Retrieving Enthalpy of Vaporization from CoolProp

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## Enthalpy of Vaporization

A fluid will “absorb” a certain amount of enthalpy in the process of evaporating from a liquid state. This enthalpy of vaporization is usually quantified on either a molar specific basis or a mass specific basis , in units of and respectively. This value varies with temperature and pressure. For our purposes, we will consider the enthalpy of vaporization at a constant chamber pressure.

## Finding Vaporization Enthalpy with CoolProp

CoolProp does not contain the enthalpy of vaporization specifically as a callable output, but it *does* provide enthalpy, on a molar specific and mass specific basis. Furthermore, as mentioned in the CoolProp documentation, we can input the vapor quality (i.e. mass in a vapor state vs total mass) and, of course, the pressure. So, we can find the enthalpy of a given gas at a pressure and of its corresponding liquid at a given pressure using the following functions:

*py.CoolProp.CoolProp.PropsSI(“Hmolar”, “P”, 101325, “Q”, 1, “H2O”)*

And…

*py.CoolProp.CoolProp.PropsSI(“Hmolar”, “P”, 101325, “Q”, 0, “H2O”)*[[1]](#footnote-0)

Subtracting the latter from the former, then, would yield the molar specific enthalpy of vaporization of water at a pressure of one atmosphere, or 101325 pascals, or the amount of enthalpy that must be added to liquid water to evaporate it into a vapor with a pressure of 1 atmosphere.

## Related Documentation

[A] [CoolProp Quick Reference](https://docs.google.com/document/d/1SwY_JbAcMK3dY37hVzANKK0KHyNtMjkAvfUAsUOoy1Y/edit?usp=sharing)

1. Note that since both mass-specific and molar-specific enthalpy are relative properties, the reference state at which a given fluid is assumed to have an enthalpy of zero varies by fluid. [↑](#footnote-ref-0)