

GE FRAME 9E TURBINES



PG9171-E 123-MW / 50-HZ DUAL FUEL TURBINES

SPECIFICATIONS

Number of Units: [8] *NEW* Units

Design Application: Designed for High Ambient Temperatures

Delivery Time: Immediate

Warranty: Full, 18 months from delivery, or 12 month operation.

Payment: LC

Validity: 30 days – subject to prior sale –

Package: 106 Ft Long 36 Ft High (Air Intake) X 10 Ft Wide Plus Electrical House & Cooler Assembly

| | <u>Dimensions:</u> | <u>Weights:</u> |
|------------------------|---------------------------|------------------------|
| Gas Turbine: | 12.66 m x 5.03m x 5.05m | 202-Tons |
| Accessory Compartment: | 8.45m x 3.45m x 4.10m | 43.5-Tons |
| Exhaust Plenum: | 5.35m x 3.45m x 3.94m | 22.5-Tons |
| Exhaust Accessories: | 5.55m x 3.65m x 0.76m | 6.4-Tons |
| Load Compartment: | 5.30m x 1.90m x 1.05m | 4.6-Tons |

GE FRAME PG9171 TECHNICAL DESCRIPTION

GE Frame PG9171 Technical Description(s)

| General Operating Conditions | |
|-------------------------------------|--|
| Atmospheric Pressure | 1012 mbar |
| Design ambient temperature | 50° centigrade |
| Minimum ambient temperature | -6° centigrade |
| Maximum ambient temperature | 55° centigrade |
| Design relative humidity | 30% |
| Minimum relative humidity | 5% |
| Maximum relative humidity | 95% |
| Seismic code | UBC97 |
| Horizontal acceleration | 0.2 g |
| Grid code | No specific requirement |
| Gas Turbine | |
| Frame size | PG9171 |
| Fuel system | Dual fuel (natural gas + light diesel oil) |
| Starter | Electrical motor |
| Air filtration | Self-cleaning |
| Compressor/turbine cleaning | On and off-line compressor water wash and off-line turbine washing |
| Exhaust system | Side right |
| Fire protection | High pressure CO ₂ |
| Generators | |
| Model | Models GE9A5, Brush BDAX9, or Alstom T900B as a function of availability |
| Frequency | 50 Hz |
| Power factor | 0.85 lagging |
| Power factor | Up to 0.95 leading |
| Terminal voltage | 15.0 kV |
| Control Systems | |
| Gas turbine | Speedtronic Mark VIe (TMR) |
| Generator | |
| | |

Estimated Performance – Base Load, Liquid Fuel

Estimated Performance – PG9171

| Load Condition | | Base | Base | Base |
|-------------------------|--------|-------|------|------|
| Exhaust static pressure | mm H2O | 106.7 | 75.6 | 72.4 |
| Ambient temperature | deg C | -.5 | 50 | 55 |

| Estimated Performance – PG9171 (Liquid Fuel Continued...) | | | | |
|---|------------------------|------------------------|---------|---------|
| Load Condition | | Base | Base | Base |
| Evaporator cooler status | | Off | On | On |
| Evaporator cooler effectiveness | % | | 85 | 85 |
| Fuel type | | Liquid | Liquid | Liquid |
| Fuel LHV | kJ/kg | 41,800 | 41,800 | 41,800 |
| Fuel temperature | deg C | 40 | 40 | 40 |
| Liquid fuel H/C ratio | | 1.64 | 1.64 | 1.64 |
| Gross output | kW | 137,500 | 105,100 | 105,100 |
| Gross heat rate (LHV) | kJ/kWh | 10,770 | 11,380 | 11,470 |
| Heat cons. (LHV) | GJ/hr | 1,480.9 | 1,196.0 | 1,164.2 |
| Exhaust flow | x10 ³ kg/hr | 1,658.3 | 1,381.2 | 1,350.8 |
| Exhaust temperature | deg C | 500.6 | 533.3 | 537.2 |
| Exhaust MolWt | kg/kgmol | 28.79 | 28.40 | 28.31 |
| Exhaust energy | GJ/hr | 884.7 | 724.8 | 710.6 |
| Water flow | kg/hr | 22,639 | 12,388 | 10,088 |
| <u>Emissions</u> | | | | |
| NOx | ppmvd@15% O2 | 80 | 80 | 80 |
| CO | ppmvd | 10 | 10 | 10 |
| UHC | ppmvw | 7 | 7 | 7 |
| Particulates | kg/hr | 5 | 5 | 5 |
| <u>Exhaust Analysis</u> | | | | |
| Argon | | 0.89 | 0.86 | 0.85 |
| Nitrogen | | 74.86 | 72.16 | 71.54 |
| Oxygen | | 13.74 | 13.29 | 13.17 |
| Carbon Dioxide | | 4.53 | 4.34 | 4.30 |
| Water | | 5.98 | 9.36 | 10.14 |
| <u>Site Conditions</u> | | | | |
| Site Pressure | Bar | 1.0120 | | |
| Inlet loss | mm H2O | 75.00 | | |
| Exhaust static pressure | mm H2O | 90.00 @ ISO conditions | | |
| Relative humidity | % | 30 | | |
| Application | | TEWAC Generator | | |
| Power factor | | 0.85 | | |
| Combustion system | | Non-DLN combustor | | |

