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ABSTRACT

A model for the behavior of explosives loaded with inert heavy metals is described.

An equation-of-state description for ammonium nitrate-loaded RDX and TNT explosives is proposed, and the computations using that equation of state are compared with existing experimental data.

I. INTRODUCTION

An ideal explosive would exhibit steady-state or time-independent behavior, but such an explosive probably does not exist. Many explosives can be adequately described for engineering purposes by steady-state theory calibrated with experimental data in the geometry of interest. These explosives may be called nearly ideal explosives. Some explosives exhibit such a nonideal behavior that they cannot be described by steady-state theory. The dividing line for nonideal and ideal explosives is arbitrary.

In this report we define a nonideal explosive as one having a C-J pressure, velocity, or an expansion isentrope significantly different than expected from equilibrium, steady-state calculations such as BKW.[1-4] Pressure differences of 50 kbar and velocity differences of 500 m/s are significant by our definition. A significant isentrope difference depends upon the application, but if the experimental and calculated air isentrope values are different by more than 0.1 cm/μs, the explosive can be defined as nonideal. Nonideal explosives often exhibit other differences, such as larger sensitivity to diameter or confinement.

Adding a nonexplosive component to an explosive mixture does not necessarily result in a nonideal explosive. The common assumption that the addition of powdered aluminum to an explosive will result in a nonideal explosive has not been demonstrated. Table I shows that Alex 20 and 32 are well described by equilibrium BKW calculations, as first demonstrated in Ref. 1. The C-J and isentrope state parameters are reproduced adequately by assuming that complete reaction occurs at the C-J plane, as shown in Refs. 1 through 4. Similar results were obtained for other military explosives containing RDX and/or TNT and aluminum, as shown in Table II.

Adding large amounts of inert diluents to explosives, such as heavy metals, resulted in explosive mixtures that may be classified as nonideal, as discussed in Refs. 3 and 5 through 9.

The addition of ammonium salts, such as ammonium nitrate or perchlorate, to explosives also results in mixtures that exhibit nonideal behavior.

This report contains the results of some of our studies of these nonideal explosives.

II. METAL-LOADED EXPLOSIVES

In the early 1950's, an extensive study was undertaken at Los Alamos to measure the effect on explosive performance when adding both inert and noninert components. The experimental data for RDX/EXON/Pb mixtures are shown in Table I. Gammas as high as 6.7 indicated that these explosive mixtures were of a different class than the common explosives which have gammas around 3.0.

TABLE I

SUMMARY OF EXPERIMENTAL AND BKW C-J PARAMETERS

Explosive	Experimental ρ_o	P_{CJ}	D_{CJ}	Reference	BKW P_{CJ}	D_{CJ}	T_{CJ}	Description of Calculations
Alex 20 44/32/20/4 wt% RDX/TNT/Al/Wax	1.801	230	7530	1	252	7496	5166	Al burns to compressible Al_2O_3 solid
Alex 32 37/28/31/4 RDX/TNT/Al/Wax	1.880	215	7300	1	213	7066	5928	Al burns to compressible Al_2O_3 solid
90/10 vol% RDX/EXON	1.787	320	8404	8	317	8403	2468	
80/10/10 RDX/EXON/Pb	2.700		6734	8	296	6692	2447	Pb treated as compressible inert
70/10/20 RDX/EXON/Pb	3.650		5709	8	285	5748	2352	Pb treated as compressible inert
60/10/30 RDX/EXON/Pb	4.60	150	5012	8	249	4887	2368	Pb treated as compressible inert
55/10/35 HMX/EXON/W	7.90	230	4900	7	328	4807	1755	W treated as compressible inert
Comp B 61/39 wt% RDX/TNT	1.70		7900	10	277	8004	2787	
Amatex 40 41/30/21 RDX/TNT/AN	1.66		7545	10	265	7963	2472	Ammonium Nitrate (AN) complete reaction
					235	7571	2380	50% AN reacted, rest inert[a]
					206	7154	2271	AN as compressible inert[a]
Amatex 20 20/38/42 RDX/TNT/AN	1.61		7009	10	250	7866	2211	Complete AN reaction
					191	7031	1943	50% AN reacted, rest inert[a]
					137	6105	1670	AN as compressible inert[a]
Amatol 40/60 TNT/AN	1.60		5760	10	247	7896	1940	Complete AN reaction
					118	5796	1393	19% AN reacted, rest inert[a]
					88	5163	1217	AN as compressible inert[a]

[a] AN inert Hugoniot assumed to be described by $U_s = 0.25 + 1.5\ U_p$, $\rho_o = 1.725$.

Table I shows that one could sometimes reproduce the experimental detonation velocity with BKW calculations that have calculated C-J pressures 100 kbar too high. The explosive detonation velocity was ideal, whereas the C-J pressure was obviously nonideal.

The list of inert diluents that caused nonideal behavior grew as others added inert components to explosive systems. Reference 9 is an example of such work.

In the late 1960's, attention was given to tungsten-loaded explosives. Table III shows that the BKW calculations reproduced the detonation velocity but overestimated the C-J pressure by 100 kbar. The behavior of the heavy metal-loaded explosives along the shock Hugoniot or expansion isentrope could be described down to 1-10 kbar if a constant gamma law isentrope through the experimental C-J state point and the experimental gamma were used. For example,

TABLE II

BKW CALCULATIONS AND EXPERIMENTAL RESULTS FOR Al CONTAINING EXPLOSIVES

	BKW	Experimental
Tritonal ρ = 1.72	80/20 TNT/Al	
D	6583	6475
P	191	
γ	2.90	
HBX-1 ρ = 1.72	40/38/17/5 RDX/TNT/Al/Wax	
D	7270	7224
P	229	
γ	2.98	
H-6 ρ = 1.71	45/30/30/5 RDX/TNT/Al/Wax	
D	7235	7194
P	225	
γ	2.963	
HBX-3 ρ = 1.81	31/29/35/5 RDX/TNT/Al/Wax	
D	6853	6917
P	195	
γ	3.37	
Torpex ρ = 1.81	42/40/18 RDX/TNT/Al	
D	7492	7495
P	259	
γ	2.92	

TABLE III

BKW CALCULATED PARAMETERS FOR 55/10/35 HMX/EXON/W

P	D	T	γ	
328	4807	1755	4.56	Compressible W in Pressure and Temperature Equilibrium with HE Products
318	4649	2165	4.36	Compressible W in Pressure Equilibrium with HE Products and the W forced to its single shock Hugoniot Energy and Temperature at that single shock Hugoniot pressure
311	5024	1692	5.41	Incompressible W

Craig[7] measured the free-surface velocity of 0.25- to 1.1-cm-thick Dural plates in contact with a 0.3-cm slab of 55/10/35 HMX/EXON/W at 7.90 g/cm^3 which was overdriven by 3.2 cm of 9404 and a P081 Baratol plane wave lens. The calculated and experimental Dural free-surface velocities for several Dural plate thicknesses are tabulated here.

Dural Thickness (cm)	Experimental Free-Surface Velocity (cm/μs)	Calculated Free-Surface Velocity (cm/μs)
0.254	0.281	0.284
0.406	0.279	0.280
1.016	0.264	0.265

The experimental data could be reproduced assuming the experimental gamma and C-J state values defined the tungsten-loaded explosive equation of state.

An impressive study of tungsten-loaded explosives was recently reported by Al'tshuler, Ryozanov, and Splranskava.[5] They also observed that their experimental velocities were close to what they expected, but that their experimental pressures were much lower. They proposed that the agreement between experimental and theoretical detonation velocity was not significant because the Hugoniot is so steep that the detonation velocity is changing too slowly to be a sensitive parameter.

Our calculations in Table IV show that the shock velocity is changing by only 180 m/s, while the pressure changes from 250 to 500 kbar. For Composition B, our calculations show a 600-m/s change, while the pressure changes from 300 to 500 kbar.

Because a slight increase in detonation velocity results in a very significant decrease in detonation pressure, Al'tshuler et al. propose that the heavy metal-loaded explosives have slightly elevated non-ideal velocities as a result of a leading propagation of the detonation through the grains of explosive between the metal particles.

TABLE IV

BKW HUGONIOT FOR 55/10/35 HMX/EXON/W

P	V	U_S	U_P	T
500	0.0946	5008	1264	1993
400	0.0994	4858	1042	1836
300	0.1059	4820	787	1731
250	0.1102	4955	638	1703
200	0.1160	5510	459	1694

If our calculated Hugoniots are approximately correct, then the experimental state values at the detonation front should lie close to the calculated Hugoniot at a higher shock velocity. Figures 1 and 2 show that the experimental detonation front state values do lie near the calculated Hugoniots. The tungsten-loaded explosive velocity is about 200 m/s higher and the lead-loaded explosive velocity is about 400 m higher than observed experimentally. This is outside experimental error and demonstrates that our calculated Hugoniots are only good approximations.

Other models were studied. Hershkowitz[10] suggested using a positive heat of formation as an energy sink for the inert metal. Calculations for the 60/10/30 RDX/EXON/Pb system were performed with various positive heats of formation for the compressible lead. To get near the experimentally observed C-J pressure, a heat of formation of +70 kcal/mole for lead was needed. The corresponding detonation velocity was 750 m lower than the experimental detonation velocity.

For another model, the heavy metal is assumed not to be in thermodynamic equilibrium with the detonation products. Although it may be correct to assume pressure equilibrium, the system is not in thermal equilibrium if the metal is present as a thick layer between layers of explosive. Calculations were performed assuming that the tungsten was in pressure equilibrium with the detonation products, but had its single shock Hugoniot energy and temperature. The resulting detonation product temperature was higher, and tungsten temperature was much lower, than for the assumption of pressure and thermal equilibrium. As shown in Table III, this model results in about the same pressure and has a detonation velocity that is too low.

The Al'tshuler model, where the explosive detonates at an average velocity determined by the individual detonation wavelets traveling around the inert, is not inconsistent with our observations. Additional evidence showing that such a process is possible is presented by Malin, Campbell, and Mautz.[11] They demonstrated that the detonation velocity of Composition B increased with increased particle size. If the Al'tshuler model is correct, then our Hugoniots for explosives containing inerts are not unrealistic. If the inert has a low density, the detonation velocity should be a more sensitive parameter in evaluating the equation of state.

Until a more detailed description of the nonideal behavior of heavy metal-loaded explosives becomes available, it will be necessary to determine experimentally the detonation pressure and velocity.

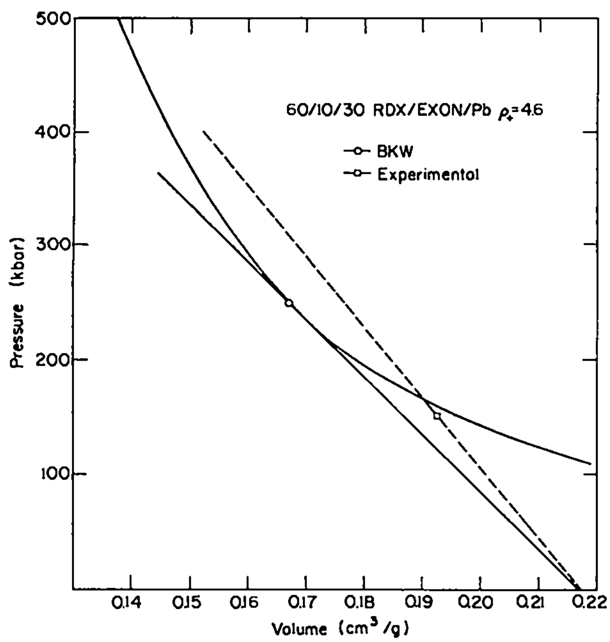

Fig. 1. The BKW calculated Hugoniot for 60/10/30 RDX/EXON/Pb at ρ_o = 4.6 g/cm^3.

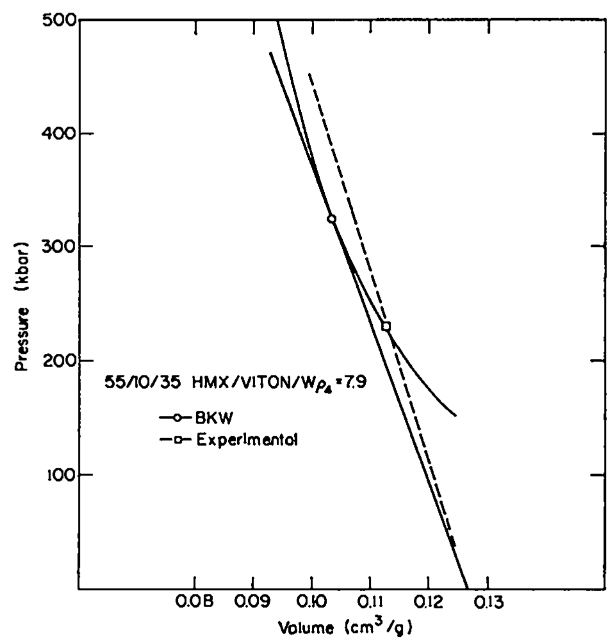

Fig. 2. The BKW calculated Hugoniot for 55/10/35 HMX/VITON/W at ρ_o = 7.9 g/cm^3.

III. AMMONIUM NITRATE-LOADED EXPLOSIVES

As shown in Table I, ammonium nitrate- (AN) loaded explosives exhibit differences between the observed and calculated performance (assuming either complete reaction or no reaction of the ammonium nitrate with the rest of the detonation products) sufficient to be classified as nonideal. The difference between observed and calculated detonation velocities increases with increased AN concentration, assuming complete decomposition of the ammonium nitrate.

Hershkowitz and Rigdon[10] demonstrated that the detonation velocity, or cylinder wall velocity, of Amatex 40 and Amatex 20 was insensitive to the particle size (50 to 500 μm) of the ammonium nitrate. Craig[7] found only 101 ± 40 m/s difference in the detonation velocity between 2.54-cm diam of pressed charges of Amatex 20 with ammonium nitrate particle sizes of 15 and 500 μm. This suggests that as much reaction as possible is being obtained between the ammonium nitrate and the detonation products at the observed C-J state. The remaining ammonium nitrate is assumed to be present as an inert. If these assumptions are correct, and if our equation of state for the explosive mixture, assuming that the ammonium nitrate is an inert, is valid, then the observed C-J state must lie on a partially reacted Hugoniot between the inert and completely reacted Hugoniots. The experimentally observed detonation velocity may be reproduced if the Amatex 40 and 20 have 50% of the ammonium nitrate decomposed and if 50% is inert. The experimentally observed detonation velocity of Amatol can be reproduced if 19% of the ammonium nitrate decomposes and if the rest is an inert. One possible explanation for the difference in the amount of ammonium nitrate that is decomposed between the Amatex and Amatol explosives is that the detonation temperatures are higher for the Amatex than for Amatol explosives and more decomposition occurs at the higher temperatures.

If the decomposition of ammonium nitrate is primarily dependent upon the temperature rather than upon diffusion and other transport phenomena, then the amount of decomposed ammonium nitrate would be expected to not change significantly along the expansion isentrope from the C-J point as the temperature is decreasing along the expansion isentrope. One would also expect the explosive to exhibit large effects from side rarefactions as the temperature of the detonation products cooled. The observed large effect of charge diameter on detonation velocity is consistent with this model.

The calculated state parameters for the ammonium nitrate containing explosives are given in Table I. The reactive Hugoniots are given in Figs. 3, 4, and 5. The BKW equation of state using the partially reacted model is given in Tables V, VI, and VII for Amatex 40, Amatex 20, and Amatol. The isentropes expand to beyond the range of the ammonium nitrate equation of state and the ammonium nitrate is treated as incompressible at lower isentrope pressures.

Our present experimental evidence does not eliminate other models for the detonation process of ammonium nitrate-loaded explosives. The ammonium nitrate may be behaving completely as an inert and the detonation wave may be traveling at an average velocity determined by the individual detonation wavelets traveling around the ammonium nitrate grains similar to heavy metal-loaded explosives discussed earlier.

The ammonium nitrate may all be partially decomposing to some intermediate set of detonation products as proposed by Hershkowitz[10] and others.

Hershkowitz[10] studied the detonation product composition of Amatex 20 and Amatol, both confined and unconfined, after it came to a steady state in-

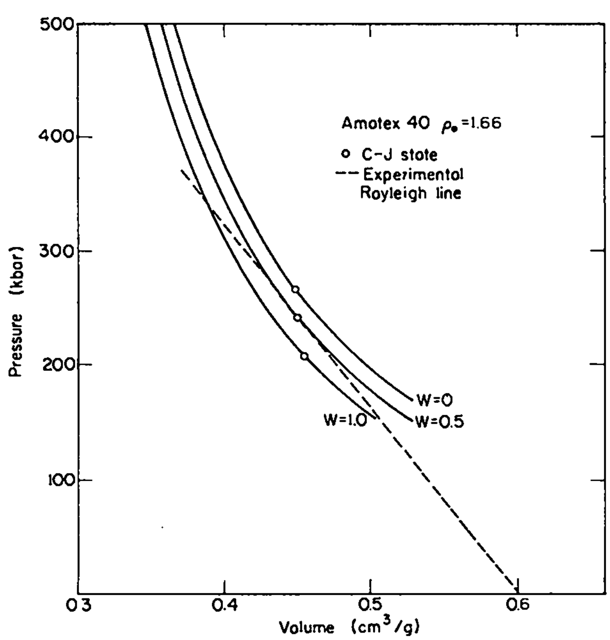

Fig. 3. The BKW calculated Hugoniots for Amatex 40 for W_{AN} = 0, 0.5, and 1.0.

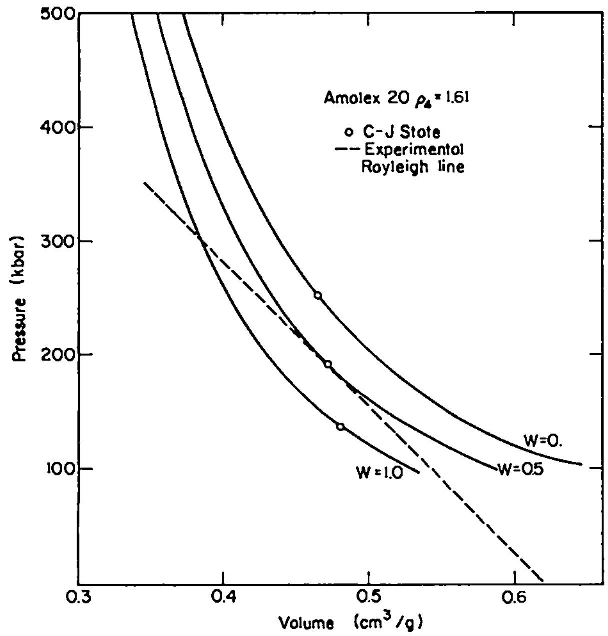

Fig. 4. The BKW calculated Hugoniots for Amatex 20 for W_{AN} = 0, 0.5, and 1.0.

side large steel spheres. His results are considerably different for confined and unconfined geometries and in no case was any undecomposed ammonium nitrate recovered. Other gas-analysis studies[12] after detonation have shown large dependence of the composition upon the experimental container, the

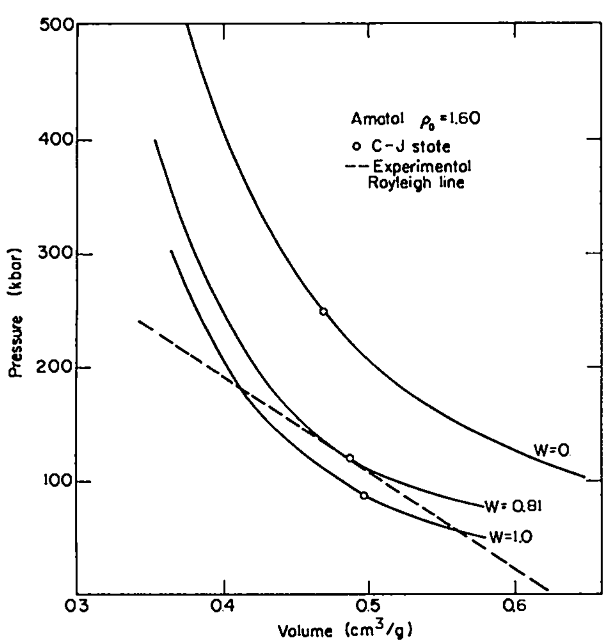

Fig. 5. The BKW calculated Hugoniots for Amatol for W_{AN} = 0, 0.81, and 1.0.

confinement, and the atmosphere used in the container. The shocks interact with the walls and the explosive confinement and send reflected shocks back into the detonation products, resulting in additional heating and varying amounts of additional chemical reaction.

Because the gas-analysis studies give such varied results, the products along a C-J isentrope are not being measured, but the products many steps removed. The equation of state proposed in this report is inadequate to account for the additional reaction of the ammonium nitrate and detonation products that apparently occurred in the Hershkowitz experiments.

The model[13] of diffusion-controlled grain burning of the ammonium nitrate is still a candidate; however, the apparent absence of appreciable particle size effects for Amatex explosives in the studies of Hershkowitz and Rigdon[10] or Craig[7] is hard to reconcile with the diffusion model. Walker[13] showed that 5-μm ammonium perchlorate in nitromethane appears to react completely and 200-μm ammonium perchlorate appears to be only about 30% reacted initially. Perhaps the particle size effects are dependent upon the nature of the explosive mixture. It seems unlikely that any nonideal model will be satisfactory for all the various types of nonideal explosives.

The Hugoniot and other equation-of-state values of ammonium nitrate would also be valuable information. The experimental data will be essential to the evaluation of any proposed equation of state for these materials.

If other nonideal explosives, such as those containing ammonium perchlorate, are to be investigated, the ammonium perchlorate equation-of-state data and C-J and isentrope state points of the explosive mixture will be needed.

Another interesting characteristic that nonideal explosives apparently exhibit may be inferred from Craig's[7] experimental studies of the overdriving of 7.6 cm of Amatex 20 with 5.0 cm of Composition B initiated by a P-40 lens. The pressures observed by Craig in the Amatex 20 (~ 295 kbar) were much higher than would be calculated (~ 220 kbar) if the usual decay with distance of run were obtained. This suggests that overdriving a nonideal explosive could cause a shift in the nonideal behavior that could be self-supporting. The detonation state achieved by a nonideal explosive probably is dependent upon the magnitude of the initiation pulse. Further experimental studies of nonideal detonations should include variations of the magnitude of the initiating pulse.

IV. EVALUATION OF THE PROPOSED EQUATION OF STATE

If the required experimental information for properly evaluating an equation of state is not available, it is possible to use data from integral experiments, such as cylinder tests or plate dents, to estimate the validity of the model.

Another test for a proposed description of nonideal explosives is to extend the test to other explosives for which data are available. We performed calculations for two explosives containing aluminum in addition to ammonium nitrate or ammonium perchlorate. The BKW calculations are shown in Table VIII for Minol and in Table IX for ANFO. The ammonium nitrate equation of state used for Minol has different constants from those used for the other explosives to be appropriate for the high temperature of Minol detonation products. It is interesting to note that the amount of reaction of the nonideal component is just slightly greater than that required to complete the combustion of the aluminum for Minol and PBXN-103. The results of these calculations are summarized in Table X. The calculated pressures for the amount of reaction that reproduced the observed detonation velocity are in reasonably good agreement with the experimental values for ANFO and PBXN-103.

One of the more remarkable correlations between an integral experiment and the C-J pressure exists for the plate-denting test. Smith[8] has shown that a linear relationship exists between the plate-dent depth and the C-J pressure. Urizar[14] measured plate dents of 0.757-cm for Amatex 20 and 0.419-cm for Amatol in 5.08-cm-diam charges. He found that the plate dent scales by the diameter of the charge. Performing this scaling, and using the relationship described in Ref. 8, he finds a C-J pressure for Amatex 20 of 199 kbar and for Amatol a C-J pressure of 100 kbar. The calculated C-J pressures for these explosives in Table I of 191 and 118 kbar are in remarkable agreement with those found from the plate dent.

The rich man's plate-dent test is the cylinder test. Using the cylinder wall "energy" after the cylinder wall has traveled 6 and 19 mm, as given in Ref. 12, a good correlation is obtained with the C-J pressures described in Ref. 12 or Ref. 1. This correlation is shown in Fig. 6 along with the available data for the nonideal explosives. The error bars show the range of C-J pressures between the two sources of C-J pressures.

The correlation is good for all the explosives except PETN. Why PETN is different will make an interesting study because PETN is also the most oxygen-rich and has the fastest kinetics and smallest

TABLE X

EXPERIMENTAL AND BKW C-J PARAMETERS

Explosive	Density	P_{CJ} Experimental	D_{CJ} Experimental	P_{CJ} Calculated	D_{CJ} Calculated	T_{CJ} Calculated	Description
Minol	1.68		5820	220	7183	4754	Complete AN reaction
40/20/40				139	5887	3949	43% AN reaction[a]
TNT/Al/AN				93	4887	3330	All AN inert[a]
PBXN-103	1.89	156	6200	295	7640	6105	Complete AP reaction
CHNOCl/AP/Al				170	6226	4955	15% AP reaction[a]
				150	5840		All AP inert[a]
ANFO	0.88	~50	4700	74	5438	2250	Complete AN reaction
				47	4600	1718	75% AN reaction[a]

[a]Because the products have low pressures and high temperatures, the results are very sensitive to the details of an AN (ammonium nitrate) and AP (ammonium perchlorate) equations of state. The AP equation of state was $U_s = 0.25 + 1.5\ U_p$, $\rho_o = 1.95$.

