

VESTKRAFT, UNIT 3

Plant description

Vestkraft (power plant), unit 3, is a 100% coal and oil-fired power plant supplying district heating to the towns Esbjerg and Varde. The unit has an electrical maximum output of 412 MW in condensing mode corresponding to approx 383 MW net output. At back-pressure operation and a maximum district heating output of 460 MJ/s the maximum electrical output is 328 MW.

At coal-firing and in condensing mode the unit has a heat consumption of 7,943 kJ/kWh which gives a net efficiency of 45.3%. In 100% back-pressure mode the net efficiency is 91.4%.



The plant was erected as an independent unit at a new site approx 600 m from the old buildings of Vestkraft in Esbjerg and is equipped with its own coal yard, quay etc.

The unit is a conventional pulverised coal-fired plant with supercritical steam data, single re-superheating, turbine plant consisting of 1 HP, 2 IP and 2 LP cylinders and with seawater cooling of the condenser. The plant is equipped with a flue gas desulphurisation plant of the wet scrubber type and prepared for a deNO_x plant. The district heating plant is designed as an integrated system which can be supplied by Vestkraft's old units and by the new unit 3.

The district heating system is equipped with a 47,000 m³ hot water storage tank capable of storing a thermal quantity of 8.9 TJ corresponding to 6 hours' full-load operation.

The boiler plant consists of a tower boiler of the once-through type with low NO_x burners placed tangentially at six levels. The maximum steam production amounts to 304 kg/s at 250 bar and 560 °C. Re-superheating also takes place at 560 °C.

The unit is automatically controlled and can hence be started and operated by one head engineer, two assisting engineers and one unskilled worker.

Project structure

In cooperation with the owner, I/S Vestkraft, who has had the overall responsibility, DONG Energy has been in charge of the project and project management of the unit including auxiliary systems.

The plant was built according to the multi-contract principle, ie the overall project was split up into a number of part systems and plants under separate contracts. Therefore the owner carried out a considerable amount of the composite design and engineering in house.

The project management group was composed of a project manager from I/S Vestkraft, a managing engineer from DONG Energy and team leaders from DONG Energy for the mechanical, electrical and civil engineering groups respectively, who were in charge of the design of the plant.

Furthermore, DONG Energy carried out the time planning in the form of network planning and was in charge of budget follow-up by means of a sophisticated budget follow-up system.

DONG Energy was thus responsible for the day-to-day management of the engineering group, which was placed at the DONG Energy headquarters.

Services provided by DONG Energy

- Pre-project study including determination of layout, main data, budget and schedule.
- Authority approvals including calculation of the emissions to the immediate and distant environments: the town of Esbjerg, the air and the sea.
- Detailed engineering of main and auxiliary systems including specification of data, degree of contract split-up, scope of supply, time schedule and budget concerning elaboration of contracts.
- Specification of level of quality, quality assurance system and extent of documentation.
- Preparation and wording of tender specifications for the various systems specifying the performance data to be guaranteed.

- Procurement and evaluation of references and information concerning potential suppliers.
- Selection of tenderers and issue of tender specifications.
- Tender evaluation and negotiations as well as elaboration and preparation of contracts.
- Follow-up and coordination of the various contracts concerning technique, quality and deadlines as well as inspection and factory test visits to the places of manufacture.
- Supervision of the building site involving planning, coordination and inspection of the various suppliers' activities at the site through daily visits and meetings with the suppliers' site management.
- Elaboration of plans for commissioning in cooperation with Vestkraft's operating staff and the suppliers as well as participation in tests and commissioning of the sub-systems and the total plant.
- Implementation of guarantee tests and handover procedures with the suppliers.

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