<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>$a$</td>
<td>Average distance between molecules.</td>
</tr>
<tr>
<td>$a'$</td>
<td>Distance between two molecules i and l at which the energy of interaction is minimum.</td>
</tr>
<tr>
<td>$a_v$</td>
<td>Area of contact of two impacting surfaces.</td>
</tr>
<tr>
<td>$a_e$</td>
<td>Energy density constant in radiation.</td>
</tr>
<tr>
<td></td>
<td>Second virial coefficient of the mixture.</td>
</tr>
<tr>
<td>$b$</td>
<td>Coefficient of p in Jones equation of State.</td>
</tr>
<tr>
<td>$b'$</td>
<td>A function measuring departure of explosion products from perfect gas behaviour.</td>
</tr>
<tr>
<td>$b_v$</td>
<td>Van der Waals covolume term.</td>
</tr>
<tr>
<td>$c$</td>
<td>Third virial coefficient for the mixture.</td>
</tr>
<tr>
<td>$c_e$</td>
<td>Coefficient of cubical expansion.</td>
</tr>
<tr>
<td>$d$</td>
<td>Fourth virial coefficient for the mixture.</td>
</tr>
<tr>
<td>$e$</td>
<td>Base of Naperian logarithms.</td>
</tr>
<tr>
<td>$g$</td>
<td>Functions in Kirkwood's state equation.</td>
</tr>
<tr>
<td>$g$</td>
<td>$G = \int e^{-\frac{W}{kT}} dv$</td>
</tr>
<tr>
<td>$g$</td>
<td>$G = \ln \left[ \int e^{-\frac{W}{kT}} dv \right]$</td>
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</tr>
<tr>
<td>$h$</td>
<td>Planck's constant.</td>
</tr>
<tr>
<td>$h$</td>
<td>Interval in the numerical solution of the differential equation.</td>
</tr>
<tr>
<td>$k_e$</td>
<td>Volume Elasticity.</td>
</tr>
<tr>
<td>$k$</td>
<td>Boltzmann's constant.</td>
</tr>
<tr>
<td>$k_c$</td>
<td>Stress concentration factor.</td>
</tr>
</tbody>
</table>
Constants defined in the text

- \( k_i \)
- \( \ell(q) \)
- \( L(q) \)
- \( m(q) \)
- \( \omega(q) \)

Functions in Lennard Jones State Equation.

- \( m_1 \)
- \( m_2 \)
- \( m_i \)
- \( m_{ij} \)
- \( m_{m} \)
- \( m_{n} \)

- Molecular weight of the explosive
- Molecular weight of the component i in the explosion products.

- Mass of the anvil and the ball in impact experiments.

- \( n \)
  - Total number of gm. moles of the explosion products, in the gaseous state.

- \( n_1, n_2 \)
  - Number of gm. moles of the i th gaseous species, and that of the solid phase in the explosion products.

- \( p \)
  - Pressure in the detonation wave front.
- \( p_0 \)
  - Original pressure of the explosive.
- \( p_e \)
  - Partial pressure of the species i among the explosive products.
- \( p_* \)
  - Fugacity of the component i in the mixture of products.
- \( p^* \)
  - Standard pressure.
- \( p_r \)
  - Radiation pressure.

- \( r \)
  - Distance between molecules.
- \( r_0 \)
  - Radius of the ball in impact experiments.
- \( s \)
  - Specific heat of the crystal.

- \( t \)
  - Time of impact of colliding bodies.

- \( v \)
  - Volume per molecule

- \( v = \frac{n_3}{n} \)

- \( v \)
  - Parameter for the mixture as defined by Kirkwood.

- \( w \)
  - Interaction energy per molecule.

- \( w_c \)
  - Velocity of the compression waves.

- \( w_o \)
  - Velocity of approach of the ball wrt the anvil in impact experiments.

- \( w \)
  - Number of nitrogen atoms in the explosive.
$x = \frac{X}{nRTv^2}$

- Number of carbon atoms in the explosive
- Mole fraction of the species $i$ in the mixture.

$x_i = \left( \frac{b}{r} \right)$

- Number of hydrogen atoms in the explosive
- Number of oxygen atoms in the explosive.

