

Regenerative Rankine Cycle

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Background and Description:

This process flow sheet shows the ideal Regenerative Rankine Cycle with one open feed-water heater.

Steam enters the turbine at 9 MPa, 480°C and is then condensed in a condenser at a pressure of 7 kPa. Bleeding from the turbine occurs at 0.7 MPa.

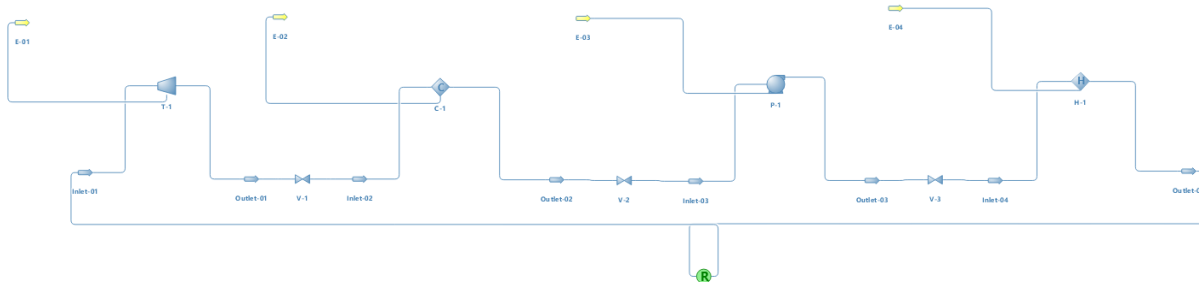
WORKING:-

Turbine- Steam with elevated temperature and pressure expands through the turbine to produce work and then is discharged to the condenser with relatively low pressure.

Condenser- Steam from the turbine is condensed to liquid water in the condenser.

Pump- Pump pressurized the liquid water from the condenser prior to going back to the boiler.

Boiler- Liquid water enters the boiler and is heated to superheated state in the boiler.

Flowsheet:

Flowsheet 1- Regenerative Rankine Cycle

Results:

Master Property Table									
Object	Outlet-04	Outlet-03	Outlet-02	Outlet-01	Inlet-04	Inlet-03	Inlet-02	Inlet-01	
Temperature	783.306	773.893	760.979	770.432	773.893	760.979	770.432	783.306	K
Pressure	9.69299E+06	9.693E+06	8.993E+06	9E+06	9.693E+06	8.993E+06	9E+06	9.69299E+06	Pa
Mass Flow	1	1	1	1	1	1	1	1	kg/s
Molar Flow	55.5084	55.5084	55.5084	55.5084	55.5084	55.5084	55.5084	55.5084	mol/s

Table 1- Inlet and Outlet flow results

Master Property Table					
Object	E-04	E-03	E-02	E-01	
Energy Flow	20	27.336	20	26.6006	kW

Table 2- Energy flow

Reference:

http://romulus.sdsu.edu/testcenterdev/testhome/Test/problems/chapter09/chapter09Local_1.html