APPENDIX
D

CURVE FITS FOR AIR PROPERTIES

EES is used to generate curve fits for air properties that are used in the UTC system TRNSYS subroutine. Four air properties are necessary: density, heat capacity, conductivity, and viscosity.

D.1 Density

Density is a function of both temperature and pressure. The isobars of density as a function of temperature are generated, as shown in Figure D.1.1. The curve fits of the isobars are in the form of Equation D.1.1.

$$den = a0 + a1\ T + a2\ T^2 \qquad (D.1.1)$$

The coefficients of Equation D.1.1 are functions of pressure. The curve fits are shown in Figures D.1.2-4.

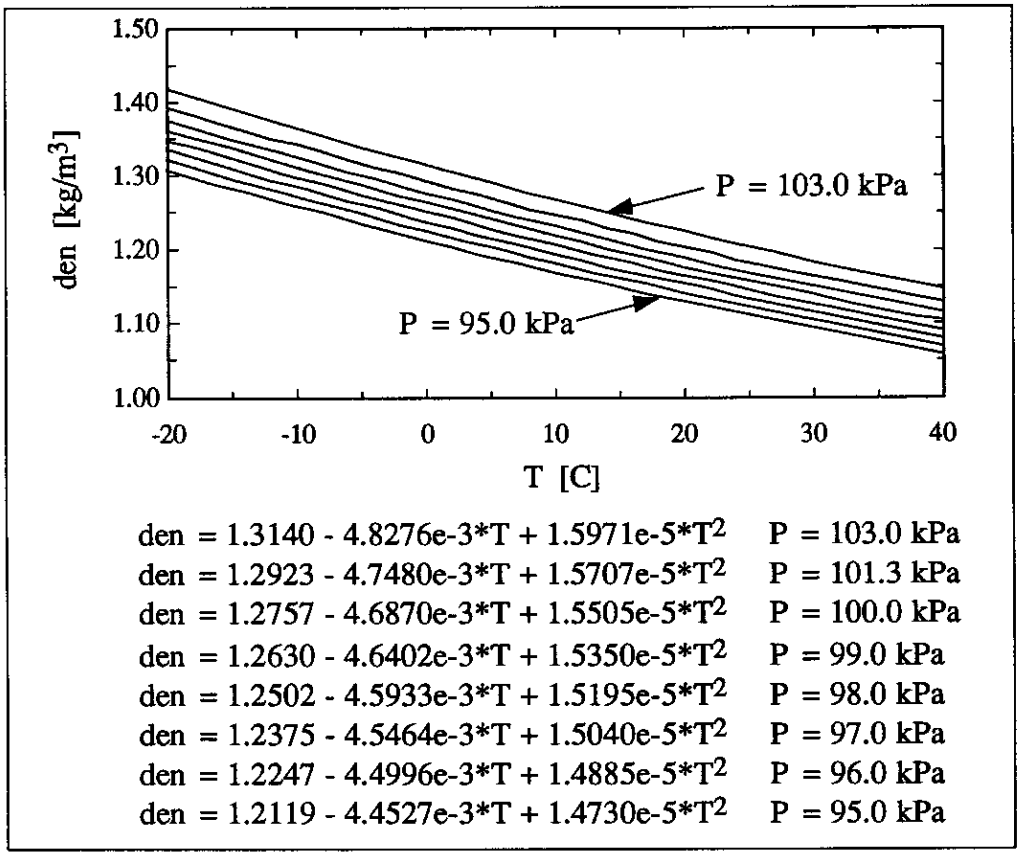

Figure D.1.1. Curve fits of isobars of density as a function of temperature.