- Helmholtz Free Energy
- Angstrom Unit.

$$A_i = \frac{1}{2} \left[ \frac{\pi \omega_k (r_k + s_k) m_a m_b}{16 (m_a + m_b)} \right]^{1/2}$$

- Second virial coefficient of the component $i$ in the mixture.
- Lennard-Jones function for the second virial coefficient.

- Velocity of sound.
- Specific heat at constant volume.
- Average specific heat at constant volume between the temperatures 300°K and $T^\circ K$.

- Specific heat at infinite volume.
- Third virial coefficient of the component $i$ in the mixture.

- Detonation velocity.
- Fourth virial coefficient of the component $i$ in the mixture.

- Total energy of the products of explosion.
- Energy of interaction of the products.

- Internal energy of the component $i$ in the mixture.
- Internal Energy of the explosive.

- Energy of elastic deformation.
- Internal Energy of the solid phase in the explosion products.
- Energy due to radiation.
\( \alpha, \beta, \gamma, \delta, \ \) Number of gm. moles of \( \text{CO}_2, \ \text{CO}, \ \text{H}_2\text{O}, \ \text{H}_2, \ \text{CH}_4, \ \text{N}_2 \) and \( \text{C} \) in the explosion products.

\( \alpha_0, \beta_0, \gamma_0 \) Bipolar coordinates as defined by Jeffery.

\( \alpha, \epsilon, \nu \) Constants in RH equation for Proton gas.

\( \alpha' \) \( \nu(1- \frac{1}{\zeta}) \)

\( \alpha_0 \) Constant taking account of the cross section of the reaction, in deuteron formation.

\( \gamma_0 \) Ratio of specific heats.

\( \epsilon_0 \) Parameter defined by Kirkwood for the mixture.

\( \epsilon \) Energy between two molecules at a distance \( r \).

\( \epsilon_0 \) Minimum of energy between two molecules \( i \) and \( l \).

\( \eta \) \( \frac{H_r}{m \beta^4} \)

\( \Theta \) A function defined in the text.

\( \theta \) Function tabulated in tables by Ficket and Wood.

\( \lambda^0 \) Absolute activity of the component \( i \).

\( \lambda^i \) Chemical potential of the species \( i \).

\( \lambda^a \) Shear modulus.

\( \xi \) \( -\frac{V}{V_0} \)

\( \Pi \) A notation for the products.

\( \rho_0 \) Original density of the explosive.

\( \rho \) Density of the explosion products in the detonation, wave front.

\( \rho_c \) Crystal density.

\( \rho'_c \) Energy density.

\( \rho'_b \) Density of the material of impacting bodies.

\( \sigma \) \( (1 + x_r + x_b^2 + x_b^3 + \cdots) \)

\( \sigma_0 \) A constant defining the communal entropy.

\( \sigma_* \) Poisson's ratio.

\( \zeta \) Function tabulated in Tables of Ficket and Wood.

\( \phi \) \( \frac{n \pi}{T_0} \)

\( \phi_0 \) \( \frac{(1-\pi)^r}{\pi \omega^r c(-3 \omega)} \)

\( \psi \) A function defined in the text.
F  Force of impact.
G  Gibbs free energy.
H  Heat of reaction.
I^0H^0  Constants derived in the graph of \( f \cdot C_v \cdot dT = H \) against temperature.
K, K'  Ideal and corrected equilibrium constant.
°K  Degree absolute of temperature.
N  A. vogodros number.
P, ... Pressure at the point of impact, and that exerted by the anvil on the explosive.
R  Gas constant.
S  Entropy of the products of explosion.
S_e  Entropy of the solid phase in explosion products.
S_i^T  Temperature dependent part of the entropy of the component \( i \) in the explosion products.
S_i^0  Entropy of the component \( i \) at some standard state.
T_o  Original temperature of the explosive.
T  Temperature of the explosion products, in the detonation wave at the Chapman Jouguet point.
T_s  Stress.
U  Function used in the calculation.
V_o  Original volume of the explosive.
V  Volume of the products of explosion, in the detonation wave at Chapman Jouguet point.
V_g, V_s  Volumes of the gaseous and solid products of explosion.
W  Particle velocity.
W(r)  Interaction energy per mole.
X  A constant in the interaction energy.
Z  \((1 + \frac{d \log D}{d \log \xi})\)