NOTE: The following information is for Pure Compounds only. We are working on similar information for Binary Mixtures.

trc.nist.gov/TDE/Equations/FEquations.html

Fitted Equations for Specific Properties

Listed below are the properties for which evaluated data is generated by *TDE*. Each property is linked to a list showing the set of possible equations that can be fit to the data. The equation that is used for a specific query is the one that provides the best fit of the data. This equation is then used to provide evaluated data.

NOTE: All of this information is displayed here in an individual file so that you can do text searches by using the **Find** funtion from the **Edit** menu of your browser.

Purpose: Provide definitions of equations and equation parameters used for output of evaluated data.

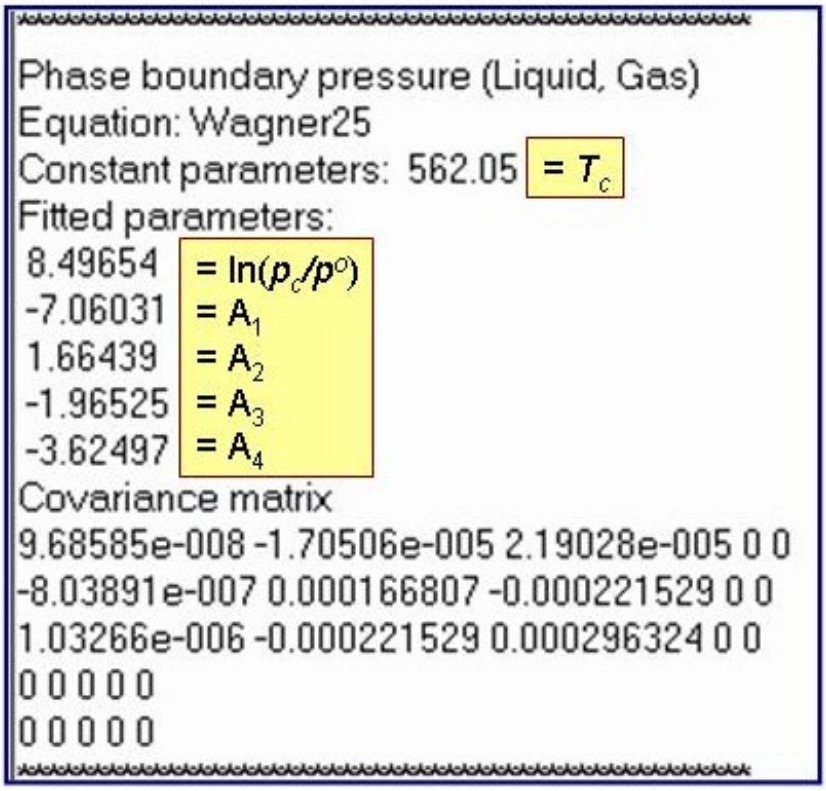
Select a property to see all associated equations. Properties represented with equations in *TDE* output are:

Vapor Pressure: *Liquid-Gas Phase Boundary Pressure*

- **DEFAULT: Wagner 25** (sample parameter output)
  $\ln(p/p^o) - \ln(p_c/p^o) = T_c/T\ (A_1 + A_2 \times t^{1.5} + A_3 \times t^{2.5} + A_4 \times t^5)$; where $t = 1 - T/T_c$ and $p^o = 1$ kPa
- **Alternative 1: Antoine** (sample parameter output)
  $\ln(p/p^o) = A + B/(T + C)$; where $p^o = 1$ kPa
- **Alternative 2: Yaws.VaporPressure** (sample parameter output)
  $\lg(p/p^o) = a + b/T + c \times \lg(T) + d \times T + e/T^2$; where $p^o = 1$ kPa and $\lg = \log_{10}$
- **Alternative 3: DIPPR 115** (sample parameter output)
  $\ln(p/p^o) = a + b/T + c \times \ln(T) + d \times T^2 + e/T^2$; where $p^o = 1$ kPa
- **Alternative 4: DIPPR 101** (sample parameter output)
  $\ln(p/p^o) = a + b/T + c \times \ln(T) + d \times T^e$; where $p^o = 1$ kPa
- **Alternative 5: Wagner 36** (sample parameter output)
  $\ln(p/p^o) - \ln(p_c/p^o) = T_c/T\ (A_1 + A_2 \times t^{1.5} + A_3 \times t^3 + A_4 \times t^6)$; where $t = 1 - T/T_c$ and $p^o = 1$ kPa

Wagner 25 (Vapor Pressure: *Output Details*)

$\ln(p/p^o) - \ln(p_c/p^o) = T_c/T\ (A_1 + A_2 \times t^{1.5} + A_3 \times t^{2.5} + A_4 \times t^5)$; where $t = 1 - T/T_c$ and $p^o = 1$ kPa
Evaluation Results:

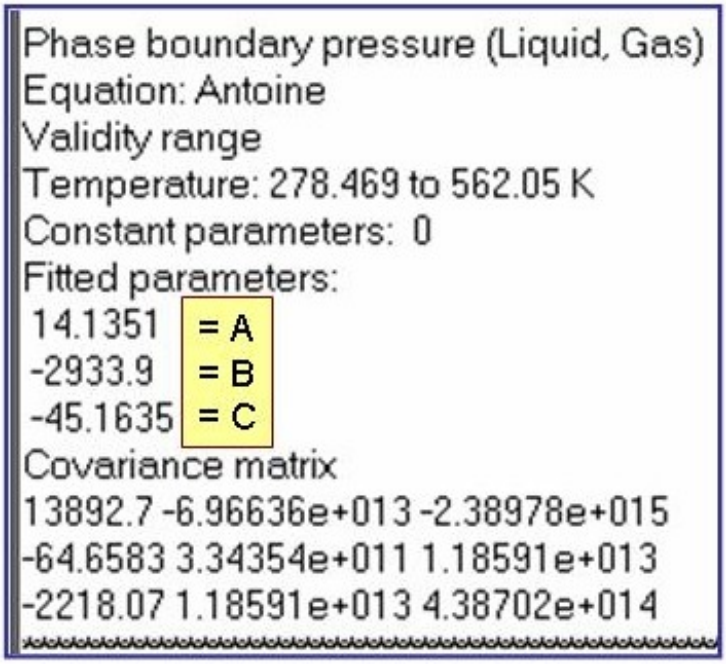


The example is for fitted vapor pressures for **benzene**.

Antoine (Vapor Pressure: *Output Details*)

$\ln(p/p^o) = A + B/(T + C)$; where p^o = 1 kPa
Evaluation Results:

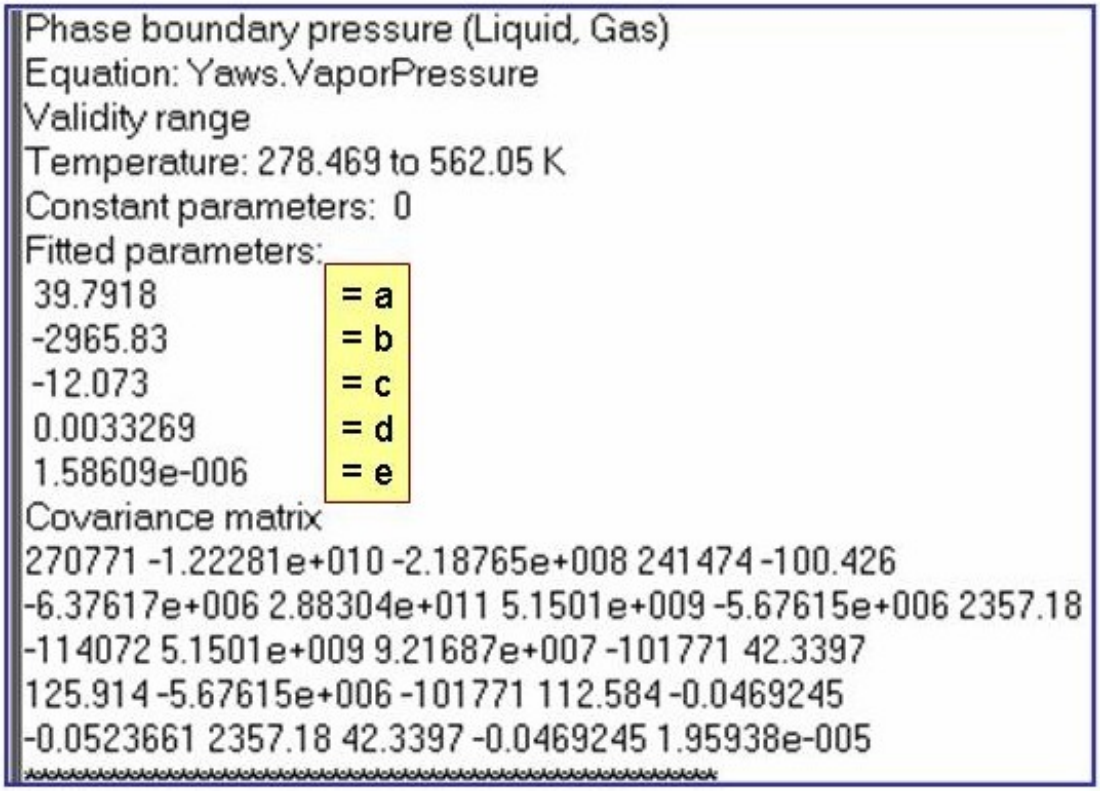
The example is for fitted vapor pressures for **benzene**.



Yaws (Vapor Pressure: *Output Details*)

$\lg(p/p^o) = a + b/T + c\times\lg(T) + d\times T + e/T^2$; where p^o = 1 kPa and lg = $\log_{10}$

Evaluation Results:



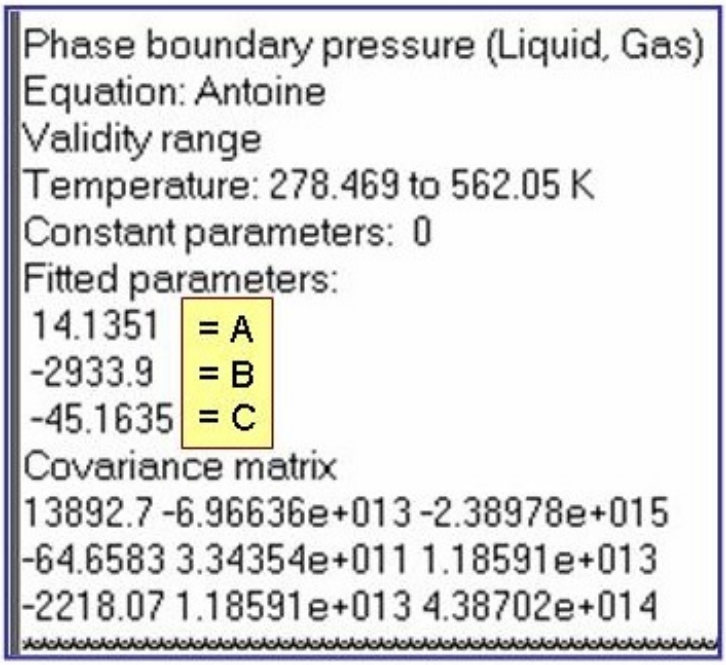
The example is for fitted vapor pressures for **benzene**.

DIPPR 115 (Vapor Pressure: *Output Details*)

$\ln(p/p^o) = a + b/T + c \times \ln(T) + d \times T^2 + e/T^2$; where p^o = 1 kPa

Evaluation Results:

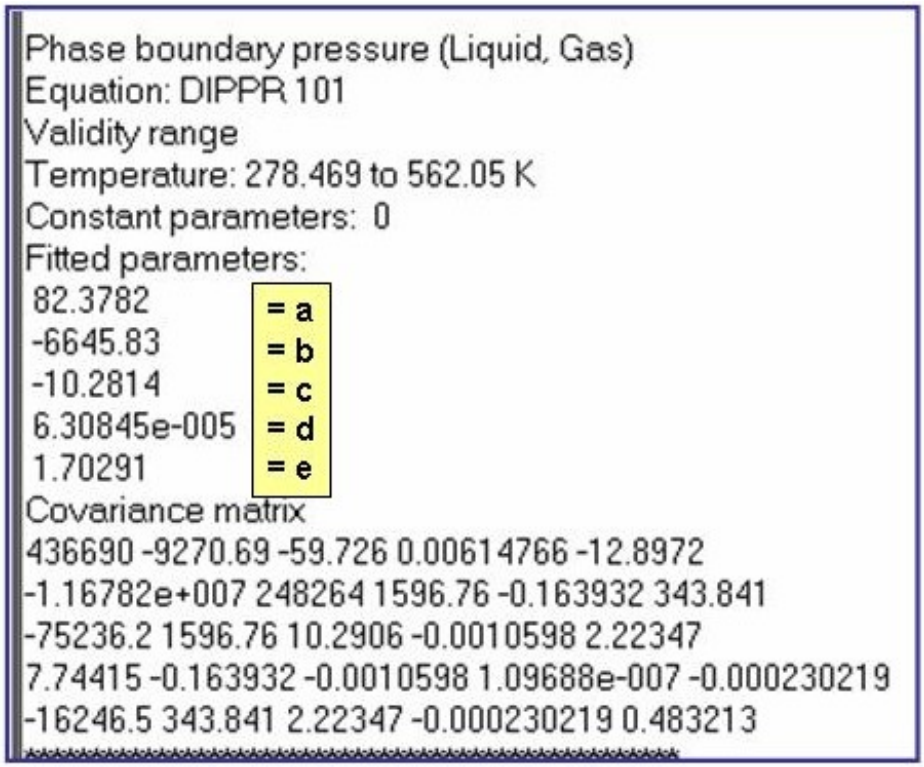
The example is for fitted vapor pressures for **benzene**.



DIPPR 101 (Vapor Pressure: *Output Details*)

$\ln(p/p^o) = a + b/T + c \times \ln(T) + d \times T^e$; where p^o = 1 kPa

Evaluation Results:

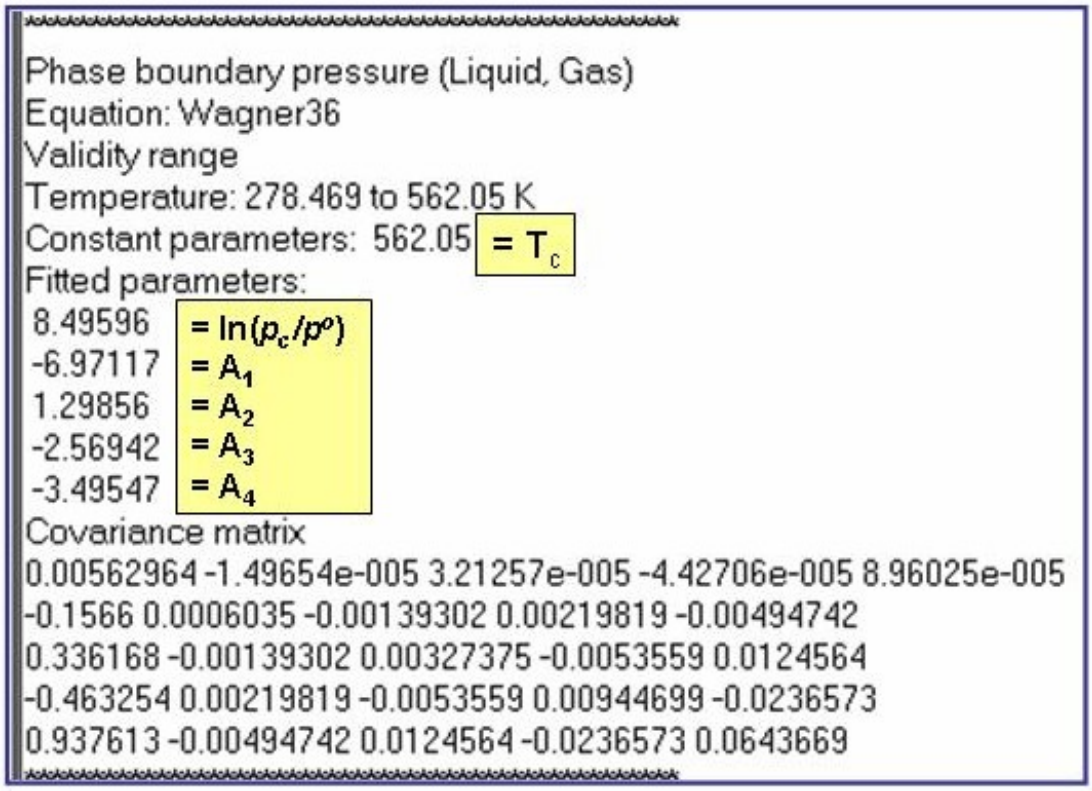


The example is for fitted vapor pressures for **benzene**.

