Q. How can we use \(c_p\) if the process is not constant-pressure?

Q. How can we use \(c_v\) if the process is not constant-volume?

That’s right, you may have noticed that we have used \(c_p\) in a process that is not constant-pressure, or used \(c_v\) in a process that is not constant-volume. How is that possible? You have to look at when we use \(c_v\) and \(c_p\) in the first place. In this course, we use them only under two conditions:

1. When approximating a subcooled liquid (or solid) as an incompressible substance.
2. When approximating a superheated vapor as an ideal gas.

In both cases above, it turns out that both \(u\) and \(h\) are nearly entirely functions of temperature, and nothing else. In other words, changes in pressure or volume have a negligible effect on \(u\) and \(h\), so in these cases, it doesn’t matter if either the substance’s pressure or volume is changing!