

Bergen K gas engine projects

Unique Power Plant Ltd, Bangladesh



Fact sheet

Project description

Located outside of Dhaka, close to Meghna Bridge in the Narayanganji district of Bangladesh, this installation uses three K-gas engines to provide reliable power and steam to the adjacent Meghna Group factory site. The CHP plant (Combined Heat and Power) is a captive IPP owned by Unique Power Plant Ltd. a subsidiary of Meghna Group Ltd.

The CHP plant supplies electricity to United Cement Industries Ltd. and several other of Meghna Group's surrounding factories. Steam is supplied to Meghna Vegetable Oil Industries Ltd. for use in the vegetable oil production process. The CHP plant produces 10.5MW net electrical power and approx 8.2 tons net, 14barg, saturated steam per hour. The steam production is increased by more than ten per cent by utilising engine jacket water to preheat the boiler feeder water.

Previously, Meghna Group bought electricity from the grid – but choose to build their own CHP plant since this gives stable power supply and low cost steam. The electricity bill will be reduced by 50 per cent and in addition the system will deliver steam at one-fifth of normal costs, resulting in improved return of investment and increased margins for the group.

The CHP plant is designed with three Bergen KVGS-18G4 lean-burn gas engines each with separate auxiliary boilers, giving a total output of 10.8MW. The Rolls-Royce lean-burn gas engines and auxiliary systems were specially designed by the team of Bergen engineers in order to cope with step loads from the cement plant and at the same time stay within +/- 5 per cent frequency band. Since the CHP plant normally runs in island mode with the three generator sets working in parallel, Rolls-Royce designed a special software that ensures even load sharing and load tripping if one of the engines shut down.

Each spark-ignited engine drives an 11kV/4500kVA alternator and operates on Bangladeshi natural gas. The

auxiliary systems includes oil bath filters and silencers for combustion air and heavy duty radiators since the plant is located in a demanding environment. Rolls-Royce supply also includes exhaust silencers, start and control air systems, cooling water expansion tanks, pumps, genset control panels, MCC panels, grid synchronising panel, 24VDC panel and SCADA system for plant operation.

The Rolls-Royce Bergen K gas engine is capable of running at 100 per cent load at 42°C ambient temperature, 48°C cooling water (which enables radiator/air blast cooling), NOx emission down to 250mg/Nm³ and methane number at 70 – all at the same time.

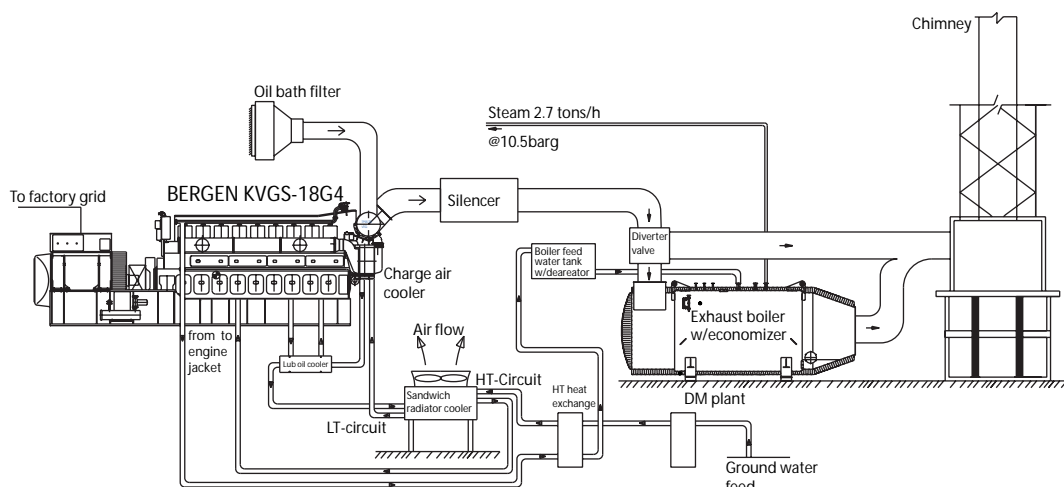
The plant was built as a turn-key project by Energypac Power Generation Ltd, the Rolls-Royce representative in Bangladesh.

Technical specification

Engine	3 x KVGS-18G4
Shaft power	3 x 3750kW
Electrical power (pf>0.8)	3 x 3600kW
Gas consumption (0% tolerance at 35°C)	3 x 877 Nm ³ /h
Energy consumption (0% tolerance at 35°C)	3 x 8770kW
Electrical efficiency (0% tolerance at 35°C)	41.1%

Design criteria

Max return water temperature to LT circuit	48°C
Ambient temperature	40°C
Generator voltage	11kV
Steam production @14 barg	8200kg/h
Step load, frequency response	max +/- 5%
Step load, voltage response	max +/- 15%
Lower heating value of the fuel gas	36MJ/Nm ³
Methane number according to AVL	min 70
Exhaust gas emissions, NOx at 5% O ₂	500mg/Nm ³



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