Direct Steam Gas Generator: DSGG400

Product Description

The DSGG400 is a pressurized gas generator that combusts gaseous fuel with oxygen and controls combustion temperature via water injection. It creates thermal energy for power, industrial, or chemical processes while enabling >99% carbon capture and is rated for 20 MW_t when operating on pipeline quality natural gas fuel at design pressures. The combustion products are primarily steam and carbon dioxide (H_2O and CO_2) which enables simple carbon capture via gas liquid separation without the need for harsh chemicals such as amines.

Applications

- Clean Firm Power
- Combined Heat and Power (CHP)
- Industrial Decarbonization
- Clean Steam Production
- Produced Water Treatment & Thermal Enhancement
- Enhanced Oil and Gas Recovery (EOR, EGR)

Features

- Fully containerized or skid mounted solutions for minimal install time and cost
- Fully automated control system via Allen Bradley PLC, e.g. fuel demand, temperature control, load following, etc.
- Independent control over produced gas pressure and temperature
- Easy access maintenance system for full module or component replacement
- Unit can be completely overhauled in <24 hours
- Built to ASME BPVC Section VIII Division 2
- Increased safety via high-speed ignition detection (on the order of <500ms) and minimal stored volume; unit can be tripped, purged, and made safe for internal work in <15min.

Materials of Construction

Typical materials of construction of the DSGG are SS316 for a wide array of applications and corrosion resistance. The burner is manufactured with Inco 600 for high pressure oxygen compatibility. Non-standard applications may require the use of nickel alloys, stabilized stainless such as SS321, copper, or copper alloys.

Typical Dimensions: L 40-45' x W 11' x H 11' (12-14m x 4m x 4m) in operational enclosure

Nominal Operating Conditions

Thermal Rating	68 MM btu/hr (20 MW_t) at maximum pressure
Fuel Type	Natural Gas. Other fuels available on request.
Fuel Heating Value	Nominal: 20,260 btu/lb (47.1MJ/kg); Range: 3,500-51,590 btu/lb (8.14-120 MJ/kg)
Fuel Flow Rate	3,348 lb/hr (1,518 kg/hr)
Oxidizer Type	94.0-99.5 mol% oxygen; additional purity available on request
Oxidizer Flow Rate	12,816 lb/hr (5,813 kg/hr)
Diluent Type	Water
Diluent Flow Rate	66,780 lb/hr (30,291 kg/hr)
Coolant Type	Boiler quality water or ethylene glycol
Coolant Flow Rate	18,000 lb/hr (8,165 kg/hr)
Drive Gas Output Flow Rate	Up to 50,000 lbs/hr (22,680 kg/hr)
CO_2 Output Flow Rate	Up to 1,850 mscfd (~100 tonnes per day) based on natural gas fuel
Drive Gas Composition	~94 mol% H_2O, 6 mol% CO_2
Exit Temperature	Saturation temperature up to 3,200 °F (1,760 °C)
Supply Pressure	Up to 1,500 psi (103 bar); customizable up to 5,000 psi (345 bar). Does not include piping or valve losses
Exit Pressure	Up to 1,350 psi (93 bar); customizable up to 4,500 psi (310 bar)
Operating Range	30-100% fuel demand