PSM
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FlameSheet™

A Revolution in Combustion Technology for Power Generation Gas Turbines

PSM'S PREMIER COMBUSTOR DESIGNED FOR ULTIMATE FLEXIBILITY

The future is now! PSM has been successfully implementing FlameSheet™ on multiple engine frames over the recent years. Whether the market demands include fuel flexibility, higher peaking and turndown capabilities, or longer run time, FlameSheet™ has the answer.

FlameSheet™ Cross-section

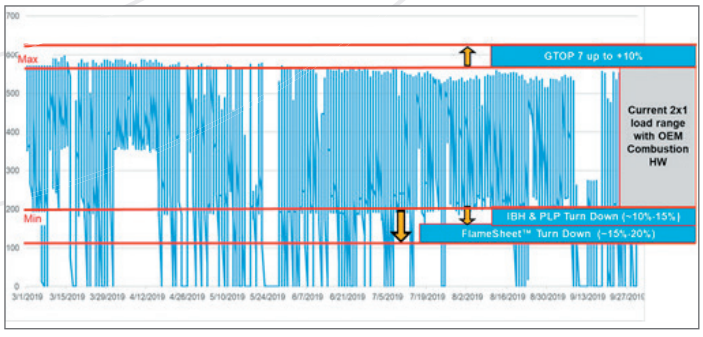
FlameSheet™ Benefits

+ Up to a 30% increase in GT operating load range with single digit NOx and CO
+ Optional low load HRSG protection setting
+ Superior Fuel Flex
  - 30% Modified Wobbe Index
  - Ideally suited for alternate fuel operation, including hydrogen, ethane, and propane
    + Up to 60% Hydrogen mix (demonstrated 80% in rig testing conditions!)
    + Up to 40% Ethanes (C2)
    + Up to 10% Butanes (C4-C6)
    + Up to 20% Propane (C3)
  - PSM is on our way to 100% Hydrogen capability!
+ NOx as low as 5ppm
+ Peaking power at constant NOx emissions
+ Dual fuel capable
+ Up to 32K / 1250 start inspection intervals
+ Compatible with plant's existing GT controller and fuel skids

It is now necessary more than ever for gas turbines to be able to be operationally flexible. FlameSheet™ coupled with PSM's digital platform, FlexSuite™, and GTOP program allows users to maximize their operating profile while adhering to strict emissions demands.

501F FlameSheet™ ready to be sent to site for 2020 installation along with PSM's 501F GTOP7

40% operational range increase possible (2x1) with PSM Upgrades. The example above includes GTOP7, FlameSheet™, FlexSuite™ with AutoTune and PLP (Part Load Performance), and IBH (Inlet Bleed Heat) when compared with a standard OEM 501FD2.



Allows users to take advantage of market swings, reduce operating fuel costs, and defer maintenance costs (capital and O&M).

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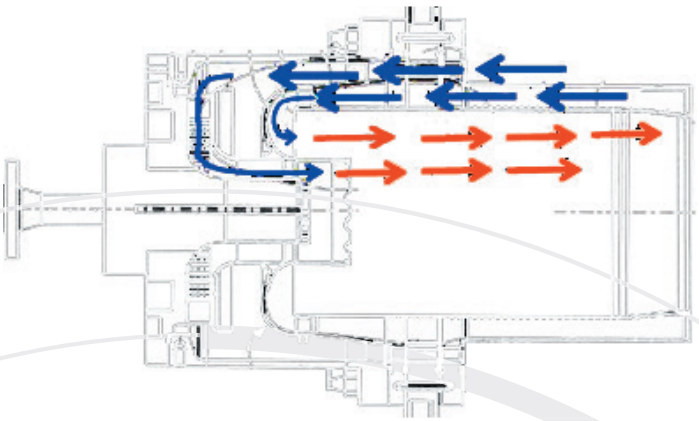
HOW IT WORKS

