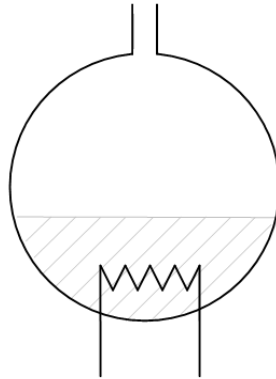


Energy Needed to Vaporize Ethanol



This application calculates the energy needed to vaporize liquid ethanol at an initial temperature of 20°C and pressure of 101325 Pa

> with(ThermophysicalData) :

Calculate the boiling temperature of ethanol at 101325 Pa

```
> boilingTemp := Property( "T", "P" = 101325, "Q" = 0, "ethanol" )
      boilingTemp := 351.570404467516369 (1)
```

Define a function that gives the specific heat capacity of ethanol at an arbitrary temperature

```
> Cp := T → Property( "C", "P" = 101325, "T" = T, "ethanol" ) :
```

Hence the heat required to raise ethanol from 20°C to its boiling point

```
> heat1 := int( Cp( T ), T = 273.15 + 20 .. boilingTemp, numeric )
      heat1 := 154741.6213 (2)
```

Calculate the latent heat of vaporization

```
> heat2 := Property( "enthalpy", "T" = boilingTemp, "Q" = 1, "ethanol" ) - Property( "enthalpy", "T"
      = boilingTemp, "Q" = 0, "ethanol" )
      heat2 := 849613.4885 (3)
```

Hence the total energy required in J kg⁻¹ is

```
> heat1 + heat2
      1.004355110106 (4)
```