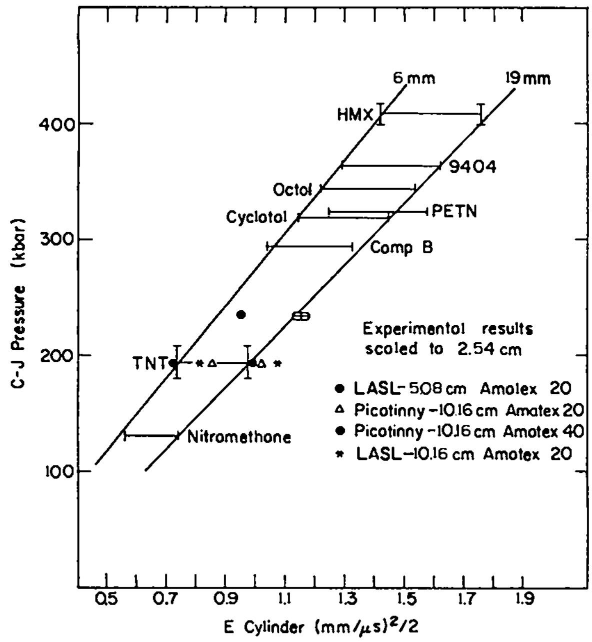

Fig. 6. The C-J pressure as a function of cylinder test wall velocity at 6- and 19-mm wall expansion.

reaction zone of any of the explosives studied.

The Amatex explosives are showing an obvious diameter effect, but they appear to correlate adequately with the calculated C-J pressures and observed cylinder energies.

The Amatex explosive equations of state were used to describe the explosive behavior in numerical hydrodynamic calculations of the cylinder test. The agreement between the experimental and calculated wall motion was as good for the nonideal explosives as for the more nearly ideal explosives.

Although integral experimental data are less desirable for evaluating a proposed equation of state than a direct measurement of the state values of interest, the correlations available for such integral experimental data permit testing the equation of state and, if the agreement is found satisfactory, one becomes more confident in the use of the equation of state for engineering applications.

V. CONCLUSIONS

A model for the behavior of and an engineering equation of state for inert heavy metal-loaded explosives has been proposed.

An equation-of-state description has been proposed for ammonium nitrate-loaded explosives. Numerical calculations using the model were performed and are presented in detail.

It is interesting to speculate as to why a powdered metal such as aluminum appears to be completely reacted near the C-J plane, whereas a powdered inorganic such as ammonium nitrate does not appear to be completely reacted near the C-J plane. One possible explanation is found in the behavior of the detonation product temperature as reaction occurs with the additive. Although both additives increase the heat of detonation as they react, the aluminum raises the temperature of the products while the ammonium nitrate lowers the temperature of the products. This is readily understood from the principles of partition of energy discussed in Ref. 1. The product molecule from burning of aluminum is solid Al_2O_3, whereas the product molecules from ammonium nitrate decomposition are water and nitrogen. The ammonium nitrate gives products that raise the particle density of the detonation products; the aluminum gives products which lower the particle density. An increase in particle density results in a shift of energy from thermal to intermolecular potential energy. The temperature is lowered by the decomposing ammonium nitrate, which may result in limiting how much ammonium nitrate is decomposed near the C-J plane. The temperature is raised by the burning aluminum, which could increase the rate of aluminum burning until all the aluminum is burned near the C-J plane.

Consequently, a reactive additive to an explosive probably will result in a nonideal explosive if the C-J temperature is significantly lowered by the decomposing additive, and it will exhibit more nearly ideal behavior if the C-J temperature is raised.

The continued interaction between the generation of theory and the generation of experimental data should result in increased understanding of the nonideal explosive and should result in better predictive capability for systems using nonideal explosives. The modeling of nonideal explosives presently is primitive and different models will be required for various kinds of nonideal explosives.

ACKNOWLEDGMENTS

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TABLE V

THE PARTIALLY REACTED BKW EQUATION OF STATE FOR AMATEX 40 WITH W_{AN} = 0.5

A FORTRAN BKW CALCULATION FOR THE EXPLOSIVE
AMATEX 40 WITH AN HALF REACTED

THE NUMBER OF ELEMENTS IS 5

THE NUMBER OF GAS SPECIES IS 11

THE NUMBER OF SOLID SPECIES IS 2

THE BKW EQUATION OF STATE PARAMETERS ARE
ALPHA= 5.00000000000E-01 BETA= 1.60000000000E-01 THETA= 4.00000000000E+02 KAPPA= 1.09097784436E+01

THE COMPOSITION OF THE EXPLOSIVE IS

9.34486900000E+00	MOLES OF	C
1.33746590000E+01	MOLES OF	H
1.01405240000E+01	MOLES OF	N
1.35704015000E+01	MOLES OF	O
7.10647000000E-01	MOLES OF	AN

THE DENSITY OF THE EXPLOSIVE IS 1.66000000000E+00, GRAMS/CC

THE MOLECULAR WEIGHT IS 5.41769000000E+02 GRAMS

THE HEAT OF FORMATION AT 0 DEG K IS -7.82100000000E+04 CALORIES PER FORMULA WEIGHT

THE SOLID ICOMANI EQUATION OF STATE PARAMETERS VO, AS, BS, CS, DS, ES, A1, A2, C1, C2, C3, ATOMIC WT

AN	5.79710144928E-01	1.94813309828E+00	-3.55623056821E+00	2.38631872297E+00	-7.15791941313E-01	8.45912212177E-02
	4.49704093435E-01	1.80817009794E-02	-0.	-0.	-0.	8.00480000000E+01
(S)	4.44444444444E-01	8.30935837268E-01	-1.39381809219E+00	6.72569716021E-01	-1.13537262508E-01	6.49155882007E-03
	-2.26705345948E-01	1.20516569525E-01	8.31600000000E-02	-1.75590000000E-01	1.55310000000E-01	1.20100000000E+01

THE INPUT DETONATION PRODUCT ELEMENTAL COMPOSITION MATRIX

0.	2.0E+00	0.	1.0E+00	0.	0.	2.0E+00	0.	0.	0.	0.	0.
0.	2.0E+00	0.	1.0E+00	0.	0.	2.0E+00	0.	1.0E+00	0.	0.	1.0E+00
0.	0.	3.0E+00	1.0E+00	0.	0.	0.	1.0E+00	0.	0.	0.	0.
0.	1.0E+00	1.0E+00	0.	0.	0.	2.0E+00	0.	0.	0.	1.0E+00	0.
1.0E+00	0.	1.0E+00	4.0E+00	0.	0.	0.	0.	0.	0.	0.	1.0E+00
1.0E+00	0.	0.	0.	0.							

A FORTRAN BKW CALCULATION FOR THE EXPLOSIVE
AMATEX 40 WITH AN HALF REACTED

THE COMPUTED CJ PRESSURE IS 2.35258171503E-01 MEGABARS

THE COMPUTED DETONATION VELOCITY IS 7.57098851260E-01 CM/MICROSECOND

THE COMPUTED CJ TEMPERATURE IS 2.38083824082E+03 DEGREES KELVIN

THE COMPUTED CJ VOLUME 4.53466150352E-01 CC/GM OF EXPLOSIVE

THE COMPUTED GAMMA IS 3.04453450898E+00

THE VOLUME OF THE GAS IS 1.32419506684E+01 CC/MOLE OF GAS AND THERE ARE 1.52396015455E+01 MOLES OF GAS

SOLID	VOLUME IN CC/GM
AN	3.77317907549E-01
(S)	3.18245265031E-01

TABLE V (cont)

THE C-J COMPOSITION OF THE DETONATION PRODUCTS AND THE INPUT COEFFICIENTS TO THE THERMODYNAMIC FITS FOR EACH SPECIE

SPECIE	NO OF MOLES	COEFFICIENTS A,B,C,D,E, THE INTEGRATION CONSTANT, HEAT OF FORMATION IN CAL/MOLE,COVOLUME				
H2O	6.68688233538E+00	4.25884200000E+01	1.48080500000E-02	-2.63918100000E-06	1.92045300000E-10	0.
		1.34282835156E+03	-5.71070000000E+04	2.50000000000E+02		
H2	1.16053537670E-04	2.97034700000E+01	1.14382900000E-02	-2.20122200000E-06	1.67776100000E-10	0.
		1.17589615365E+03	0.	1.80000000000E+02		
O2	7.64933575571E-07	4.70309000000E+01	1.28714700000E-02	-2.50021700000E-06	1.90157000000E-10	0.
		1.03537647396E+03	0.	3.50000000000E+02		
CO2	3.40126606156E+00	4.74811200000E+01	1.95446300000E-02	-3.72129600000E-06	2.77030000000E-10	0.
		7.46280968750E+02	-9.39680000000E+04	6.00000000000E+02		
CO	8.09446174492E-02	4.53308200000E+01	1.23816100000E-02	-2.41640300000E-06	1.82818100000E-10	0.
		1.12158830990E+03	-2.72010000000E+04	3.90000000000E+02		
NH3	2.05811168562E-04	4.20181600000E+01	1.91166200000E-02	-3.16433000000E-06	2.19780100000E-10	0.
		1.20696121615E+03	-9.36800000000E+03	4.76000000000E+02		
H	7.55194464924E-08	2.63911000000E+01	8.12137200000E-03	-1.69074000000E-06	1.31682300000E-10	0.
		7.94631617188E+02	5.16190000000E+04	7.60000000000E+01		
NO	4.08198725730E-05	4.84149800000E+01	1.26938600000E-02	-2.49460000000E-06	1.89321300000E-10	0.
		1.20924970573E+03	2.14770000000E+04	3.86000000000E+02		
N2	5.07013868448E+00	4.39234000000E+01	1.22250100000E-02	-2.37900500000E-06	1.79832200000E-10	0.
		1.13916134896E+03	0.	3.80000000000E+02		
OH	7.43189919924E-08	4.24179200000E+01	1.15684700000E-02	-2.22665900000E-06	1.68915300000E-10	0.
		1.18351754427E+03	3.56000000000E+03	4.13000000000E+02		
CH4	6.15970692100E-06	3.87568600000E+01	2.36401300000E-02	-3.70795700000E-06	2.47071400000E-10	0.
		1.04242791146E+03	-1.60000000000E+04	5.28000000000E+02		
AN	7.10647000000E-01	-4.27708542530E+00	1.53027164063E-01	-6.46991182208E-05	1.36108882907E-08	-1.06334374464E-12
		-0.	-7.81000000000E+04	-0.		
(S)	5.86265216129E+00	-2.46151900000E-01	7.17985500000E-03	-1.29755000000E-06	9.34999500000E-11	0.
		-2.58204389323E+02	0.	0.		

A BKW ISENTROPE THRU BKW CJ PRESSURE FOR
AMATEX 40 WITH AN HALF REACTED

LN(P)= -3.88384896581E+00 -2.86273371070E+00LNV 3.44296121450E-01LNV**2 9.54376635475E-02LNV**3 -4.21179903348E-02LNV**4

LN(T)= 7.09023954852E+00 -6.75725582008E-01LNV 2.04123041714E-01LNV**2 2.25031644059E-02LNV**3 -2.32503273383E-02LNV**4

LN(E)= -1.52422054813E+00 5.16993509211E-01LNP 6.04098361901E-02LNP**2 1.56385220238E-03LNP**3 -8.84701526117E-05LNP**4

THE CONSTANT ADDED TO ENERGIES WAS 1.00000000000E-01

PRESSURE (MBARS)	VOLUME (CC/GM)	TEMPERATURE (DEG K)	ENERGY+C (MB-CC/GM)	GAMMA (-DLNP/DLNV)	PARTICLE VELOCITY
2.35258171503E-01	4.53466148838E-01	2.38083824082E+03	1.17520160522E-01	3.14490380498E+00	1.87190204583E-01
1.64680720052E-01	5.07368941063E-01	2.12743143234E+03	1.03987700062E-01	3.14551379799E+00	2.47850108747E-01
1.15276504036E-01	5.67254263630E-01	1.88967497915E+03	9.28916021798E-02	3.13039869955E+00	3.01229093187E-01
8.06935528[illegible]E-02	6.33804242189E-01	1.67068389102E+03	8.38069220616E-02	3.10122756377E+00	3.48207834790E-01
5.64854869778E-02	7.07796683408E-01	1.46661750619E+03	7.62978319029E-02	3.05955923308E+00	3.89599240009E-01
3.95398408844E-02	7.90503755798E-01	1.29072557929E+03	7.03556033884E-02	3.00659949377E+00	4.26288486200E-01
2.76778886191E-02	8.90350933629E-01	1.21691231750E+03	6.70596069621E-02	2.93858070625E+00	4.61138160389E-01
1.93745220334E-02	1.00828290971E+00	1.14713045027E+03	6.43333655530E-02	2.85703426775E+00	4.93122936098E-01
1.35621654234E-02	1.14855048699E+00	1.08134838731E+03	6.20630464573E-02	2.76231861248E+00	5.22429234800E-01
9.49351579635E-03	1.31652756804E+00	1.01936683538E+03	6.01596179936E-02	2.65522402070E+00	5.49244190867E-01
6.64546105745E-03	1.51902797143E+00	9.60917913738E+02	5.85532774117E-02	2.53712137906E+00	5.73757540637E-01
4.65182274021E-03	1.76491776117E+00	9.06054215629E+02	5.71942248887E-02	2.41002587168E+00	5.96178499023E-01
3.25627591815E-03	2.06478779298E+00	8.53840993845E+02	5.60277994815E-02	2.27718903637E+00	6.16664680891E-01
2.27939314270E-03	2.43290672359E+00	8.04468238383E+02	5.50258416259E-02	2.14259443278E+00	6.33436308885E-01
1.59557519989E-03	2.88741443935E+00	7.57724051564E+02	5.41600999853E-02	2.01151447166E+00	6.52698382099E-01
1.11690263992E-03	3.45192917540E+00	7.13387257935E+02	5.34075161641E-02	1.89052055083E+00	6.68661372070E-01
7.81831847947E-04	4.15742221036E+00	6.71220277907E+02	5.27491859466E-02	1.78764287719E+00	6.83338284391E-01
3.47282293563E-04	5.04466254430E+00	6.30973845824E+02	5.21696427339E-02	1.71256300819E+00	6.97540934142E-01
3.83097605494E-04	6.16731800786E+00	5.92396768022E+02	5.16563147546E-02	1.67679937419E+00	7.10874643300E-01
2.68168323846E-04	7.59579642754E+00	5.55246221779E+02	5.11990890527E-02	1.69381107539E+00	7.23727885718E-01
1.87717826692E-04	9.42181110761E+00	5.19296108645E+02	5.07899448329E-02	1.77892812206E+00	7.36249889981E-01
1.31402478685E-04	1.17634965425E+01	4.84342294675E+02	5.04226385594E-02	1.94900815232E+00	7.48511025051E-01
2.70346897228E-01	4.33820309718E-01	2.48167115954E+03	1.23573171112E-01	3.13990443376E+00	0.
3.11128931812E-01	4.14945634339E-01	2.58261513607E+03	1.30112009215E-01	3.13224614673E+00	0.
3.57798271584E-01	3.96789027148E-01	2.68301581087E+03	1.37190026353E-01	3.12154464876E+00	0.
4.11468012322E-01	3.79283808551E-01	2.78224845839E+03	1.44877184923E-01	3.10769756009E+00	0.
4.73188214170E-01	3.62334477158E-01	2.87961554254E+03	1.53267818452E-01	3.09044301518E+00	0.
5.44166446295E-01	3.45771327617E-01	2.97429191256E+03	1.62507679697E-01	3.06932252117E+00	0.
6.25791413239E-01	3.29131291116E-01	3.06527669196E+03	1.72921681754E-01	3.04315611731E+00	0.
7.19660125225E-01	3.10538621839E-01	3.15138941903E+03	1.85662169150E-01	3.00699793454E+00	0.
8.27609144009E-01	2.96252260743E-01	3.23101438266E+03	1.97247598695E-01	2.97337218760E+00	0.
9.51750515611E-01	2.83870014973E-01	3.30255212090E+03	2.09004928233E-01	2.93943743863E+00	0.

TABLE V (cont)

THE ISENTROPE STATE VARIABLES AS COMPUTED FROM THE LEAST SQUARES FIT

BKW PRESSURE	FIT PRESSURE	BKW TEMPERATURE	FIT TEMPERATURE	BKW ENERGY + C	FIT ENERGY
2.35258171503E-01	2.30328514691E-01	2.38083824082E+03	2.28030568037E+03	1.17520160522E-01	1.16370669084E-01
1.64680720052E-01	1.61755889809E-01	2.12743143234E+03	2.06059163161E+03	1.03987700062E-01	1.03279508342E-01
1.15276504036E-01	1.13960276446E-01	1.88967497915E+03	1.86767341867E+03	9.28916021798E-02	9.28395166502E-02
8.06935528254E-02	8.06469538289E-02	1.67068389102E+03	1.69881909342E+03	8.38069220616E-02	8.44757038398E-02
5.64854869778E-02	5.73885234168E-02	1.46661750619E+03	1.55136236657E+03	7.62978319029E-02	7.77549852747E-02
3.95398408844E-02	4.10401407607E-02	1.29072557929E+03	1.42227058572E+03	7.03556033884E-02	7.23476547364E-02
2.76778886191E-02	2.88142442876E-02	1.21691231750E+03	1.30170711844E+03	6.70596069621E-02	6.79998335657E-02
1.93745220334E-02	2.00918787434E-02	1.14713045027E+03	1.19354067846E+03	6.43333655530E-02	6.45135418803E-02
1.35621654234E-02	1.39329729680E-02	1.08134838731E+03	1.09731096767E+03	6.20630464573E-02	6.17321079760E-02
9.49351579635E-03	9.62575317754E-03	1.01936683538E+03	1.01251049494E+03	6.01596179936E-02	5.95293486761E-02
6.64546105745E-03	6.63889580605E-03	9.60917913738E+02	9.38562866222E+02	5.85532774117E-02	5.78014390059E-02
4.65182274021E-03	4.58048996005E-03	9.06054215629E+02	8.74751966235E+02	5.71942248887E-02	5.64607231003E-02
3.25627591815E-03	3.17105796166E-03	8.53840993845E+02	8.20383632100E+02	5.60277994815E-02	5.54309513635E-02
2.27939314270E-03	2.20692806988E-03	8.04468238383E+02	7.74410706823E+02	5.50258416259E-02	5.46435947727E-02
1.59557519989E-03	1.54655116409E-03	7.57724051564E+02	7.35588808551E+02	5.41600999853E-02	5.40350082887E-02
1.11690263992E-03	1.09189026600E-03	7.13387257935E+02	7.02324160559E+02	5.34075161641E-02	5.35443052163E-02
7.81831847947E-04	7.75944543910E-04	6.71220277907E+02	6.72563422236E+02	5.27491859466E-02	5.31118718240E-02
5.47282293563E-04	5.53427782409E-04	6.30973845824E+02	6.43672140776E+02	5.21696427339E-02	5.26785010058E-02
3.83097605494E-04	3.94019671490E-04	5.92396768022E+02	6.12356125453E+02	5.16563147546E-02	5.21851567494E-02
2.68168323846E-04	2.77642176292E-04	5.55246221779E+02	5.74750307768E+02	5.11990890527E-02	5.15733969298E-02
1.87717826692E-04	1.91250539076E-04	5.19296108645E+02	5.26877370444E+02	5.07899448329E-02	5.07864783048E-02
1.31402478685E-04	1.26656523798E-04	4.84342294675E+02	4.65684696984E+02	5.04226385594E-02	4.97711419848E-02
2.70546897228E-01	2.64726233528E-01	2.48167115954E+03	2.37440207979E+03	1.23573171112E-01	1.22383007397E-01
3.11128931812E-01	3.04359718925E-01	2.58261513607E+03	2.47330841343E+03	1.30112009215E-01	1.28974594756E-01
3.57798271584E-01	3.50067987874E-01	2.68301581087E+03	2.57732700073E+03	1.37190026353E-01	1.36209351049E-01
4.11468012322E-01	4.02892864357E-01	2.78224845839E+03	2.68689753344E+03	1.44877184923E-01	1.44159499199E-01
4.73188214170E-01	4.64222567745E-01	2.87961554254E+03	2.80275654409E+03	1.53267818452E-01	1.52906776123E-01
5.44166446295E-01	5.36188252515E-01	2.97429191256E+03	2.92640403150E+03	1.62507679697E-01	1.62543837538E-01
6.25791413239E-01	6.23431292802E-01	3.06527669196E+03	3.06228282804E+03	1.72921681754E-01	1.73175890315E-01
7.19660125225E-01	7.43352515062E-01	3.15138941903E+03	3.22971216202E+03	1.85662169150E-01	1.84922592414E-01
8.27609144009E-01	8.55780979115E-01	3.23101438266E+03	3.37093404131E+03	1.97247598695E-01	1.97920267926E-01
9.51750515611E-01	9.70925429347E-01	3.30255212090E+03	3.50315807628E+03	2.09004928233E-01	2.12324493824E-01

THE ISENTROPE PRESSURE AND COMPOSITION OF DETONATION PRODUCTS

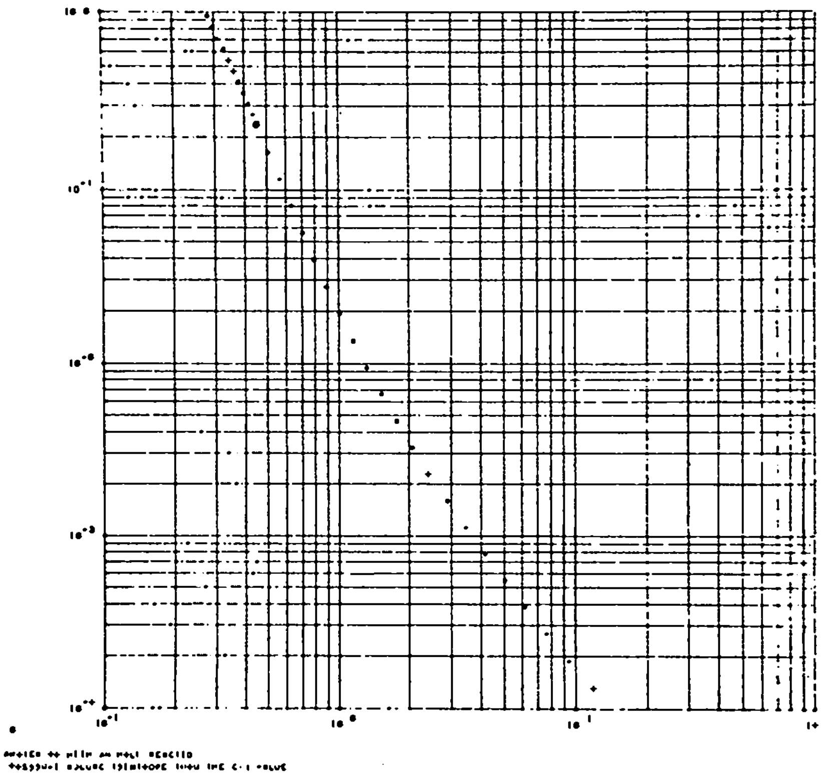
H2O H2 O2 CO2 CO NH3 H NO N2 OH CH4 AN C(S)