Wagner36 (Vapor Pressure: *Output Details*)

$\ln(p/p^o) - \ln(p_c/p^o) = T_c/T\,(A_1 + A_2 \times t^{1.5} + A_3 \times t^3 + A_4 \times t^6)$; where $t = 1 - T/T_c$ and p^o = 1 kPa

Evaluation Results:



The example is for fitted vapor pressures for **benzene**.

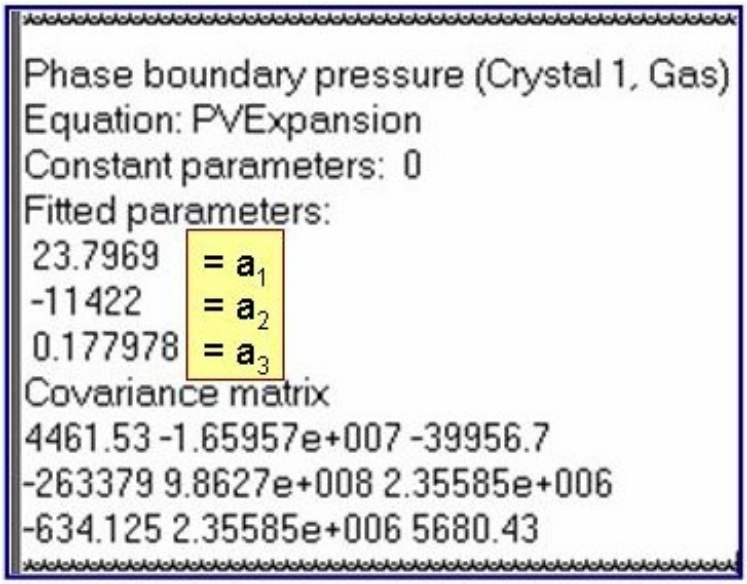
Sublimation Pressure: *Crystal-Gas Phase Boundary Pressure*

- **DEFAULT: PV Expansion:** (sample parameter output)
  $\ln(p/p^o) = a_1 + a_2/T + a_3 \times \ln(T) + a_4 \times T + a_5 \times T^2 + a_6 \times T^6 + a_7/T^4$
- **Alternative 1: Antoine** (sample parameter output)
  $\ln(p/p^o) = A + B/(T + C)$; where p^o = 1 kPa
- **Alternative 2: Yaws.VaporPressure** (sample parameter output)
  $\lg(p/p^o) = a + b/T + c \times \lg(T) + d \times T + e/T^2$; where p^o = 1 kPa and lg = $\log_{10}$
- **Alternative 3: DIPPR 115** (sample parameter output)
  $\ln(p/p^o) = a + b/T + c \times \ln(T) + d \times T^2 + e/T^2$; where p^o = 1 kPa
- **Alternative 4: DIPPR 101** (sample parameter output)
  $\ln(p/p^o) = a + b/T + c \times \ln(T) + d \times T^e$; where p^o = 1 kPa

PV Expansion: Sublimation Pressure

$\ln(p/p^o) = a_1 + a_2/T + a_3 \times \ln(T) + a_4 \times T + a_5 \times T^2 + a_6 \times T^6 + a_7/T^4$

NOTE: The *TDE* program truncates this equation based upon the extent and quality of the fitted data.

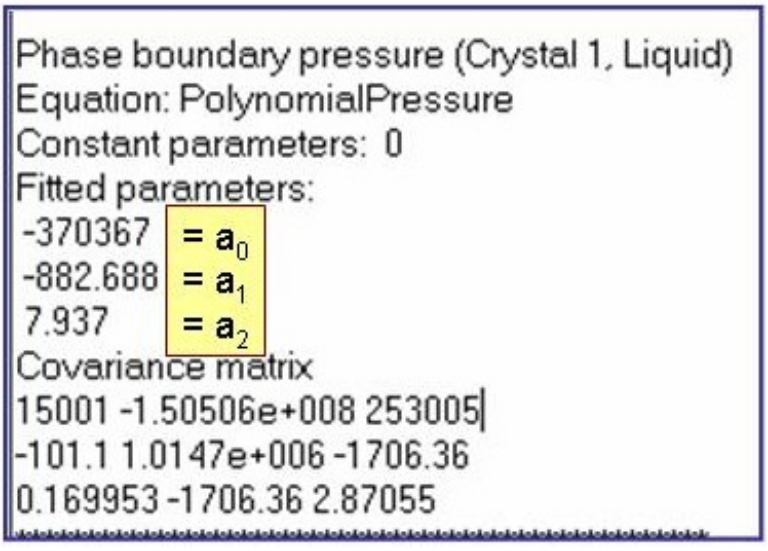


Condensed Phase boundary pressure

- **DEFAULT: PolynomialPressure:** (sample parameter output)
  $\ln(p/p^o) = \sum a_i \times T^i$, where the summation is from ***i = 0*** to ***nTerms - 1***
- **Alternative 1**:
  There are no alternative equations for this property at this time.

PolynomialExpansion: Phase boundary pressure for the crystal/liquid boundary

$\ln(p/p^o) = \sum a_i \times T^i$, where the summation is from ***i = 0*** to ***nTerms - 1***
Evaluation Results:



The example is for fitted phase-boundary pressures for **benzene**.

Density of the Liquid *(on the Liquid/Gas phase boundary)*: d_{sat}

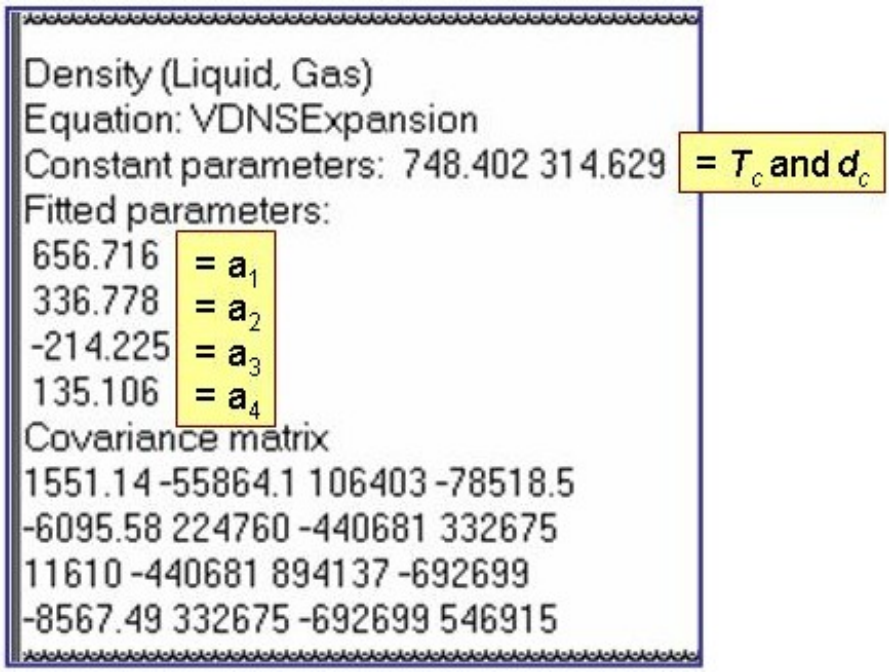
- **VDNS Expansion:** (sample parameter output)
  $d_{sat} = d_c + a_1 \times t^{0.35} + \text{åa}_{i+1} \times t^i$, where the summation is from ***i = 1*** to ***nTerms -1***.

  d_c = the critical density and $t = 1 - T/T_c$, where T_c is the critical temperature.

- **Alternative 1: Rackett** (sample parameter output)
  $d_{sat} = d_c \times B^{-(1-T/T_c)^N}$; where T_c and d_c are the critical temperature and critical density, respectively.
- **Alternative 2: PPDS 10** (sample parameter output)
  $d_{sat} = d_c + a_1 \times t^{0.35} + a_2 \times t^{2/3} + a_3 \times t + a_4 \times t^{4/3}$;
  d_c = the critical density and $t = 1 - T/T_c$, where T_c is the critical temperature.
- **Alternative 3: PPDS 17** (sample parameter output)
  $d_{sat} = (a_1 + a_2 \times t)^{-1 - t^{-2/7}}/a_0$; where $t = 1 - T/T_c$, and T_c is the critical temperature.

VDNS Expansion: For d_{sat} of the Liquid or Gas phase

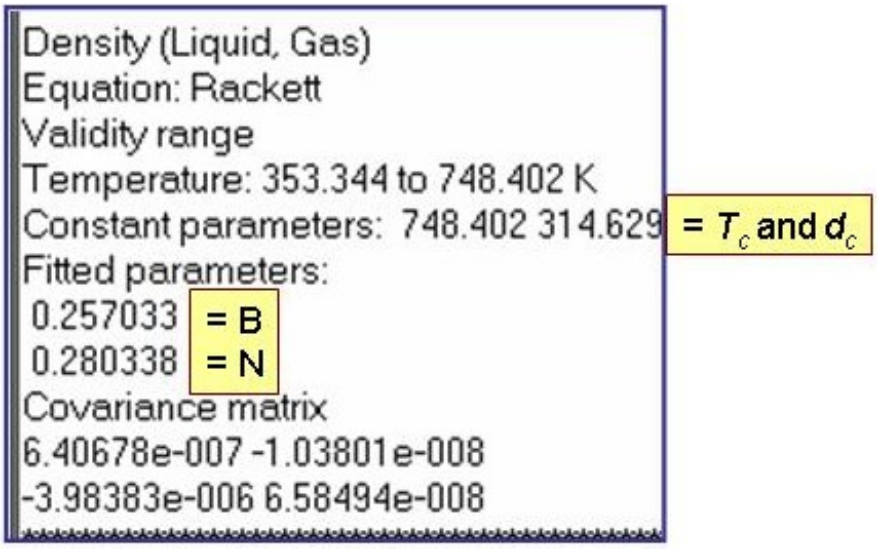
$d_{sat} = d_c + a_1 \times t^{0.35} + \text{åa}_{i+1} \times t^i$; where the summation is from ***i = 1*** to ***nTerms -1***.
d_c = the critical density and $t = 1 - T/T_c$, where T_c is the critical temperature.



NOTE: The *TDE* program truncates this equation based upon the extent and quality of the fitted data.

Rackett Equation: For d_{sat} of the Liquid phase

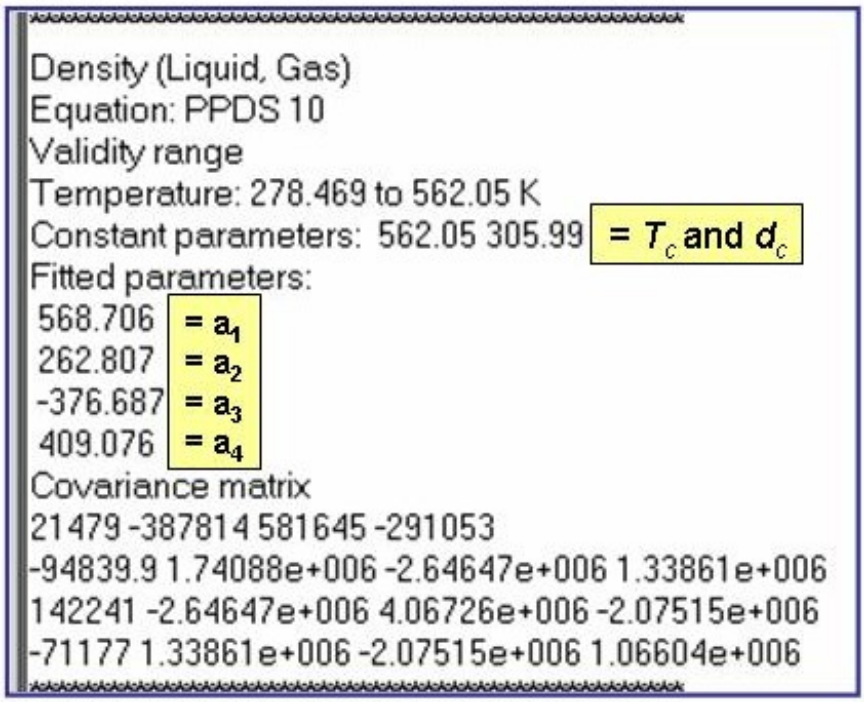
$d_{sat} = d_c \times B^{-(1-T/T_c)^N}$; where T_c and d_c are the critical temperature and critical density, respectively.



PPDS 10: *For d_{sat} of the Liquid phase*

$d_{sat} = d_c + a_1 \times t^{0.35} + a_2 \times t^{2/3} + a_3 \times t + a_4 \times t^{4/3}$;
d_c = the critical density and $t = 1 - T/T_c$, where T_c is the critical temperature.

Evaluation Results:

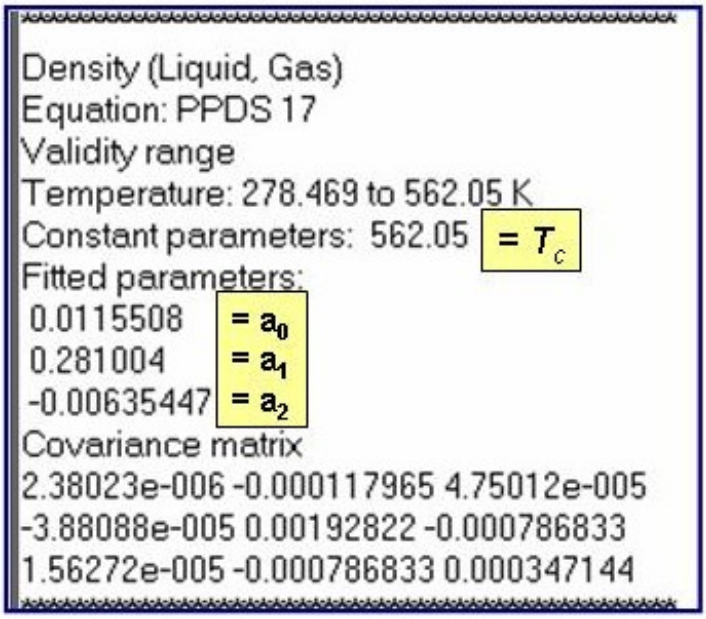


The example is for fitted densities at vapor saturation for **benzene**.

