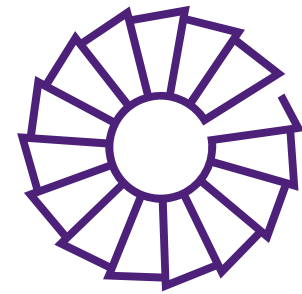


Product Improvement Bulletin

Upgrade of SGT-600 with 3rd Generation DLE system
to support flexible operation and emission reduction

SB09/2014/SGT-600

Edition: C
Date: 2017-07-05
Document number: SB09/2014/SGT-600



Bulletin applies to

SGT-600

Background

Environmental requirements have increased over the last few years and will continue to set even tougher demands on gas turbine emissions. The European Union has, for example, enforced an update to the Industrial Emission Directive (IED) where the limits of NO_x and CO emissions are reduced for certain gas turbine applications to 50 mg/Nm³ NO_x and 100 mg/Nm³ CO, at certain load ranges. Although these emission levels could be reached with the existing SGT-600 combustion system, for certain load and temperature ranges, future lower requirements might not be possible to reach. Additionally, the increasing portion of renewable energy sources in the energy mix along with variations in the electricity demand increases the need for flexible operation capability of existing plants while retaining lowest possible emissions at all power output ranges.

Siemens Energy's product and environmental strategy has driven the development of the SGT-600 to incorporate the latest

3rd generation combustion system, as has been done in the well proven SGT-700 and SGT-800 gas turbine designs. The new SGT-600 3rd generation DLE design delivers reduced emissions, even at low part load levels, combined with increased operation flexibility to meet upcoming emission and market challenges.

Description

The upgraded SGT-600 core engine is fitted with the proven 3rd generation DLE combustion system and an improved turbine stage one, see figure 1. Benefits with the upgrade are improved emission values and higher power output in hot ambient conditions. Moreover, depending on upgrade level and unit configuration, maintenance intervals could be improved along with the maintenance plan lifecycle.

To ensure a fast and effective upgrade, Siemens Energy can, upon order, engineer and perform any necessary rebuild of the gas turbine package to accommodate the upgraded core engine with the 3rd generation DLE.

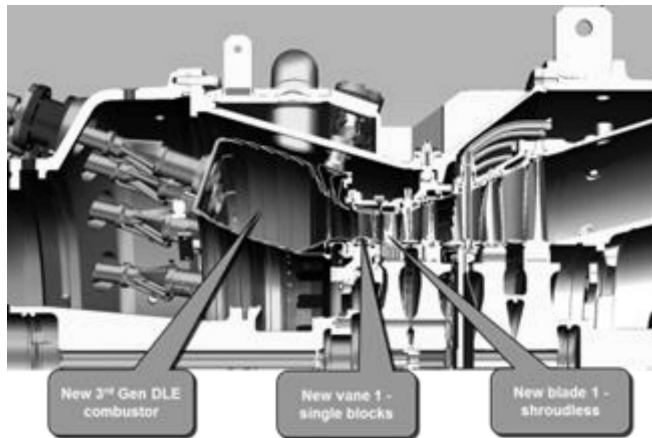


Figure 1: SGT-600 3rd generation DLE, detail of the combustion and turbine sections.

3rd generation DLE upgrade for reduced emission levels

This upgrade focuses on the combustion system and the compressor turbine stage 1. The combustion system is replaced with a new 3rd generation DLE combustion system in order to reduce NO_x emission levels down to 30 mg/Nm³. The turbine upgrade is a necessary step to make operation with 3rd generation DLE possible through the entire output range. CO emission levels can be reduced down to 30 mg/Nm³ with an optional modification included in this package.

Power output upgrade

The 3rd generation combustion system, combined with assessment and upgrade of the installed turbine and exhaust components, increases power output at hot ambient conditions, that is, at ambient temperatures over 35 °C. Example of typical power augmentation is +1,3 MW at 45 °C.