2.35258171503E-01	6.68680233537E+00	1.16053537284E-04	7.64933571682E-07	3.40126606181E+00	8.09446169520E-02
2.05811170910E-04	7.55194457380E-08	4.08198724870E-05	5.07013868448E+00	7.43189919067E-08	6.15970700034E-06
7.10647000000E-01	5.86265216153E+00				
1.64680720052E-01	6.68641958584E+00	2.96084190498E-04	5.35635945235E-08	3.39767966617E+00	8.86154565405E-02
3.78553674234E-04	5.24252089486E-08	6.95706725408E-06	5.07006924463E+00	6.10665728625E-08	1.79713550847E-05
7.10647000000E-01	5.85855590592E+00				
1.15276504036E-01	6.68573143882E+00	6.07295755569E-04	3.04076603207E-10	3.40043860377E+00	8.37919863742E-02
5.95735536424E-04	5.82734794688E-10	8.66026897709E-07	5.06996369922E+00	6.23895401036E-10	4.35807577186E-05
7.10647000000E-01	5.86059482910E+00				
8.06935528254E-02	6.68483810856E+00	1.04259120152E-03	5.73649935299E-11	3.40838420173E+00	6.87949121284E-02
8.34217041843E-04	4.27595271702E-10	7.52529242666E-08	5.06984485385E+00	4.74269826781E-10	9.37371118982E-05
7.10647000000E-01	5.86759614903E+00				
5.64854869778E-02	6.68392848152E+00	1.48077702785E-03	1.00000000000E-11	3.41963655070E+00	4.71999164675E-02
1.03606072632E-03	2.49917478892E-10	3.53539843998E-10	5.06974396946E+00	2.91334410662E-10	1.78075038747E-04
7.10647000000E-01	5.87785445780E+00				
3.95398408844E-02	6.68287236853E+00	1.92937765754E-03	1.00000000000E-11	3.42921176155E+00	2.91056082528E-02
1.23221916293E-03	1.04721585457E-10	8.96151479662E-11	5.06964589037E+00	1.32637882651E-10	3.34712473621E-04
7.10647000000E-01	5.88621691772E+00				
2.76778886191E-02	6.67743350371E+00	4.36903414374E-03	1.00000000000E-11	3.42999780401E+00	3.29723883148E-02
2.15399083291E-03	8.42183366387E-11	2.50970755838E-11	5.06918500457E+00	1.04174919439E-10	1.14298790010E-03
7.10647000000E-01	5.88075581978E+00				
1.93745220334E-02	6.66719754608E+00	8.48815203046E-03	1.00000000000E-11	3.43441417488E+00	3.43756043178E-02
3.34581067639E-03	5.81435523085E-11	1.00000000000E-11	5.06858909466E+00	6.94040590125E-11	3.30754290790E-03
7.10647000000E-01	5.87277167789E+00				
1.35621654234E-02	6.64937513627E+00	1.44292096783E-02	1.00000000000E-11	3.44394853225E+00	3.31292994011E-02
4.68994441906E-03	3.25907493625E-11	1.00000000000E-11	5.06791702780E+00	3.67159810626E-11	8.24011869252E-03
7.10647000000E-01	5.85955104957E+00				
9.49351579635E-03	6.62074211466E+00	2.17879705365E-02	1.00000000000E-11	3.46003155604E+00	2.95962736196E-02
6.00186294288E-03	1.36639342337E-11	1.00000000000E-11	5.06726106855E+00	1.38832004113E-11	1.78933101890E-02
7.10647000000E-01	5.83734786015E+00				
6.64546105745E-03	6.57865202783E+00	2.95781937264E-02	1.00000000000E-11	3.48360049932E+00	2.45484739880E-02
7.07756997203E-03	1.00000000000E-11	1.00000000000E-11	5.06672321504E+00	1.00000000000E-11	3.42364617408E-02
7.10647000000E-01	5.80248356495E+00				
4.65182274021E-03	6.52220479691E+00	3.65756197462E-02	1.00000000000E-11	3.51459660823E+00	1.90634871905E-02
7.76551355382E-03	1.00000000000E-11	1.00000000000E-11	5.06637924326E+00	1.00000000000E-11	5.84454065110E-02
7.10647000000E-01	5.75282349807E+00				
3.25627591815E-03	6.45473133363E+00	4.13320123908E-02	1.00000000000E-11	3.55103095354E+00	1.36082599622E-02
7.96207368465E-03	1.00000000000E-11	1.00000000000E-11	5.06628096321E+00	1.00000000000E-11	8.96565217414E-02
7.10647000000E-01	5.69057326475E+00				
2.27939314270E-03	6.38185196344E+00	4.31919333521E-02	1.00000000000E-11	3.58974706067E+00	9.05541600579E-03
7.70271079606E-03	1.00000000000E-11	1.00000000000E-11	5.06641064467E+00	1.00000000000E-11	1.25360768531E-01

TABLE V (cont)

7.10647000000E-01	5.62070575479E+00				
1.59557519989E-03	6.31132233968E+00	4.20443775949E-02	1.00000000000E-11	3.62674401128E+00	5.59113865876E-03
7.08238398037E-03	1.00000000000E-11	1.00000000000E-11	5.06672080810E+00	1.00000000000E-11	1.61664603422E-01
7.10647000000E-01	5.55086924664E+00				
1.11690263992E-03	6.25085094335E+00	3.83405031164E-02	1.00000000000E-11	3.65817836425E+00	3.19382919556E-03
6.22826407568E-03	1.00000000000E-11	1.00000000000E-11	5.06714786806E+00	1.00000000000E-11	1.94392828731E-01
7.10647000000E-01	5.48910397781E+00				
7.81831847947E-04	6.20662819489E+00	3.28683131682E-02	1.00000000000E-11	3.68104679012E+00	1.67972604724E-03
5.26335933020E-03	1.00000000000E-11	1.00000000000E-11	5.06763032044E+00	1.00000000000E-11	2.19963976525E-01
7.10647000000E-01	5.44217850731E+00				
5.47282293563E-04	6.18263660371E+00	2.65166662538E-02	1.00000000000E-11	3.69347872844E+00	8.07440748740E-04
4.28640494875E-03	1.00000000000E-11	1.00000000000E-11	5.06811879765E+00	1.00000000000E-11	2.35868311374E-01
7.10647000000E-01	5.41471451944E+00				
3.83097605494E-04	6.18058445144E+00	2.00986575389E-02	1.00000000000E-11	3.69473297174E+00	3.51106565743E-04
3.36655590358E-03	1.00000000000E-11	1.00000000000E-11	5.06857872219E+00	1.00000000000E-11	2.40793278861E-01
7.10647000000E-01	5.40899164303E+00				
2.68168323846E-04	6.20013495416E+00	1.42477364021E-02	1.00000000000E-11	3.68506518447E+00	1.36178562023E-04
2.34653587406E-03	1.00000000000E-11	1.00000000000E-11	5.06898873223E+00	1.00000000000E-11	2.34558502905E-01
7.10647000000E-01	5.42510913406E+00				
1.87717826692E-04	6.23918964868E+00	9.37304240506E-03	1.00000000000E-11	3.66558280853E+00	4.82361332864E-03
1.84862716689E-03	1.00000000000E-11	1.00000000000E-11	5.06933768660E+00	1.00000000000E-11	2.17891934185E-01
7.10647000000E-01	5.46124802114E+00				
1.31402478683E-04	6.29413031777E+00	5.65679131352E-03	1.00000000000E-11	3.63812888858E+00	1.34071539673E-03
1.28137927360E-03	1.00000000000E-11	1.00000000000E-11	5.06962181057E+00	1.00000000000E-11	1.92803911129E-01
7.10647000000E-01	5.51392079314E+00				
2.70546897228E-01	6.68700945236E+00	7.41475056453E-05	1.96383335930E-06	3.40446286391E+00	7.43872169474E-02
1.32234514643E-04	7.67066412072E-08	7.51053407152E-05	5.07014832017E+00	6.98344859245E-08	3.72233848388E-06
7.10647000000E-01	5.86601319660E+00				
3.11128931812E-01	6.68710860708E+00	4.48992004555E-05	1.82106927983E-06	3.40841466557E+00	6.63212273046E-02
1.07801256014E-04	7.23011793585E-08	1.32631611392E-04	3.07014178357E+00	6.05233450071E-08	2.11271132276E-06
7.10647000000E-01	5.87013099421E+00				
3.57798271384E-01	6.68718293327E+00	2.55809094533E-05	1.14099037542E-05	3.41288984876E+00	3.71902729671E-02
7.24739461848E-05	6.30033542892E-08	2.25728246831E-04	5.07011289890E+00	4.81879609114E-08	1.10963310637E-06
7.10647000000E-01	5.87478776862E+00				
4.11468012322E-01	6.68723608513E+00	1.35973441040E-05	2.63017591393E-05	3.41761313487E+00	4.75143623500E-02
4.58220090615E-05	5.03799233085E-08	3.72178632079E-04	5.07005299968E+00	6.36794657423E-10	5.29500682490E-07
7.10647000000E-01	5.87974097328E+00				
4.73188214170E-01	6.68727199310E+00	6.67060842694E-06	5.90156996610E-05	3.42229455780E+00	3.78225020173E-02
2.69055370429E-05	3.71165215229E-08	5.98234555475E-04	5.06994942995E+00	2.33294407872E-08	2.23879914357E-07
7.10647000000E-01	5.88475171631E+00				
5.44166446295E-01	6.68729473603E+00	2.97639520009E-06	1.36551878761E-04	3.42664241802E+00	2.86036233661E-02
1.44168466140E-05	5.84981527486E-10	9.45200105717E-04	5.06978219152E+00	5.06558662741E-10	8.08807607201E-08
7.10647000000E-01	5.88962287753E+00				
6.25791413239E-01	6.68730803020E+00	1.18152613365E-06	3.21801276435E-04	3.43035482289E+00	2.02528010506E-02
6.85776223113E-06	5.12982360682E-10	1.48741998022E-03	5.06951486113E+00	4.28722228495E-10	5.77367209595E-10
7.10647000000E-01	5.89426137548E+00				
7.19660125225E-01	6.68731502209E+00	3.98300460763E-07	8.41432730667E-04	3.43302906866E+00	1.29314687673E-02
2.71898837520E-06	4.29120829105E-10	2.41398601435E-03	5.06905364750E+00	3.46942347286E-10	3.71271609623E-10
7.10647000000E-01	5.89890844220E+00				
8.27609144009E-01	6.68731809136E+00	1.10504908583E-07	2.52225761721E-03	3.43332008407E+00	7.30031391426E-03
8.64985032418E-07	3.36128181320E-10	4.09841108455E-03	5.06821236197E+00	2.63898218525E-10	1.77038124884E-10
7.10647000000E-01	5.90424860184E+00				
9.51750515611E-01	6.68731915269E+00	5.91263459366E-10	7.99103230846E-03	3.42817290694E+00	3.78182212923E-03
2.30938495866E-07	2.41591868188E-10	6.97264649308E-03	5.06677556128E+00	1.81041757743E-10	4.74910580874E-11
7.10647000000E-01	5.91291427088E+00				

TABLE V (cont)



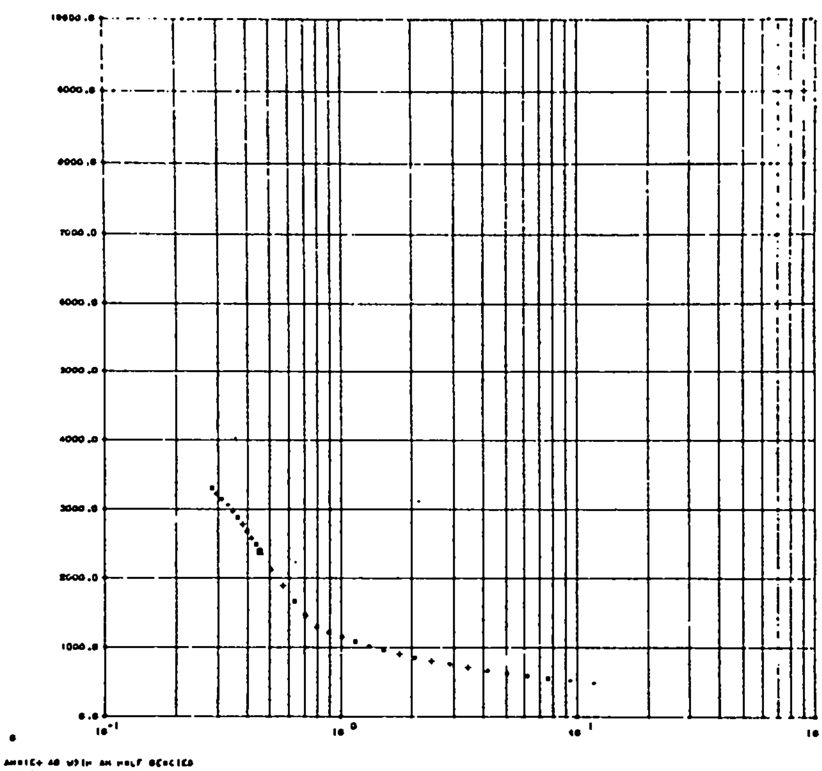

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TABLE V (cont)

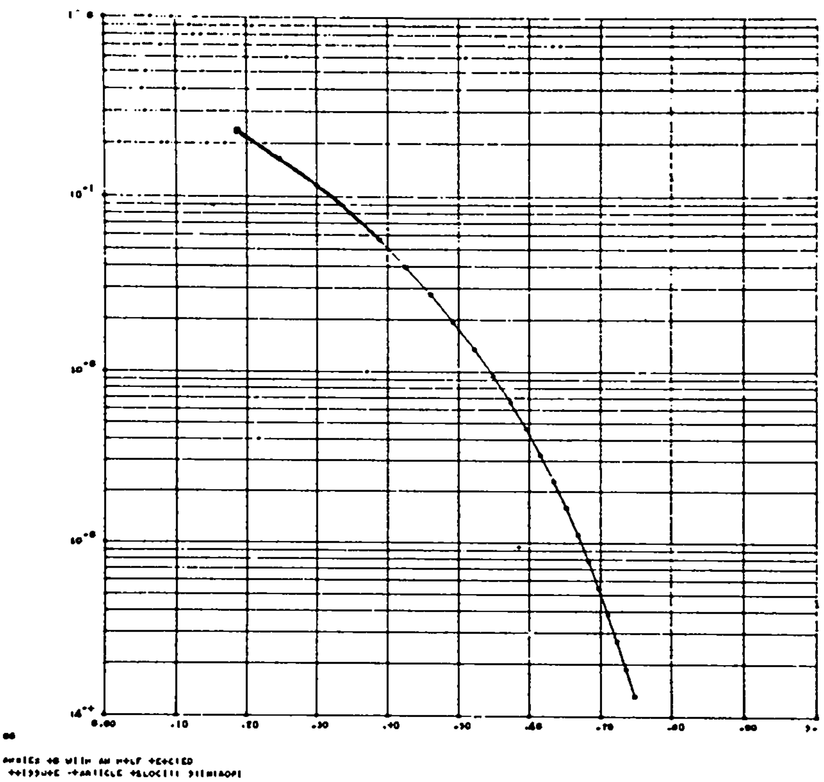


TABLE VI

THE PARTIALLY REACTED BKW EQUATION OF STATE FOR AMATEX 20 WITH $W_{AN} = 0.5$

A FORTRAN BKW CALCULATION FOR THE EXPLOSIVE
AMATEX 20 WITH AN HALF REACTED

THE NUMBER OF ELEMENTS IS 5

THE NUMBER OF GAS SPECIES IS 11

THE NUMBER OF SOLID SPECIES IS 2

THE BKW EQUATION OF STATE PARAMETERS ARE
ALPHA= 5.00000000000E-01 BETA= 1.60000000000E-01 THETA= 4.00000000000E+02 KAPPA= 1.09097784436E+01

THE COMPOSITION OF THE EXPLOSIVE IS
8.65448000000E+00 MOLES OF C
1.45072880000E+01 MOLES OF H
9.40852400000E+00 MOLES OF N
1.39579060000E+01 MOLES OF O
1.54938000000E+00 MOLES OF AN

THE DENSITY OF THE EXPLOSIVE IS 1.61000000000E+00, GRAMS/CC

THE MOLECULAR WEIGHT IS 5.97758000000E+02 GRAMS

THE HEAT OF FORMATION AT 0 DEG K IS -2.44723000000E+05 CALORIES PER FORMULA WEIGHT

THE SOLID (COWAN) EQUATION OF STATE PARAMETERS VO, AS, BS, CS, DS, ES, A1, A2, C1, C2, C3, ATOMIC WT

AN	5.79710144928E-01	1.94813309828E+00	-3.55623058821E+00	2.38631872297E+00	-7.15791941313E-01	8.45912212177E-02
	4.49704093435E-01	1.80817009794E-02	-0.	-0.	-0.	8.00480000000E+01
IS›	4.44444444444E-01	8.30935837268E-01	-1.39381809219E+00	6.72569716021E-01	-1.13537262508E-01	6.49155882007E-03
	·2.26705345948E-01	1.20516569525E-01	8.31600000000E-02	-1.75590000000E-01	1.55310000000E-01	1.20100000000E+01

THE INPUT DETONATION PRODUCT ELEMENTAL COMPOSITION MATRIX

0.	2.0E+00	*.	1.0E+00	0.	*.	2.0E+00	*.	*.	*.	*.	*.
0.	2.0E+00	0.	1.0E+00	*.	*.	2.0E+00	*.	1.0E+00	*.	*.	1.0E+00
*.	*.	3.0E+00	1.0E+00	*.	*.	*.	1.0E+00	*.	*.	*.	*.
*.	1.0E+00	1.0E+00	*.	*.	*.	2.0E+00	*.	*.	*.	1.0E+00	*.
1.0E+00	*.	1.0E+00	4.0E+00	0.	*.	*.	*.	*.	*.	*.	1.0E+00
1.0E+00	*.	*.	*.	0.							

A FORTRAN BKW CALCULATION FOR THE EXPLOSIVE
AMATEX 20 WITH AN HALF REACTED

THE COMPUTED CJ PRESSURE IS 1.91057449437E-01 MEGABARS

THE COMPUTED DETONATION VELOCITY IS 7.03153039436E-01 CM/MICROSECOND

THE COMPUTED CJ TEMPERATURE IS 1.94377465602E+03 DEGREES KELVIN

THE COMPUTED CJ VOLUME 4.72041153398E-01 CC/GM OF EXPLOSIVE

THE COMPUTED GAMMA IS 3.16640627886E+00

THE VOLUME OF THE GAS IS 1.38806904371E+01 CC/MOLE OF GAS AND THERE ARE 1.53229896201E+01 MOLES OF GAS

SOLID	VOLUME IN CC/GM
AN	3.90253821427E-01
(S)	3.31706488972E-01

TABLE VI (cont)

THE C-J COMPOSITION OF THE DETONATION PRODUCTS AND THE INPUT COEFFICIENTS TO THE THERMODYNAMIC FITS FOR EACH SPECIE

SPECIE	NO OF MOLES	COEFFICIENTS A,B,C,D,E, THE INTEGRATION CONSTANT, HEAT OF FORMATION IN CAL/MOLE,COVOLUME				
H2O	7.25348830855E+00	4.25884200000E+01	1.48080500000E-02	-2.63918100000E-06	1.92045300000E-10	0.
		1.34282835156E+03	-5.71070000000E+04	2.50000000000E+02		
H2	3.88611680743E-05	2.97034700000E+01	1.14382900000E-02	-2.20122200000E-06	1.67776100000E-10	0.
		1.17589615365E+03	0.	1.80000000000E+02		
O2	5.07885533057E-10	4.70309000000E+01	1.28714700000E-02	-2.50021700000E-06	1.90157000000E-10	0.
		1.03537647396E+03	0.	3.50000000000E+02		
CO2	3.33925575216E+00	4.74811200000E+01	1.95446300000E-02	-3.72129600000E-06	2.77030000000E-10	0.
		7.46280968750E+02	-9.39680000000E+04	6.00000000000E+02		
CO	2.59043647257E-02	4.53308200000E+01	1.23816100000E-02	-2.41640300000E-06	1.82818100000E-10	0.
		1.12158830990E+03	-2.72010000000E+04	3.90000000000E+02		
NH3	7.58788984500E-05	4.20181600000E+01	1.91166200000E-02	-3.16433000000E-06	2.19780100000E-10	0.
		1.20696121615E+03	-9.36800000000E+03	4.76000000000E+02		
H	3.31436014309E-10	2.63911000000E+01	8.12137200000E-03	-1.69074000000E-06	1.31682300000E-10	0.
		7.94631617188E+02	5.16190000000E+04	7.60000000000E+01		
NO	1.82!04109108E-06	4.84149800000E+01	1.26938600000E-02	-2.49460000000E-06	1.89321300000E-10	0.
		1.20924970573E+03	2.14770000000E+04	3.86000000000E+02		
N2	4.70422315003E+00	4.39234000000E+01	1.22250100000E-02	-2.37900500000E-06	1.79832200000E-10	0.
		1.13916134896E+03	0.	3.80000000000E+02		
OH	3.39748613436E-10	4.24179200000E+01	1.15684700000E-02	-2.22665900000E-06	1.68915500000E-10	0.
		1.18351754427E+03	3.56000000000E+03	4.13000000000E+02		
CH4	1.50579760126E-06	3.87568600000E+01	2.36401300000E-02	-3.70795700000E-06	2.47071400000E-10	0.
		1.04242791146E+03	-1.60000000000E+04	5.28000000000E+02		
AN	1.54938000000E+00	-4.27708542530E+00	1.53027164063E-01	-6.46991182208E-05	1.36108882907E-08	-1.06334374464E-12
		-0.	-7.81000000000E+04	-0.		
(S)	5.28931837731E+00	-2.46151900000E-01	7.17985500000E-03	-1.29755000000E-06	9.34999500000E-11	0.
		-2.58204389323E+02	0.	0.		

A BKW ISENTROPE THRU BKW CJ PRESSURE FOR
AMATEX 20 WITH AN HALF REACTED

LN(P)= -4.04056034372E+00 -2.93722253172E+00LNV 3.88078560035E-01LNV*2 9.50635328003E-02LNV+3 -4.12593052869E-02LNV*4

LN(T)= 6.97953834057E+00 -6.21205219814E-01LNV 1.88836676323E-01LNV*2 2.52361003874E-02LNV+3 -2.07344641799E-02LNV+4

LN(E)= -1.55161004811E+00 4.81545346088E-01LNP 6.97979186971E-02LNP+2 4.01522346010E-03LNP+3 5.57266913897E-05LNP+4

THE CONSTANT ADDED TO ENERGIES WAS 1.00000000000E-01

PRESSURE (MBARS)	VOLUME (CC/GM)	TEMPERATURE (DEG K)	ENERGY+C (MB-CC/GM)	GAMMA (-DLNP/DLNV)	PARTICLE VELOCITY
1.91057449437E-01	4.72041153835E-01	1.94377465602E+03	1.14241196773E-01	3.28934341921E+00	1.68766834584E-01
1.33740214606E-01	5.26481102609E-01	1.75691071086E+03	1.03583169446E-01	3.27420484653E+00	2.24186657118E-01
9.36181502242E-02	5.87057785259E-01	1.57890606285E+03	9.49021044577E-02	3.24478286712E+00	2.72872809650E-01
6.55327051569E-02	6.54509050823E-01	1.41399529273E+03	8.78652609879E-02	3.20240480121E+00	3.15667062058E-01
4.58728936098E-02	7.29893386603E-01	1.25681124002E+03	8.20403700645E-02	3.14817721441E+00	3.53428446665E-01
3.21110255269E-02	8.13741240277E-01	1.13261555561E+03	7.76714747438E-02	3.08363777895E+00	3.86624787852E-01
2.24777178688E-02	9.10420879944E-01	1.07382725288E+03	7.50772640523E-02	3.00741531244E+00	4.16824948167E-01
1.57344025082E-02	1.02526335469E+00	1.01842308834E+03	7.29204334808E-02	2.91768282933E+00	4.44898013288E-01
1.10140817557E-02	1.16268589760E+00	9.66260291180E+02	7.11136327803E-02	2.81431579790E+00	4.70903363071E-01
7.70985722901E-03	1.32835460093E+00	9.17128480953E+02	6.95888813260E-02	2.69762493276E+00	4.94921000976E-01
5.39690006030E-03	1.52955622047E+00	8.70783694316E+02	6.82926859433E-02	2.56853316355E+00	5.17049479881E-01
3.77783004221E-03	1.77567153209E+00	8.27002263868E+02	6.71828996847E-02	2.42878856324E+00	5.37403455902E-01
2.64448102955E-03	2.07880551868E+00	7.85603876609E+02	6.62261800511E-02	2.28118672699E+00	5.56113054336E-01
1.85113672068E-03	2.45468649697E+00	7.46440009247E+02	6.53958665892E-02	2.12976727471E+00	5.73325512039E-01
1.29579570448E-03	2.92397768643E+00	7.09365101390E+02	6.46703150283E-02	1.97998583185E+00	5.89206369216E-01
9.07056993135E-04	3.51413522074E+00	6.74213993085E+02	6.40317223850E-02	1.83890872203E+00	6.03937708392E-01
6.34939895195E-04	4.26295504167E+00	6.41060019942E+02	6.34691249642E-02	1.71533910584E+00	6.17730356112E-01
4.44457926636E-04	5.21833653555E+00	6.09143842064E+02	6.29623866980E-02	1.62069754863E+00	6.30757115164E-01
3.11120548645E-04	6.44810119401E+00	5.78543480973E+02	6.25058585747E-02	1.56845466673E+00	6.43247172365E-01
2.17784384052E-04	8.04272750295E+00	5.49055472159E+02	6.20915244470E-02	1.57499540442E+00	6.55412415022E-01
1.52449068836E-04	1.01239270110E+01	5.20494107543E+02	6.17130268088E-02	1.65951520672E+00	6.67440880004E-01
1.06714348185E-04	1.28544854853E+01	4.92697014042E+02	6.13654309449E-02	1.84377898150E+00	6.79444190500E-01
2.19716066853E-01	4.52290102922E-01	2.01793193453E+03	1.19038144957E-01	3.29107826149E+00	0.
2.52673476881E-01	4.33384213516E-01	2.09177983568E+03	1.24225080860E-01	3.29033774056E+00	0.
2.90574498413E-01	4.15283342595E-01	2.16471042941E+03	1.29836278222E-01	3.28705156551E+00	0.
3.34160673175E-01	3.97938926666E-01	2.23619604838E+03	1.35916765766E-01	3.28114345304E+00	0.
3.84284774151E-01	3.81289846939E-01	2.30570318862E+03	1.42523896640E-01	3.27251862500E+00	0.
4.41927490273E-01	3.65254435141E-01	2.37265398693E+03	1.49733188855E-01	3.26103979882E+00	0.
5.08216613814E-01	3.49703918804E-01	2.43638316534E+03	1.57654937003E-01	3.24646691483E+00	0.
5.84449105886E-01	3.34344861767E-01	2.49609313001E+03	1.66503599281E-01	3.22822351792E+00	0.
6.72116471769E-01	3.17532058973E-01	2.55080845929E+03	1.77280367466E-01	3.20314021290E+00	0.
7.72933942535E-01	3.03175882308E-01	2.59930206004E+03	1.87854375677E-01	3.17678865044E+00	0.
8.88874033915E-01	2.91312908183E-01	2.64005519802E+03	1.98149560223E-01	3.15104414172E+00	0.

