

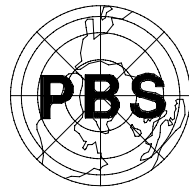
PRECISION BLASTING SERVICES

INTRODUCES

**CALCULATIONS FOR HIGH EXPLOSIVE
FORMULATIONS VERSION 8.0**

Modern explosive technology has evolved to the point where many small companies mix ingredients to provide the user with emulsions, water gel, and heavy ANFO types of explosives. This software provides the user with thermodynamic calculations, to easily determine optimum mixtures of ingredients. It will calculate the oxygen balance for explosive mixtures, detonation velocity, temperatures and pressures for Detonation State and Explosion State. A unique feature of the software is the ability to calculate the temperature and pressure which result from decoupled charges. This is the Expansion State and it provides useful information when charge volumes are smaller than borehole volumes or charge diameters are smaller than borehole diameters.

The software works with both U.S. Customary and S.I. (Metric) units of measurement.



PRECISION BLASTING SERVICES
PO BOX 189 MONTVILLE OH 44064 U.S.A.
TEL: (440) 474-6700 FAX: (440) 968-3967
Email: idc-pbs.com

Ammonium Nitrate	H4N2O3	=	94.48	%
Fuel oil	CH2	=	5.52	%
Carbon		=	0.3935	g atoms/100 g
Hydrogen		=	5.5084	g atoms/100 g
Nitrogen		=	2.3607	g atoms/100 g
Oxygen		=	3.5411	g atoms/100 g

Calculated moles of product per Kg of Explosive:

Moles of H2O	=	27.54	moles/Kg
Moles of N2	=	11.80	moles/Kg
Moles of CO2	=	3.93	moles/Kg

Oxygen balance 0.000001

Heat of formation (Reactants)	QR =	4,428.17	KJ/Kg	1,057.65	Kcal/Kg
Heat of formation (Products)	QP =	8,214.38	KJ/Kg	1,961.97	Kcal/Kg
Heat of the explosion (QP-QR)	Q2 =	3,786.21	KJ/Kg	904.32	Kcal/Kg
Explosive density	=	0.85	g/cm3		

DETONATION STATE

Detonation velocity	DV =	4,689.45	m/s	15,385.32	ft/s
Detonation temperature	T2 =	3,223.35	°K		
Detonation pressure	P2 =	49,764.19	bar	721,766.10	psi

EXPLOSION STATE

Explosion temperature	T3 =	2,793.74	°K		
Explosion pressure	P3 =	22,735.70	bar	329,752.30	psi
Diameter of the borehole	D =	6.00	in		
Length of the borehole	L =	40.00	ft		
Weight of explosive in the hole	W =	200.00	lb		

EXPANSION STATE

Expansion temperature	T4 =	2,339.97	°K		
Expansion pressure	P4 =	5,717.23	bar	82,921.11	psi