PPDS 17: *For d_{sat} of the Liquid phase*

$d_{sat} = (a_1 + a_2 \times t)^{-1 - t^{-2/7}}/a_0$; where $t = 1 - T/T_c$, and T_c is the critical temperature.
Evaluation Results:

The example is for fitted densities at vapor saturation for **benzene**.



Density of the Gas *(on the Liquid/Gas phase boundary)*

- **VDNSExpansion:** (sample parameter output)
  $d_{sat} = d_c + a_1 \times t^{0.35} + \text{å}a_{i+1} \times t^i$, where the summation is from ***i = 1*** to ***nTerms -1***.

  d_c = the critical density and $t = 1 - T/T_c$, where T_c is the critical temperature.

- **Alternative 1:** There are no alternative equations for this property at this time.

Density *(Liquid Phase)*

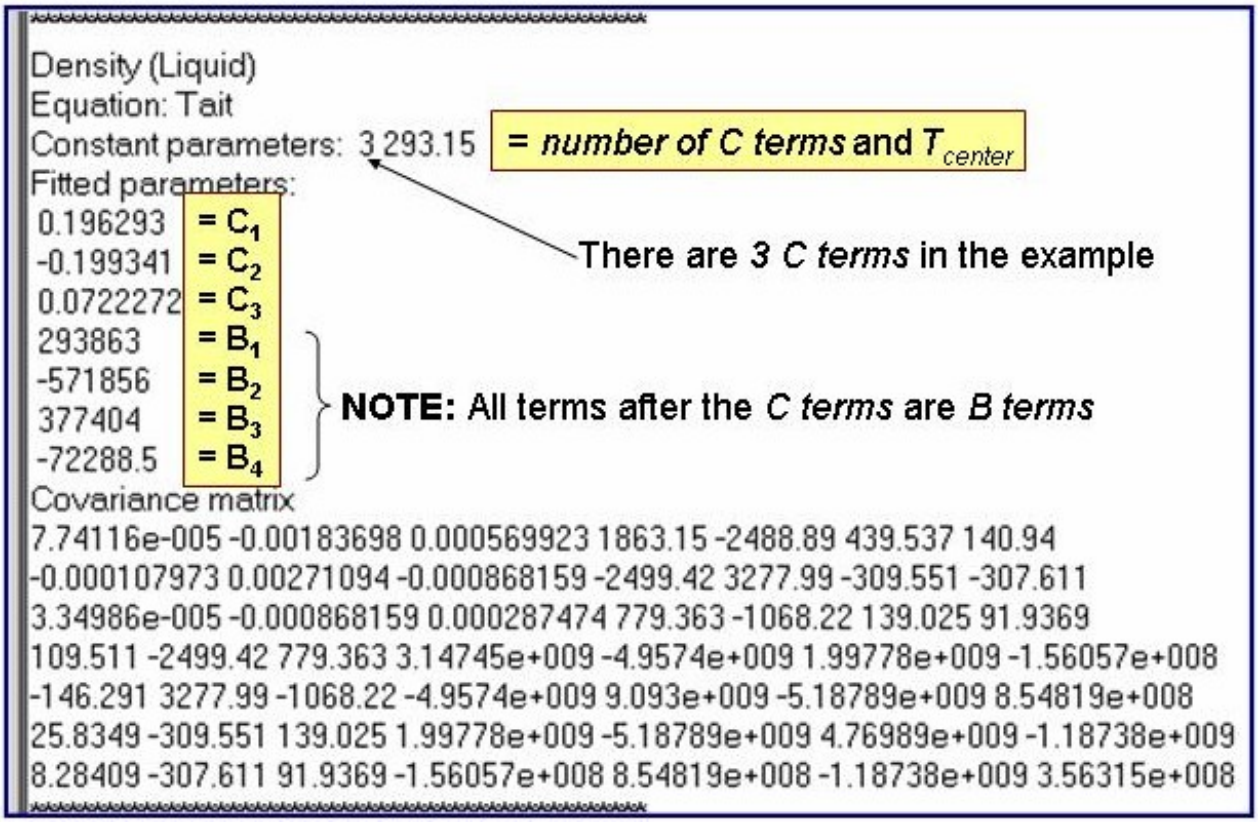
- **Tait Equation:** (sample parameter output)
  $d = d_{sat} / [1 - c \times \ln\{(b + p) / (b + p_{sat})\}]$; where

  $b = \text{å}B_{i+1} \times t^i$, $c = \text{å}C_{i+1} \times t^i$, and $t = (T - T_{center})/100$, where T_{center} is a constant parameter. Summations are from i = 0 to (*nTerms* -1), where *nTerms* is the number of B or C terms.
  d_{sat} = the density of the saturated liquid and p_{sat} = the saturation vapor pressure.

- **Alternative 1:** There are no alternative equations for this property at this time.

Tait Equation: Density *(Liquid Phase)*

$d = d_{sat} / [1 - c \times \ln\{(b + p) / (b + p_{sat})\}]$; where
$b = \text{å}B_{i+1} \times t^i$, $c = \text{å}C_{i+1} \times t^i$, and $t = (T - T_{center})/100$, where T_{center} is a constant parameter. Summations are from i = 0 to (*nTerms* -1), where *nTerms* is the number of B or C terms.
d_{sat} = the density of the saturated liquid and p_{sat} = the saturation vapor pressure.



Density *(Gas Phase)*

- **DEFAULT: Virial Equation (VirialV):**
  (sample parameter output)
  d = 1000×Mw / V_m; where Mw is the molar mass and V_m is the molar volume.

  $Z = 1000 \times p \times V_m/(R \times T) = 1 + B/V_m + C/V_m^2$,

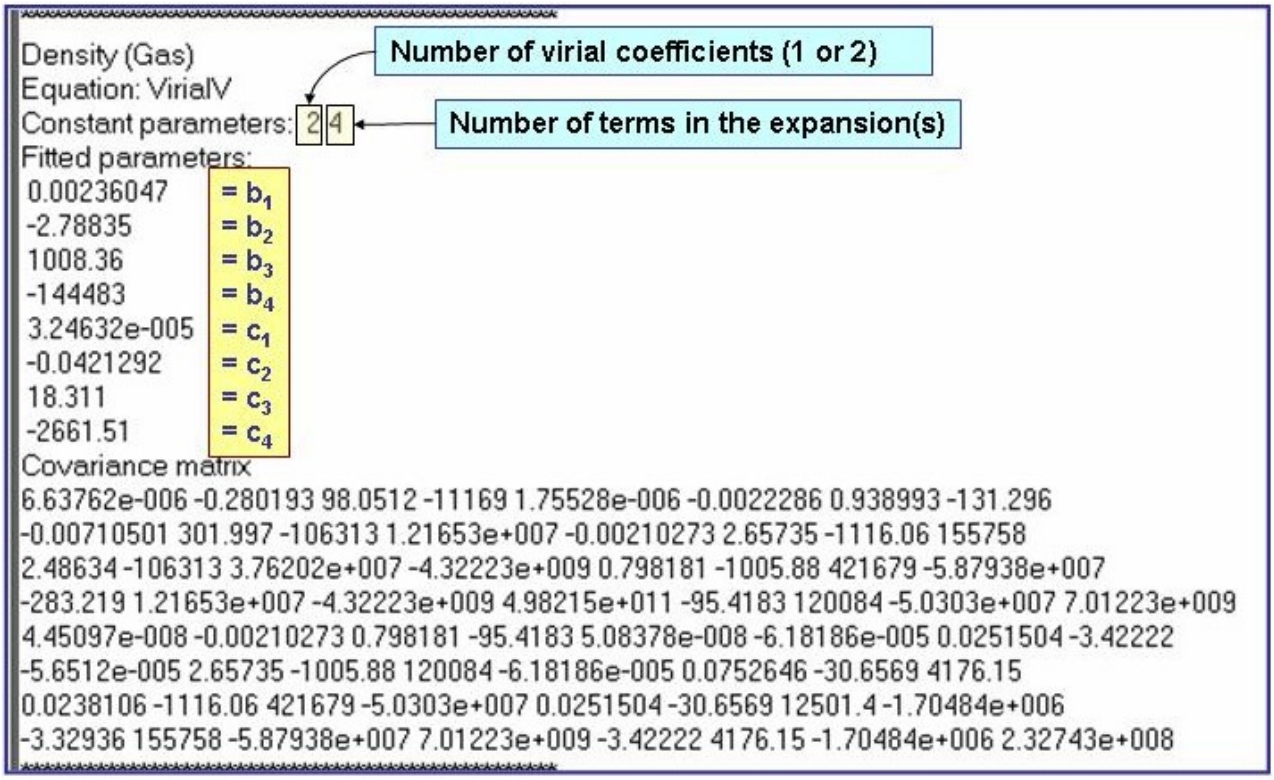
  where $B = \text{å}b_{i+1}/T^i$ and $C = \text{å}c_{i+1}/T^i$

- **Alternative 1**:
  There are no alternative equations for this property at this time.

VirialV: *For density of the gas phase.*

d = 1000×Mw / V_m; where Mw is the molar mass and V_m is the molar volume.
$Z = 1000 \times p \times V_m/(R \times T) = 1 + B/V_m + C/V_m^2$, where $B = \text{å}b_{i+1}/T^i$ and $C = \text{å}c_{i+1}/T^i$

Evaluation Results:



The example is for fitted gas densities of **pentane**.

Enthalpy of Vaporization *(Liquid/Gas)*

- **DEFAULT: HVP Expansion:** (sample parameter output)
  $\ln(H_{vap}/H_{vap}^{o}) = a_1 + \text{åa}_i \times T_r^{i-1} \times \ln(1-T_r)$, where the summation is from ***i = 2*** to ***nTerms -1***

  $T_r = T/T_c$, T_c is the critical temperature, and H_{vap}^{o} = 1 kJ/mol

- **Alternative 1: Yaws.VaporizationH** (sample parameter output)
  $H_{vap} = A \times \{1 - (T / T_c)\}^n$

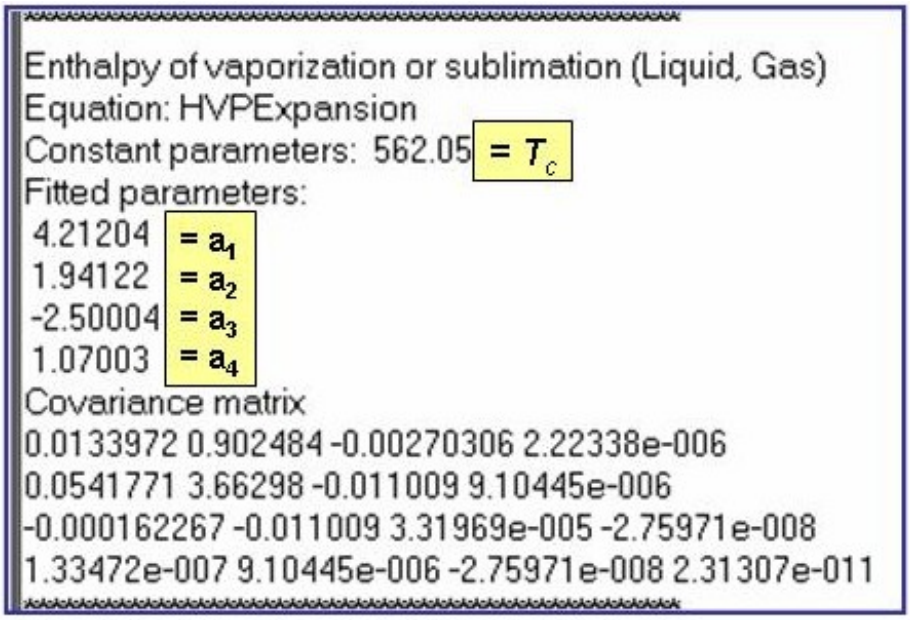
- **Alternative 2: PPDS 12** (sample parameter output)
  $H_{vap}/R = a_1 \times t^{1/3} + a_2 \times t^{2/3} + a_3 \times t + a_4 \times t^2 + a_5 \times t^6$

  where $t = 1 - T/T_c$, T_c is the critical temperature, and R is the gas constant.

HVPExpansion: *For H_{vap} for the liquid-gas phase boundary*

$\ln(H_{vap}/H_{vap}^{o}) = a_1 + \text{åa}_i \times T_r^{i-1} \times \ln(1-T_r)$, where the summation is from ***i = 2*** to ***nTerms -1***
$T_r = T/T_c$, T_c is the critical temperature, and H_{vap}^{o} = 1 kJ/mol

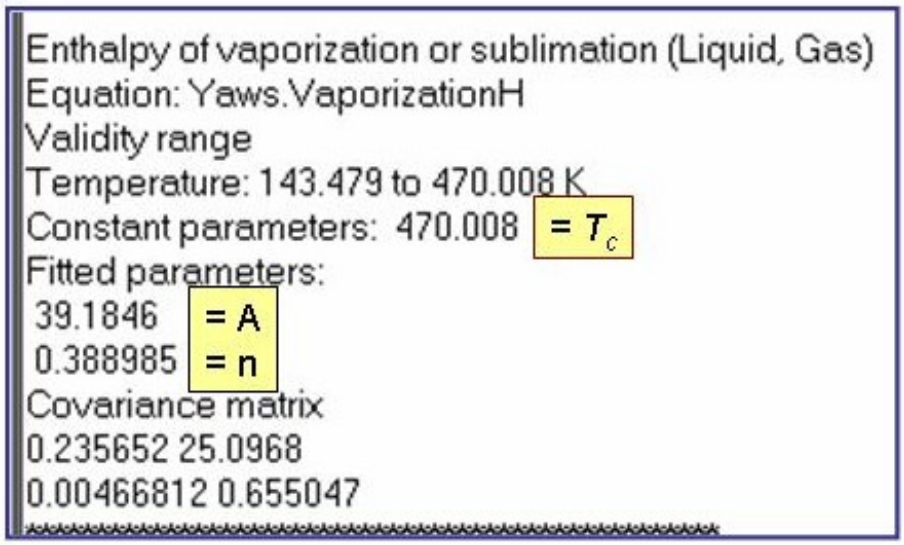
Evaluation Results:



The example is for fitted enthalpies of vaporization for **benzene**.