TABLE VI (cont)

THE ISENTROPE STATE VARIABLES AS COMPUTED FROM THE LEAST SQUARES FIT

BKW PRESSURE	FIT PRESSURE	BKW TEMPERATURE	FIT TEMPERATURE	BKW ENERGY + C	FIT ENERGY
1.91057449437E-01	1.88201479194E-01	1.94377465602E+03	1.87249254387E+03	1.14241196773E-01	1.13582731824E-01
1.33740214608E-01	1.31521895582E-01	1.75691071086E+03	1.71233079846E+03	1.03583169446E-01	1.03345054045E-01
9.36181502242E-02	9.22096695993E-02	1.57890606285E+03	1.56948432555E+03	9.49021044577E-02	9.51595050163E-02
6.55327051569E-02	6.49324861259E-02	1.41399529273E+03	1.44257476161E+03	8.78652609879E-02	8.85895955943E-02
4.58728936098E-02	4.59290948370E-02	1.25681124002E+03	1.32989842044E+03	8.20403700645E-02	8.33055062741E-02
3.21110255269E-02	3.27261330725E-02	1.13261555561E+03	1.23070269436E+03	7.76714747438E-02	7.90545586507E-02
2.24777178688E-02	2.32471942054E-02	1.07382725288E+03	1.14079206476E+03	7.50772640523E-02	7.56403496975E-02
1.57344025082E-02	1.63488196195E-02	1.01842308834E+03	1.05802316228E+03	7.29204334808E-02	7.29078204000E-02
1.10140817557E-02	1.13996292769E-02	9.66260291180E+02	9.82665252493E+02	7.11136327803E-02	7.07324430203E-02
7.70985722901E-03	7.89628829501E-03	9.17128480953E+02	9.14904883133E+02	6.95888813260E-02	6.90123056562E-02
5.39690006030E-03	5.44654241697E-03	8.70783694316E+02	8.54832616017E+02	6.82926859433E-02	6.76622648825E-02
3.77783004221E-03	3.75150557249E-03	8.27002263868E+02	8.02422205179E+02	6.71828996847E-02	6.66095991365E-02
2.64448102955E-03	2.58829991641E-03	7.85603876609E+02	7.57492821967E+02	6.62261800511E-02	6.57907723582E-02
1.85113672068E-03	1.79414600758E-03	7.46440009247E+02	7.19650985010E+02	6.53958665892E-02	6.51490378966E-02
1.29579570448E-03	1.25259565346E-03	7.09365101390E+02	6.88215730246E+02	6.46703150283E-02	6.46326952116E-02
9.07056993135E-04	8.82029960953E-04	6.74213993085E+02	6.62123031529E+02	6.40317223850E-02	6.41938682989E-02
6.34939895195E-04	6.26032902292E-04	6.41060019942E+02	6.39767429186E+02	6.34691249642E-02	6.37877127695E-02
4.44457926636E-04	4.47093661570E-04	6.09143842064E+02	6.18921728161E+02	6.29623866980E-02	6.33719832399E-02
3.11120548645E-04	3.19343961774E-04	5.78543480973E+02	5.96391123968E+02	6.25058585747E-02	6.29069075813E-02
2.17784384052E-04	2.25922059051E-04	5.49055472159E+02	5.68040097930E+02	6.20915244470E-02	6.23553220930E-02
1.52449068836E-04	1.55966122947E-04	5.20494107543E+02	5.29046662972E+02	6.17130268088E-02	6.16830236760E-02
1.06714348185E-04	1.02888233946E-04	4.92697014042E+02	4.74905459116E+02	6.13654309449E-02	6.08592931504E-02
2.19716066853E-01	2.16621850104E-01	2.01793193453E+03	1.94006855378E+03	1.19038144957E-01	1.18275077409E-01
2.52673476881E-01	2.49303869860E-01	2.09177983568E+03	2.01038093072E+03	1.24225080860E-01	1.23413234281E-01
2.90574498413E-01	2.86858576228E-01	2.16471042941E+03	2.08347221354E+03	1.29836278222E-01	1.29045855256E-01
3.34160673175E-01	3.30004598430E-01	2.23619604838E+03	2.15942470299E+03	1.35916765766E-01	1.35228027346E-01
3.84284774151E-01	3.79617392920E-01	2.30570318862E+03	2.23839863208E+03	1.42523896640E-01	1.42022255665E-01
4.41927490273E-01	4.36825317651E-01	2.37265398693E+03	2.32070437917E+03	1.49733188855E-01	1.49499615708E-01
5.08216613814E-01	5.03259758282E-01	2.43638316534E+03	2.40700800975E+03	1.57654937003E-01	1.57741105930E-01
5.84449105886E-01	5.82029122724E-01	2.49609313001E+03	2.49918956942E+03	1.66503599281E-01	1.66839239161E-01
6.72116471769E-01	6.87079658724E-01	2.55080845929E+03	2.60887206111E+03	1.77280367466E-01	1.76899919497E-01
7.72933942535E-01	7.96359231898E-01	2.59930206004E+03	2.71056386231E+03	1.87854375677E-01	1.88044661224E-01
8.88874033915E-01	9.03564873093E-01	2.64005519802E+03	2.80072544514E+03	1.98149560223E-01	2.00413218606E-01

THE ISENTROPE PRESSURE AND COMPOSITION OF DETONATION PRODUCTS

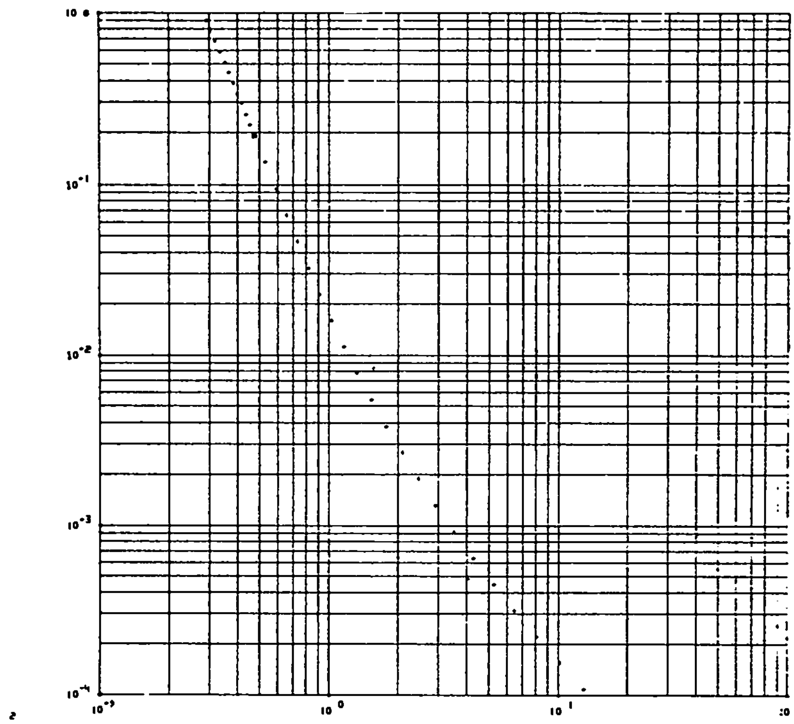
H2O H2 O2 CO2 CO NH3 H NO N2 OH CH4 AN C(S)

1.91057449437E-01	7.25348830855E+00	3.88611682478E-05	5.07885532863E-10	3.33925575211E+00	2.59043648202E-02
7.58788984887E-05	3.31436014873E-10	1.82104108998E-06	4.70422315003E+00	3.39748613691E-10	1.50579760671E-06
1.54938000000E+00	5.28931837727E+00				
1.33740214606E-01	7.25326437486E+00	1.17168314905E-04	1.90893642269E-10	3.33782820133E+00	2.89849667652E-02
1.67013481138E-04	2.94950602633E-10	2.55016564773E-07	4.70417836575E+00	3.21374728239E-10	5.96814556686E-06
1.54938000000E+00	5.28766086376E+00				
9.36181502242E-02	7.25287311021E+00	2.75514301346E-04	2.37837056323E-11	3.33867744859E+00	2.76779917164E-02
3.05027225108E-04	2.21990703265E-10	5.90967428324E-10	4.70410948609E+00	2.56128142941E-10	1.89172036363E-05
1.54938000000E+00	5.28810564249E+00				
6.55327051569E-02	7.25227491670E+00	5.34721135433E-04	1.00000000000E-11	3.34133918337E+00	2.29527161743E-02
4.87000677268E-04	1.33426686698E-10	2.73416582705E-10	4.70401849952E+00	1.64989448625E-10	5.19305019881E-05
1.54938000000E+00	5.29013616996E+00				
4.58728936098E-02	7.25156470263E+00	8.33100854928E-04	1.00000000000E-11	3.34535286106E+00	1.56355752568E-02
6.70068580307E-04	4.82685566802E-11	6.04254400077E-11	4.70392696568E+00	6.80641071414E-11	1.20546795595E-04
1.54938000000E+00	5.29337101689E+00				
3.21110255269E-02	7.25030931107E+00	1.31932916800E-03	1.00000000000E-11	3.34833496579E+00	1.09267575543E-02
9.40866257282E-04	1.09507347314E-11	1.00000000000E-11	4.70379156687E+00	1.79094160519E-11	3.02030179792E-04
1.54938000000E+00	5.29491624648E+00				
2.24777178688E-02	7.24583095272E+00	3.04604031807E-03	1.00000000000E-11	3.34985671714E+00	1.23616132683E-02
1.69851155587E-03	1.00000000000E-11	1.00000000000E-11	4.70341274423E+00	1.08500789071E-11	1.10961980796E-03
1.54938000000E+00	5.29115204978E+00				
1.57344025082E-02	7.23676915600E+00	6.01670866816E-03	1.00000000000E-11	3.35411617997E+00	1.29044844198E-02
2.70710375230E-03	1.00000000000E-11	1.00000000000E-11	4.70290844814E+00	1.00000000000E-11	3.39873985157E-03
1.54938000000E+00	5.28406059576E+00				
1.10140817557E-02	7.21978355797E+00	1.03776688086E-02	1.00000000000E-11	3.36281357354E+00	1.24952953933E-02
3.87293851241E-03	1.00000000000E-11	1.00000000000E-11	4.70232553077E+00	1.00000000000E-11	8.83668272995E-03
1.54938000000E+00	5.27033444833E+00				
7.70985722901E-03	7.19060990639E+00	1.58863265941E-02	1.00000000000E-11	3.37801314004E+00	1.12698140667E-02
5.03824772063E-03	1.00000000000E-11	1.00000000000E-11	4.70174287618E+00	1.00000000000E-11	1.97951977239E-02
1.54938000000E+00	5.24540184817E+00				
5.39690006030E-03	7.14531976488E+00	2.18718182778E-02	1.00000000000E-11	3.40154358263E+00	9.49907049234E-03
6.02171824456E-03	1.00000000000E-11	1.00000000000E-11	4.70125114093E+00	1.00000000000E-11	3.87099197495E-02
1.54938000000E+00	5.20472742713E+00				
3.77783004221E-03	7.08238998689E+00	2.73970529565E-02	1.00000000000E-11	3.43400640895E+00	7.50319592974E-03
6.67295538547E-03	1.00000000000E-11	1.00000000000E-11	4.70092552237E+00	1.00000000000E-11	6.69237635552E-02
1.54938000000E+00	5.14604663156E+00				
2.64448102955E-03	7.00440470114E+00	3.15624077787E-02	1.00000000000E-11	3.47396669801E+00	5.56790367172E-03
6.91715687606E-03	1.00000000000E-11	1.00000000000E-11	4.70080342163E+00	1.00000000000E-11	1.03650577910E-01
1.54938000000E+00	5.07129482041E+00				
1.85113672068E-03	6.91805396778E+00	3.37864421348E-02	1.00000000000E-11	3.51798108408E+00	3.88986500583E-03
6.76791819618E-03	1.00000000000E-11	1.00000000000E-11	4.70087804099E+00	1.00000000000E-11	1.45825856430E-01
1.54938000000E+00	4.98678319449E+00				

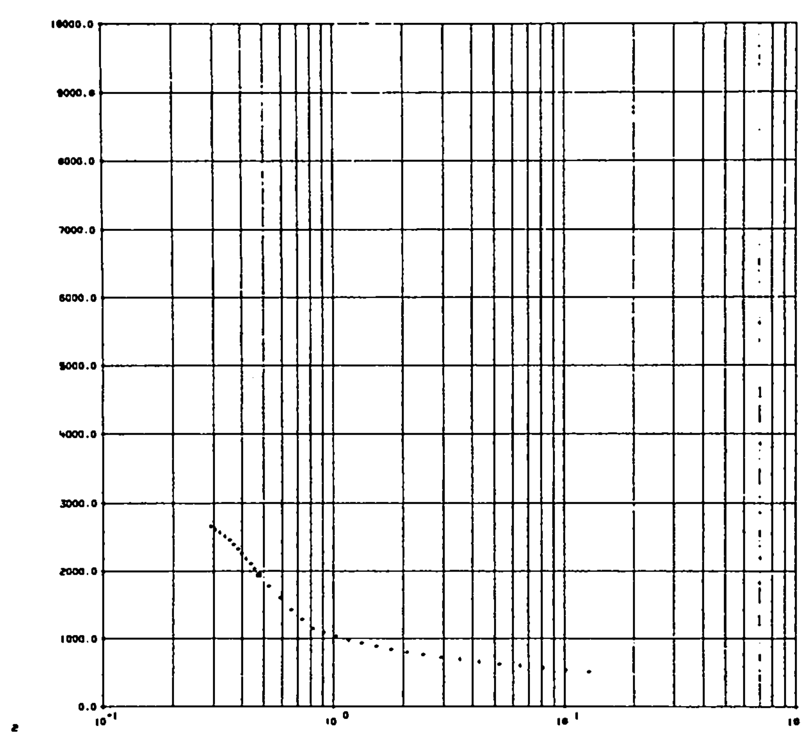
TABLE VI (cont)

1.29579570448E-03	6.83232031467E+00	3.39208533737E-02	1.00000000000E-11	3.56151184141E+00	2.56200355943E-03
6.30506430014E-03	1.00000000000E-11	1.00000000000E-11	4.70110946795E+00	1.00000000000E-11	1.88972617796E-01
1.54938000000E+00	4.90143353723E+00				
9.07056993135E-04	6.75606995009E+00	3.21883039620E-02	1.00000000000E-11	3.60012241149E+00	1.59122808613E-03
5.63614779273E-03	1.00000000000E-11	1.00000000000E-11	4.70144392621E+00	1.00000000000E-11	2.28465762180E-01
1.54938000000E+00	4.82430059824E+00				
6.34939895195E-04	6.69542462385E+00	2.91387416313E-02	1.00000000000E-11	3.63077212070E+00	9.37136043749E-04
4.87231705532E-03	1.00000000000E-11	1.00000000000E-11	4.70182584159E+00	1.00000000000E-11	2.60886079528E-01
1.54938000000E+00	4.76188466373E+00				
4.44457926636E-04	6.65659914194E+00	2.50674411744E-02	1.00000000000E-11	3.65039608912E+00	5.14681243771E-04
4.07622793600E-03	1.00000000000E-11	1.00000000000E-11	4.70222388617E+00	1.00000000000E-11	2.82931537563E-01
1.54938000000E+00	4.72063769206E+00				
3.11120548645E-04	6.64067913291E+00	2.05948132339E-02	1.00000000000E-11	3.65848139790E+00	2.64072836581E-04
3.31398651409E-03	1.00000000000E-11	1.00000000000E-11	4.70260500689E+00	1.00000000000E-11	2.93699537124E-01
1.54938000000E+00	4.70203499214E+00				
2.17784384052E-04	6.64753603831E+00	1.61453575423E-02	1.00000000000E-11	3.65512214205E+00	1.25679283388E-04
2.61991841300E-03	1.00000000000E-11	1.00000000000E-11	4.70295204096E+00	1.00000000000E-11	2.93016363360E-01
1.54938000000E+00	4.70621581530E+00				
1.52449068836E-04	6.67540651968E+00	1.20433317432E-02	1.00000000000E-11	3.64122226025E+00	5.49616908195E-05
2.01226832665E-03	1.00000000000E-11	1.00000000000E-11	4.70325586602E+00	1.00000000000E-11	2.81587873153E-01
1.54938000000E+00	4.73161490491E+00				
1.06714348185E-04	6.72126744998E+00	8.50676012467E-03	1.00000000000E-11	3.61830836510E+00	2.18218523811E-05
1.49820075884E-03	1.00000000000E-11	1.00000000000E-11	4.70351289982E+00	1.00000000000E-11	2.60811244504E-01
1.54938000000E+00	4.77533856854E+00				
2.19716066853E-01	7.25354124091E+00	2.31358712128E-05	4.14183148279E-08	3.34038876431E+00	2.35835295175E-02
5.20102699096E-05	2.30694015308E-09	3.61582860746E-06	4.70423418695E+00	2.28923390501E-09	8.02760228171E-07
1.54938000000E+00	5.29050690341E+00				
2.52673476881E-01	7.25357930771E+00	1.29832169376E-05	1.14833786853E-07	3.34176480443E+00	2.07899888881E-02
3.39393945264E-05	3.24444066901E-10	6.86456805819E-06	4.70424159802E+00	3.13141346074E-10	3.99832887617E-07
1.54938000000E+00	5.29192480685E+00				
2.90574498413E-01	7.25360547829E+00	6.80873765956E-06	3.05118444083E-07	3.34330158175E+00	1.76842525866E-02
2.08974928602E-05	3.07793033698E-10	1.24950953802E-05	4.70424530371E+00	2.86000515802E-10	1.83216967258E-07
1.54938000000E+00	5.29349398244E+00				
3.34160673175E-01	7.25362251506E+00	3.30570750512E-06	7.84051392026E-07	3.34490068735E+00	1.44586406652E-02
1.20181833548E-05	2.82537189123E-10	2.19012246033E-05	4.70424504030E+00	2.50670289325E-10	7.58477689742E-08
1.54938000000E+00	5.29512059614E+00				
3.84284774151E-01	7.25363296658E+00	1.46925280115E-06	1.97072451000E-06	3.34646313240E+00	1.13056622585E-02
6.37516004406E-06	2.49371026679E-10	3.71647019737E-05	4.70424023007E+00	2.08742444233E-10	6.01525962568E-10
1.54938000000E+00	5.29671120474E+00				
4.41927490273E-01	7.25363880549E+00	5.89437855722E-07	4.91528702086E-06	3.34789988075E+00	8.39613969858E-03
3.06933474457E-06	2.09488642971E-10	6.14625738061E-05	4.70422973405E+00	1.62534481595E-10	4.43790299131E-10
1.54938000000E+00	5.29818397911E+00				
5.08216813814E-01	7.25364182150E+00	2.09504723409E-07	1.24027970495E-05	3.34913860661E+00	5.86222458542E-03
1.31218339664E-06	1.64694654478E-10	9.99349956959E-05	4.70421137641E+00	1.15208924359E-10	2.91139901586E-10
1.54938000000E+00	5.29947916852E+00				
5.84449105886E-01	7.25364321213E+00	6.42285451139E-08	3.26253138254E-05	3.35012523920E+00	3.78512227234E-03
4.82160543140E-07	1.17590528112E-10	1.61936495978E-04	4.70418079067E+00	7.09226820614E-11	1.53295921005E-10
1.54938000000E+00	5.30056963837E+00				
6.72116471769E-01	7.25364378551E+00	5.25078543360E-10	9.59308048739E-05	3.35081181348E+00	2.17649092961E-03
1.42543919890E-07	7.17347773834E-11	2.70234956764E-04	4.70412681125E+00	3.49533443517E-11	4.69041658376E-11
1.54938000000E+00	5.30149169554E+00				
7.72933942535E-01	7.25364399873E+00	3.25413349288E-10	3.48645006056E-04	3.35101140343E+00	1.05501399790E-03
6.17375647887E-10	3.28935939344E-11	4.86890395751E-04	4.70401855449E+00	1.24046901369E-11	1.00000000000E-11
1.54938000000E+00	5.30241358257E+00				
8.88874033915E-01	7.25364399933E+00	1.58460696501E-10	1.39975963634E-03	3.35005893677E+00	4.52923084009E-04
3.82160992565E-10	1.00000000000E-11	8.91684782299E-04	4.70381615742E+00	1.00000000000E-11	1.00000000000E-11
1.54938000000E+00	5.30396814018E+00				

TABLE VI (cont)

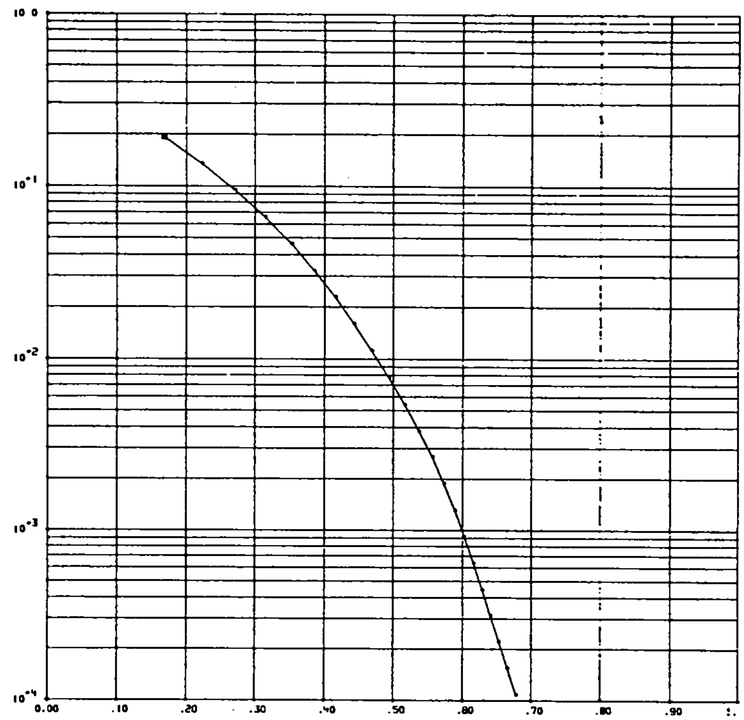


AMATEX 20 WITH AN HALF REACTED
PRESSURE-VOLUME ISENTROPE THRU THE C-J VALUE



AMATEX 20 WITH AN HALF REACTED
TEMPERATURE -VOLUME ISENTROPE THRU THE C-J VALUE

TABLE VI (cont)



AMATEX 20 WITH AN HALF REACIED
PRESSURE -PARIICLE VELOCIIV ISENTROPE

TABLE VII

THE PARTIALLY REACTED BKW EQUATION OF STATE FOR AMATOL WITH W_{AN} = 0.81

A FORTRAN BKW CALCULATION FOR THE EXPLOSIVE
AMATOL WITH AN 19 O/O REACTED

THE NUMBER OF ELEMENTS IS 5

THE NUMBER OF GAS SPECIES IS 11

THE NUMBER OF SOLID SPECIES IS 2

THE BKW EQUATION OF STATE PARAMETERS ARE
ALPHA= 5.00000000000E-01 BETA= 1.60000000000E-01 THETA= 4.00000000000E+02 KAPPA= 1.09097784436E+01

THE COMPOSITION OF THE EXPLOSIVE IS

7.00000000000E+00	MOLES OF	C
8.23501600000E+00	MOLES OF	H
4.61750800000E+00	MOLES OF	N
8.42626200000E+00	MOLES OF	O
3.44784600000E+00	MOLES OF	AN

THE DENSITY OF THE EXPLOSIVE IS 1.60000000000E+00, GRAMS/CC

THE MOLECULAR WEIGHT IS 5.67870000000E+02 GRAMS

THE HEAT OF FORMATION AT 0 DEG K IS -3.33887900000E+05 CALORIES PER FORMULA WEIGHT

THE SOLID (COWAN) EQUATION OF STATE PARAMETERS VO, AS, BS, CS, DS, ES, A1, A2, C1, C2, C3, ATOMIC WT

AN	5.79710144928E-01	1.94813309828E+00	-3.55623058821E+00	2.38631872297E+00	-7.15791941313E-01	8.45912212177E-02
	4.49704093435E-01	1.80817009794E-02	-0.	-0.	-0.	8.00480000000E+01
(S)	4.44444444444E-01	8.30935837268E-01	-1.39381809219E+00	6.72569716021E-01	-1.13537262508E-01	6.49155882007E-03
	-2.26705345948E-01	1.20516569525E-01	8.31600000000E-02	-1.75590000000E-01	1.55310000000E-01	1.20100000000E+01

THE INPUT DETONATION PRODUCT ELEMENTAL COMPOSITION MATRIX

0.	2.0E+00	+.	1.0E+00	0.	+.	2.0E+00	+.	+.	+.	+.	+.
0.	2.0E+00	0.	1.0E+00	+.	+.	2.0E+00	+.	1.0E+00	+.	+.	1.0E+00
+.	+.	3.0E+00	1.0E+00	+.	+.	+.	1.0E+00	+.	+.	+.	+.
+.	1.0E+00	1.0E+00	+.	+.	+.	2.0E+00	+.	+.	+.	1.0E+00	+.
1.0E+00	+.	1.0E+00	4.0E+00	0.	+.	+.	+.	+.	+.	+.	1.0E+00
1.0E+00	+.	+.	+.	0.							