+ Aerodynamic trapped vortex to ensure wide stability margin
+ Flame isolation – Combustor within Combustor to allow extended turndown operation
+ High premixer exit velocities for tolerance to highly reactive fuels
+ Robust mixing techniques for improved fuel flexibility and tolerance to fuel Wobbe index variation



FlameSheet™ employs a simple, two-stage radially-inflow "combustor-within-a-combustor" concept that allows the staged operation of each at various load conditions. While at high loads, both combustors are used, with the outer combustor flame structure looking like an annular "sheet of flame" around the inner combustor. At low loads, the outer combustor is predominantly used. Leveraging trapped vortex stabilization aerodynamics, the outer combustor operates with excellent stability & remains sufficiently hot at very low loads to consume CO (CO typically limits low load operation).

FlameSheet™ combustion systems are available now for a wide variety of GE, Siemens-Westinghouse, MHI, and other gas turbine engines.

Superior Turndown, Fuel Flexibility, and Emissions Capability

PSM is the premier global gas turbine combustion engineering and service solution provider. We manufacture combustion systems to achieve industry and market demands that enable our customers to be competitive now and the future energy industry.

FlameSheet™ is the ultimate combustor solution to meet any new conditional operational needs. As the power generation market continues to be impacted by renewable penetration, low natural gas prices from fracking, and dynamic financial market changes, users are forced to reevaluate their fleets in order to remain relevant. PSM's FlameSheet™ technology is a perfect solution for ultimate flexibility along with the added benefit of 'future-proofing' the traditional GT power plant as the market looks to the horizon of alternatives to batteries such as the hydrogen 'power to gas', burning larger quantities of shale gas, ultra-low emissions, and more, all while revitalizing aging fleets in opposition to the cost of new unit installations.

Future-proof your engines today with the ultimate in combustion technology!

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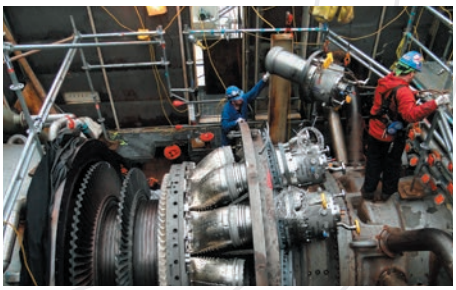

Additional Services and Product Offerings:
Servicing GE, SW, MHI: B, E & F Class Fleets for 50Hz & 60Hz

Field Services & Outage Management including on-staff bladers and supply of labor for gas turbines, steam turbines and generators worldwide for GE B,E & F-class, SW & MHI F-class.

Reconditioning & Repair of all turbine airfoils and combustion system components, including fuel nozzle overhaul using advanced techniques for improved life cycle cost and incorporating new make design improvements during repair

Combustion System Engine Tuning including Monitoring & Diagnostics
Support for all rotating equipment (e.g. remote monitoring) of gas turbines worldwide.

Rotor Rebuild & Inspection including seed rotors, new replacement compressor and turbine disks, disk repairs, full volumetric NDE inspection and rotor lifetime extension.

R&D, Engineering Assessments, Root Cause Analysis and system technical support for gas turbines.

Flexible Long-Term Parts and Service Agreements (LTSA) combine all of PSM's products and services for a custom solution that meets your needs.

Power Plant Solutions provide integrated services and upgrades for all your critical power plant components and systems. PSM provides a single point of contact for maximizing your plant's performance potential, increasing operational flexibility, and outage management.

FlexSuite provides plant optimization tailored to your exact needs, offer on multiple OEM control systems, from FastStart & FastRamp to Part Load Performance

AutoTune offers autonomous, real-time combustion system control tuning packages for optimizing combustion dynamics/pulsations, emissions and output on the GE 7F gas turbines.

GTOP Upgrade Packages increase output and reduce heat rate, while extending component lifetime and inspection intervals.

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