

# **Influence of Thermodynamics on the Calculation of Energies of Commercial Explosives**

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## ABSTRACT

The demand for more data on the detonation properties of commercial explosives grows as blasting becomes a more exact science. Proper use of this information by blasting engineers depends on the appreciation of the assumptions and limitations inherent in calculating energies and pressures of explosives. The strength of an explosive is usually a calculated energy value derived from a model of the explosive. The model may be simple or complex, depending on the thermo-hydrodynamic assumptions made. The calculated energy and pressures of commercial explosives are sensitive to assumptions about their reaction products. The equation of state describing the reaction product gases, the treatment of solid reaction products (e.g. reacted calcium and sodium nitrate and aluminum) and the reaction time are examined to show the variability of calculated results as a result of different assumptions. These same models of explosives also serve to explain phenomena of explosives such as the effect of charge diameter on V.O.D. (and strength) and decoupled explosives.