Yaws.VaporizationH: *For H_{vap} for the liquid-gas phase boundary*

H_{vap} = A×{1 - (T / T_c)}^{n}
Evaluation Results:

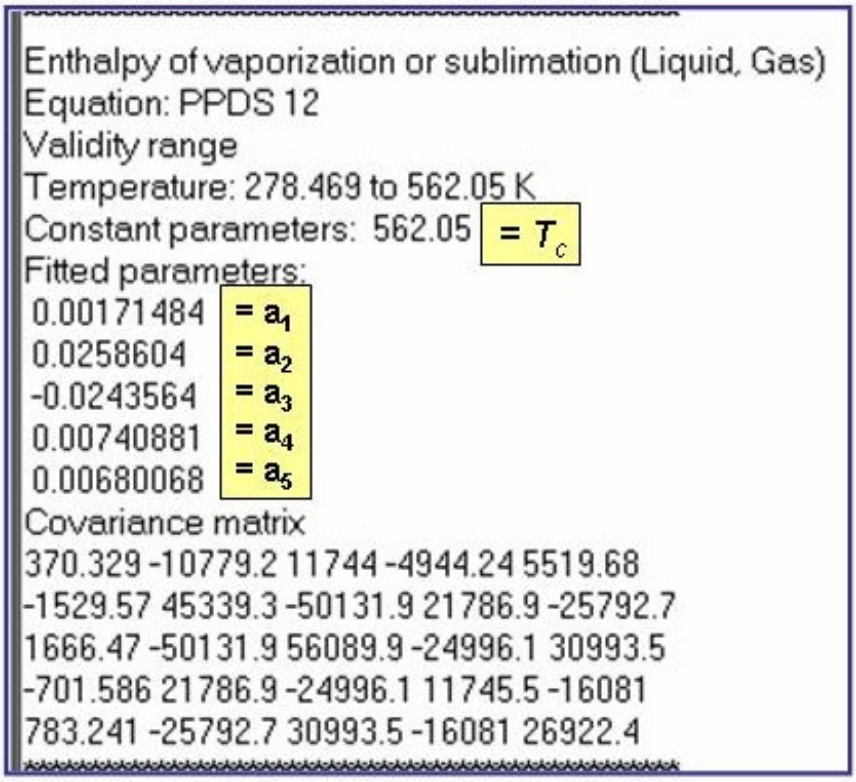


The example is for fitted enthalpies of vaporization for **pentane**.

PPDS12: *For H_{vap} for the liquid-gas phase boundary*

$H_{vap}/R = a_1 \times t^{1/3} + a_2 \times t^{2/3} + a_3 \times t + a_4 \times t^2 + a_5 \times t^6$
where t = 1 - T/T_c, T_c is the critical temperature, and R is the gas constant.

Evaluation Results:



The example is for fitted enthalpies of vaporization for **benzene**.

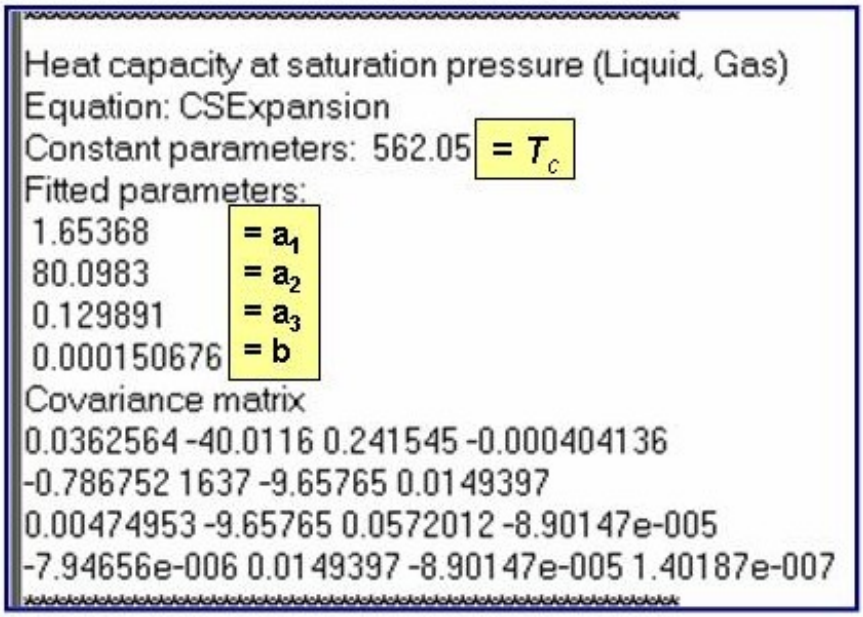
C_{sat} *(Liquid Phase)*

- **DEFAULT: CSExpansion:** (sample parameter output)
  C_{sat} = (åa$_{i+1}$× t^i) + b/t , where the summation is from ***i = 0*** to ***nTerms -1***.
- **Alternative 2: Yaws.PolynomialExpansion** (sample parameter output)
  C_{sat} = å a$_i$× T^i, where the summation is from ***i = 0*** to ***nTerms - 1***
- **Alternative 3: DIPPR.PolynomialExpansion** (sample parameter output)
  C_{sat} = å a$_i$× T^i, where the summation is from ***i = 0*** to ***nTerms - 1***
- **Alternative 3: PPDS 15** (sample parameter output)
  C_{sat} / R = a_0/t + a_1 + a_2×t + a_3×t^2 + a_4×t^3 + a_5×t^4

  where t = 1 - T/T_c, T_c is the critical temperature, and R is the gas constant.

CSExpansion: *For C_{sat} of the Liquid phase*

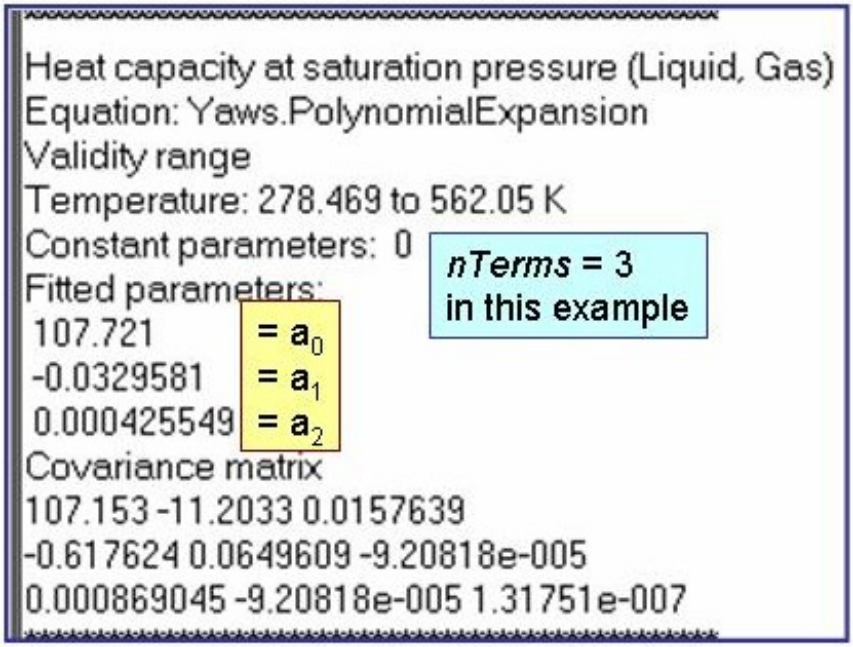
C_{sat} = (åa$_{i+1}$× t^i) + b/t , where the summation is from ***i = 0*** to ***nTerms -1***.
Evaluation Results:



The example is for fitted heat capacities at vapor saturation for **benzene**.

Yaws.PolynomialExpansion: *For C_{sat} of the liquid phase*

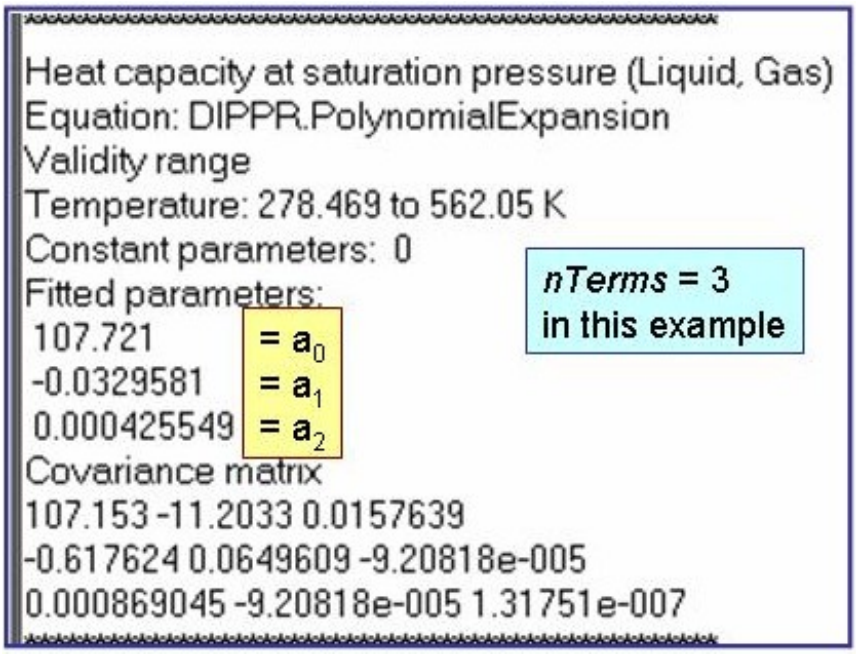
C_{sat} = å $a_i \times T^i$, where the summation is from ***i = 0*** to ***nTerms - 1***
Evaluation Results:



The example is for fitted heat capacities at vapor saturation for **benzene**.

DIPPR.PolynomialExpansion: *For C_{sat} of the liquid phase*

C_{sat} = å $a_i \times T^i$, where the summation is from ***i = 0*** to ***nTerms - 1***
Evaluation Results:

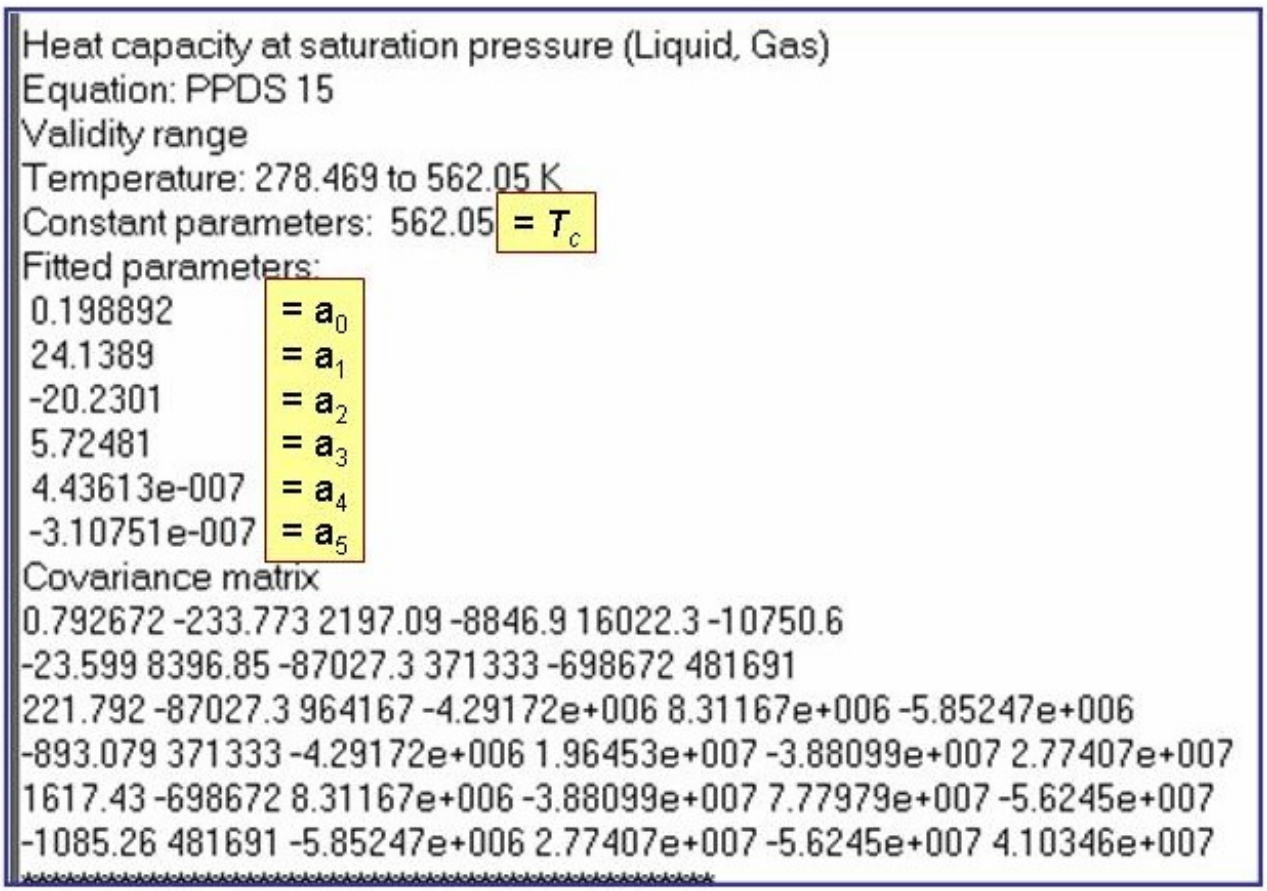


The example is for fitted heat capacities at vapor saturation for **benzene**.

PPDS 15: *For C_{sat} of the liquid phase*

C_{sat} / R = $a_0/t + a_1 + a_2 \times t + a_3 \times t^2 + a_4 \times t^3 + a_5 \times t^4$
where t = 1 - T/T_c, T_c is the critical temperature, and R is the gas constant.

Evaluation Results:



The example is for fitted heat capacities at vapor saturation for **benzene**.

C_p^o(Ideal Gas)

- **DEFAULT: Wilhoit Equation**
  C_p^o / R = a_0 + (a_1 /T^2) × exp(-a_2 /T) + a_3 × y^2 + {a_4 - a_5 /(T - a_7)^2} × y^8

  where y = (T - a_7)/(T + a_6) and R is the gas constant.

  See *Thermodynamics of Organic Compounds in the Gas State (Volumes I and II)* by M. Frenkel, G. J. Kabo, K. N. Marsh, G. N. Roganov, and R. C. Wilhoit. Publsihed by the Thermodynamics Research Center (TRC), College Station: TX. **1994.**

- **Alternative 1: Yaws.PolynomialExpansion** (sample parameter output)
  C_p^o = å a_i× T^i, where the summation is from ***i = 0*** to ***nTerms - 1***

- **Alternative 2: AlyLee (which is also DIPPR 107)** (sample parameter output)
  C_p^o = a + b×{(c/T)/sinh(c/T)}^{2} + d×{(e/T)/cosh(e/T)}^{2}

- **Alternative 3: PPDS2** (sample parameter output)
  C_p^o/R = C_{low} + (C_{low} - C¥)×y^2 ×{1 + (y - 1) å(a_i × y_i)} ; where the summation is from ***i = 0 to 4***.