A FORTRAN BKW CALCULATION FOR THE EXPLOSIVE
AMATOL WITH AN 19 O/O REACTED

THE COMPUTED CJ PRESSURE IS 1.18079792177E-01 MEGABARS

THE COMPUTED DETONATION VELOCITY IS 5.79644738426E-01 CM/MICROSECOND

THE COMPUTED CJ TEMPERATURE IS 1.39346505774E+03 DEGREES KELVIN

THE COMPUTED CJ VOLUME 4.87719724912E-01 CC/GM OF EXPLOSIVE

THE COMPUTED GAMMA IS 3.55269124839E+00

THE VOLUME OF THE GAS IS 1.61297919954E+01 CC/MOLE OF GAS AND THERE ARE 8.58170220023E+00 MOLES OF GAS

SOLID	VOLUME IN CC/GM
AN	4.26337782057E-01
(S)	3.58764897699E-01

TABLE VII (cont)

THE C-J COMPOSITION OF THE DETONATION PRODUCTS AND THE INPUT COEFFICIENTS TO THE THERMODYNAMIC FITS FOR EACH SPECIE

SPECIE	NO OF MOLES	COEFFICIENTS A.B.C.D.E. THE INTEGRATION CONSTANT. HEAT OF FORMATION IN CAL/MOLE.COVOLUME				
H2O	4.11747834241E+00	4.25884200000E+01	1.48080500000E-02	-2.63918100000E-06	1.92045300000E-10	0.
		1.34282835156E+03	-5.71070000000E+04	2.50000000000E+02		
H2	6.46976288336E-06	2.97034700000E+01	1.14382900000E-02	-2.20122200000E-06	1.67776100000E-10	0.
		1.17589615365E+03	0.	1.80000000000E+02		
O2	1.00000000000E-11	4.70309000000E+01	1.28714700000E-02	-2.50021700000E-06	1.90157000000E-10	0.
		1.03537647396E+03	0.	3.50000000000E+02		
CO2	2.15332824049E+00	4.74811200000E+01	1.95446300000E-02	-3.72129600000E-06	2.77030000000E-10	0.
		7.46280968750E+02	-9.39680000000E+04	6.00000000000E+02		
CO	2.12717639583E-03	4.53308200000E+01	1.23816100000E-02	-2.41640300000E-06	1.82818100000E-10	0.
		1.12158830990E+03	-2.72010000000E+04	3.90000000000E+02		
NH3	1.51261384792E-05	4.20181600000E+01	1.91166200000E-02	-3.16433000000E-06	2.19780100000E-10	0.
		1.20696121615E+03	-9.36800000000E+03	4.76000000000E+02		
H	1.00000000000E-11	2.63911000000E+01	8.12137200000E-03	-1.69074000000E-06	1.31682300000E-10	0.
		7.94631617188E+02	5.16190000000E+04	7.60000000000E+01		
NO	2.26040523083E-10	4.84149800000E+01	1.26938600000E-02	-2.49460000000E-06	1.89321300000E-10	0.
		1.20924970573E+03	2.14770000000E+04	3.86000000000E+02		
N2	2.30874643682E+00	4.39234000000E+01	1.22250100000E-02	-2.37900500000E-06	1.79832200000E-10	0.
		1.13916134896E+03	0.	3.80000000000E+02		
OH	1.00000000000E-11	4.24179200000E+01	1.15684700000E-02	-2.22665900000E-06	1.88915500000E-10	0.
		1.18351754427E+03	3.56000000000E+03	4.13000000000E+02		
CH4	2.49305184203E-07	3.87568600000E+01	2.36401300000E-02	-3.70795700000E-06	2.47071400000E-10	0.
		1.04242791146E+03	-1.60000000000E+04	5.28000000000E+02		
AN	3.44784600000E+00	-4.27708542530E+00	1.53027164063E-01	-6.46991182208E-05	1.36108882907E-08	-1.06334374464E-12
		-0.	-7.81000000000E+04	-0.		
(S)	4.84454433381E+00	-2.46151900000E-01	7.17985500000E-03	-1.29755000000E-06	9.34999500000E-11	0.
		-2 58204389323E+02	0.	0.		

A BKW ISENTROPE THRU BKW CJ PRESSURE FOR
AMATOL WITH AN 19 O/O REACTED

LN(P)= -4.80278975638E+00 -3.30254984340E+00LNV 7.33840593243E-01LNV+2 1.93590258281E-01LNV*3 -1.18341470827E-01LNV*4

LN(T)= 6.74295143801E+00 -4.77933880222E-01LNV 3.02289761515E-01LNV*2 2.56017637059E-02LNV+3 -4.68956995399E-02LNV+4

LN(E)= -1.62772609950E+00 4.06661816626E-01LNP 6.99171208109E-02LNP+2 5.07731964008E-03LNP+3 1.20869708657E-04LNP+4

THE CONSTANT ADDED TO ENERGIES WAS 1.00000000000E-01

PRESSURE (MBARS)	VOLUME (CC/GM)	TEMPERATURE (DEG K)	ENERGY+C (MB-CC/GM)	GAMMA (-DLNP/DLNV)	PARTICLE VELOCITY
1.18079792177E-01	4.87719722138E-01	1.39346505774E+03	1.08105080252E-01	3.88172764917E+00	1.27318601753E-01
8.26558545238E-02	5.36821480979E-01	1.26969834173E+03	1.01915521222E-01	3.87686252610E+00	1.69257551983E-01
5.78590981667E-02	5.90095097756E-01	1.15544678111E+03	9.70047833111E-02	3.84565477309E+00	2.05246208699E-01
4.05013687167E-02	6.48520765706E-01	1.04844462150E+03	9.30343337000E-02	3.79078130802E+00	2.36464291137E-01
2.83509581017E-02	7.15094283227E-01	9.36965333858E+02	8.95567927545E-02	3.71156288524E+00	2.64478756643E-01
1.98456706712E-02	7.75322924924E-01	9.03589110528E+02	8.80520250358E-02	3.63062876941E+00	2.84786477180E-01
1.38919694698E-02	8.46341444590E-01	8.77034892114E+02	8.68752977149E-02	3.52904394587E+00	3.04245700524E-01
9.72437862887E-03	9.32276520020E-01	8.52197371704E+02	8.58784679818E-02	3.40245292271E+00	3.23054318151E-01
6.80706504021E-03	1.03725815261E+00	8.28927309391E+02	8.50260069716E-02	3.24810584142E+00	3.41052192175E-01
4.76494552815E-03	1.16677270156E+00	8.07041602050E+02	8.42898771651E-02	3.06409260542E+00	3.58103247227E-01
3.33546186970E-03	1.32813403117E+00	7.86363612247E+02	8.36479567207E-02	2.85010751742E+00	3.74104921527E-01
2.33482330879E-03	1.53109972586E+00	7.66754931771E+02	8.30828496148E-02	2.60854047476E+00	3.88995744296E-01
1.63437631615E-03	1.78874586221E+00	7.48121295401E+02	8.25808011053E-02	2.34576338805E+00	4.02764357928E-01
1.14406342131E-03	2.11879470813E+00	7.30392635805E+02	8.21307049813E-02	2.07350195990E+00	4.15457955812E-01
8.00844394916E-04	2.54562214846E+00	7.13497026435E+02	8.17233461738E-02	1.81029339009E+00	4.27186664125E-01
5.60591076441E-04	3.10318886966E+00	6.97346785312E+02	8.13509418860E-02	1.58315835729E+00	4.38128258766E-01
3.92413753509E-04	3.83921386487E+00	6.81839537465E+02	8.10069066833E-02	1.42953134214E+00	4.48545583314E-01
2.74689627456E-04	4.82104593218E+00	6.66867316604E+02	8.06857294242E-02	1.39926396746E+00	4.58819436727E-01
1.92282739219E-04	6.14385891449E+00	6.52326932761E+02	8.03828894129E-02	1.55628195983E+00	4.69447484633E-01
1.34597917454E-04	7.94402682271E+00	6.38339004730E+02	8.00989167785E-02	1.97990854778E+00	4.80884480667E-01
1.35791761003E-01	4.69573726271E-01	1.44406657818E+03	1.10942564869E-01	3.87566845452E+00	0.
1.56160525154E-01	4.52068932620E-01	1.49545562388E+03	1.14036959949E-01	3.86482671407E+00	0.
1.79584603927E-01	4.35223230264E-01	1.54717055189E+03	1.17401388559E-01	3.84906131757E+00	0.
2.06522294516E-01	4.19048852860E-01	1.59877689440E+03	1.21051656663E-01	3.82827757865E+00	0.
2.37500638694E-01	4.03544272165E-01	1.64985672128E+03	1.25007474230E-01	3.80241357884E+00	0.
2.73125734498E-01	3.88691258582E-01	1.70002884804E+03	1.29294813441E-01	3.77141519739E+00	0.
3.14094594672E-01	3.74454563781E-01	1.74894855025E+03	1.33948186612E-01	3.73520305450E+00	0.
3.61208783873E-01	3.60781899976E-01	1.79629114201E+03	1.39013401500E-01	3.69362972255E+00	0.
4.15390101454E-01	3.47599640624E-01	1.84172662000E+03	1.44552537442E-01	3.64640881998E+00	0.
4.77698616672E-01	3.34794705328E-01	1.88489149326E+03	1.50657094272E-01	3.59295208730E+00	0.
5.49353409173E-01	3.22132001756E-01	1.92536044656E+03	1.57497787165E-01	3.53177534340E+00	0.
6.31756420549E-01	3.08462166630E-01	1.96261838270E+03	1.65782104800E-01	3.45518746169E+00	0.
7.26519883631E-01	2.95282232799E-01	1.99603066798E+03	1.74760092306E-01	3.36950491027E+00	0.
8.35497866176E-01	2.85416148102E-01	2.02480994625E+03	1.82768851976E-01	3.29673270486E+00	0.
9.60822546102E-01	2.76327836926E-01	2.04799064830E+03	1.91260325725E-01	3.22236823991E+00	0.

TABLE VII (cont)

THE ISENTROPE STATE VARIABLES AS COMPUTED FROM THE LEAST SQUARES FIT

BKW PRESSURE	FIT PRESSURE	BKW TEMPERATURE	FIT TEMPERATURE	BKW ENERGY + C	FIT ENERGY
1.18079792177E-01	1.15752794434E-01	1.39346505774E+03	1.36651298104E+03	1.08105080252E-01	1.08133117584E-01
8.26558545238E-02	7.97671047072E-02	1.26969834173E+03	1.26656917501E+03	1.01915521222E-01	1.02181405619E-01
5.78590981667E-02	5.53440409263E-02	1.1554467811:E+03	1.17822636963E+03	9.70047833111E-02	9.74573174464E-02
4.05013687167E-02	3.85868947301E-02	1.04844462150E+03	1.09980635841E+03	9.30343337000E-02	9.37214178138E-02
2.83509581017E-02	2.67402944163E-02	9.36965333858E+02	1.02829489461E+03	8.95567927545E-02	9.07857815881E-02
1.98456706712E-02	1.98701680014E-02	9.03589110528E+02	9.76066828160E+02	8.80520250358E-02	8.85002661146E-02
1.38919694698E-02	1.45177532657E-02	8.77034892114E+02	9.26065282548E+02	8.68752977149E-02	8.67426371674E-02
9.72437862887E-03	1.03822607181E-02	8.52197371704E+02	8.78260745413E+02	8.58784679818E-02	8.54114142943E-02
6.80706504021E-03	7.28011554859E-03	8.28927309391E+02	8.33700225478E+02	8.50260069716E-02	8.44206676931E-02
4.76494552815E-03	5.02123979470E-03	8.07041602050E+02	7.93531458652E+02	8.42898771651E-02	8.36962404356E-02
3.33546186970E-03	3.42306347211E-03	7.86363612247E+02	7.58960371750E+02	8.36479567207E-02	8.31730304751E-02
2.33482330879E-03	2.32183641013E-03	7.66754931771E+02	7.31171307479E+02	8.30828496148E-02	8.27930740187E-02
1.63437631615E-03	1.57960550766E-03	7.48121295401E+02	7.11175907833E+02	8.25808011053E-02	8.25042432381E-02
1.14406342131E-03	1.08687625298E-03	7.30392635805E+02	6.99559327555E+02	8.21307049813E-02	8.22594185537E-02
8.00844394916E-04	7.61511683408E-04	7.13497026435E+02	6.96061344835E+02	8.17233461738E-02	8.20160266625E-02
5.60591076441E-04	5.44794344038E-04	6.97346785312E+02	6.98851295548E+02	8.13509418860E-02	8.17358554728E-02
3.92413753509E-04	3.96111471571E-04	6.81839537465E+02	7.03317173445E+02	8.10069066833E-02	8.13850700188E-02
2.74689627456E-04	2.87878826628E-04	6.66867316604E+02	7.00407124482E+02	8.06857294242E-02	8.09343620617E-02
1.92282739219E-04	2.02061410521E-04	6.52326932761E+02	6.75439822081E+02	8.03828894128E-02	8.03591725505E-02
1.34597917454E-04	1.29074994933E-04	6.38339004730E+02	6.10089653206E+02	8.00989167785E-02	7.96399319591E-02
1.35791761003E-01	1.34093151241E-01	1.44406657818E+03	1.40895210251E+03	1.10942564869E-01	1.10884598602E+01
1.56160525154E-01	1.55334876261E-01	1.49545562388E+03	1.45314648913E+03	1.14036959949E-01	1.13853503296E-01
1.79584603927E-01	1.79840237210E-01	1.54717055189E+03	1.49898506462E+03	1.17401388559E-01	1.17124768436E-01
2.06522294516E-01	2.07984072617E-01	1.59877689440E+03	1.54633177943E+03	1.21051656663E-01	1.20706290129E-01
2.37500638694E-01	2.40163866634E-01	1.64985672128E+03	1.59505365925E+03	1.25007474230E-01	1.24629347999E-01
2.73125734498E-01	2.76815343783E-01	1.70002884804E+03	1.64504327326E+03	1.29294813441E-01	1.28929097308E-01
3.14094594672E-01	3.18436093659E-01	1.74894855025E+03	1.69623778618E+03	1.33948186612E-01	1.33645141200E-01
3.61208783873E-01	3.65623300504E-01	1.79629114201E+03	1.74863936584E+03	1.39013401500E-01	1.38822197664E-01
4.15390101454E-01	4.19149495744E-01	1.84172662000E+03	1.80235508848E+03	1.44552537442E-01	1.44510878743E-01
4.77698616672E-01	4.80153918729E-01	1.88489149326E+03	1.85770559314E+03	1.50657094272E-01	1.50768603086E-01
5.49353409173E-01	5.50858676192E-01	1.92536044656E+03	1.91566533477E+03	1.57497787165E-01	1.57660667313E-01
6.31756420549E-01	6.40976964534E-01	1.96261838270E+03	1.98197790353E+03	1.65782104800E-01	1.65261506997E-01
7.26519883631E-01	7.43994830118E-01	1.99603066798E+03	2.04963473031E+03	1.74760092306E-01	1.73656184663E-01
8.35497866176E-01	8.33238462655E-01	2.02480994625E+03	2.10283797190E+03	1.82768851976E-01	1.82942150267E-01
9.60822546102E-01	9.25943664326E-01	2.04799064830E+03	2.15363201916E+03	1.91260325725E-01	1.93231329633E-01

THE ISENTROPE PRESSURE AND COMPOSITION OF DETONATION PRODUCTS

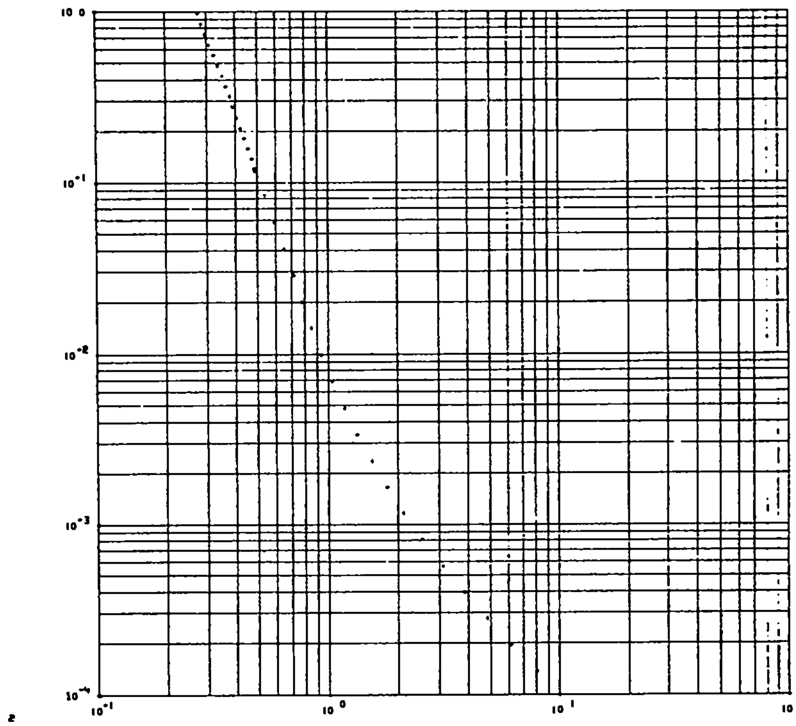
H2O H2 O2 CO2 CO NH3 H NO N2 OH CH4 AN C(S)

1.18079792177E-01	4.11747834241E+00	6.46976292273E-06	1.00000000000E-11	2.15332824051E+00	2.12717636675E-03
1.51261394496E-05	1.00000000000E-11	2.26040521811E-10	2.30874643682E+00	1.00000000000E-11	2.49305206306E-07
3.44784600000E+00	4.84454433382E+00				
8.26558545238E-02	4.11743167014E+00	2.01957657447E-05	1.00000000000E-11	2.15333489472E+00	2.16054045164E-03
3.57942540155E-05	1.00000000000E-11	6.38677992653E-11	2.30873610284E+00	1.00000000000E-11	1.22135737951E-06
3.44784600000E+00	4.84450334347E+00				
5.78590981667E-02	4.11733981264E+00	5.06102050887E-05	1.00000000000E-11	2.15350143968E+00	1.91930818846E-03
7.17679413133E-05	1.00000000000E-11	1.00000000000E-11	2.30871811603E+00	1.00000000000E-11	4.96262733534E-06
3.44784600000E+00	4.84457428950E+00				
4.05013687167E-02	4.11718773566E+00	1.02144462019E-04	1.00000000000E-11	2.15380986640E+00	1.45453186016E-03
1.22983971120E-04	1.00000000000E-11	1.00000000000E-11	2.30869250803E+00	1.00000000000E-11	1.68219707724E-05
3.44784600000E+00	4.84471877977E+00				
2.83509581017E-02	4.11702858279E+00	1.46109302457E-04	1.00000000000E-11	2.15422404794E+00	7.85321844187E-04
1.66050256733E-04	1.00000000000E-11	1.00000000000E-11	2.30867097491E+00	1.00000000000E-11	4.21162868163E-05
3.44784600000E+00	4.84494851393E+00				
1.98456706712E-02	4.11612324830E+00	4.26706319416E-04	1.00000000000E-11	2.15453892723E+00	1.06089782378E-03
3.59301429645E-04	1.00000000000E-11	1.00000000000E-11	2.30857434933E+00	1.00000000000E-11	2.09546644087E-04
3.44784600000E+00	4.84419062831E+00				
1.38919694698E-02	4.11365909563E+00	1.09428231136E-03	1.00000000000E-11	2.15558729919E+00	1.42830662530E-03
6.89492344185E-04	1.00000000000E-11	1.00000000000E-11	2.30840925388E+00	1.00000000000E-11	8.60191798196E-04
3.44784600000E+00	4.84212420239E+00				
9.72437862887E-03	4.10772625680E+00	2.38674038400E-03	1.00000000000E-11	2.15836889685E+00	1.79795019399E-03
1.15455999970E-03	1.00000000000E-11	1.00000000000E-11	2.30817672006E+00	1.00000000000E-11	2.83158143592E-03
3.44784600000E+00	4.83700157152E+00				
6.80706504021E-03	4.09502428633E+00	4.53964986037E-03	1.00000000000E-11	2.16455163503E+00	2.13444434596E-03
1.72259550229E-03	1.00000000000E-11	1.00000000000E-11	2.30789270231E+00	1.00000000000E-11	7.68008530657E-03
3.44784600000E+00	4.82563383531E+00				
4.76494552815E-03	4.07123215027E+00	7.68096371214E-03	1.00000000000E-11	2.17631125768E+00	2.40733516762E-03
2.32690208706E-03	1.00000000000E-11	1.00000000000E-11	2.30759054902E+00	1.00000000000E-11	1.75522664708E-02
3.44784600000E+00	4.80372914068E+00				
3.33546186970E-03	4.03251164660E+00	1.17524506946E-02	1.00000000000E-11	2.19557701508E+00	2.59632408716E-03
2.88233813441E-03	1.00000000000E-11	1.00000000000E-11	2.30731283101E+00	1.00000000000E-11	3.44601977847E-02
3.44784600000E+00	4.76736646305E+00				
2.33482330879E-03	3.97766401218E+00	1.65021324151E-02	1.00000000000E-11	2.22295218535E+00	2.69361801542E-03
3.31157618585E-03	1.00000000000E-11	1.00000000000E-11	2.30709821199E+00	1.00000000000E-11	5.91872455962E-02
3.44784600000E+00	4.71516695103E+00				
1.63437631615E-03	3.90939784068E+00	2.15632809628E-02	1.00000000000E-11	2.25708065088E+00	2.70285851296E-03
3.56941427751E-03	1.00000000000E-11	1.00000000000E-11	2.30696929295E+00	1.00000000000E-11	9.05963785045E-02
3.44784600000E+00	4.64962011210E+00				
1.14406342131E-03	3.83359220103E+00	2.65706674497E-02	1.00000000000E-11	2.29501713023E+00	2.63553951940E-03
3.65133588401E-03	1.00000000000E-11	1.00000000000E-11	2.30692833215E+00	1.00000000000E-11	1.25934063884E-01
3.44784600000E+00	4.57641326637E+00				

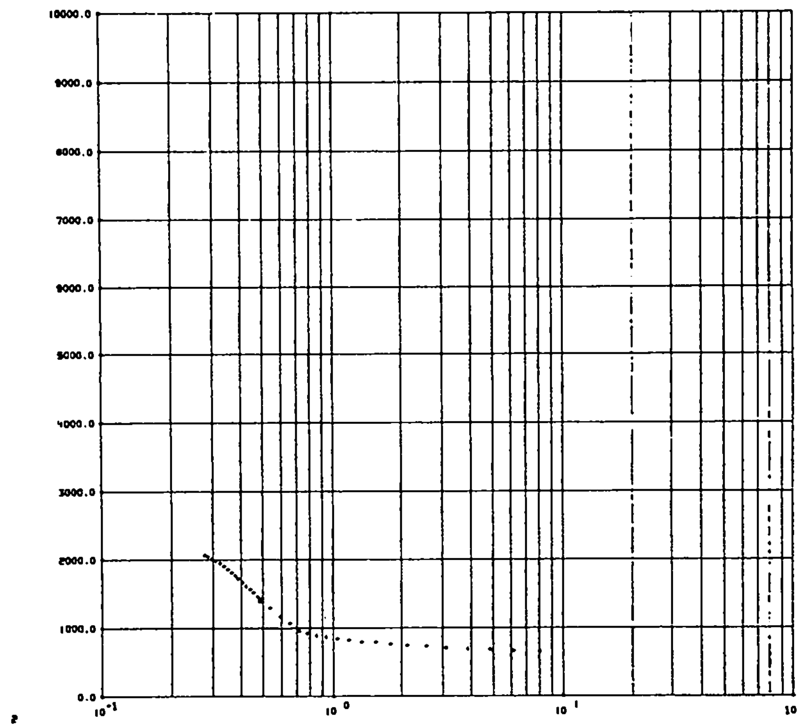
TABLE VII (cont)

