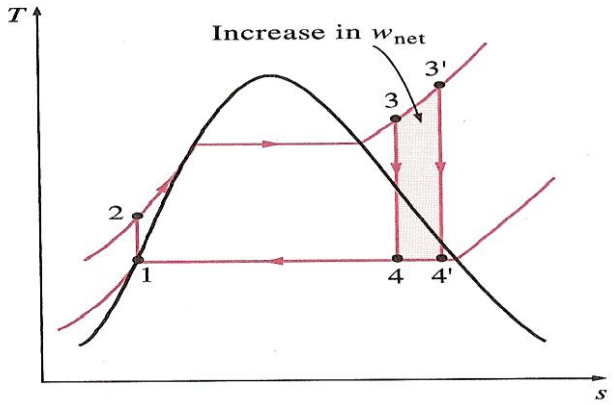
Superheating the Steam to High Temperatures:

The average temperature at which heat is added to the steam can be increased without increasing the boiler pressure by superheating the steam to high temperatures. Superheat allows heat addition at average temperature than using saturated steam only. From Carnot analysis this should result in higher cycle efficiency .A turbine operating with less moisture is more efficient and less prone to blade damage .

Note: superheating : η_{is} of turbine increase and less blade damage.



- Superheating the steam to higher temperatures has very desirable effect: It decreases the moisture content of the steam at the turbine exit as can be seen in T-*s* diagram.
- The temperature to which steam can be superheated is limited by metallurgical consideration.

Increasing the Boiler Pressure

- The average temperature during the heat addition process is to increase the operating pressure of the boiler, which automatically raises the temperature at which boiling take place.
- This, in turn, raises the average temperature at which heat is added to the steam and thus raises the thermal efficiency of the cycle.
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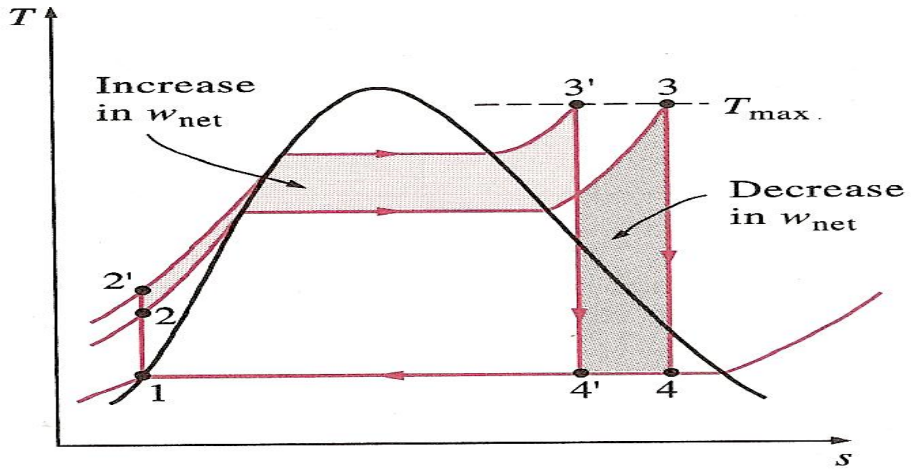

EX(2): A steam power plant operates between boiler pressure of (42 bar) condenser pressure (0.036 bar) .Calculate the cycle performance if the steam is superheated to(500℃)?