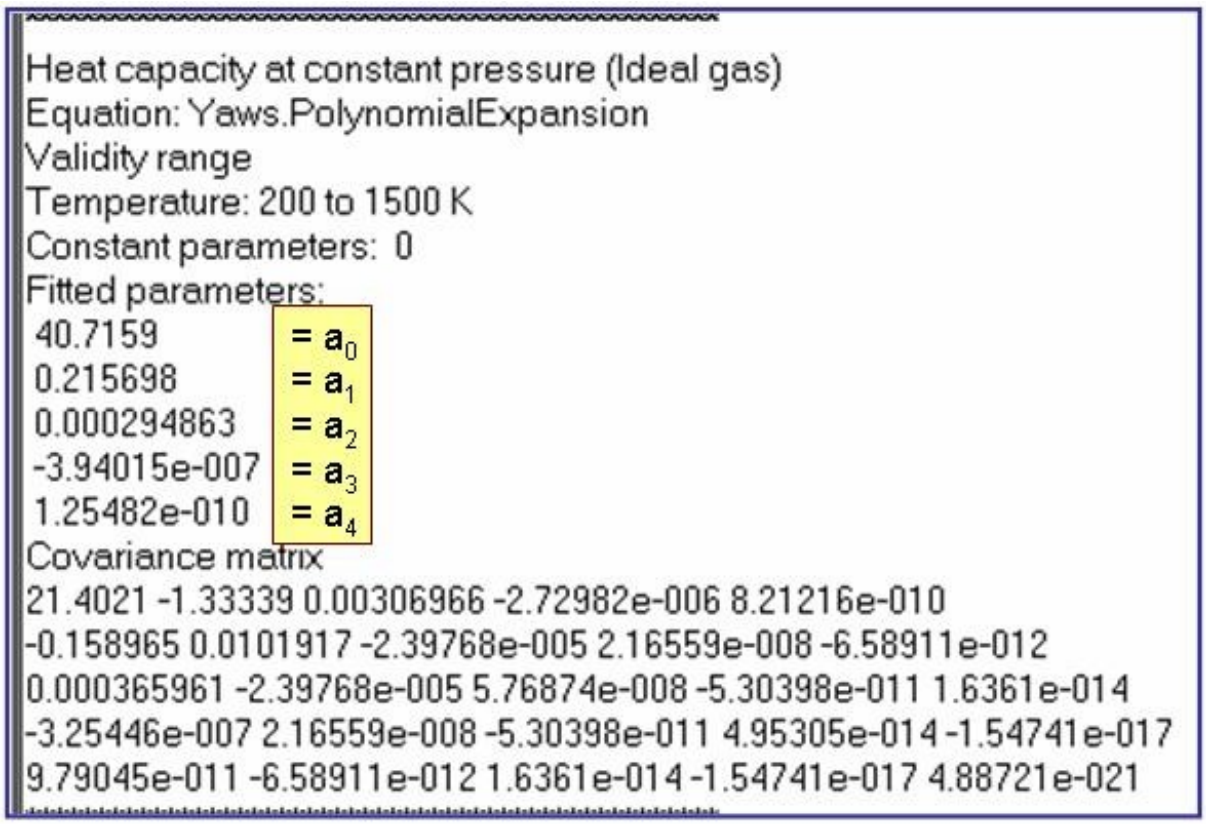
  C_{low} and C¥ are equation constants, and y = T / (T + T_S), where T_S is a constant.

- **Alternative 4: Helmholtz** (sample parameter output)
  C_p^o/R = 1 + t - {åa_i×n_i×(n_i - 1)×t^{n_i}}$_{(n_i \neq 0 \text{ or } 1)}$ + åb_i×(c_i×t)^2×exp(c_i×t) / {exp(c_i×t) - 1}^{2};

  where t = T_c/T, T_c = the critical temperature, and the summations are from ***i = 1*** to ***nTerms***.

C_p^o(Ideal Gas)

C_p^o = å a_i× T^i, where the summation is from ***i = 0*** to ***nTerms - 1***

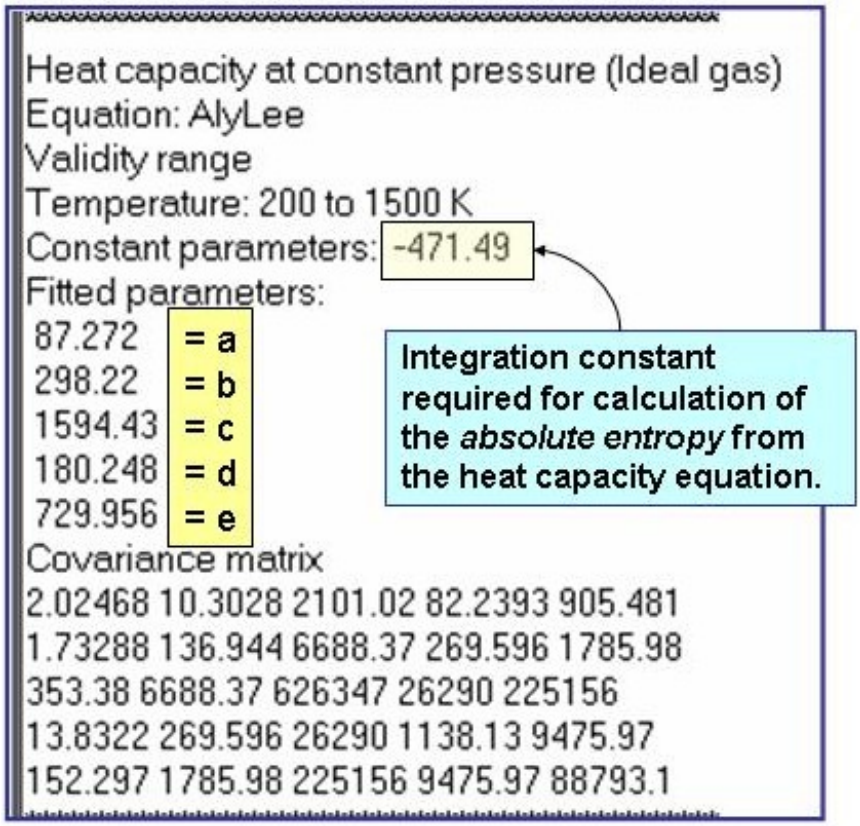


The example is for fitted heat capacities in the ideal-gas state at p = 100 kPa for **pentane**.

Aly & Lee Equation (same as DIPPR 107): *C_p^o(Ideal Gas)*

$C_p^o = a + b\times\{(c/T)/\sinh(c/T)\}^2 + d\times\{(e/T)/\cosh(e/T)\}^2$

Reference: Aly, F. A.; Lee, L. L. *Fluid Phase Equil.* **1981**, *6*, 169-179.

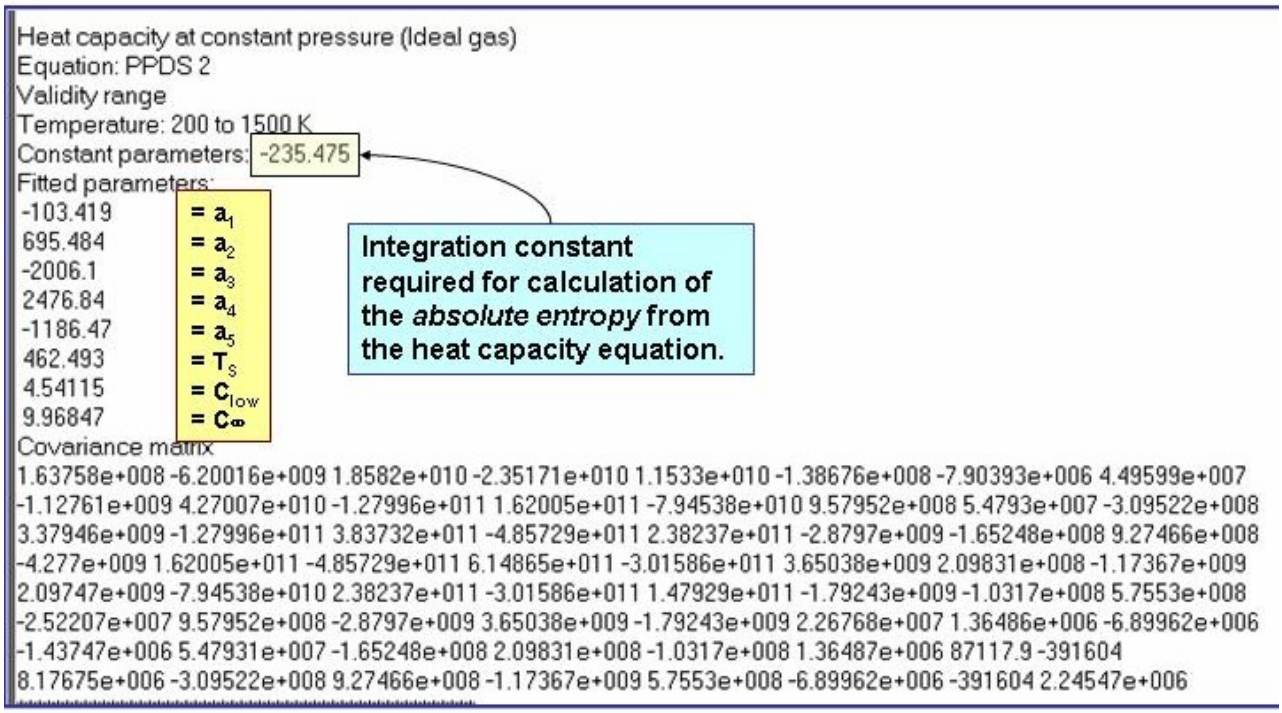


The example is for fitted heat capacities in the ideal-gas state at p = 100 kPa for **pentane**.

PPDS 2: C_p^o(Ideal Gas)

$C_p^o/R = C_{low} + (C_{low} - C_¥)\times y^2 \times\{1 + (y - 1)\ å(a_i \times y_i)\}$; where the summation is from ***i = 0 to 4***. C_{low} and $C_¥$ are equation constants, and $y = T / (T + T_S)$, where T_S is a constant.

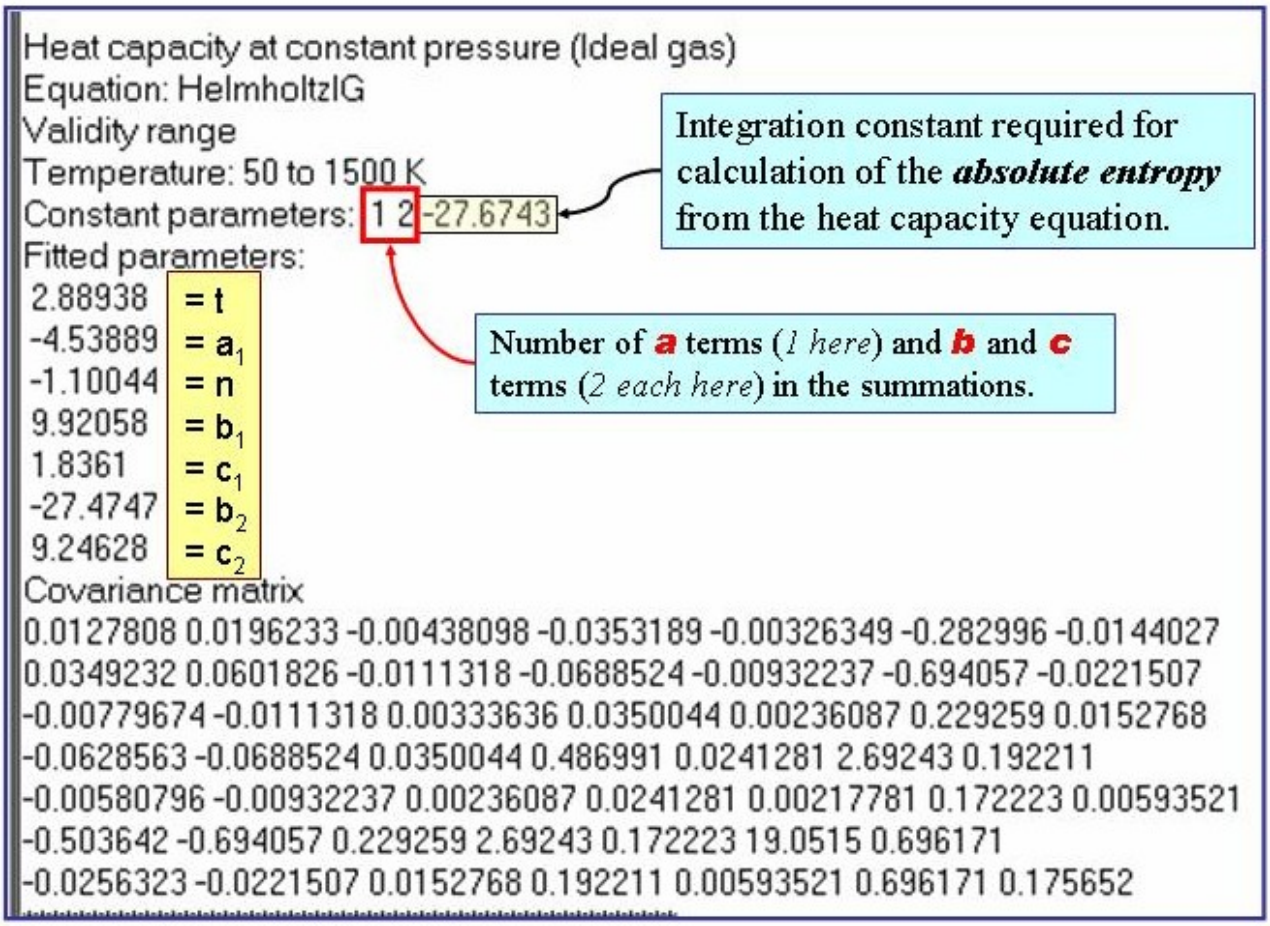
Evaluation Results:



The example is for fitted heat capacities in the ideal-gas state at p = 100 kPa for **pentane**.

Helmholtz: C_p^o*(Ideal Gas)*

$C_p^o/R = 1 + t - \{\text{åa}_i \times n_i \times (n_i - 1) \times t^{n_i}\}_{(n_i^1 \text{ 0 or } 1)} + \text{åb}_i \times (c_i \times t)^2 \times \exp(c_i \times t) / \{\exp(c_i \times t) - 1\}^2$;
where $t = T_c/T$, T_c = the critical temperature, and the summations are from ***i = 1*** to ***nTerms***.



The example is for fitted heat capacities in the ideal-gas state at p = 100 kPa for **2-methylpyrrole**.

Speed of Sound *(Liquid Phase)*

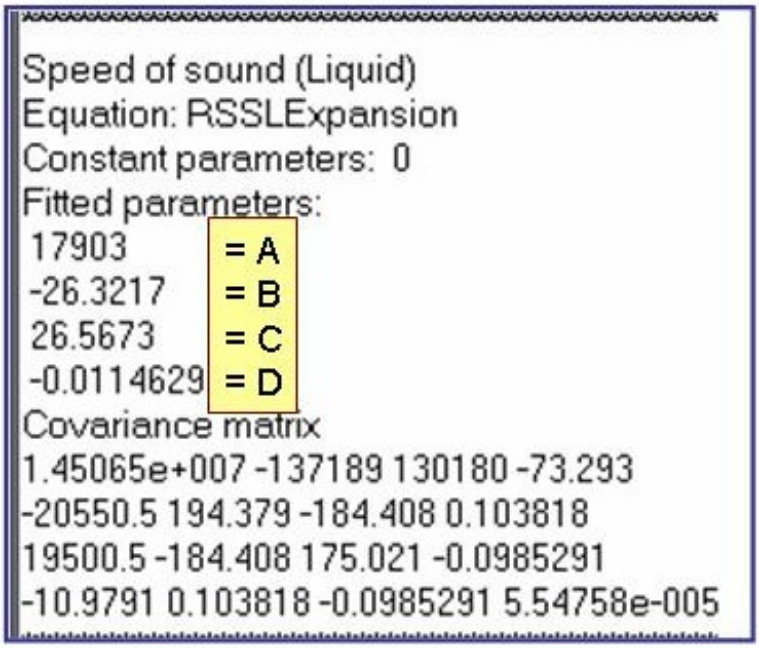
- **DEFAULT: RSSL Expansion:** (sample parameter output)
  $u = A + B \times T + C \times (d - d_{sat}) + D \times d^2$,

  where d is the density of the liquid and d_{sat} is the density of the saturated liquid.

