

Questions to practice properties of fluids calculations and table reading – Week 2

1. Define what extensive and intensive mean regarding a property of a fluid.
2. Find the saturation pressure for water when the temperature is 42°C and 65°C .
3. Find the specific volume of water vapour when the pressure is 1.9 bar, and 30 bar. What is the density of the water vapour at these pressures. And what temperature would the water have to be in order to liberate this steam? You will need to refer to p.4 of the tables for this.
4. Why does the table for saturated water and steam end at such a very specific pressure and temperature?
5. What will happen to water when it is at 20°C and the pressure above it is reduced to 0.2 bar?
6. What will happen to water when it is at 40°C and the pressure above it is reduced to 0.04 bar?
7. Find the enthalpy of water liquid when the temperature is 10°C and 40°C .
8. Find the enthalpy of water vapour when the temperature is 20°C and 70°C .
9. How much energy is required to condense 200g of water in a chamber at 0.04 bar?
10. How much energy is required to bring to the boil a drum of 200 litres of water from 24°C ?
11. How much energy is required to boil to steam 50 kg/s at 160 bar from 70°C ?

Use the superheat tables for the following:

12. What is the entropy of steam at 80 bar and 500°C ?
13. What is the entropy of steam at 80 bar and 525°C (by interpolation)?
14. If the steam at 80 bar and 500°C is reduced to 20 bar by an *isentropic* process (i.e. the entropy remains unchanged), what is the temperature of the steam at the end of the process?
15. If the steam at 80 bar and 525°C is reduced to 9 bar by an isentropic process, what is the enthalpy of the steam at the end of the process?