further improved to boost downstream equipment performance. This simple and cost-effective upgrade can be included easily as part of routine overhaul whilst still maintaining the highest uptime for your unit.



Description

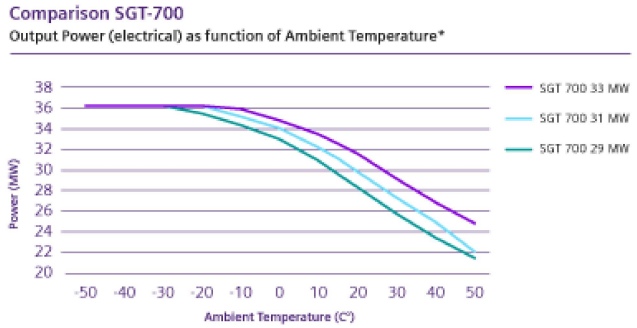
A fast and cost-effective upgrade solution

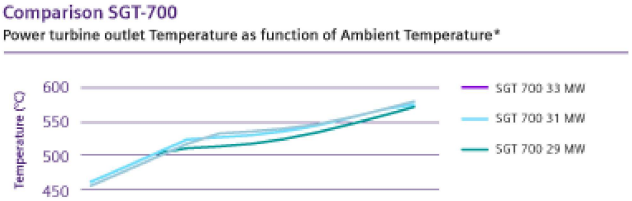
The SGT-700 33 MW power upgrade can be easily achieved with minimal modification to the existing package design during routine unit overhaul. This cost-effective and simple retrofit approach ensures facility down-time is minimized, while performance, power and operator profitability are optimized.

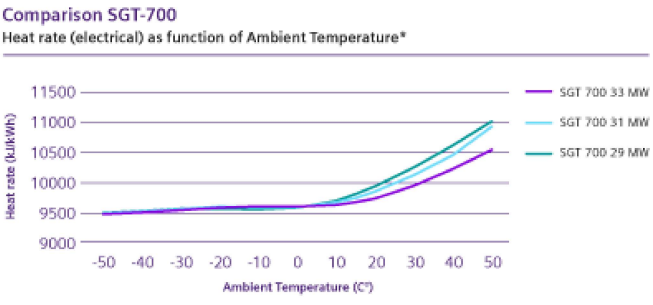
Technical excellence

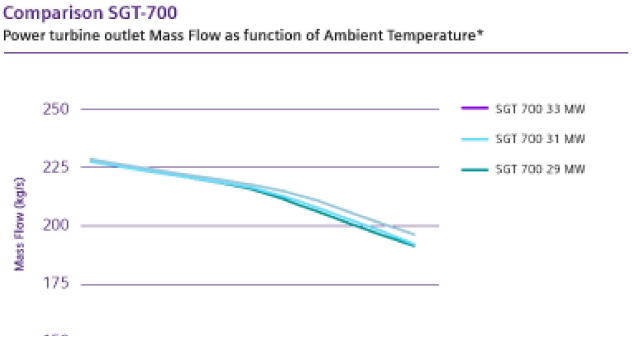
The power enhancement results from:

- Increased mass flow
- Optimization of cooling air distribution
- Introduction of a Thermal Barrier Coating (TBC), on some components. Material temperatures can be kept with a lower amount of cooling air









