

# 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<sub>t</sub> when operating on pipeline quality natural gas fuel at design pressures. The combustion products are primarily steam and carbon dioxide (H<sub>2</sub>O and CO<sub>2</sub>) 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

	Nominal	Customizable Range
<b>Thermal Rating</b>	68 MMBtu/hr (20 MW <sub>t</sub> )	Up to 205 MMBtu/hr (60 MW <sub>t</sub> )
<b>Fuel Type</b>	Pipeline Natural Gas	Other gaseous fuels upon request
<b>Fuel Heating Value</b>	20,260 Btu/lb (47.1 MJ/kg)	3,500 - 51,590 Btu/lb (8.14-120 MJ/kg)
<b>Fuel Flow Rate</b>	3,348 lb/hr (1,518 kg/hr)	Up to 10,000 lb/hr (4,536 kg/hr)
<b>Oxidizer Type</b>	98 mol% Oxygen	90 - 100 mol% Oxygen
<b>Oxidizer Flow Rate</b>	12,816 lb/hr (5,813 kg/hr)	Up to 31,070 lb/hr (14,090 kg/hr)
<b>Diluent Type</b>	Water	Water, salt water, produced water
<b>Diluent Flow Rate*</b>	66,780 – 90,000 lb/hr (30,290 – 40,820 kg/hr)	Based on required drive gas exit temperature
<b>Coolant Type</b>	Boiler quality water	Boiler quality water, ethylene glycol, TEG
<b>Coolant Flow Rate</b>	18,000 lb/hr (8,165 kg/hr)	Varies by design and site conditions
<b>Drive Gas Output</b>	82,944 lbs/hr (37,622 kg/hr)	Up to 311,070 lbs/hr (141,099 kg/hr)
<b>CO<sub>2</sub> Output</b>	1,850 mscfd (100 tonnes per day)	Up to 17,880 mscfd (940 tonnes/day)
<b>Drive Gas Composition</b>	~94 mol% H <sub>2</sub> O, 6 mol% CO <sub>2</sub>	Up to 90% CO <sub>2</sub> content
<b>Exit Temperature</b>	Saturation up to 3,200 °F (1,760 °C)	
<b>Supply Pressure</b>	1,800 psi (124 bar)	Up 5,000 psi (345 bar)
<b>Exit Pressure</b>	1,500 psi (100 bar)	Up to 4,200 psi (290 bar)
<b>Operating Range</b>	30 – 100% fuel demand	

\*Diluent flow rate varies according to temperature control inputs and diluent supply temperature