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(one mole of a monatomic ideal gas)

The heat capacity functions have a pivotal role in thermodynamics. We consider many of their properties further in the next section and in later chapters (particularly §10-9 and §10-10.) Because we want to use these properties before we get around to justifying them all, let us summarize them now:

1. For monatomic ideal gases, C_V and C_P are independent of temperature.
2. For polyatomic gases, real or ideal, C_V and C_P are functions of temperature.
3. C_P is always greater than C_V , but as the temperature decreases, their values converge, and both vanish at absolute zero.
4. At ordinary temperatures, C_V and C_P increase only slowly as temperature increases. For many purposes they can be taken to be constant over rather wide temperature ranges.
5. For real substances, C_V is a weak function of volume, and C_P is a weak function of pressure. These dependencies are so small that they can be neglected for many purposes.
6. For ideal gases, C_V is independent of volume, and C_P is independent of pressure.

7.13: Heat Capacities for Gases- C_V , C_P is shared under a [CC BY-SA 4.0](#) license and was authored, remixed, and/or curated by [Paul Ellgen](#) via [source content](#) that was edited to conform to the style and standards of the LibreTexts platform; a detailed edit history is available upon request.

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