- **Alternative 1**:
  There are no alternative representations for this property at this time.

Speed of Sound *(Liquid Phase)*

$u = A + B \times T + C \times (d - d_{sat}) + D \times d^2$,
where d is the density of the liquid and d_{sat} is the density of the saturated liquid.



The example is for fitted speeds of sound for **benzene**.

Speed of Sound *(Gas Phase)*

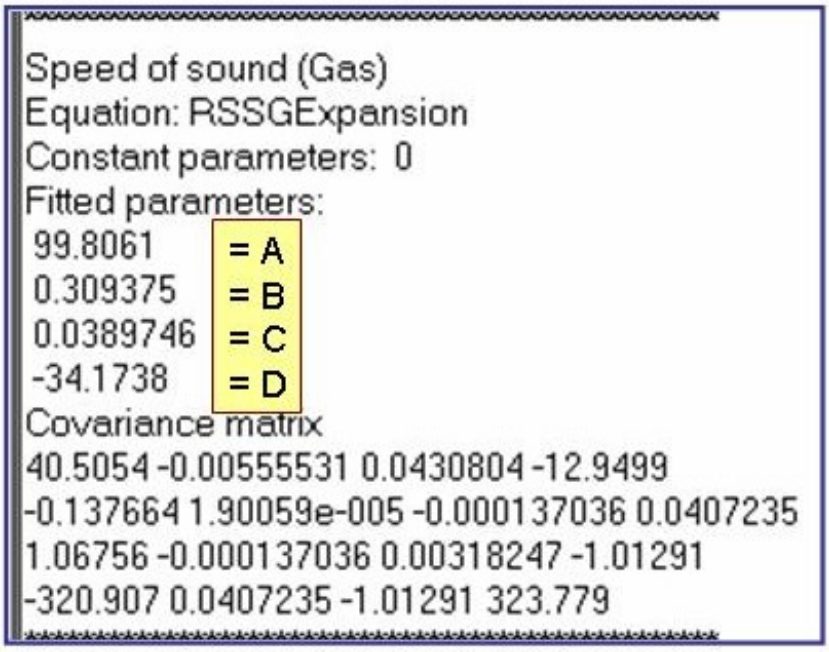
- **DEFAULT: RSSG Expansion:** (sample parameter output)
  $u = A + B \times T + C \times p + D \times p/T$;

  where T is the temperature and p is pressure.

- **Alternative 1**:
  There are no alternative representations for this property at this time.

Speed of Sound *(Gas Phase)*

$u = A + B \times T + C \times p + D \times p/T$;
where T is the temperature and p is pressure.



The example is for fitted speeds of sound for **pentane** in the gas phase.

Refractive Index n_D *(Liquid)*

- **DEFAULT: RIXExpansion:** (sample parameter output)
  n_D = A + B×t + å C_i×w^i ;the summation is from ***i = 1*** to ***nTerms***

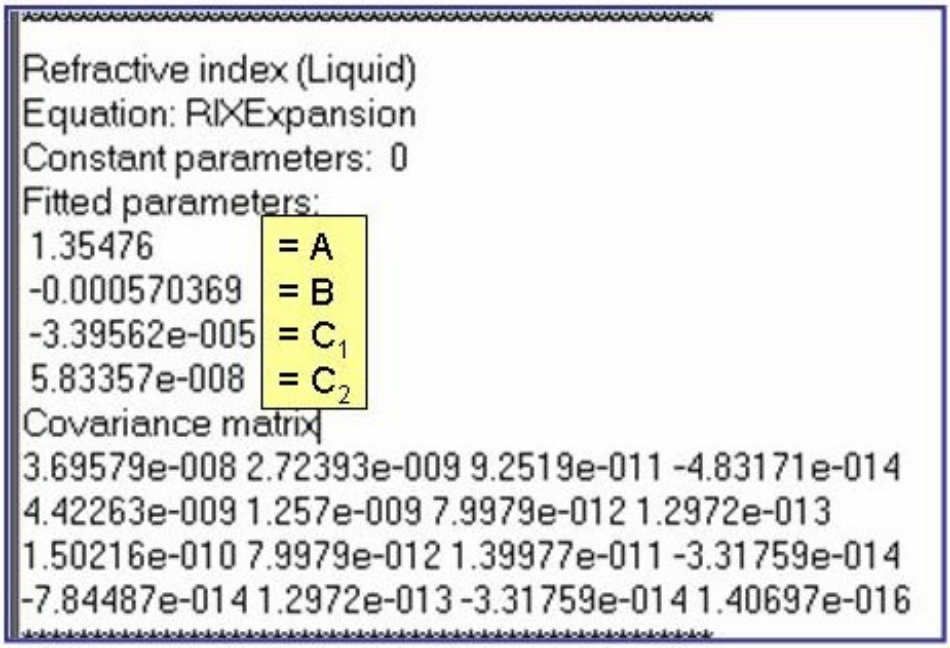
  where t = T - 298.15 K and w = WL - 589.26 (WL = wavelength in nm)

- **Alternative 1**:
  There are no alternative equations for this property at this time.

RIXExpansion: *Refractive Index n_D (Liquid)*

n_D = A + B×t + å C_i×w^i ;the summation is from ***i = 1*** to ***nTerms***
where t = T - 298.15 K and w = WL - 589.26 (WL = wavelength in nm)

Evaluation Results:



The example is for fitted surface tensions for **pentane**.

Surface Tension s *(Liquid/Gas)*

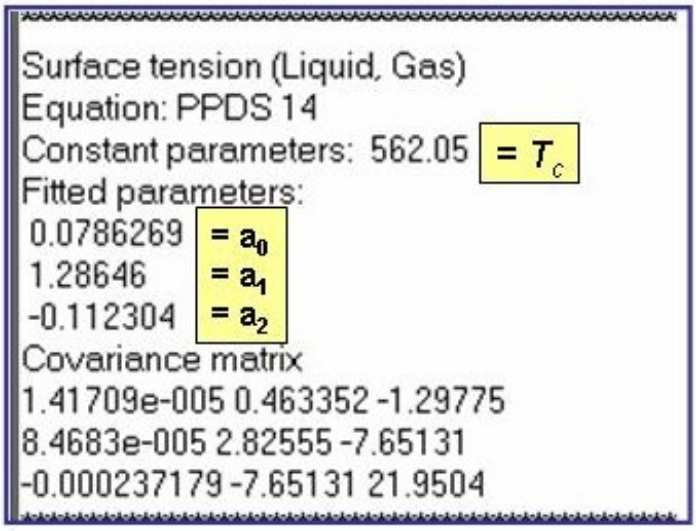
- **DEFAULT: PPDS 14:** (sample parameter output)
  $s = a_0 \times t^{a_1} \times (1 + a_2 \times t)$, where $t = 1 - T/T_c$ and T_c is the critical temperature.
- **Alternative 1: Yaws.SurfaceTension** (sample parameter output)
  $s = \exp(A) \times \{1 - (T / T_c)\}^n$
- **Alternative 2: HVPExpansion** (sample parameter output)
  $\ln(s/s^o) = a_1 + \text{å}a_i \times T_r^{i-1} \times \ln(1-T_r)$, where the summation is from ***i = 2*** to ***nTerms -1***

  $T_r = T/T_c$, T_c is the critical temperature, and s^o = 1 N/m

PPDS14: *For surface tension s for the liquid/gas interface*

$s = a_0 \times t^{a_1} \times (1 + a_2 \times t)$, where $t = 1 - T/T_c$ and T_c is the critical temperature.
Evaluation Results:

The example is for fitted surface tensions for **benzene**.



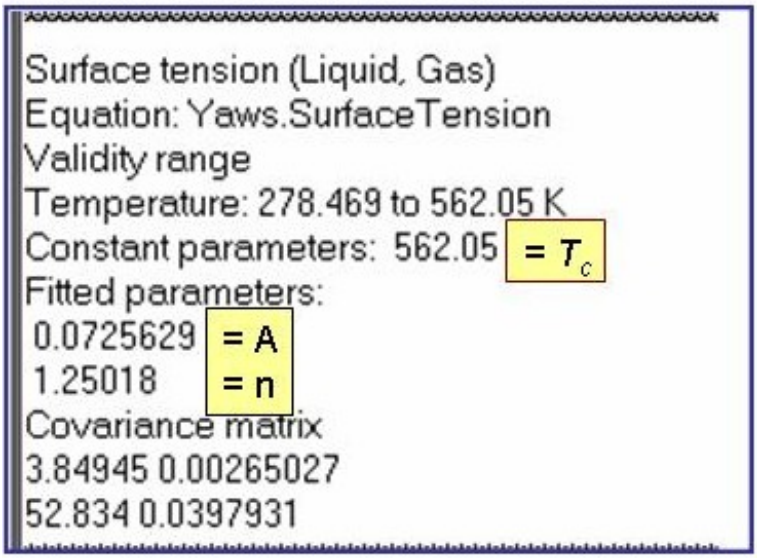
Yaws.SurfaceTension: *For surface tension s for the liquid/gas interface*

- **Alternative 1: Yaws.SurfaceTension** (sample parameter output)

$s = \exp(A) \times \{1 - (T / T_c)\}^n$

Evaluation Results:

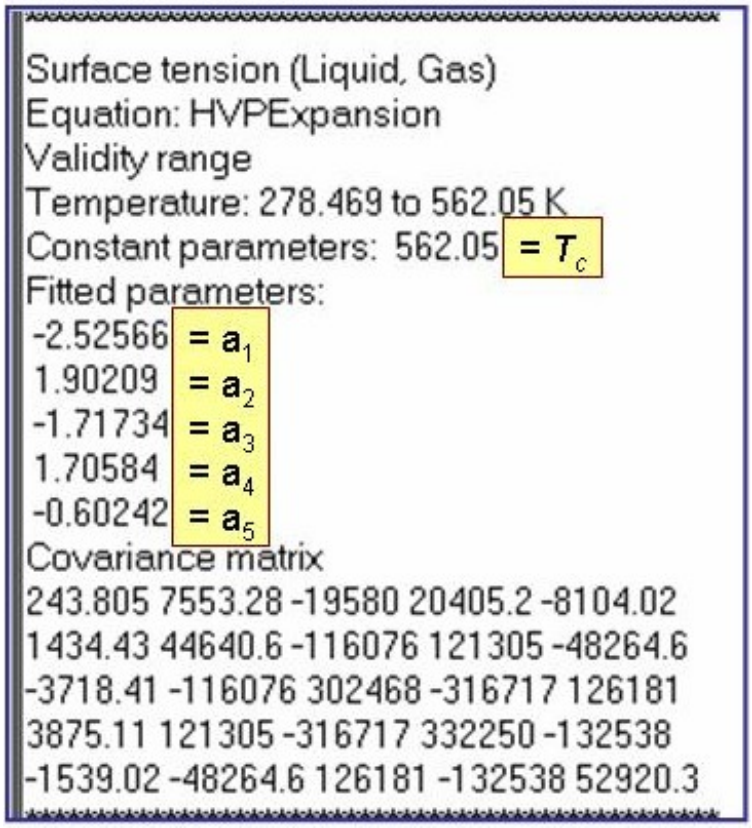
The example is for fitted surface tensions for **benzene**.



HVPExpansion: *For surface tension s for the liquid/gas interface*

$\ln(s/s^o) = a_1 + \text{åa}_i \times T_r^{i-1} \times \ln(1-T_r)$, where the summation is from ***i = 2*** to ***nTerms -1***
$T_r = T/T_c$, T_c is the critical temperature, and s^o = 1 N/m

The example is for fitted surface tensions for **benzene**.

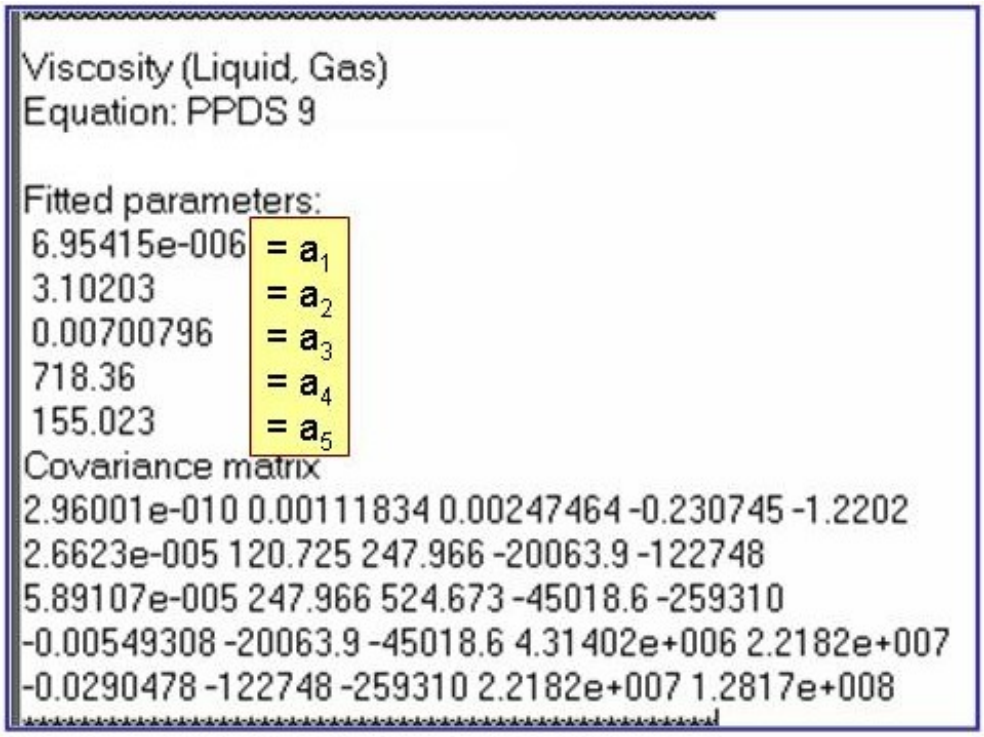


Viscosity *(Saturated Liquid)*

- **DEFAULT: PPDS 9:** (sample parameter output)
  $\ln(h/h^o) = a_1 \times X^{1/3} + a_2 \times X^{4/3} + \ln(a_5)$, where $X = (a_3 - T) / (T - a_4)$ and h^o = 1 Pa×s
- **Alternative 1: Yaws.Viscosity** (sample parameter output)
  $\lg(h/h^o) = A + B/T + C \times T + D \times T^2$
- **Alternative 2: DIPPR 101** (sample parameter output)
  $\ln(h/h^o) = a + b/T + c \times \ln(T) + d \times T^e$; where h^o = 1 Pa×s

