

Gas Turbine Review

GE Energy Oil & Gas has introduced on its 2-shaft GE10-2 gas turbine a new combustor capable of lowering NO_x emission below 15 ppm (with 15% O₂ ppmvd) in mechanical drive applications, with natural gas fuel.

This machine is specifically intended for compressor drive along small and medium size pipelines, a duty requiring wide power variation. For this reason the system has been designed to guarantee such low emission level in the whole power range between 50 and 100% of rated power (11,615 kW ISO) and within a temperature bracket extending from -29 to +38 °C. In spite of the low NO_x, CO emission level have been maintained below 25 ppmvW.

The new system, which does not use catalytic hardware, is retrofittable to existing units featuring a 25 ppm NO_x combustor.

The new combustor is an evolution of the PGT10 and GE10 25 ppm combustor which has shown its reliability and robustness in over 800,000 hours operation. Emission reduction has been obtained by replacing the diffusive pilot flames previously used with four GE5 premixed pilot burners located in the liner cap which stabilize the main flame. The combustion system also includes a flame detector, flashback thermocouples and a humming detection system for full flame control.

In order to maintain constant the fuel to air ratio within all the wide operating range (50-100% power) air admission in the combustion zone is controlled by a variable geometry valve. This valve consists of two coaxial slotted cylinders the external one of which is fixed and the internal can rotate around its main axis.

At full load the slots of the two cylinders coincide providing maximum air flow in the combustion zone, when the load lowers the internal cylinder rotates so that the openings of the slots progressively overlap reducing the air passage area.

The system ensures a continuous adjustment of the fuel air ratio, with an excellent turndown capability and also eliminates the need of re-mapping between combustion inspections.

The same system will be used on the single shaft GE10 in the near future.