8.00844384916E-04	3.75718296045E+00	3.12432416236E-02	1.00000000000E-11	2.33326607564E+00	2.50688932079E-03
3.58380077368E-03	1.00000000000E-11	1.00000000000E-11	2.30696209971E+00	1.00000000000E-11	1.61853048424E-01
3.44784600000E+00	4.50235396661E+00				
5.60591076441E-04	3.68620973374E+00	3.54060524448E-02	1.00000000000E-11	2.36885975077E+00	2.33276583526E-03
3.40680165715E-03	1.00000000000E-11	1.00000000000E-11	2.30705059928E+00	1.00000000000E-11	1.95391005712E-01
3.44784600000E+00	4.43341647768E+00				
3.92413753509E-04	3.62487277950E+00	3.89715256491E-02	1.00000000000E-11	2.39963064211E+00	2.12793743810E-03
3.15988348361E-03	1.00000000000E-11	1.00000000000E-11	2.30717405837E+00	1.00000000000E-11	2.24461934861E-01
3.44784600000E+00	4.37377948559E+00				
2.74689627456E-04	3.57547672261E+00	4.19094510998E-02	1.00000000000E-11	2.42443994966E+00	1.90537928401E-03
2.87533628530E-03	1.00000000000E-11	1.00000000000E-11	2.30731633197E+00	1.00000000000E-11	2.47904410985E-01
3.44784600000E+00	4.32575026007E+00				
1.92282739219E-04	3.53879851547E+00	4.42219462195E-02	1.00000000000E-11	2.44289368958E+00	1.67610664558E-03
2.57679951115E-03	1.00000000000E-11	1.00000000000E-11	2.30746560037E+00	1.00000000000E-11	2.65311169577E-01
3.44784600000E+00	4.29011903420E+00				
1.34597917454E-04	3.51398594957E+00	4.60520325883E-02	1.00000000000E-11	2.45540946875E+00	1.45711426138E-03
2.28304880983E-03	1.00000000000E-11	1.00000000000E-11	2.30761247572E+00	1.00000000000E-11	2.77022722376E-01
3.44784600000E+00	4.26611069461E+00				
1.35791761003E-01	4.11748860818E+00	3.85009652422E-06	1.00000000000E-11	2.15337271697E+00	2.02795754366E-03
1.01345070029E-05	1.00000000000E-11	3.13002208122E-10	2.30874890259E+00	1.00000000000E-11	1.24975237388E-07
3.44784600000E+00	4.84459920051E+00				
1.56160525154E-01	4.11749579613E+00	2.18077004243E-06	1.33506488444E-11	2.15344223669E+00	1.88173003374E-03
6.60260967397E-06	1.00000000000E-11	4.09939315528E-10	2.30875069849E+00	1.00000000000E-11	5.95883505484E-08
3.44784600000E+00	4.84467597368E+00				
1.79584603927E-01	4.11750071556E+00	1.16611934947E-06	4.19657066046E-11	2.15353424593E+00	1.69279196730E-03
4.07807886191E-06	1.00000000000E-11	5.14494331684E-10	2.30875196070E+00	1.00000000000E-11	5.96147174363E-10
3.44784600000E+00	4.84477296151E+00				
2.06522294516E-01	4.11750384271E+00	5.83583706372E-07	9.41822670081E-11	2.15364364676E+00	1.47086296088E-03
2.38183533033E-06	1.00000000000E-11	6.24551516328E-10	2.30875280877E+00	1.00000000000E-11	4.75269389839E-10
3.44784600000E+00	4.84488548981E+00				
2.37500638694E-01	4.11750577432E+00	2.70734479629E-07	1.69329542111E-10	2.15376329269E+00	1.22957295905E-03
1.30281782812E-06	1.00000000000E-11	6.69995538720E-08	2.30875331509E+00	1.00000000000E-11	3.58574206336E-10
3.44784600000E+00	4.84500713399E+00				
2.73125734498E-01	4.11750689428E+00	1.15208642092E-07	2.66130435538E-10	2.15388514855E+00	9.84675295992E-04
6.60010555933E-07	1.00000000000E-11	1.32799371271E-07	2.30875360360E+00	1.00000000000E-11	2.49129649226E-10
3.44784600000E+00	4.84513017591E+00				
3.14094594672E-01	4.11750749646E+00	4.44235047849E-08	1.38896496561E-09	2.15400128821E+00	7.51671040115E-04
3.05672059840E-07	1.00000000000E-11	2.53305679573E-07	2.30875372051E+00	1.00000000000E-11	3.07995843484E-10
3.44784600000E+00	4.84524704044E+00				
3.61208783873E-01	4.11750780826E+00	5.17872852105E-10	5.22894417000E-10	2.15410508194E+00	5.43558995087E-04
1.27389769498E-07	1.00000000000E-11	4.67839209635E-07	2.30875370239E+00	1.00000000000E-11	7.28443248255E-11
3.44784600000E+00	4.84535135900E+00				
4.15390101454E-01	4.11750792843E+00	1.30405319845E-09	4.80939324918E-08	2.15419194350E+00	3.69245143667E-04
4.68284469464E-08	1.00000000000E-11	8.43255005362E-07	2.30875355496E+00	1.00000000000E-11	2.22439961829E-11
3.44784600000E+00	4.84543881133E+00				
4.77698616672E-01	4.11750799902E+00	2.33825505862E-10	1.49246232265E-07	2.15425968271E+00	2.32838210147E-04
5.13141657216E-10	1.00000000000E-11	1.49887731664E-06	2.30875325030E+00	1.00000000000E-11	1.00000000000E-11
3.44784600000E+00	4.84550747908E+00				
5.49353409173E-01	4.11750799944E+00	1.19959780158E-10	4.91737694531E-07	2.15430828786E+00	1.33772408239E-04
3.49043745974E-10	1.00000000000E-11	2.66900377510E-06	2.30875266532E+00	1.00000000000E-11	1.00000000000E-11
3.44784600000E+00	4.84555793975E+00				
6.31756420549E-01	4.11750799981E+00	3.95402794857E-11	1.84843559202E-06	2.15433899802E+00	6.73833043598E-05
1.96940332295E-10	1.00000000000E-11	4.92402821188E-06	2.30875153789E+00	1.00000000000E-11	1.00000000000E-11
3.44784600000E+00	4.84559361872E+00				
7.26519883631E-01	4.11750800012E+00	1.00000000000E-11	9.36432161135E-06	2.15434890247E+00	2.72689310758E-05
7.16973822686E-11	1.00000000000E-11	1.01974275156E-05	2.30874890125E+00	1.00000000000E-11	1.00000000000E-11
3.44784600000E+00	4.84562382868E+00				
8.35497866176E-01	4.11750800033E+00	1.00000000000E-11	5.59448333734E-05	2.15430530439E+00	9.42104007212E-06
1.01196407176E-11	1.00000000000E-11	2.20802642840E-05	2.30874295986E+00	1.00000000000E-11	1.00000000000E-11
3.44784600000E+00	4.84568527469E+00				
9.60822546102E-01	4.11750800051E+00	1.00000000000E-11	3.79291636655E-04	2.15397192582E+00	2.80901353907E-06
1.00000000000E-11	1.00000000000E-11	4.87556665842E-05	2.30872962218E+00	1.00000000000E-11	1.00000000000E-11
3.44784600000E+00	4.84602526534E+00				

TABLE VII (cont)

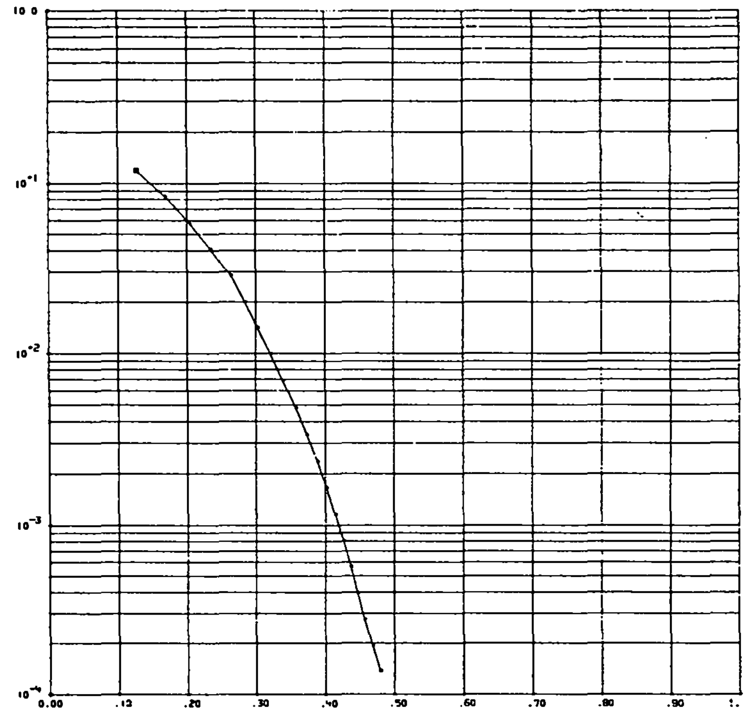


AMATOL WITH AN 19 O/O REACTED
PRESSURE-VOLUME ISENTROPE THRU THE C-J VALUE



AMATOL WITH AN 19 O/O REACTED
TEMPERATURE -VOLUME ISENTROPE THRU THE C-J VALUE

TABLE VII (cont)



AMATOL WITH AN 19 0/0 REACTED
PRESSURE -PARTICLE VELOCITY ISENTROPE

TABLE VIII

THE PARTIALLY REACTED BKW EQUATION OF STATE FOR MINOL WITH W_{AN} = 0.57

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 A FORIRAN BKW CALCULATION FOR THE EXPLOSIVE
MINOL WITH WAN = 0.57


THE NUMBER OF ELEMENTS IS      6


THE NUMBER OF GAS SPECIES IS    13


THE NUMBER OF SOLID SPECIES IS     4


THE BKW EQUATION OF STATE PARAMETERS ARE
 ALPHA= 5.00000000000E-01 BETA= 1.60000000000E-01 THETA= 4.00000000000E+02 KAPPA= 1.09097784436E+01


THE COMPOSITION OF THE EXPLOSIVE IS
     7.00000000000E+00 MOLES OF   C
     9.88300000000E+00 MOLES OF   H
     5.44150000000E+00 MOLES OF   N
     9.66200000000E+00 MOLES OF   O
     4.21078000000E+00 MOLES OF   AL
     1.61820000000E+00 MOLES OF   AN


THE DENSITY OF THE EXPLOSIVE IS  1.68000000000E+00, GRAMS/CC


THE MOLECULAR WEIGHT IS  5.67820000000E+02 GRAMS


THE HEAT OF FORMATION AT 0 DEG K IS -2.23160000000E+05 CALORIES PER FORMULA WEIGHT


THE SOLID (COWAN) EQUATION OF STATE PARAMETERS    VO, AS, BS, CS, DS, ES,     A1, A2, C1, C2, C3, ATOMIC WT


SOLC     4.44444444444E-01   8.30935837268E-01  -1.39381809219E+00   6.72569716021E-01  -1.13537262508E-01   6.49155882007E-03
        -2.28705345948E-01   1.20516569525E-01   8.31600000000E-02  -1.75590000000E-01   1.55310000000E-01   1.20100000000E+01


AL2O3    2.51445813427E-01   2.60794630342E+00  -2.39602954846E+00   6.63740961689E-01  -8.61467961951E-02   7.29275969850E-03
         6.18564547281E-01   1.41953846003E-02   0.                  0.                  0.                  1.01960000000E+02


AN       5.79710144928E-01   2.29045933122E+00  -4.18286469733E+00   2.82035133528E+00  -8.49510858921E-01   1.00265016717E-01
         2.57346082385E-01   1.80817009794E-02  -0.                 -0.                 -0.                  8.00480000000E+01


AL       3.59066427289E-01   4.80796100152E-01  -5.97885999022E-01   1.40179984071E-01   3.43369665964E-03   1.28113614983E-04
         4.37749255889E-01   5.36671857620E-02   0.                  0.                  0.                  2.67900000000E+01


THE INPUT DETONATION PRODUCT ELEMENTAL COMPOSITION MATRIX
  0.        0.        0.        3.0E+00   2.0E+00   4.        0.        4.        0.        4.        1.0E+00   0.
  4.        2.0E+00   4.        1.0E+00   0.        0.        0.        2.0E+00   0.        4.        4.        0.
  0.        0.        4.        2.0E+00   0.        0.        1.0E+00   0.        0.        2.0E+00   0.        0.
  1.0E+00   0.        0.        1.0E+00   0.        0.        0.        3.0E+00   1.0E+00   0.        0.        4.
  0.        1.0E+00   0.        0.        0.        0.        0.        0.        1.0E+00   1.0E+00   0.        0.
  0.        0.        2.0E+00   0.        0.        0.        0.        1.0E+00   4.        1.0E+00   0.        0.
  1.0E+00   4.0E+00   0.        0.        0.        0.        1.0E+00   0.        0.        4.        4.        4.
  0.        0.        0.        3.0E+00   2.0E+00   0.        0.        0.        0.        0.        4.        1.0E+00
  0.        0.        0.        0.        1.0E+00   0.

 A FORIRAN BKW CALCULATION FOR THE EXPLOSIVE
MINOL WITH WAN = 0.57


THE COMPUTED CJ PRESSURE IS      1.38846084177E-01      MEGABARS


THE COMPUTED DETONATION VELOCITY IS      5.88742964627E-01     CM/MICROSECOND


THE COMPUTED CJ TEMPERATURE IS      3.94927102583E+03     DEGREES KELVIN


THE COMPUTED CJ VOLUME     4.53312578602E-01  CC/GM OF EXPLOSIVE
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TABLE VIII (cont)

THE COMPUTED GAMMA IS 3.19398725691E+00

THE VOLUME OF THE GAS IS 1.60711385398E+01 CC/MOLE OF GAS AND THERE ARE 7.17332734337E+00 MOLES OF GAS

SOLID	VOLUME IN CC/GM
SOLC	3.61816721372E-01
AL2O3	2.59489420734E-01
AN	4.59723371949E-01
AL	3.83147485277E-01

THE C-J COMPOSITION OF THE DETONATION PRODUCTS AND THE INPUT COEFFICIENTS TO THE THERMODYNAMIC FITS FOR EACH SPECIE

SPECIE	NO OF MOLES	COEFFICIENTS A,B,C,D,E, THE INTEGRATION	CONSTANT, HEAT OF	FORMATION IN CAL/MOLE,COVOLUME		
AL2O3	4.29697902513E-10	6.51223800000E+01	3.92489500000E-02	-7.92542100000E-06	6.07439800000E-10	0.
		7.41808468750E+02	-2.40000000000E+05	1.35000000000E+03		
AL	3.56314708993E-10	3.83231600000E+01	8.16978100000E-03	-1.70494700000E-06	1.32957700000E-10	0.
		9.62900841146E+02	7.69000000000E+04	3.50000000000E+02		
H2O	2.99640945640E+00	4.25884200000E+01	1.48080500000E-02	-2.63918100000E-06	1.92045300000E-10	0.
		1.34282835156E+03	-5.71070000000E+04	2.50000000000E+02		
H2	4.70969117239E-01	2.97034700000E+01	1.14382900000E-02	-2.20122200000E-06	1.67776100000E-10	0.
		1.17589615365E+03	0.	1.80000000000E+02		
O2	1.46862275374E-06	4.70309000000E+01	1.28714700000E-02	-2.50021700000E-06	1.90157000000E-10	0.
		1.03537647396E+03	0.	3.50000000000E+02		
CO2	2.09971008004E-02	4.74811200000E+01	1.95446300000E-02	-3.72129800000E-06	2.77030000000E-10	0.
		7.48280968750E+02	-9.39680000000E+04	6.00000000000E+02		
CO	3.06826208857E-01	4.53308200000E+01	1.23816100000E-02	-2.41640300000E-06	1.82818100000E-10	0.
		1.12158830990E+03	-2.72010000000E+04	3.90000000000E+02		
NH3	3.28194373705E-01	4.20181600000E+01	1.91166200000E-02	-3.18433000000E-06	2.19780100000E-10	0.
		1.20696121815E+03	-9.36800000000E+03	4.76000000000E+02		
H	2.67988238965E-03	2.63911000000E+01	8.12137200000E-03	-1.69074000000E-06	1.31682300000E-10	0.
		7.94631617188E+02	5.16190000000E+04	7.60000000000E+01		
NO	3.87130572374E-04	4.84149800000E+01	1.26938800000E-02	-2.49480000000E-06	1.89321300000E-10	0.
		1.20924970573E+03	2.14770000000E+04	3.86000000000E+02		
N2	2.55645924786E+00	4.39234000000E+01	1.22250100000E-02	-2.37900500000E-06	1.79832200000E-10	0.
		1.13918134896E+03	0.	3.80000000000E+02		
OH	2.10068055890E-04	4.24179200000E+01	1.15684700000E-02	-2.22865900000E-06	1.48915500000E-10	0.
		1.18351754427E+03	3.58000000000E+03	4.13000000000E+02		
CH4	4.90192445789E-01	3.87568600000E+01	2.56401300000E-02	-3.70795700000E-06	2.47071400000E-10	0.
		1.04242791146E+03	-1.80000000000E+04	5.28000000000E+02		
SOL C	6.18198424475E+00	-2.46151900000E-01	7.17985500000E-03	-1.29755000000E-06	9.34999500000E-11	0.
		-2.58204389323E+02	0.	0.		
AL2O3	2.10538999939E+00	5.15819100000E+00	4.45208600000E-02	-8.91889700000E-06	6.80574300000E-10	0.
		-1.21976061198E+03	-3.96000000000E+05	0.		
AN	1.61820000000E+00	-4.27708542530E+00	1.53027164063E-01	-6.46991182208E-05	1.36106882907E-08	-1.06334374464E-12
		-0.	-7.81000000000E+04	-0.		
AL	0.	5.26704100000E+00	9.56928600000E-03	-1.97729200000E-06	1.53396100000E-10	0.
		2.40307549479E+02	0.	0.		

A BKW ISENTROPE THRU BKW CJ PRESSURE FOR
MINOL WITH WAN : 0.57

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LN(P)= -4.14102718913E+00   -2.34642657784E+00LNV   4.52504285947E-01LNV**2 -5.62043989687E-02LNV**3 -5.94590642038E-04LNV**4

LN(T)=  8.00010346112E+00   -2.78992814032E-01LNV   7.20028908628E-02LNV**2 -2.31331124988E-03LNV**3 -1.91539143863E-03LNV**4

LN(E)= -1.71648035829E+00    3.78313942960E-01LNP   7.99503418367E-02LNP**2  8.90598829594E-03LNP**3  3.73682105235E-04LNP**4
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THE CONSTANT ADDED TO ENERGIES WAS 1.00000000000E-01

PRESSURE (MBARS)	VOLUME (CC/GM)	TEMPERATURE (DEG K)	ENERGY+C (MB-CC/GM)	GAMMA (-DLNP/DLNV)	PARTICLE VELOCITY
1.38846084177E-01	4.53312547744E-01	3.94927102583E+03	1.09852973218E-01	3.16681180808E+00	1.40377356542E-01
9.71922589237E-02	5.13747274716E-01	3.77313633341E+03	1.04763022827E-01	3.02327592327E+00	1.92135583852E-01
6.80345812466E-02	5.79269051160E-01	3.58969036413E+03	1.00505840062E-01	2.89042762318E+00	2.34981247980E-01
4.76242068726E-02	6.48141938224E-01	3.40887351050E+03	9.66779602619E-02	2.77039304038E+00	2.70123106129E-01
3.33369448108E-02	7.34328344536E-01	3.23910698214E+03	9.32823805336E-02	2.64190071966E+00	3.04513303132E-01
2.33358613676E-02	8.41652361565E-01	3.08567423028E+03	9.02957190282E-02	2.50743800862E+00	3.37445242031E-01
1.63351029573E-02	9.75230770767E-01	2.95033227467E+03	8.76772759083E-02	2.36923126276E+00	3.68549638482E-01
1.14345720701E-02	1.14241143104E+00	2.83196461864E+03	8.53733139721E-02	2.22892709692E+00	3.97773816980E-01
8.00420044908E-03	1.35385171919E+00	2.72785356606E+03	8.33275166908E-02	2.08779252799E+00	4.25253941244E-01
5.60294031436E-03	1.62478555082E+00	2.63490448601E+03	8.14889411708E-02	1.94715278146E+00	4.51191072252E-01
3.92205822005E-03	1.97670318695E+00	2.55038292161E+03	7.98151889013E-02	1.80877388520E+00	4.75782474252E-01

2.74544075404E-03	2.43976205102E+00	2.47216601764E+03	7.82724381460E-02	1.67506592948E+00	4.99202896616E-01
1.92180852782E-03	3.05625473665E+00	2.39871488508E+03	7.68341841824E-02	1.54912468272E+00	5.21610016114E-01
1.34526596948E-03	3.88550537516E+00	2.32895776062E+03	7.54798933293E-02	1.43465583075E+00	5.43155748678E-01
9.41686178634E-04	5.01066787246E+00	2.26216783579E+03	7.41938103821E-02	1.33581191426E+00	5.65995657949E-01
6.59180325044E-04	6.54809821382E+00	2.19786874038E+03	7.29640943766E-02	1.25696338181E+00	5.84294711187E-01
4.61426227531E-04	8.66027089377E+00	2.13575854651E+03	7.17820194812E-02	1.20243820876E+00	6.04228237089E-01
3.22998359272E-04	1.15736048031E+01	2.07565141064E+03	7.06413192094E-02	1.17627888469E+00	6.23975664819E-01
2.26098851490E-04	1.56031774543E+01	2.01743235718E+03	6.95375301167E-02	1.18206126807E+00	6.43704120564E-01
1.58269196043E-04	2.11870688587E+01	1.96102442294E+03	6.84674934385E-02	1.22280125466E+00	6.83539617763E-01
1.10788437230E-04	2.89341525777E+01	1.90636786977E+03	6.74289471560E-02	1.30094685480E+00	6.83527521478E-01
1.59672996803E-01	4.33515315495E-01	4.01441103398E+03	1.12143360974E-01	3.21926410217E+00	0.
1.83623946324E-01	4.15259202932E-01	4.07712984264E+03	1.14631301325E-01	3.27041476147E+00	0.
2.11167538272E-01	3.98336124078E-01	4.13744686177E+03	1.17340700079E-01	3.32045185414E+00	0.
2.42842669013E-01	3.82571891427E-01	4.19572865886E+03	1.20302767358E-01	3.36954984423E+00	0.
2.79269069365E-01	3.67802669677E-01	4.25256982976E+03	1.23556490002E-01	3.41792776675E+00	0.
3.21159429770E-01	3.53871611559E-01	4.30873746367E+03	1.27150875558E-01	3.46586115440E+00	0.
3.69333344235E-01	3.40630046530E-01	4.36515666709E+03	1.31147974732E-01	3.51367645169E+00	0.
4.24733345871E-01	3.27936734474E-01	4.42295707740E+03	1.35627108555E-01	3.56175516748E+00	0.
4.88443347751E-01	3.15647653599E-01	4.48370508929E+03	1.40695032684E-01	3.61057708791E+00	0.
5.61709849914E-01	3.03587281254E-01	4.55005764165E+03	1.46511825192E-01	3.66085675098E+00	0.
6.45966327401E-01	2.91462729085E-01	4.63090652604E+03	1.53422102269E-01	3.71397917996E+00	0.
7.42861276511E-01	2.78287921892E-01	4.74811652468E+03	1.62337402369E-01	3.77491197151E+00	0.
8.54290467988E-01	2.65499413874E-01	4.90671381799E+03	1.72378080614E-01	3.83758248648E+00	0.
9.82434038186E-01	2.55942257409E-01	5.01709610687E+03	1.80647127360E-01	3.88690963178E+00	0.