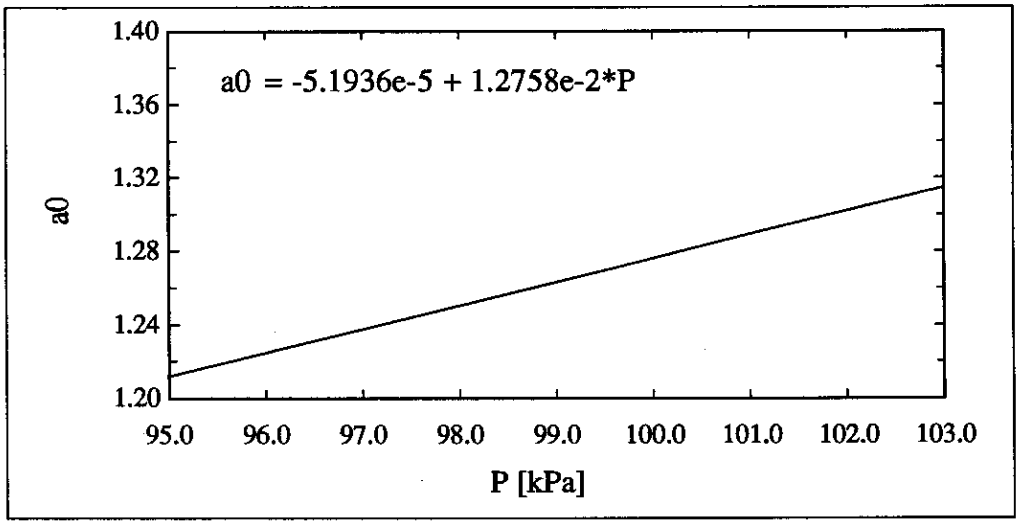

Figure D.1.2. Curve fit of zero-order coefficient as a function of pressure.

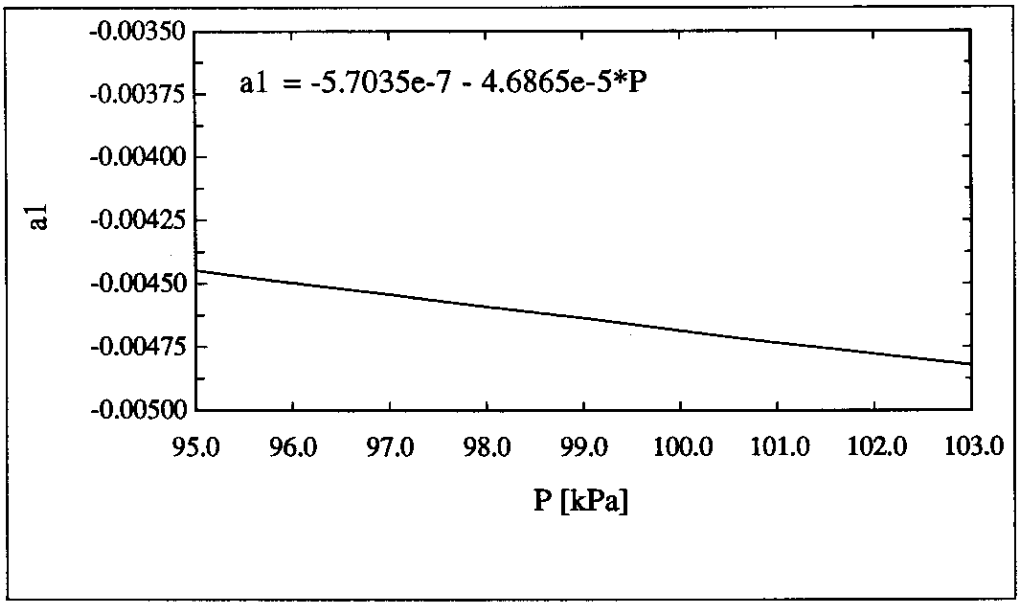

Figure D.1.3. Curve fit of first-order coefficient as a function of pressure.