This upgrade includes all benefits achieved in the emission upgrade.

Availability upgrade

This option includes a complete core engine assessment and upgrade necessary to enable for extended maintenance intervals up to 34 kEOH, see below in figure 2. This upgrade option ensures highest availability of the SGT-600 in terms of longer service intervals between major inspections.

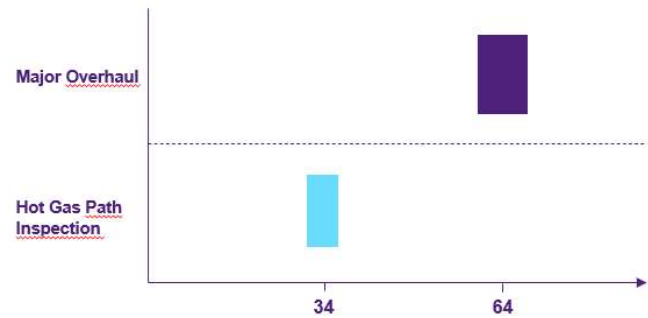


Figure 2: Example of maintenance interval for the SGT-600 3rd generation DLE.

This upgrade includes all the benefits achieved in the emission and power output upgrades.

Your benefit

Continued operation of your SGT-600 installation with emission levels down to NO_x 30 mg/Nm³ and CO 30 mg/Nm³ and:

- Introducing further operation flexibility and cyclic capability.
- Allowing running part load operation while retaining lowered emissions.
- Longer service intervals between major inspections (34 kEOH) for increased availability.
- Continued reliable operation of the SGT-600 unit with the well proven 3rd generation DLE system.
- Retrofit scope adapted to customer needs in terms of emissions, power output or availability.
- Minimized plant rebuild for lowest cost of upgrade.

Further information

All upgrade alternatives here described require rebuild of the current customer owned package and auxiliaries. The exact scope of work for the retrofit depends on the package generation, actual control system and the installed equipment at site.

Please use your regular Siemens Energy representative for further advice and a specific proposal for your installation regarding the recommended actions in this Service Bulletin.

Sincerely yours

Anders Nilsson

SGT-600 Product Manager

Siemens Energy AB
Finspong, Sweden

Published by

Siemens Energy AB
SE-612 83 Finspong, Sweden

For more information, please visit our website:
siemens-energy.com

No warranties, expressed or implied, whether of fitness for purpose or merchantability, from course of dealing or usage of trade, as to the completeness, usefulness, adequacy, or accuracy thereof, or otherwise, are made regarding the information, recommendations, or descriptions contained in this product improvement bulletin.

Any obligation or liability of Siemens Energy shall be solely if and to the extent set forth in existing contracts, if any, and nothing in this Product Improvement Bulletin shall be deemed or construed to give rise to any additional obligation or liability of Siemens Energy.

This Product Improvement Bulletin is confidential to Siemens Energy. Neither this document nor any information contained in it is to be reproduced, transmitted, disclosed or used otherwise in whole or in part without the written authorization of Siemens Energy.

If you require further information or to make the necessary arrangements in respect of your installation please contact your Siemens Energy designated Project Manager or Customer Support Manager or your regional Siemens Energy Representative.

The Bulletin is submitted in confidence and is to be used solely for the purpose for which it is furnished. This Bulletin is not to be reproduced, transmitted, disclosed or used otherwise in whole or in part without the written consent of Siemens Energy AB, Sweden.

Trademarks mentioned in this document are the property of Siemens Energy, its affiliates or their respective owners.

The technical and other data contained in this document is provided for information only. Neither Siemens Energy AB, its offices nor employees, accept responsibility for, nor should be taken as making any representation or warranty (whether expressed or implied) as to the accuracy or completeness of such data or the achievement of any projected performance criteria where these are indicated. Siemens Energy AB reserves the right to revise or change this data at any time without further notice.

Siemens Energy is a trademark licensed by Siemens AG.