PPDS9: *Viscosity h of the saturated liquid*

$\ln(h/h^o) = a_1 \times X^{1/3} + a_2 \times X^{4/3} + \ln(a_5)$, where $X = (a_3 - T) / (T - a_4)$ and h^o = 1 Pa×s.
Evaluation Results:

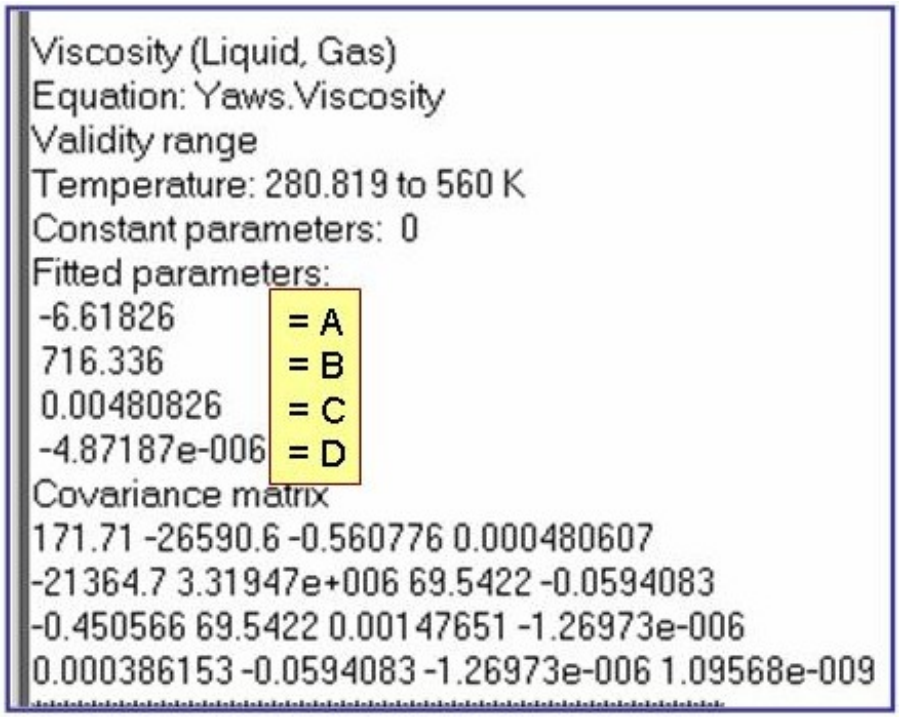


The example is for fitted viscosities for the saturated liquid phase of **benzene**.

Yaws.Viscosity: *Viscosity h of the saturated liquid*

$\lg(h/h^o) = A + B/T + C \times T + D \times T^2$

Evaluation Results:

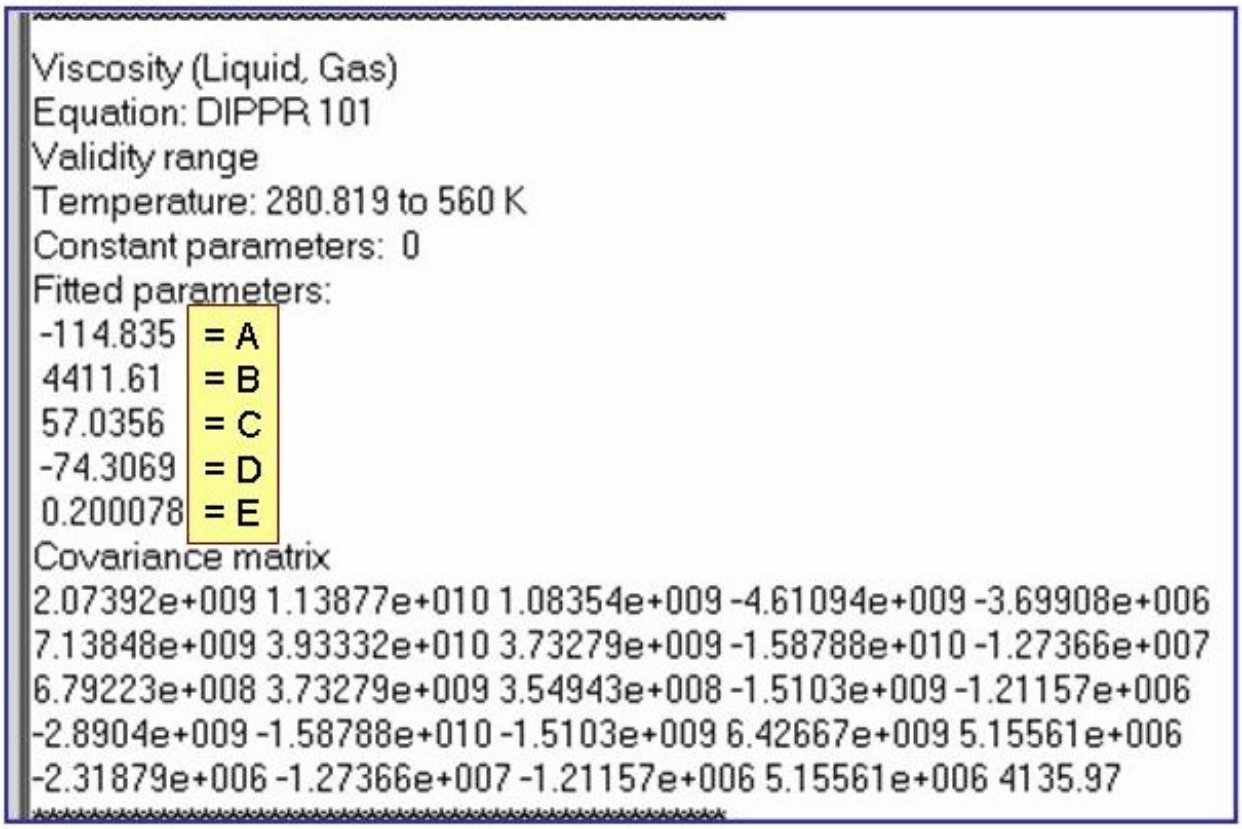


The example is for fitted viscosities for the saturated liquid phase of **benzene**.

DIPPR101: *Viscosity h of the saturated liquid*

$\ln(h/h^o) = a + b/T + c \times \ln(T) + d \times T^e$; where $h^o = 1$ Pa×s

Evaluation Results:



The example is for fitted viscosities for the saturated liquid phase of **benzene**.

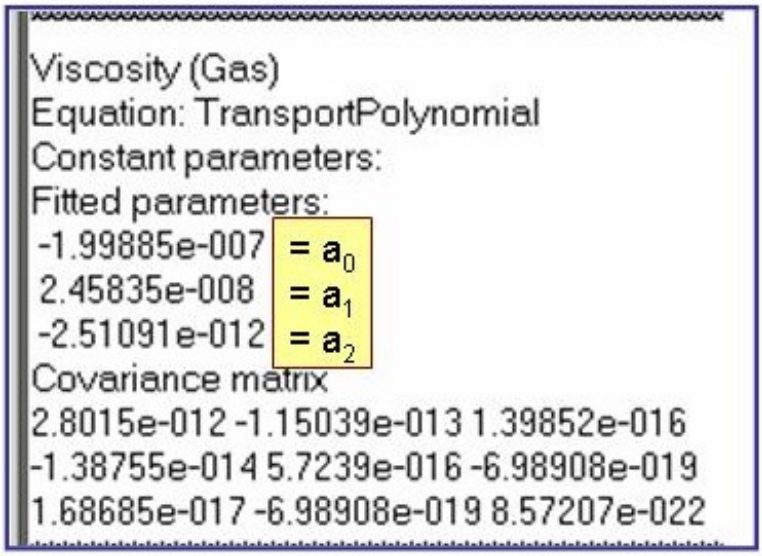
Viscosity *(Gas at low pressures; p < 6 bar)*

- **DEFAULT: TransportPolynomial:** (sample parameter output)
  h = å $a_i \times T^i$, where the summation is from ***i = 0*** to ***nTerms - 1***
- **Alternative 1: Yaws.PolynomialExpansion** (sample parameter output)
  h = å $a_i \times T^i$, where the summation is from ***i = 0*** to ***nTerms - 1***
- **Alternative 2: DIPPR 102** (sample parameter output)
  $h = A \times T^B / (1 + C/T + D/T^2)$
- **Alternative 3: PPDS 5** (sample parameter output)
  $h = a_0 \times T_r / \{1 + a_1 \times (T_r - 1) \times T_r^{a_2}\}^{1/6}$; where $T_r = T/T_c$ and T_c is the critical temperature.

TransportPolynomial: *For viscosity h of the gas at low pressures (p < 600 kPa)*

h = å $a_i \times T^i$, where the summation is from ***i = 0*** to ***nTerms - 1***

Evaluation Results:

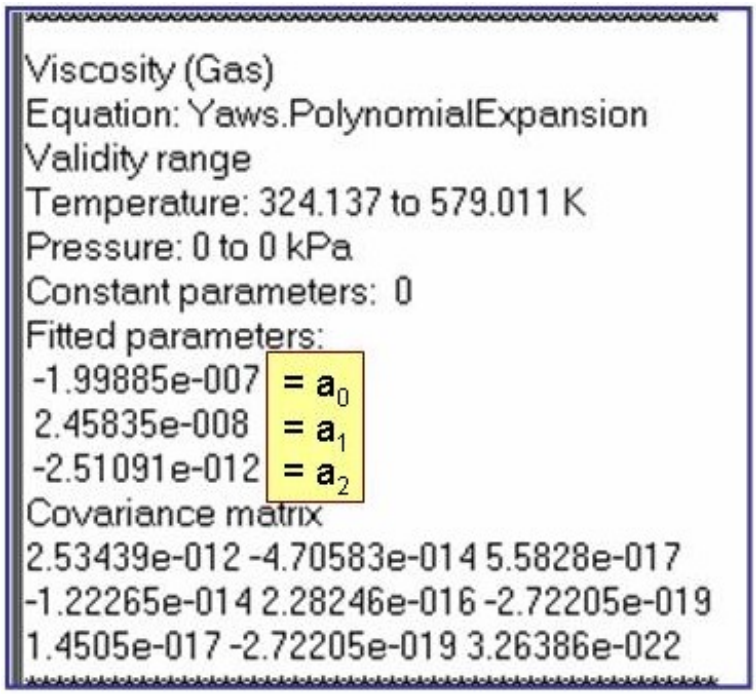


The example is for fitted thermal conductivities for the saturated liquid phase of **pentane**.

Yaws.PolynomialExpansion: *For viscosity h of the gas at low pressures (p < 600 kPa)*

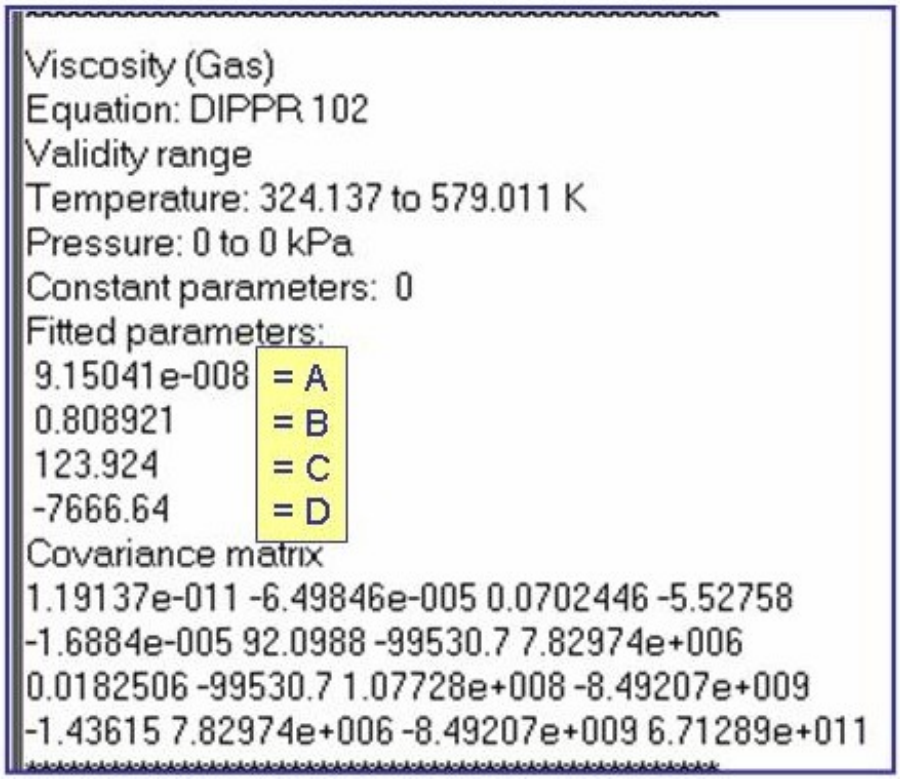
h = å $a_i \times T^i$, where the summation is from ***i = 0*** to ***nTerms - 1***
Evaluation Results:

The example is for fitted thermal conductivities for the saturated liquid phase of **pentane**.



DIPPR 102: *For viscosity h of the gas at low pressures (p < 600 kPa)*

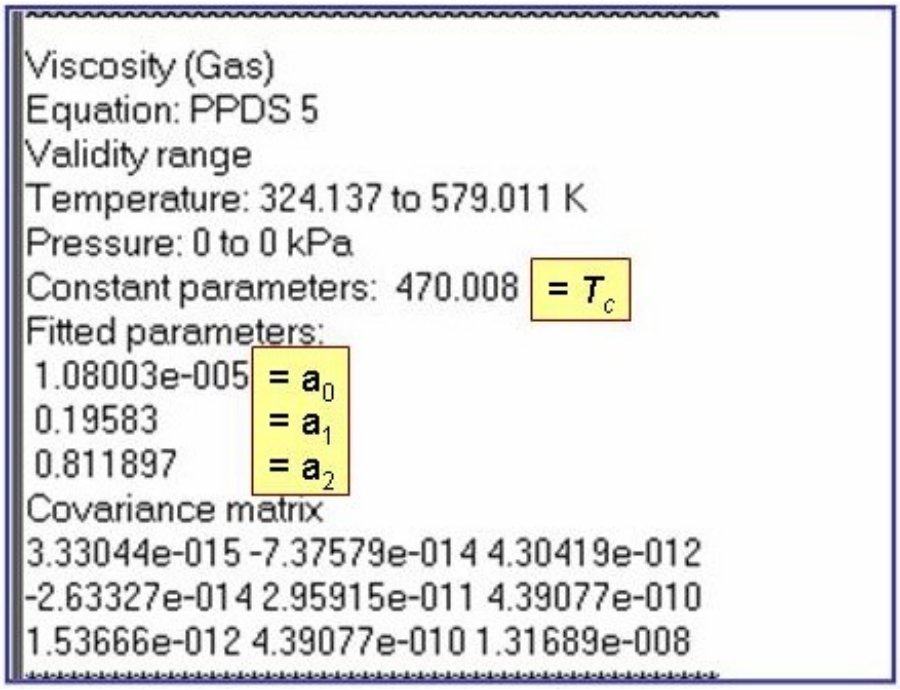
h = $A \times T^B / (1 + C/T + D/T^2)$
Evaluation Results:



The example is for fitted thermal conductivities for the saturated liquid phase of **pentane**.