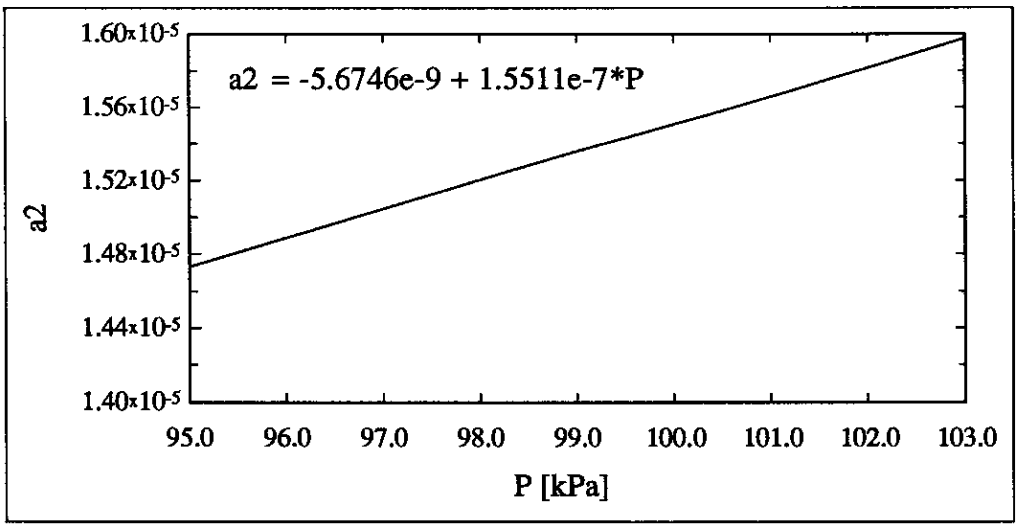

Figure D.1.4. Curve fit of second-order coefficient as a function of pressure.

D.2 Specific Heat

The specific heat is a function only of temperature. The curve fit is shown in Figure D.2.1.

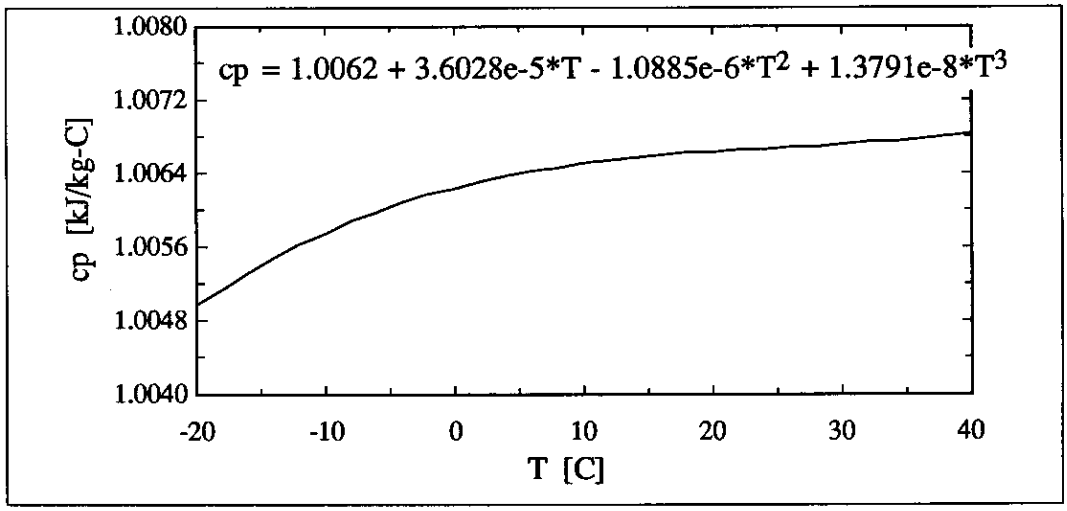

Figure D.2.1. Curve fit of specific heat as a function of temperature.

D.3 Conductivity

The conductivity is a function only of temperature. The curve fit is shown in Figure D.3.1.

