

COMPARATIVE ANALYSIS OF COMBINED-CYCLE PLANTS

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The gas turbine installation of the GTE-45 (JSC "Turboatom") is designed for use in the combined-cycle plants of the discharged type CCP-280, with an exhaust-heat boiler CCP-100 and with the system of network heaters. The purpose of this use is to increase the plant's capacity as a whole, cover peak loads, obtain thermal power and utilize the heat of exhaust gases. Figures 1, 2, 3 show the schemes of utilization of exhaust gases in the system of network heaters, in the discharged type boiler and an exhaust-heat boiler. A comparison this schemes was made with the following parameters: electric and thermal capacities, exhaust gas temperatures, fuel consumption and efficiency. The analysis of numerical data the following conclusions:

1. GTE-45 has a high temperature of combustion products at the outlet of a gas turbine (475-478 °C), which should be useful to use.
2. The use of network heaters, a discharged type boiler, an exhaust-heat boiler allows utilizing the temperature of the exhaust gases to an acceptable level (from 115 to 152 °C).
3. Installations with network heaters and exhaust-heat boiler allow to produce thermal power for heating.
4. The installation of the discharged type of CCP-280 has the highest capacity, but it also has the largest fuel consumption, because extra fuel is fed into the boiler combustion mixed with exhaust gases from the gas turbine.
5. The largest efficiency of 46% is the installation of CCP-100 with an exhaust-heat boiler.

Thus, the most suitable installation for heating needs is installation with a system of network heaters. From the point of view of fuel consumption, efficiency and overall dimensions, the installation with an exhaust-heat boiler is the most suitable, where the fuel is supplied only in the combustion chamber, and the generation of steam in the an exhaust-heat boiler is carried out at the expense of the heat of exhaust gases GTE-45.

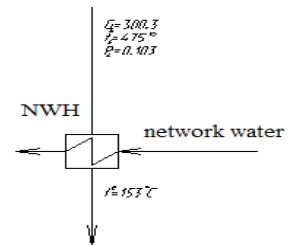


Fig. 1 Scheme with system of network heaters

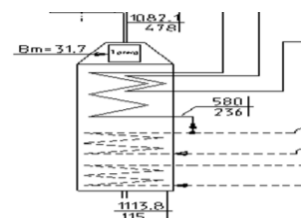


Fig. 2 Scheme with a discharged type boiler

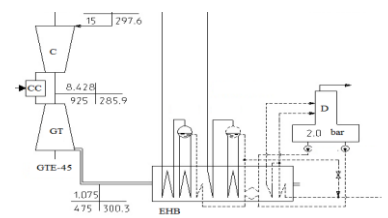


Fig. 3 Scheme with an exhaust-heat boiler