| Estimated Performance – Base Load, Gas Fuel | | | | |
|---|--------|-------|------|------|
| Estimated Performance – PG9171 | | | | |
| Load Condition | | Base | Base | Base |
| Exhaust static pressure | mm H2O | 106.2 | 75.4 | 72.3 |
| Ambient temperature | deg C | -5 | 50 | 55 |
| Evaporator cooler status | | Off | On | On |
| Evaporator cooler effectiveness | % | | 85 | 85 |

| Estimated Performance – PG9171 (Continued...) | | | | |
|---|------------------------|------------------------|----------|----------|
| Load Condition | | Base | Base | Base |
| Fuel type | | Cust Gas | Cust Gas | Cust Gas |
| Fuel LHV | kJ/kg | 46,670 | 46,670 | 46,670 |
| Fuel temperature | deg C | 42 | 42 | 42 |
| Gross output | kW | 140,500 | 108,200 | 104,600 |
| Gross heat rate (LHV) | kJ/kWh | 10,680 | 11,290 | 11,380 |
| Heat cons. (LHV) | GJ/hr | 1,500.5 | 1,221.6 | 1,190.3 |
| Exhaust flow | x10 ³ kg/hr | 1,654.7 | 1,380.3 | 1,349.9 |
| Exhaust temperature | deg C | 499.4 | 532.2 | 536.1 |
| Exhaust energy | GJ/hr | 893.8 | 733.2 | 718.9 |
| Water flow | kg/hr | 22,453 | 13,989 | 11,816 |
| <u>Fuel Composition</u> | | | | |
| CH4 – Methane | % vol | 85.00 | 85.00 | 85.00 |
| H2 – Hydrogen | % vol | 0.10 | 0.10 | 0.10 |
| C2H6 – Ethane | % vol | 11.00 | 11.00 | 11.00 |
| C3H8 – Propane | % vol | 1.00 | 1.00 | 1.00 |
| C4H10 – Butane | % vol | 0.30 | 0.30 | 0.30 |
| N2 – Nitrogen | % vol | 0.50 | 0.50 | 0.50 |
| CO2 – Carbon Dioxide | % vol | 2.00 | 2.00 | 2.00 |
| H2S – Hydrogen Sulfide | % vol | 0.10 | 0.10 | 0.10 |
| <u>Emissions</u> | | | | |
| NOx | ppmvd@15% O2 | 50 | 50 | 50 |
| CO | ppmvd | 10 | 10 | 10 |
| UHC | ppmvw | 7 | 7 | 7 |
| Particulates | kg/hr | 2 | 2 | 2 |
| <u>Exhaust Analysis</u> | | | | |
| Argon | | 0.89 | 0.86 | 0.85 |
| Nitrogen | | 73.88 | 71.10 | 70.48 |
| Oxygen | | 13.43 | 12.92 | 12.80 |
| Carbon Dioxide | | 3.38 | 3.25 | 3.23 |
| Water | | 8.43 | 11.88 | 12.64 |
| <u>Site Conditions</u> | | | | |
| Site Pressure | Bar | 1.0120 | | |
| Inlet loss | mm H2O | 75.00 | | |
| Exhaust static pressure | mm H2O | 90.00 @ ISO conditions | | |
| Relative humidity | % | 30 | | |
| Application | | TEWAC Generator | | |
| Power factor | | 0.85 | | |
| Combustion system | | Non-DLN combustor | | |