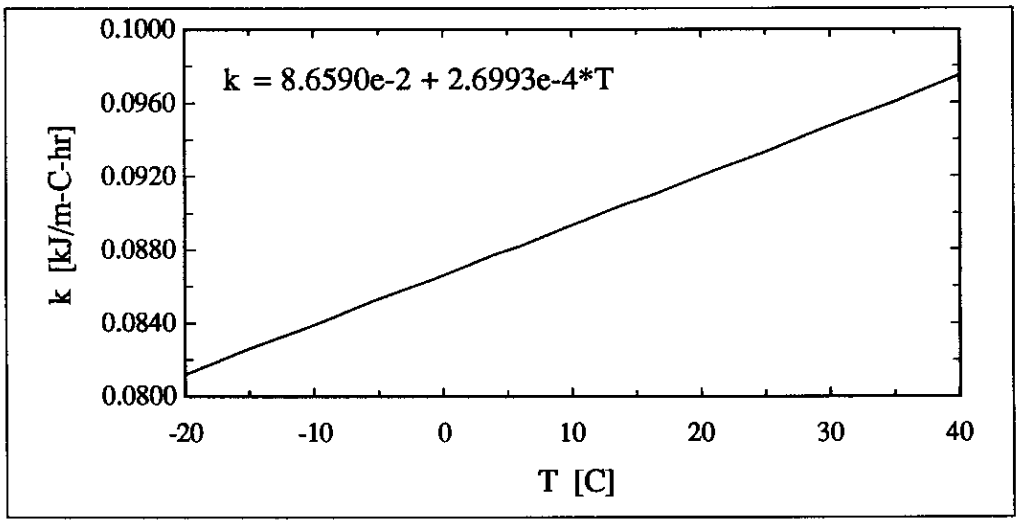

Figure D.3.1. Curve fit of conductivity as a function of temperature.

D.4 Viscosity

The viscosity is a function only of temperature. The curve fit is shown in Figure D.4.1.

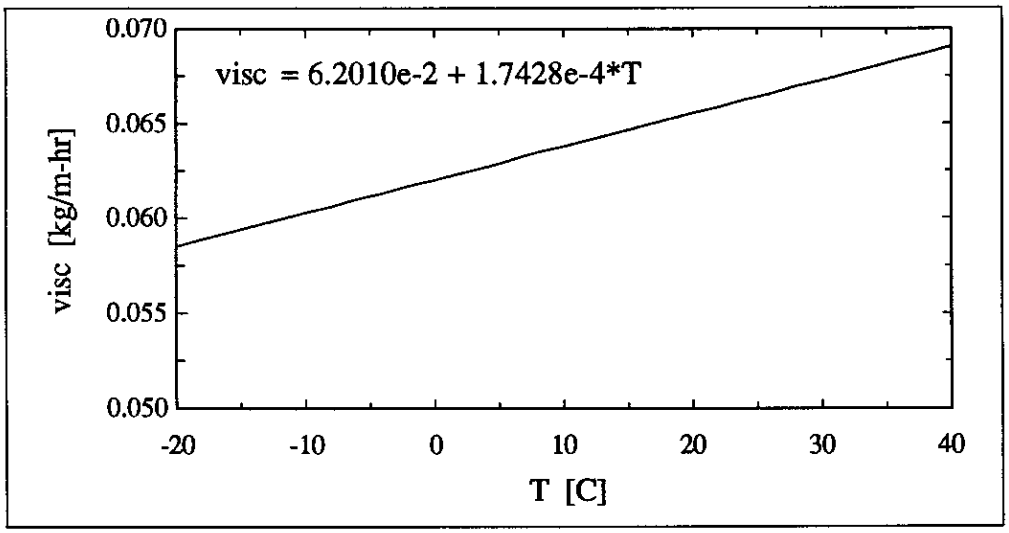

Figure D.4.1. Curve fit of viscosity as a function of temperature.