

10.213 Fall 1999

Problem 5 (due Monday, September 20)

To have the same driving range as a standard automobile powered by gasoline, a methane-fueled car would require a 40 m^3 tank if the storage conditions were 1 bar and $27 \text{ }^\circ\text{C}$. Instead, if the methane was stored at 200 bar and $27 \text{ }^\circ\text{C}$, calculate the required tank volume in several ways:

- a) NIST database (<http://webbook.nist.gov/chemistry/>)
- b) Ideal gas law
- c) Lee/Kesler generalized-correlation
- d) van der Waals EOS
- e) Redlich/Kwong EOS
- f) Comment on the ease of use and accuracy of the various methods in parts a through e.