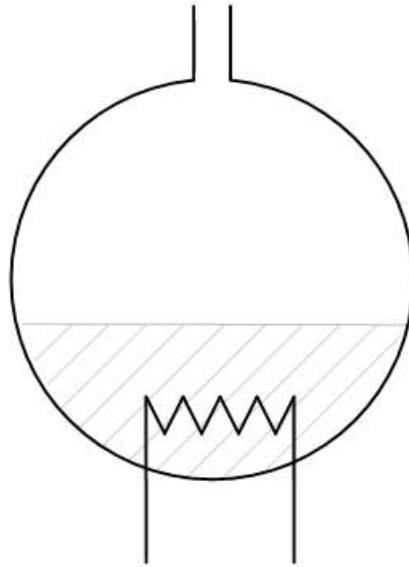


# Energy Needed to Vaporize Ethanol



This application calculates the energy needed to vaporize liquid ethanol at an initial temperature and pressure.

> with( ThermophysicalData ) :

Calculate the boiling temperature of ethanol at 101325 Pa

```
> boilingTemp := Property( temperature, pressure = 101325, Q = 0, "ethanol" )  
boilingTemp := 351.570404467516369
```

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

```
> Cp := T → Property( "C", "pressure" = 101325, "temperature" = 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 := 1.547416213 105
```

Calculate the latent heat of vaporization

```
> heat2 := Property( enthalpy, temperature = boilingTemp, Q = 1, ethanol ) – Property( enthalpy,  
temperature = boilingTemp, Q = 0, ethanol )  
heat2 := 8.496134885 105
```

Hence the total energy required in J kg<sup>-1</sup> is

```
> heat1 + heat2  
1.004355110 106
```