THE ISENTROPE STATE VARIABLES AS COMPUTED FROM THE LEAST SQUARES FIT

BKW PRESSURE	FIT PRESSURE	BKW TEMPERATURE	FIT TEMPERATURE	BKW ENERGY + C	FIT ENERGY
1.38846084177E-01	1.38935200373E-01	3.94927102583E+03	3.89055095115E+03	1.09852973218E-01	1.09194656830E-01
9.71922589237E-02	9.43222823857E-02	3.77313633341E+03	3.70769427008E+03	1.04763022827E-01	1.03758303646E-01
6.80345812466E-02	6.61442102075E-02	3.58969036413E+03	3.54786341131E+03	1.00505840062E-01	9.93455086117E-02
4.76242068726E-02	4.81297530852E-02	3.40887351050E+03	3.41095776912E+03	9.66779602619E-02	9.57123533506E-02
3.33369448108E-02	3.43328056968E-02	3.23910698214E+03	3.27205280535E+03	9.32823805336E-02	9.26692493266E-02
2.33358613676E-02	2.41663021941E-02	3.08567423028E+03	3.13488715151E+03	9.02957190282E-02	9.00674226392E-02
1.63351029573E-02	1.68755309989E-02	2.95033227467E+03	3.00233696087E+03	8.76772759083E-02	8.77897571960E-02
1.14345720701E-02	1.17307111921E-02	2.83196461864E+03	2.87620873817E+03	8.53753139721E-02	8.57445650437E-02
8.00420044908E-03	8.13221266521E-03	2.72785336606E+03	2.75758231626E+03	8.33275166908E-02	8.36613116916E-02
5.60294031436E-03	5.62924159060E-03	2.63490448601E+03	2.64725726115E+03	8.14889411706E-02	8.20876242087E-02
3.92205822005E-03	3.89622621716E-03	2.55038292161E+03	2.54599969156E+03	7.98151889013E-02	8.03871134640E-02
2.74544075404E-03	2.70109458743E-03	2.47216601764E+03	2.45453746346E+03	7.82724381460E-02	7.87376877757E-02
1.92180852762E-03	1.87912005173E-03	2.39871488508E+03	2.37338817059E+03	7.68341841824E-02	7.71301459105E-02
1.34526596948E-03	1.31398611118E-03	2.32895776062E+03	2.30260198842E+03	7.54798933293E-02	7.55669260575E-02
9.41686178634E-04	9.24288771682E-04	2.26216783579E+03	2.24147148103E+03	7.41938103821E-02	7.40609599572E-02
6.59180325044E-04	6.53722192137E-04	2.19786874038E+03	2.18824438041E+03	7.29640943766E-02	7.28346421824E-02
4.61426227531E-04	4.63849389210E-04	2.13575854651E+03	2.13988238967E+03	7.17820194812E-02	7.13189748034E-02
3.22998359272E-04	3.28790416006E-04	2.07565141084E+03	2.09192394239E+03	7.06413192094E-02	7.01529899626E-02
2.26098851490E-04	2.31360720753E-04	2.01743235718E+03	2.03852277679E+03	6.95375301167E-02	6.91835905078E-02
1.58269196043E-04	1.60298520178E-04	1.96102442294E+03	1.97274824352E+03	6.84674934385E-02	6.84659875488E-02
1.10788437230E-04	1.08284709901E-04	1.90636766977E+03	1.88723452208E+03	6.74289471560E-02	6.80649625100E-02
1.59672998803E-01	1.6022665[illegible]727E-01	4.01441103396E+03	3.96004759270E+03	1.12143360974E-01	1.11670146260E-01
1.83623946324E-01	1.84231649272E-01	4.07712984264E+03	4.02926107618E+03	1.14631301325E-01	1.14373591439E-01
2.11167538272E-01	2.11305337048E-01	4.13744686177E+03	4.09834352326E+03	1.17340700079E-01	1.17330793340E-01
2.42842669013E-01	2.41863176600E-01	4.19572865886E+03	4.16746796134E+03	1.20302767358E-01	1.20570734755E-01
2.79269069365E-01	2.76436761763E-01	4.25256982976E+03	4.23689183443E+03	1.23556490002E-01	1.24126074879E-01
3.21159429770E-01	3.15727768878E-01	4.30873746367E+03	4.30697759292E+03	1.27150875558E-01	1.28033730788E-01
3.69333344235E-01	3.60671953441E-01	4.36515666709E+03	4.37819482611E+03	1.31147974732E-01	1.32335565473E-01
4.24733345871E-01	4.12533174335E-01	4.42295707740E+03	4.45113265193E+03	1.35627108555E-01	1.37079204049E-01
4.88443347751E-01	4.73089991929E-01	4.48370508929E+03	4.52657634011E+03	1.40695032684E-01	1.42318004620E-01
5.61709849914E-01	5.45074357920E-01	4.55005764165E+03	4.60574098814E+03	1.46511825192E-01	1.48117216406E-01
6.45966327401E-01	6.33467412997E-01	4.63090652604E+03	4.69101907670E+03	1.53422102269E-01	1.54545365406E-01
7.42861276511E-01	7.53258539846E-01	4.7481[illegible]652468E+03	4.79093280258E+03	1.62337402369E-01	1.61685917502E-01
8.54290467988E-01	9.00964139377E-01	4.90671381799E+03	4.89606472077E+03	1.72378080614E-01	1.69634281083E-01
9.82434038186E-01	1.03800623283E+00	5.01709610687E+03	4.98052347954E+03	1.80647127360E-01	1.78501226715E-01

THE ISENTROPE PRESSURE AND COMPOSITION OF DETONATION PRODUCTS

AL2O3 AL H2O H2 O2 CO2 CO NH3 H NO N2 OH CH4 SOL C AL2O3 AN AL

1.38846084177E-01	4.29697855839E-10	3.56314714147E-10	2.99640948120E+00	4.70969150180E-01	1.46862263942E-06
2.09970972045E-02	3.06826191083E-01	3.28194365748E-01	2.67988266349E-03	3.87130554571E-04	2.55645923185E+00
2.10066043444E-04	4.90192422823E-01	6.18198428889E+00	2.10538999939E+00	1.61820000000E+00	0.
9.71922589237E-02	6.00223728506E-10	4.27196634367E-10	2.67032129703E+00	7.30257458672E-01	1.11352764419E 06
3.73926355234E-02	6.00045536520E-01	2.90786943757E-01	3.60493601567E-03	3.18370789202E-04	2.57519734273E+00
3.57298195143E-04	5.51379855776E-01	5.81118197218E+00	2.10538999919E+00	1.61820000000E+00	0.
6.80345812466E-02	7.83440110598E-08	4.88479209002E-10	2.25564135931E+00	1.06235615115E+00	6.26866902426E-07
5.21175108590E-02	9.85271121110E-01	2.55597248535E-01	4.32777992953E-03	2.18545358966E-04	2.59284210305E+00
4.62699505563E-04	6.18855688514E-01	5.34375567952E+00	2.10538992141E+00	1.61820000000E+00	0.
4.76242068726E-02	1.82398422736E-07	5.38825171895E-10	1.80846540878E+00	1.45291903468E+00	2.83449335083E-07
6.03496016229E-02	1.41604848513E+00	2.19023261626E-01	4.74555277085E-03	1.31349156034E-04	2.61117269461E+00
4.84987591027E-04	6.74482696957E-01	4.84911921629E+00	2.10538981733E+00	1.61820000000E+00	0.
3.33369448108E-02	3.61472675193E-07	5.80483168272E-10	1.38274737101E+00	1.87404888425E+00	1.10874130942E-07
6.09513017030E-02	1.84067241846E+00	1.81829330327E-01	4.86006266627E-03	7.23829280352E-05	2.62979914337E+00
4.35003324756E-04	7.04656108131E-01	4.39372017171E+00	2.10538963824E+00	1.61820000000E+00	0.
2.33358613676E-02	6.37251471725E-07	3.08088683216E-08	1.01641489658E+00	2.29343163310E+00	3.99583719545E-08

TABLE VIII (cont)

5.56981181649E-02	2.21763076105E+00	1.46591727703E-01	4.74710533408E-03	3.80556811332E-05	2.64743510831E+00
3.30016613708E-04	7.04608658894E-01	4.02206246187E+00	2.10538934734E+00	1.61820000000E+00	0.
1.63351029573E-02	1.03003924493E-06	3.88846105892E-08	7.26766296735E-01	2.68410244456E+00	1.39472154564E-08
4.74295460167E-02	2.52392256789E+00	1.15535476511E-01	4.49917836153E-03	1.96909955706E-05	2.66287241625E+00
2.62382779967E-04	6.77473631682E-01	3.75117425441E+00	2.10538895052E+00	1.61820000000E+00	0.
1.14345720701E-02	1.54350876028E-06	4.80904365009E-08	5.12799569684E-01	3.03008599051E+00	1.35915758946E-08
3.86128001419E-02	2.75560619091E+00	8.97233182555E-02	4.18560574986E-03	1.02411375936E-05	2.67588322030E+00
1.88467445388E-04	6.30921212913E-01	3.57485979804E+00	2.10538843245E+00	1.61820000000E+00	0.
8.00420044908E-03	2.13663265897E-06	5.74988937628E-08	3.62211614331E-01	3.32655647763E+00	2.68517421153E-10
3.07217249929E-02	2.92203738807E+00	6.91510886772E-02	3.84496652994E-03	5.41660542964E-06	2.68617174736E+00
1.32218719070E-04	5.73508341198E-01	3.47373254774E+00	2.10538783462E+00	1.61820000000E+00	0.
5.60294031436E-03	2.70618356288E-06	6.51584503667E-08	2.59124941425E-01	3.57637198188E+00	1.83671061055E-10
2.43030350304E-02	3.03800449028E+00	5.31788787755E-02	3.49533334130E-03	2.92628654727E-06	2.69415909748E+00
9.16693420932E-05	5.12220638596E-01	3.42547183610E+00	2.10538726124E+00	1.61820000000E+00	0.
3.92205822005E-03	3.10675844115E-06	6.86382802670E-08	1.89203162276E-01	3.78591753908E+00	1.18727927332E-10
1.93420633928E-02	3.11787798013E+00	4.09419623784E-02	3.14552699089E-03	1.61440943016E-06	2.70027821161E+00
6.32191176576E-05	4.51680991014E-01	3.41109896546E+00	2.10538685692E+00	1.61820000000E+00	0.
2.74544075404E-03	3.22331563488E-06	6.64085005180E-08	1.41548349622E-01	3.96216507934E+00	7.11690858884E-11
1.55963020785E-02	3.17304473896E+00	3.16053004667E-02	2.80144220714E-03	9.07138488757E-07	2.70494689620E+00
4.34995910269E-05	3.94478074718E-01	3.41688088424E+00	2.10538674348E+00	1.61820000000E+00	0.
1.92180852782E-03	3.01447933534E-06	5.86383236023E-08	1.08610991985E-01	4.11124158313E+00	3.83853417128E-11
1.27858370139E-02	3.21161701235E+00	2.44708863260E-02	2.46826396874E-03	5.17242065364E-07	2.70851429822E+00
2.98920918878E-05	3.41646008694E-01	3.43375114174E+00	2.10538695620E+00	1.61820000000E+00	0.
1.34526596948E-03	2.54981921039E-06	4.72212268989E-08	8.34010564003E-02	4.23802516348E+00	1.85866455854E-11
1.06692932921E-02	3.23906961817E+00	1.89962464938E-02	2.15082394190E-03	2.98113821125E-07	2.71125172770E+00
2.05115227888E-05	2.94246871323E-01	3.45801421721E+00	2.10538742657E+00	1.61820000000E+00	0.
9.41686178634E-04	1.96083225185E-06	6.35064277741E-10	6.86831221713E-02	4.34623317818E+00	1.00000000000E-11
9.06075413130E-03	3.25901115251E+00	1.47748022809E-02	1.85334923240E-03	1.73038140802E-07	2.71336261235E+00
1.40449584132E-05	2.51744049083E-01	3.48018404428E+00	2.10538803885E+00	1.61820000000E+00	0.
6.59180325044E-04	1.38023660402E-06	5.77059170088E-10	5.63640715647E-02	4.43868539523E+00	1.00000000000E-11
7.82393183054E-03	3.27380837583E+00	1.15049819239E-02	1.57921783980E-03	1.00820680908E-07	2.71499746863E+00
9.56899118398E-06	2.14199343454E-01	3.50416834889E+00	2.10538861947E+00	1.61820000000E+00	0.
4.61426227531E-04	8.96152958336E-07	5.10961391119E-10	4.70804942854E-02	4.51757408594E+00	1.00000000000E-11
6.88104612502E-03	3.28502083271E+00	8.98448467771E-03	1.33075865965E-03	5.87938202147E-08	2.71626772826E+00
6.52274586183E-06	1.81365021029E-01	3.52675310014E+00	2.10538910359E+00	1.61820000000E+00	0.
3.22998359272E-04	5.40965927099E-07	4.39646131234E-10	3.99757723787E-02	4.58488290854E+00	1.00000000000E-11
6.10243025858E-03	3.29368694909E+00	6.98669132688E-03	1.10918000420E-03	6.33049881704E-10	2.71725665402E+00
4.41807380617E-06	1.52923241524E-01	3.54728737913E+00	2.10538945881E+00	1.61820000000E+00	0.
2.26098851490E-04	3.05933608832E-07	3.86060929233E-10	3.43232926288E-02	4.84153616450E+00	1.00000000000E-11
5.49844661499E-03	3.30050683574E+00	5.44560573680E-03	9.14612146774E-04	5.54020690201E-10	2.71802719885E+00
2.97844600763E-06	1.28506689464E-01	5.56548804816E+00	2.10538969388E+00	1.61820000000E+00	0.
1.58269196043E-04	1.63207121925E-07	2.93101090627E-10	2.98415120818E-02	4.68948563637E+00	1.00000000000E-11
5.01561373376E-03	3.30595926261E+00	4.24467374346E-03	7.46250570484E-04	4.79993689528E-10	2.71862766289E+00
1.99786507269E-06	1.07715658356E-01	3.58131126530E+00	2.10556963665E+00	1.61820000000E+00	0.
1.10788437230E-04	8.26127254215E-08	2.23541185726E-10	2.62073552714E-02	4.72975198815E+00	1.00000000000E-11
4.62244135745E-03	3.31037642851E+00	3.30912596574E-03	6.02566450465E-04	4.10943869483E-10	2.71909543691E+00
1.33310851784E-06	9.01375089239E-02	3.59486362101E+00	2.10538991728E+00	1.61820000000E+00	0.
1.39672996803E-01	3.64866656456E-10	3.26918657014E-10	3.09151361627E+00	3.89288674985E-01	1.48832786458E-06
1.54713369096E-02	2.22819845848E-01	3.44995856892E-01	2.30111040735E-03	3.94536559636E-04	2.54805480327E+00
1.56351337010E-04	4.70987596267E-01	6.29072122097E+00	2.10538999947E+00	1.61820000000E+00	0.
1.83623946324E-01	3.03332716841E-10	2.97380081467E-10	3.16735382042E+00	3.18068998407E-01	1.42700263797E-06
1.08662686142E-02	1.56241615856E-01	3.63612717179E-01	1.93306452905E-03	3.88800445385E-04	2.53874924119E+00
1.10372490024E-04	4.54816193447E-01	6.37807392208E+00	2.10538999955E+00	1.61820000000E+00	0.
2.11167538272E-01	2.46265625429E-10	2.68159815090E-10	3.22522761538E+00	2.56569173625E-01	1.29528327629E-06
7.26588220908E-03	1.05623704442E-01	3.84235398697E-01	1.58714096598E-03	3.70585004715E-04	2.52844700815E+00
7.37405908135E-05	4.41259836086E-01	6.44585057726E+00	2.10538999962E+00	1.61820000000E+00	0.
2.42842669013E-01	1.94843800584E-10	2.39850544534E-10	3.26742802907E+00	2.04058450529E-01	1.11573697115E-06
4.62234371567E-03	6.87663890529E-02	4.06858724622E-01	1.27320268149E-03	3.42098355370E-04	2.51714958851E+00
4.65649827790E-05	4.29532774820E-01	6.49707849241E+00	2.10538999969E+00	1.61820000000E+00	0.
2.79269069365E-01	1.49958995164E-10	2.13075421967E-10	3.29684004800E+00	1.59825193845E-01	9.14847587932E-07
2.79507136359E-03	4.30638226895E-02	4.31343400444E-01	9.98048976180E-04	3.06394195832E-04	2.50492510268E+00
2.77630150025E-05	4.18653375748E-01	6.53548773020E+00	2.10538999974E+00	1.61820000000E+00	0.
3.21159429770E-01	1.12155299645E-10	1.88453464871E-10	3.31644743567E+00	1.23163167686E-01	7.16104988784E-07
1.60331236494E-03	2.58921980453E-02	4.57539194820E-01	7.64948878601E-04	2.66696883074E-04	2.49184705415E+00
1.56127421761E-05	4.07595161801E-01	6.56490932779E+00	2.10538999979E+00	1.61820000000E+00	0.
3.69333344235E-01	8.15982828216E-11	1.66580681650E-10	3.32895176379E+00	9.33400945491E-02	5.36304855617E-07
8.69357480671E-04	1.49042466609E-02	4.85428986594E-01	5.73844566766E-04	2.25929884858E-04	2.47792254176E+00
8.27234675396E-06	3.95386801658E-01	6.58883959420E+00	2.10538999984E+00	1.61820000000E+00	0.
4.24733345871E-01	5.80730841221E-11	1.48034142741E-1·)	3.33657183382E+00	6.95796996655E-02	3.84898564080E-07
4.43208776169E-04	8.18036734995E-03	5.15264509844E-0.	4.22039468266E-04	1.86485618908E-04	2.46302450227E+00
4.12808569388E-06	3.81119309487E-01	6.61025711439E+00	2.10538999987E+00	1.61820000000E+00	0.
4.88443347751E-01	4.10434868783E-11	1.33462191145E-10	3.34099598635E+00	5.10723310257E-02	2.65241917081E-07
2.10988865444E-04	4.25935468296E-03	5.47684578128E-01	3.05158726653E-04	1.50212809452E-04	2.44683260453E+00
1.93814368778E-06	3.63875633499E-01	6.63165402295E+00	2.10538999989E+00	1.61820000000E+00	0.
5.61709849914E-01	2.97934785928E-11	1.23861761458E-10	3.34343081736E+00	3.70113041848E-02	1.76444635064E-07
9.31263217954E-05	2.09318301267E-03	5.83830178276E-01	2.18127914380E-04	1.18532936783E-04	2.42877564439E+00
8.61340217642E-07	3.42601558205E-01	6.65521213246E+00	2.10538999991E+00	1.61820000000E+00	0.
6.45966327401E-01	2.44080493588E-11	1.22751478871E-10	3.34468041136E+00	2.67241440585E-02	1.16929472719E-07
3.84040149610E-05	9.78585050952E-04	6.25155259640E-01	1.57285775087E-04	9.35885213065E-05	2.40812557592E+00
3.73381752142E-07	3.16141862776E-01	6.68284114816E+00	2.10538999991E+00	1.61820000000E+00	0.

TABLE VIII (cont)

7.42861276511E-01	2.73840359238E-11	1.39579001557E-10	3.34526973312E+00	1.96881517845E-02	8.40859082964E-08
1.54028793402E-05	4.50887871661E-04	6.73876757519E-01	1.20316248819E-04	7.82331406374E-05	2.38377250487E+00
1.72149030304E-07	2.82833367311E-01	6.71670034194E+00	2.10538999990E+00	1.61820000000E+00	0.
8.54290467988E-01	4.18125805253E-11	1.79753512088E-10	3.34554991931E+00	1.49682863423E-02	6.58968325077E-08
5.83283012443E-06	1.98765218818E-04	7.36186550271E-01	9.85948793157E-05	6.94322281347E-05	2.35262200875E+00
8.60612871530E-08	2.38326324237E-01	6.76146907771E+00	2.10538999987E+00	1.61820000000E+00	0.
9.82434038188E-01	5.73283339088E-11	8.35503002269E-10	3.34570816662E+00	1.06633007509E-02	3.80281041006E-08
1.62712447296E-06	6.71030974383E-05	8.09419066513E-01	7.02771805495E-05	5.13670382178E-05	2.31601478322E+00
3.21903507520E-08	1.85482309086E-01	6.81444888069E+00	2.10538999952E+00	1.61820000000E+00	0.

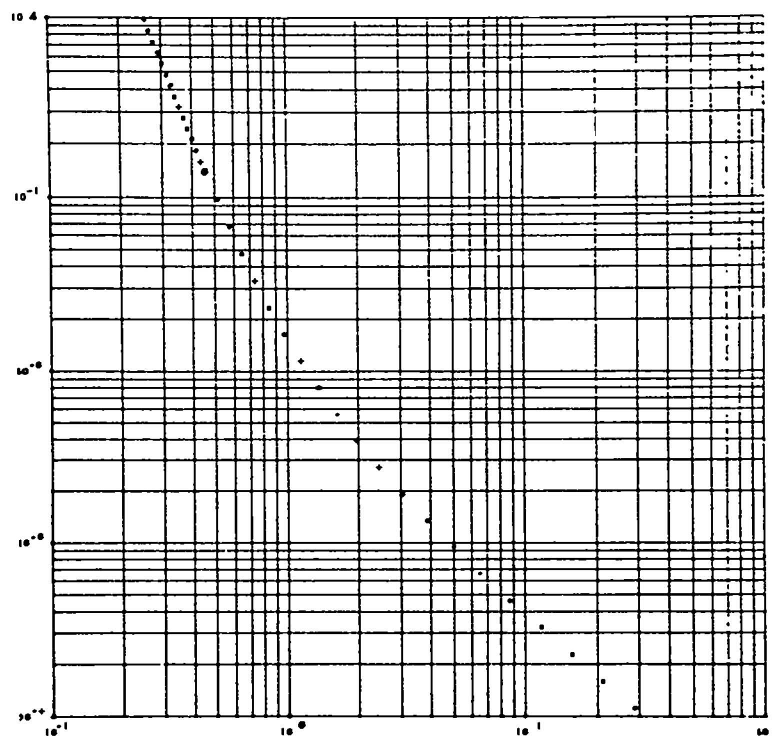
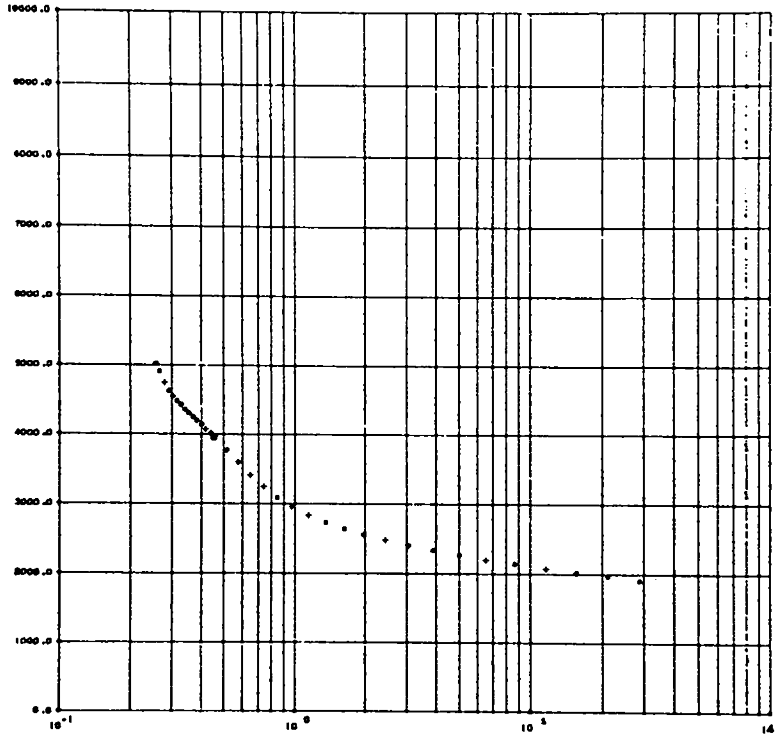
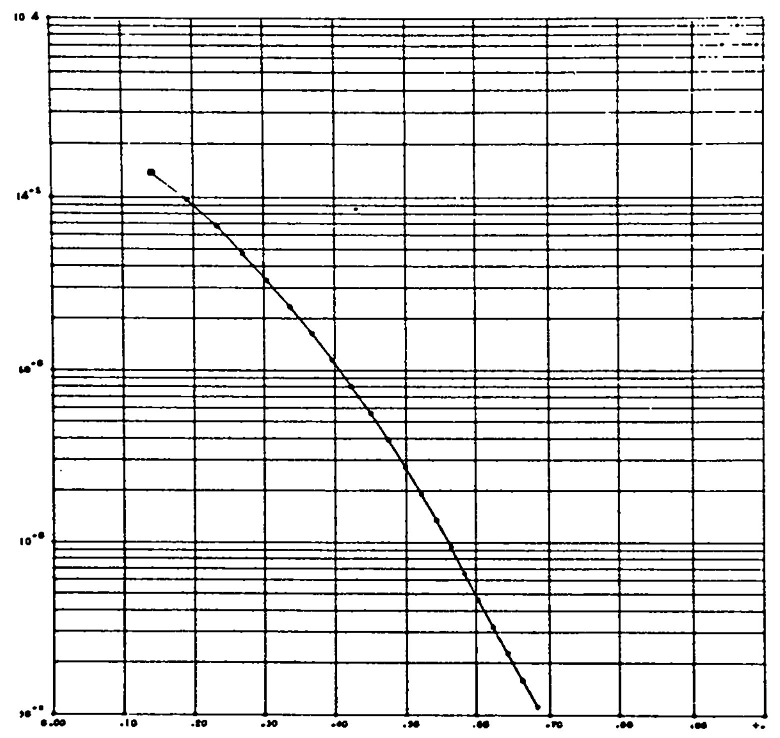


TABLE VIII (cont)



TEMPERATURE -VOLUME ISENTROPE THRU THE C-J



PRESSURE -PARTICLE VELOCITY ISENTROPE

TABLE IX

THE PARTIALLY REACTED BKW EQUATION OF STATE FOR ANFO WITH W_{AN} = 0.25

A FORTRAN BKW CALCULATION FOR THE EXPLOSIVE
ANFO ONE/FOURTH AN INERT

THE NUMBER OF ELEMENTS IS 5

THE NUMBER OF GAS SPECIES IS 11

THE NUMBER OF SOLID SPECIES IS 2

THE BKW EQUATION OF STATE PARAMETERS ARE
ALPHA= 5.00000000000E-01 BETA= 1.60000000000E-01 THETA= 4.00000000000E+02 KAPPA= 1.09097784436E+01

THE COMPOSITION OF THE EXPLOSIVE IS
3.65092000000E-01 MOLES OF C
3.71287000000E+00 MOLES OF H
1.50000000000E+00 MOLES OF N
2.25000000000E+00 MOLES OF O
2.50000000000E-01 MOLES OF AN

THE DENSITY OF THE EXPLOSIVE IS 8.80000000000E-01, GRAMS/CC

THE MOLECULAR WEIGHT IS 8.51574400000E+01 GRAMS

THE HEAT OF FORMATION AT 0 DEG K IS -7.95100000000E+04 CALORIES PER FORMULA WEIGHT

THE SOLID (COWAN) EQUATION OF STATE PARAMETERS VO, AS, BS, CS, DS, ES, A1, A2, C1, C2, C3, ATOMIC WT

AN	5.79710144928E-01	1.94813309828E+00	-3.55623058821E+00	2.38631872297E+00	-7.15791941313E-01	8.45912212177E-02
	4.49704093435E-01	1.80817009794E-02	-0.	-0.	-0.	8.00480000000E+01
ISI	4.44444444444E-01	8.30935837268E-01	-1.39381809219E+00	6.72569716021E-01	-1.13537262508E-01	6.49155882007E-03
	2.26705345948E-01	1.20516569525E-01	8.31600000000E-02	-1.75530000000E-01	1.55310000000E-01	1.20100000000E+01

THE INPUT DETONATION PRODUCT ELEMENTAL COMPOSITION MATRIX

0.	2.0E+00	•.	1.0E+00	0.	•.	2.0E+00	•.	+.	+.	+.	•.
0.	2.0E+00	0.	1.0E+00	•.	•.	2.0E+00	•.	1.0E+00	•.	•.	1.0E+00
•.	+.	3.0E+00	1.0E+00	+.	+.	•.	1.0E+00	•.	•.	•.	+.
•.	1.0E+00	1.0E+00	+.	+.	•.	2.0E+00	•.	•.	+.	1.0E+00	•.
1.0E+00	•.	1.0E+00	4.0E+00	0.	+.	+.	+.	•.	•.	•.	1.0E+00
1.0E+00	•.	•.	+.	0.							