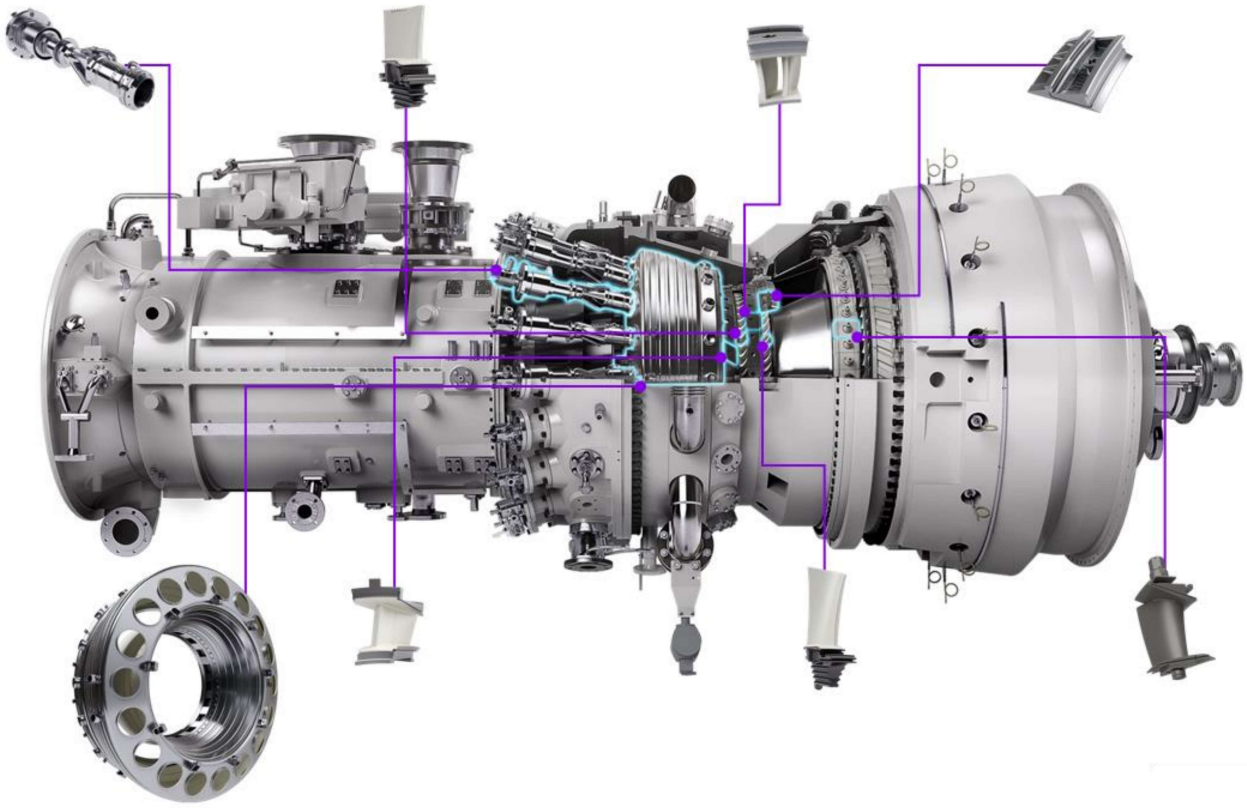
ISO power	32,5 MV€ • 5% increase from SGT-700 31MW rating •10% increase from SGT-700 29 MW rating
Heat Rate	8917 kj/kWh • 0,9% decrease from SGT-700 31MW rating • 1,5% decrease from SGT-700 29MW rating
Exhaust gas flow	96,4 kg/s
Exhaust gas temperature	532 °C
Gas generator	SGT-700 33MW rating
Combustion	3rd Generation DLE
Power Turbine	29/31 MW standard with upgraded Guide Vane 3

Track record of performance enhancements

Siemens Energy has a proven track-record of applying systematic product enhancement and upgrade improvements to increase power output and enhance the efficiency and emissions performance of equipment for owner operators.

What is upgraded?

The power upgrade is based on improvements of the turbine air cooling system and is achieved when installing the latest versions of combustion and compressor turbine hardware coupled with a change of operating limits in the control system.



Burner

- Burner tip design is improved with better cooling and better pilot flame stability.
- Optimized main gas distribution with expected better emissions.

Combustor

- Improved heat shield cooling.
- Optimized cooling of outer liners.
- Increased thickness of TBC.

Guide Vane 1

- Reduced diameter and number of cooling holes.
- TBC on airfoil and platform.

Turbine Blade 1

- TBC on airfoil and platform.
- New core with separate leading edge cooling channel.

Guide Vane 2

- Closed angle to improve performance.

Turbine Blade 2

- TBC on airfoil and platform.
- Shroud removed.

Heat Shield 2

- New design because of shroudless blade 2.
- Abradable coating for minimized tip clearances.

Guide Vane 3

- Addition of oxidation coating.

Planning and Implementation

The performance enhancement is preferably implemented during a major inspection but can be implemented at other convenient times if required.

Your Siemens Energy service contact will support you in identifying the scope of the modification.

Your Benefit

- Improved power output (MW).
- Improved efficiency.
- Improved input data for combined cycle operations.
- Simple to upgrade.

Sincerely yours

Alastair Clegg

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