





Chapter 12, Problem 12.

Nitrogen gas at 400 K and 300 kPa behaves as an ideal gas. Estimate the c_p and c_v of the nitrogen at this state, using enthalpy and internal energy data from Table A–18, and compare them to the values listed in Table A–2b.

* Problems designated by a “C” are concept questions, and students are encouraged to answer them all. Problems designated by an “E” are in English units, and the SI users can ignore them. Problems with the  are solved using EES, and complete solutions together with parametric studies are included on the enclosed DVD. Problems with the  are comprehensive in nature and are intended to be solved with a computer, preferably using the EES software that accompanies this text.



Chapter 12, Problem 16.

Verify the validity of the last Maxwell relation (Eq. 12–19) for refrigerant-134a at 80°C and 1.2 MPa.

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Chapter 12, Problem 28.

Calculate the h_{fg} and s_{fg} of steam at 120°C from the Clapeyron equation, and compare them to the tabulated values.

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Chapter 12, Problem 41.

Estimate the volume expansivity β and the isothermal compressibility α of refrigerant-134a at 200 kPa and 30°C.

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Chapter 12, Problem 47.

Consider a gas whose equation of state is $P(\mathbf{v} - a) = RT$, where a is a positive constant. Is it possible to cool this gas by throttling?

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Chapter 12, Problem 49.

Estimate the Joule-Thomson coefficient of steam at (a) 3 MPa and 300°C and (b) 6 MPa and 500°C.

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Chapter 12, Problem 57.

Determine the enthalpy of nitrogen, in kJ/kg, at 175 K and 8 MPa using (a) data from the ideal-gas nitrogen table and (b) the generalized enthalpy departure chart. Compare your results to the actual value of 125.5 kJ/kg.

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Chapter 12, Problem 59.

What is the error involved in the (a) enthalpy and (b) internal energy of CO_2 at 350 K and 10 MPa if it is assumed to be an ideal gas?

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Chapter 12, Problem 62.

Methane is compressed adiabatically by a steady-flow compressor from 2 MPa and -10°C to 10 MPa and 110°C at a rate of 0.55 kg/s. Using the generalized charts, determine the required power input to the compressor.

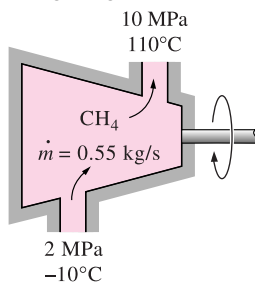




Figure P12-62

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