PPDS 5: *For viscosity h of the gas at low pressures (p < 600 kPa)*

$h = a_0 \times T_r / \{1 + a_1 \times (T_r - 1) \times T_r^{a_2}\}^{1/6}$; where $T_r = T/T_c$ and T_c is the critical temperature.
Evaluation Results:



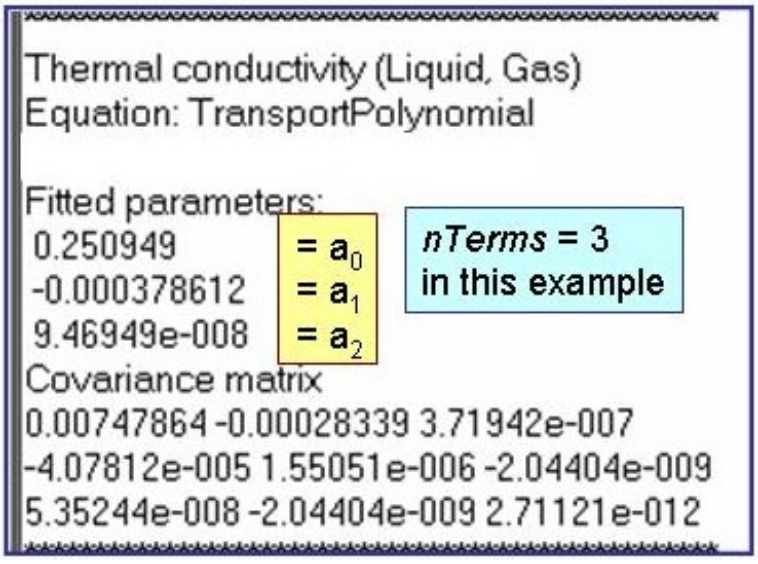
The example is for fitted thermal conductivities for the saturated liquid phase of **pentane**.

Thermal Conductivity l: *(Liquid)*

- **DEFAULT: TransportPolynomial:** (sample parameter output)
  l = å $a_i \times T^i$, where the summation is from ***i = 0*** to ***nTerms - 1***
- **Alternative 1: Yaws.ThermalConductivity** (sample parameter output)
  $\lg(l/l^o) = A + B \times (1 - T/C)^{2/7}$
- **Alternative 2: Yaws.PolynomialExpansion** (sample parameter output)
  l = å $a_i \times T^i$, where the summation is from ***i = 0*** to ***nTerms - 1***
- **Alternative 3: DIPPR.PolynomialExpansion** (sample parameter output)
  l = å $a_i \times T^i$, where the summation is from ***i = 0*** to ***nTerms - 1***
- **Alternative 4: PPDS 8** (sample parameter output)
  l = a_1 + å($a_{i+1} \times t^{i/3}$) , where the summation is from ***i = 1*** to ***nTerms -1*** and t = 1 - T/T_c

TransportPolynomial: *For thermal conductivity l of the saturated liquid*

l = å $a_i \times T^i$, where the summation is from ***i = 0*** to ***nTerms - 1***
Evaluation Results:

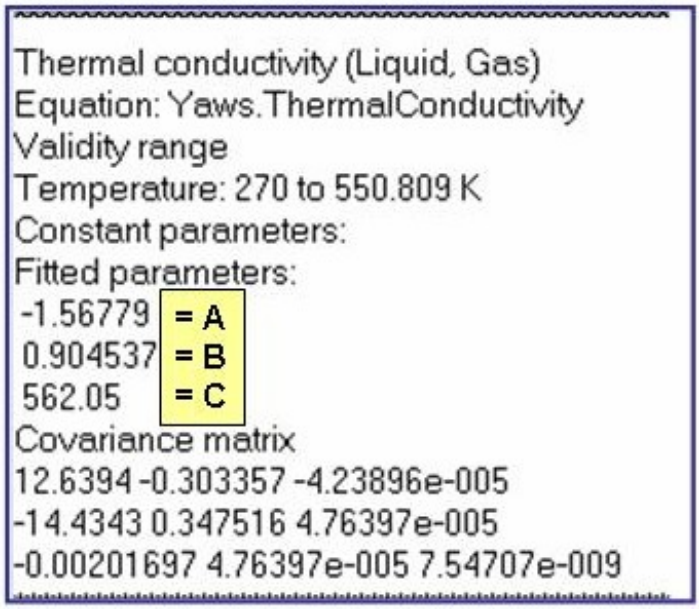


The example is for fitted thermal conductivities for the saturated liquid phase of **benzene**.

Yaws.ThermalConductivity: *For thermal conductivity l of the saturated liquid*

$\lg(l/l^o) = A + B \times (1 - T/C)^{2/7}$
Evaluation Results:

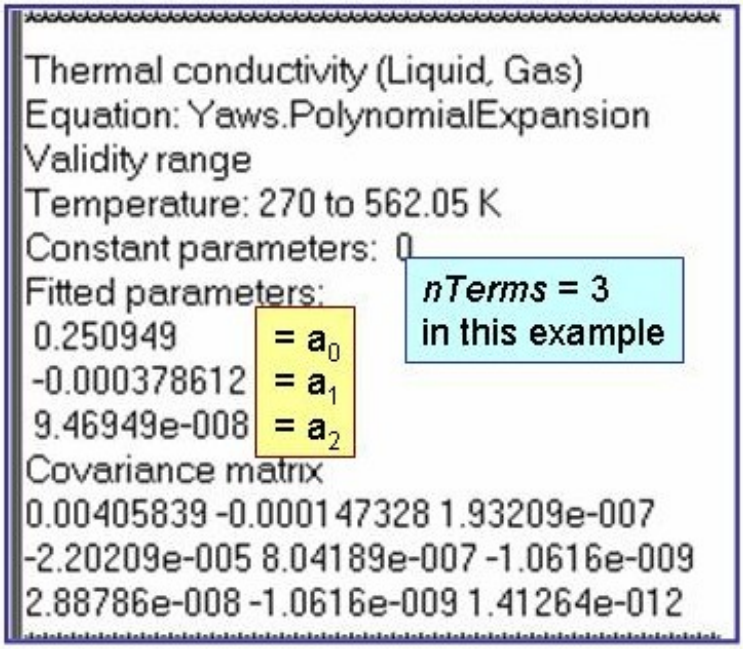
The example is for fitted thermal conductivities for the saturated liquid phase of **benzene**.



Yaws.PolynomialExpansion: *For thermal conductivity l of the saturated liquid*

l = å a_i× T^i, where the summation is from ***i = 0*** to ***nTerms - 1***
Evaluation Results:

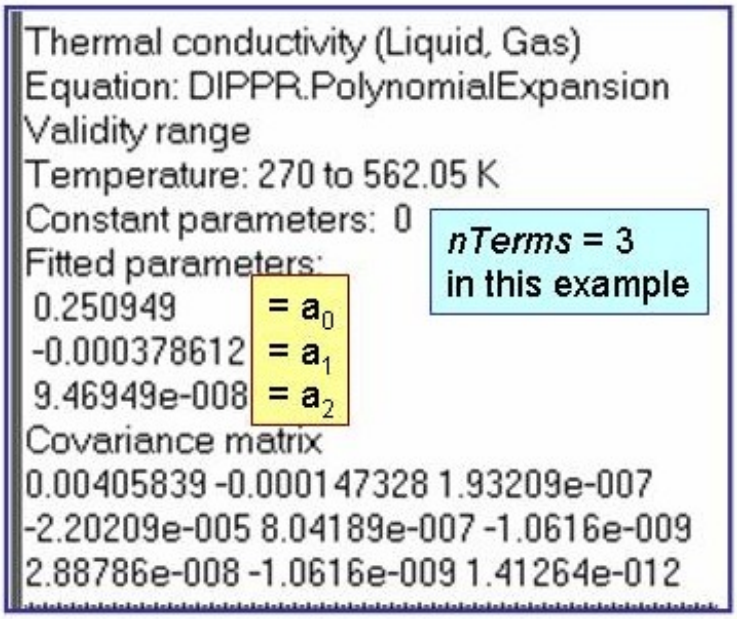
The example is for fitted thermal conductivities for the saturated liquid phase of **benzene**.



DIPPR.PolynomialExpansion: *For thermal conductivity l of the saturated liquid*

l = å a_i× T^i, where the summation is from ***i = 0*** to ***nTerms - 1***
Evaluation Results:

The example is for fitted thermal conductivities for the saturated liquid phase of **benzene**.

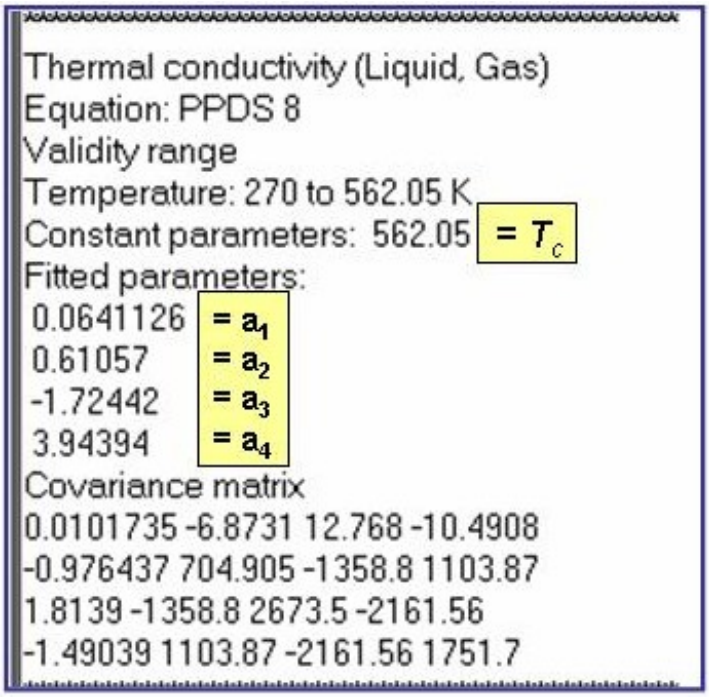


PPDS8: *For thermal conductivity l of the saturated liquid*

$l = a_1 + \sum(a_{i+1} \times t^{i/3})$, where the summation is from ***i = 1*** to ***nTerms -1*** and $t = 1 - T/T_c$

Evaluation Results:

The example is for fitted thermal conductivities for the liquid phase of **benzene**.



Thermal Conductivity *(Gas at low pressures; p < 6 bar)*

- **DEFAULT: TransportPolynomial:** (sample parameter output)
  $l = \sum a_i \times T^i$, where the summation is from ***i = 0*** to ***nTerms - 1***

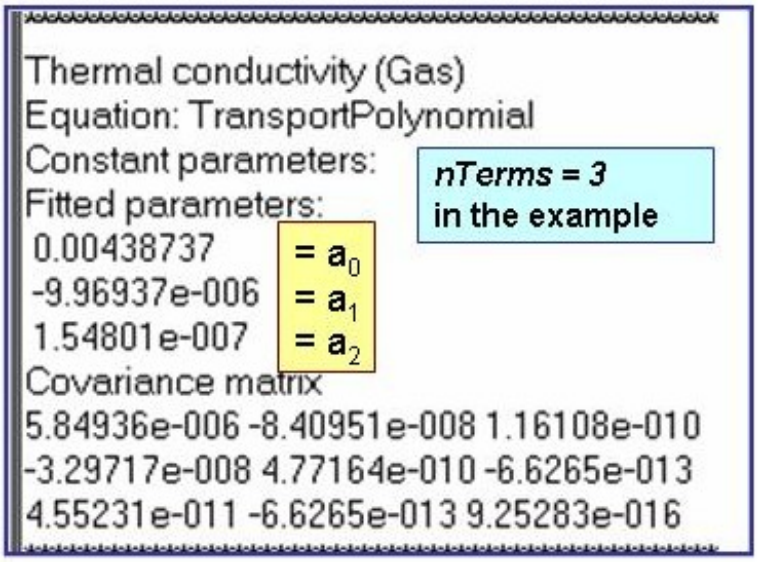
- **Alternative 1: Yaws.PolynomialExpansion** (sample parameter output)
  $l = \sum a_i \times T^i$, where the summation is from ***i = 0*** to ***nTerms - 1***

- **Alternative 2: PPDS 3** (sample parameter output)
  $l = T_r^{0.5} (\text{å} a_i / T_r^i)^{-1}$, where the summation is from ***i = 1*** to ***3***,

  and $T_r = T/T_c$, where T_c is the critical temperature.

TransportPolynomial: *For thermal conductivity l of the gas at low pressure (p < 600 kPa)*

$l = \text{å } a_i \times T^i$, where the summation is from ***i = 0*** to ***nTerms - 1***
Evaluation Results:

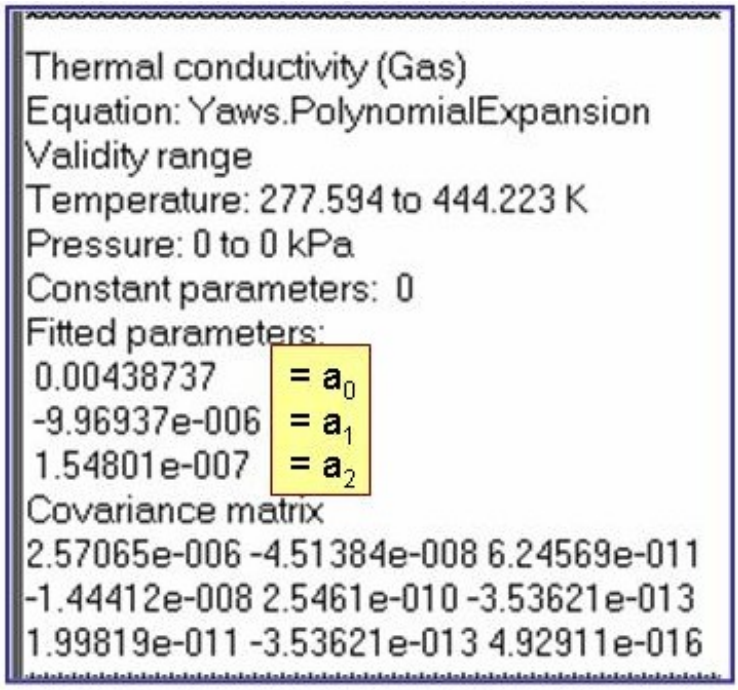


The example is for fitted thermal conductivities for the saturated liquid phase of **pentane**.

Yaws.PolynomialExpansion: *For thermal conductivity l of the gas at low pressure (p < 600 kPa)*

$l = \text{å } a_i \times T^i$, where the summation is from ***i = 0*** to ***nTerms - 1***
Evaluation Results:

The example is for fitted thermal conductivities for the saturated liquid phase of **pentane**.



PPDS 3: *For thermal conductivity l of the gas at low pressure (p < 600 kPa)*

l = $T_r^{0.5}$ (åa$_i$ / T_r^i)$^{-1}$, where the summation is from ***i* = *1*** to ***3***,
and $T_r = T/T_c$, where T_c is the critical temperature.

Evaluation Results:

The example is for fitted thermal conductivities for the saturated liquid phase of **pentane**.