A FORTRAN BKW CALCULATION FOR THE EXPLOSIVE
ANFO ONE/FOURTH AN INERT

THE COMPUTED CJ PRESSURE IS 4.68129854850E-02 MEGABARS

THE COMPUTED DETONATION VELOCITY IS 4.59418734952E-01 CM/MICROSECOND

THE COMPUTED CJ TEMPERATURE IS 1.71847652483E+03 DEGREES KELVIN

THE COMPUTED CJ VOLUME 8.49962778712E-01 CC/GM OF EXPLOSIVE

THE COMPUTED GAMMA IS 2.95765348798E+00

THE VOLUME OF THE GAS IS 2.12954097244E-01 CC/MOLE OF GAS AND THERE ARE 2.82175410769E+00 MOLES OF GAS

SOLID	VOLUME IN CC/GM
AN	5.79710144928E-01
ISI	3.96749799307E-01

TABLE IX (cont)

THE C-J COMPOSITION OF THE DETONATION PRODUCTS AND THE INPUT COEFFICIENTS TO THE THERMODYNAMIC FITS FOR EACH SPECIE

SPECIE	NO OF MOLES	COEFFICIENTS A.8.C.D.E. THE INTEGRATION CONSTANT. HEAT OF FORMATION IN CAL/MOLE.COVOLUME				
H20	1.84363237183E+00	4.25884200000E+01	1.48080500000E-02	-2.63918100000E-06	1.92045300000E-10	0.
		1.34282835156E+03	-5.71070000000E+04	2.50000000000E+02		
H2	6.53979149217E-03	2.97034700000E+01	1.14382900000E-02	-2.20122200000E-06	1.67776100000E-10	0.
		1.17589615365E+03	0.	1.80000000000E+02		
O2	1.00000000000E-11	4.70309000000E+01	1.28714700000E-02	-2.50021700000E-06	1.90157000000E-10	0.
		1.03537647396E+03	0.	3.50000000000E+02		
CO2	1.87363195359E-01	4.74811200000E+01	1.95446300000E-02	-3.72129600000E-06	2.77030000000E-10	0.
		7.46280968750E+02	-9.39680000000E+04	6.00000000000E+02		
CO	3.16412063738E-02	4.53308200000E+01	1.23816100000E-02	-2.41640300000E-06	1.82818100000E-10	0.
		1.12158830990E+03	-2.72010000000E+04	3.90000000000E+02		
NH3	2.21163282234E-03	4.20181600000E+01	1.91166200000E-02	-3.16433000000E-06	2.19780100000E-10	0.
		1.20696121615E+03	-9.36800000000E+03	4.76000000000E+02		
H	4.07858967045E-08	2.63911000000E+01	8.12137200000E-03	-1.69074000000E-06	1.31682300000E-10	0.
		7.94631617188E+02	5.16190000000E+04	7.60000000000E+01		
NO	9.90777381269E-09	4.84149800000E+01	1.26938600000E-02	-2.49460000000E-06	1.89321300000E-10	0.
		1.20924970573E+03	2.14770000000E+04	3.86000000000E+02		
N2	7.48894178635E-01	4.39234000000E+01	1.22250100000E-02	-2.37900500000E-06	1.79832200000E-10	0.
		1.13916134896E+03	0.	3.80000000000E+02		
OH	2.11613874026E-08	4.24179200000E+01	1.15684700000E-02	-2.22665900000E-06	1.68915500000E-10	0.
		1.18351754427E+03	3.56000000000E+03	4.13000000000E+02		
CH4	1.47267823313E-03	3.87568600000E+01	2.36401300000E-02	-3.70795700000E-06	2.47071400000E-10	0.
		1.04242791146E+03	-1.60000000000E+04	5.28000000000E+02		
AN	2.50000000000E-01	-4.27708542530E+00	1.53027164063E-01	-6.46991182208E-05	1.36108882907E-08	-1.06334374464E-12
		-0.	-7.81000000000E+04	-0.		
(S)	1.44614920034E-01	-2.46151900000E-01	7.17985500000E-03	-1.29755000000E-06	9.34999500000E-11	0.
		-2.58204389323E+02	0.	0.		

A BKW ISENTROPE THRU BKW CJ PRESSURE FOR
ANFO ONE/FOURTH AN INERT

LN(P)= -3.50253903786E+00 -2.64483959596E+00LNV 3.13122623031E-01LNV*2 2.02204787968E-02LNV*3 -1.13374821991E-02LNV*4

LN(T)= 7.39267171146E+00 -4.80574977028E-01LNV 1.08471669656E-01LNV*2 5.60600359903E-03LNV*3 -5.56223874566E-03LNV*4

LN(E)= -1.42252986641E+00 4.21146876047E-01LNP 6.38871367235E-02LNP*2 4.44218776167E-03LNP*3 1.08021053503E-04LNP*4

THE CONSTANT ADDED TO ENERGIES WAS 1.00000000000E-01

PRESSURE (MBARS)	VOLUME (CC/GM)	TEMPERATURE (DEG K)	ENERGY+C (MB-CC/GM)	GAMMA (-DLNP/DLNV)	PARTICLE VELOCITY
4.68129854850E-02	8.49963044310E-01	1.71847652483E+03	1.06703769627E-01	2.74484563779E+00	1.15789806080E-01
3.27690898395E-02	9.62178390632E-01	1.62417361374E+03	1.02337110576E-01	2.66889196353E+00	1.54343524210E-01
2.29383628876E-02	1.09787408591E+00	1.53217673870E+03	9.86053715291E-02	2.58587154583E+00	1.90666487432E-01
1.60568540213E-02	1.26346559401E+00	1.44437248637E+03	9.54189594162E-02	2.49564932506E+00	2.24812324765E-01
1.12397978149E-02	1.46688292807E+00	1.36207463058E+03	9.26949871017E-02	2.39854596083E+00	2.56769885711E-01
7.86785847046E-03	1.71344631838E+00	1.29359959511E+03	9.04182362617E-02	2.29709303841E+00	2.86058759263E-01
5.50750092932E-03	2.01335511521E+00	1.23236252137E+03	8.84293373644E-02	2.19242610983E+00	3.12890106471E-01
3.85525065052E-03	2.38667802915E+00	1.17567953963E+03	8.67076857168E-02	2.08401599484E+00	3.37910807026E-01
2.69867545537E-03	2.85494114714E+00	1.12263596698E+03	8.51964684588E-02	1.97347385482E+00	3.61262542468E-01
1.88907281876E-03	3.44742443482E+00	1.07278278501E+03	8.38583738664E-02	1.86283476960E+00	3.83118371270E-01
1.32235097313E-03	4.20378609551E+00	1.02569615436E+03	8.26630022642E-02	1.75475806156E+00	4.03654981416E-01
9.25645681191E-04	5.17797874655E+00	9.80986592002E+02	8.15856022898E-02	1.65265387372E+00	4.23049192352E-01
6.47951976833E-04	6.44360448943E+00	9.38306471004E+02	8.06061121297E-02	1.56080396538E+00	4.41476061716E-01
4.53566383783E-04	8.10115010069E+00	8.97354040921E+02	7.97083882075E-02	1.48445434564E+00	4.59107949064E-01
3.17496468648E-04	1.02877685400E+01	8.57877266605E+02	7.88796364962E-02	1.42984729091E+00	4.76114295209E-01
2.22247528054E-04	1.31900663149E+01	8.19667333634E+02	7.81097829735E-02	1.40417574578E+00	4.92657238483E-01
1.55573269638E-04	1.70611975561E+01	7.82559027707E+02	7.73911247638E-02	1.41543077629E+00	5.08882760244E-01
1.08901288746E-04	2.22431173551E+01	7.46420082014E+02	7.67178469702E-02	1.47216428976E+00	5.24899247022E-01
5.38349333077E-02	8.11450683049E-01	1.75771951742E+03	1.08662522271E-01	2.77262043058E+00	0.
6.19101733038E-02	7.75292342438E-01	1.79429520574E+03	1.10682006652E-01	2.79955126490E+00	0.
7.11966992994E-02	7.36059327536E-01	1.86559660446E+03	1.13602312474E-01	2.82974736612E+00	0.
8.18762041943E-02	6.99687337624E-01	1.94049774451E+03	1.16802819030E-01	2.85868335323E+00	0.
9.41576348235E-02	6.65623718391E-01	2.01025325673E+03	1.20091560048E-01	2.88663250010E+00	0.
1.08281280047E-01	6.33612857211E-01	2.07961435277E+03	1.23599065052E-01	2.91366578672E+00	0.
1.24523472054E-01	6.03424773601E-01	2.14954936948E+03	1.27371945843E-01	2.93985375321E+00	0.
1.43201992862E-01	5.74912408066E-01	2.22030869951E+03	1.31443329893E-01	2.96521135585E+00	0.
1.64682291791E-01	5.47974610742E-01	2.29180994211E+03	1.35840824743E-01	2.98972270032E+00	0.
1.89384635560E-01	5.22535495455E-01	2.36378142826E+03	1.40589525819E-01	3.01335584163E+00	0.
2.17792330894E-01	4.98527630145E-01	2.43585191883E+03	1.45714349826E-01	3.03607683884E+00	0.
2.50461180528E-01	4.75883961625E-01	2.50761429994E+03	1.51242707494E-01	3.05785736048E+00	0.
2.88030357608E-01	4.54531259802E-01	2.57865576829E+03	1.57206523720E-01	3.07868154979E+00	0.
3.31234911249E-01	4.34390524419E-01	2.64856446719E+03	1.63643889640E-01	3.09854627846E+00	0.
3.80920147936E-01	4.15378922087E-01	2.71689800575E+03	1.70599784708E-01	3.11745948098E+00	0.
4.38058170127E-01	3.97411446092E-01	2.78316079536E+03	1.78127341350E-01	3.13543829627E+00	0.
5.03766895646E-01	3.80398637102E-01	2.84677085525E+03	1.86290521416E-01	3.15251076003E+00	0.

TABLE IX (cont)

5.79331929992E-01	3.64230587864E-01	2.90703191632E+03	1.95174399278E-01	3.16873085543E+00	0.
6.66231719491E-01	3.48646306888E-01	2.96310964036E+03	2.04960993414E-01	3.18430672633E+00	0.
7.66166477415E-01	3.33794270907E-01	3.01400172372E+03	2.15615947890E-01	3.19903777212E+00	0
8.81091449027E-01	3.20354178011E-01	3.05844173730E+03	2.26790132907E-01	3.21221487949E+00	0.

THE ISENTROPE STATE VARIABLES AS COMPUTED FROM THE LEAST SQUARES FIT

BKW PRESSURE	FIT PRESSURE	BKW TEMPERATURE	FIT TEMPERATURE	BKW ENERGY + C	FIT ENERGY
4.68129854850E-02	4.66814885930E-02	1.71847652483E+03	1.76099399715E+03	1.06703769627E-01	1.07414261935E-01
3.27690898395E-02	3.33698697802E-02	1.62417361374E+03	1.65467747152E+03	1.02337110576E-01	1.02457489747E-01
2.29383628876E-02	2.35941386182E-02	1.53217673870E+03	1.55424878705E+03	9.86053715291E-02	9.83761074104E-02
1.60568540213E-02	1.65113420942E-02	1.44437248637E+03	1.46011803901E+03	9.54189594162E-02	9.50075745764E-02
1.12397978149E-02	1.14584944004E-02	1.36207463058E+03	1.37287589489E+03	9.26949871017E-02	9.22202378656E-02
7.86785847046E-03	7.95625830294E-03	1.29359959511E+03	1.29432187243E+03	9.04182362617E-02	8.99059868279E-02
5.50750092932E-03	5.53950420690E-03	1.23236252137E+03	1.22423630297E+03	8.84293373644E-02	8.79748496942E-02
3.85525065052E-03	3.85061017125E-03	1.17567953963E+03	1.16119778077E+03	8.67076857168E-02	8.63510063264E-02
2.69867545537E-03	2.67741402248E-03	1.12263596698E+03	1.10503631192E+03	8.51964884588E-02	8.49698486468E-02
1.88907281876E-03	1.86495933387E-03	1.07278278501E+03	1.05534677435E+03	8.38583738664E-02	8.37758230766E-02
1.32235097313E-03	1.30291933345E-03	1.02569615436E+03	1.01150670494E+03	8.26630022642E-02	8.27208610769E-02
9.25645681191E-04	9.13684445569E-04	9.80986592002E+02	9.72608266557E+02	8.15856022898E-02	8.17632532947E-02
6.47951976833E-04	6.43194157156E-04	9.38306471004E+02	9.37363349033E+02	8.06061121297E-02	8.08668571868E-02
4.53566383783E-04	4.54094858680E-04	8.97354040921E+02	9.03991896986E+02	7.97083882075E-02	8.00005521610E-02
3.17496468648E-04	3.20751498902E-04	8.57877266605E+02	8.70121227180E+02	7.88796364962E-02	7.91378736072E-02
2.22247528054E-04	2.25704528874E-04	8.19667333634E+02	8.32760790393E+02	7.81097829735E-02	7.82567700412E-02
1.55573269638E-04	1.57165335027E-04	7.82559027707E+02	7.88439471894E+02	7.73911247638E-02	7.73394376025E-02
1.08901288746E-04	1.07279056405E-04	7.46420082014E+02	7.33624123253E+02	7.67178469702E-02	7.63721944706E-02
5.38349333077E-02	5.30518390041E-02	1.75771951742E+03	1.80398316320E+03	1.08662522271E-01	1.09637873040E-01
6.19101733038E-02	6.02360106731E-02	1.79429520574E+03	1.84806810904E+03	1.10662006652E-01	1.12040868811E-01
7.11966992994E-02	6.97164190025E-02	1.86559660446E+03	1.90658555247E+03	1.13602312474E-01	1.14638998097E-01
8.18762041943E-02	8.05255782982E-02	1.94049774451E+03	1.95429285759E+03	1.16802819030E-01	1.17449617799E-01
9.41576348235E-02	9.29395091626E-02	2.01025325673E+03	2.00965980883E+03	1.20091560048E-01	1.20491896411E-01
1.08281280047E-01	1.07220676623E-01	2.07961435277E+03	2.06684595871E+03	1.23599065052E-01	1.23787046500E-01
1.24523472054E-01	1.23688517954E-01	2.14954936948E+03	2.12604639895E+03	1.27371945843E-01	1.27350590678E-01
1.43201992862E-01	1.42691138424E-01	2.22030869951E+03	2.18736116171E+03	1.31443329893E-01	1.31232666481E-01
1.64682291791E-01	1.64608492174E-01	2.29180994211E+03	2.25082152153E+03	1.35840824743E-01	1.35438376449E-01
1.89384635560E-01	1.89853700586E-01	2.36378142826E+03	2.31640553554E+03	1.40589525819E-01	1.40008190908E-01
2.17792330894E-01	2.18879341566E-01	2.43585191883E+03	2.38406260230E+03	1.45714349826E-01	1.44978412297E-01
2.50461180528E-01	2.52184622532E-01	2.50761429994E+03	2.45373100482E+03	1.51242707494E-01	1.50389711501E-01
2.88030357608E-01	2.90330592059E-01	2.57865576829E+03	2.52536243809E+03	1.57206523720E-01	1.56287748657E-01
3.31234911249E-01	3.33955358838E-01	2.64856446719E+03	2.59893282819E+03	1.63643889640E-01	1.62723893247E-01
3.80920147936E-01	3.83792393054E-01	2.71689800575E+03	2.67444885353E+03	1.70599784708E-01	1.69756061156E-01
4.38058170127E-01	4.40694971531E-01	2.78316079536E+03	2.75195457778E+03	1.78127341350E-01	1.77449689842E-01
5.03766895646E-01	5.05684008018E-01	2.84677085525E+03	2.83155608901E+03	1.86290521416E-01	1.85878876970E-01
5.79331929992E-01	5.80093107184E-01	2.90703191632E+03	2.91352628092E+03	1.95174399278E-01	1.95127712957E-01
6.66231719491E-01	6.66538573995E-01	2.96310964036E+03	2.99911004990E+03	2.04960993414E-01	2.05291844125E-01
7.66166477415E-01	7.65894390348E-01	3.01400172372E+03	3.08743673610E+03	2.15615947890E-01	2.16480310746E-01
8.81091449027E-01	8.73746671059E-01	3.05844173730E+03	3.17375859253E+03	2.26790132907E-01	2.28817713617E-01

THE ISENTROPE PRESSURE AND COMPOSITION OF DETONATION PRODUCTS

H2O H2 O2 CO2 CO NH3 H NO N2 OH CH4 AN C(S)

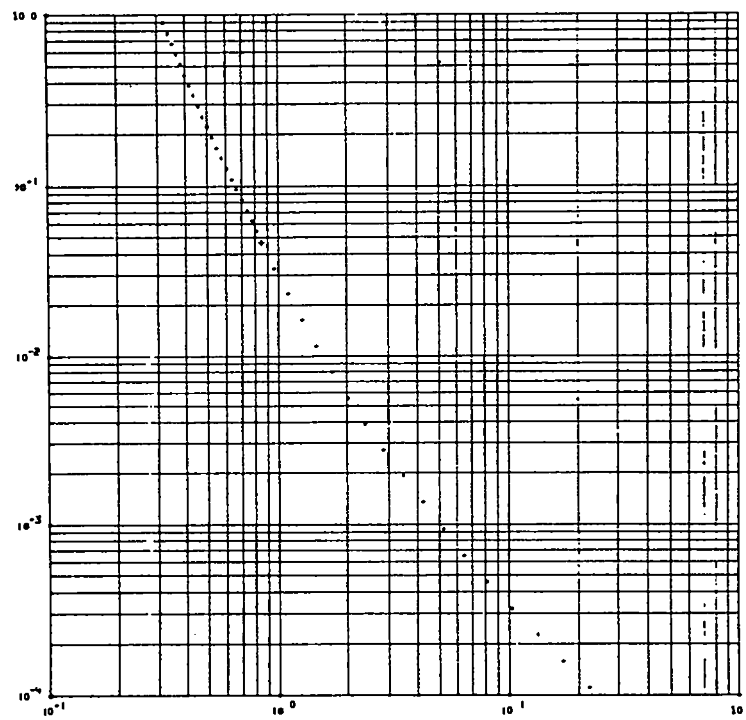
4.68129854850E-02	1.84363237121E+00	6.53979156674E-03	1.00000000000E-11	1.87363195832E-01	3.16412060580E-02
2.21163298484E-03	4.07858957440E-08	9.90777364623E-09	7.48894178554E-01	2.11613876339E-08	1.47267838858E-03
2.50000000000E-01	1.44614919721E-01				
3.27690898395E-02	1.82786276196E+00	1.38126144570E-02	1.00000000000E-11	1.91763691698E-01	3.86098538297E-02
3.76303404239E-03	6.36208430855E-10	3.11307875617E-10	7.48118482823E-01	5.35960565535E-10	4.55753596466E-03
2.50000000000E-01	1.30160918508E-01				
2.29383626876E-02	1.80032229613E+00	2.47590351163E-02	1.00000000000E-11	2.02702402353E-01	4.42728985757E-02
5.52927296027E-03	5.83636915399E-10	1.86251796870E-10	7.47235363427E-01	4.82004817047E-10	1.15298793912E-02
2.50000000000E-01	1.06586819680E-01				
1.60568540213E-02	1.75850472500E+00	3.85716962715E-02	1.00000000000E-11	2.21616398194E-01	4.82624782286E-02
7.14047159272E-03	5.10191589937E-10	9.20927891167E-11	7.46429764158E-01	4.10386524074E-10	2.43239354389E-02
2.50000000000E-01	7.08891881385E-02				
1.12397978149E-02	1.70287801844E+00	5.35103709135E-02	1.00000000000E-11	2.48404363342E-01	5.03132546763E-02
8.27070345105E-03	4.24933675594E-10	3.28298079875E-11	7.45864648258E-01	3.30071249466E-10	4.38202775466E-02
2.50000000000E-01	2.25541044341E-02				
7.86785847046E-03	1.67179191694E+00	6.70174676814E-02	1.00000000000E-11	2.65713214875E-01	4.67816532388E-02
8.28756753364E-03	3.49879594905E-10	1.00000000000E-11	7.45856216228E-01	2.65718788855E-10	5.25971318865E-02
2.50000000000E-01	0.				
5.50750092932E-03	1.66314643539E+00	7.83596574688E-02	1.00000000000E-11	2.73435704896E-01	3.99821548503E-02
7.72041759401E-03	2.79059633625E-10	1.00000000000E-11	7.46139791205E-01	2.06874544543E-10	5.16741402537E-02
2.50000000000E-01	0.				
3.85525065052E-03	1.65546218653E+00	8.83572868913E-02	1.00000000000E-11	2.80440090933E-01	3.36576317387E-02
7.08464782461E-03	2.12417385975E-10	1.00000000000E-11	7.46457676096E-01	1.50598805282E-10	5.09942773285E-02
2.50000000000E-01	0.				
2.69867545537E-03	1.64899237132E+00	9.64709468639E-02	1.00000000000E-11	2.86583561865E-01	2.78405051852E-02
6.42387719064E-03	1.51604084522E-10	1.00000000000E-11	7.46788061420E-01	9.97561338370E-11	5.06679329500E-02
2.50000000000E-01	0.				
1.88907281876E-03	1.64388546521E+00	1.02442617656E-01	1.00000000000E-11	2.91748945257E-01	2.26166446117E-02
5.76939786376E-03	9.89506255660E-11	1.00000000000E-11	7.47115301090E-01	5.76488801366E-11	5.07264101308E-02
2.50000000000E-01	0.				
1.32235097313E-03	1.64020710756E+00	1.06153519663E-01	1.00000000000E-11	2.95882884708E-01	1.80271234395E-02

TABLE IX (cont)

5.14025935013E-03	5.66235411033E-11	1.00000000000E-11	7.47429870354E-01	2.71319359940E-11	5.11819918526E-02
2.50000000000E-01	0.				
9.25645681191E-04	1.63795889712E+00	1.07590840089E-01	1.00000000000E-11	2.98981550590E-01	1.40780021906E-02
4.54691221960E-03	2.65597053641E-11	1.00000000000E-11	7.47726543927E-01	1.00000000000E-11	5.20324472194E-02
2.50000000000E-01	0.				
6.47951976833E-04	1.63709434402E+00	1.06820925058E-01	1.00000000000E-11	3.01077814000E-01	1.07500285515E-02
3.99427734995E-03	1.00000000000E-11	1.00000000000E-11	7.48002861370E-01	1.00000000000E-11	5.32641574485E-02
2.50000000000E-01	0.				
4.53566383783E-04	1.63753016923E+00	1.03971008106E-01	1.00000000000E-11	3.02231733721E-01	8.00636397370E-03
3.48401204244E-03	1.00000000000E-11	1.00000000000E-11	7.48257994032E-01	1.00000000000E-11	5.48539023052E-02
2.50000000000E-01	0.				
3.17496468648E-04	1.63915223200E+00	9.92208158384E-02	1.00000000000E-11	3.02524718634E-01	5.79833145546E-03
3.01603490791E-03	1.00000000000E-11	1.00000000000E-11	7.48491982608E-01	1.00000000000E-11	5.67689499102E-02
2.50000000000E-01	0.				
2.22247528054E-04	1.64182004736E+00	9.27954763550E-02	1.00000000000E-11	3.02055622829E-01	4.06870779523E-03
2.58942504615E-03	1.00000000000E-11	1.00000000000E-11	7.48705287549E-01	1.00000000000E-11	5.89676693762E-02
2.50000000000E-01	0.				
1.55573269638E-04	1.64536733141E+00	8.49669147459E-02	1.00000000000E-11	3.00938852418E-01	2.75496465872E-03
2.20292536723E-03	1.00000000000E-11	1.00000000000E-11	7.48898537398E-01	1.00000000000E-11	6.13981829230E-02
2.50000000000E-01	0.				
1.08301288746E-04	1.64960516902E+00	7.60495182455E-02	1.00000000000E-11	2.99301635611E-01	1.79156076019E-03
1.85513702861E-03	1.00000000000E-11	1.00000000000E-11	7.49072431579E-01	1.00000000000E-11	6.39988036291E-02
2.50000000000E-01	0.				
5.38349333077E-02	1.84734075236E+00	4.69006013926E-03	1.00000000000E-11	1.86853688781E-01	2.89518318279E-02
1.73293539336E-03	4.17751330529E-08	1.63854746301E-08	7.49133524111E-01	2.18508838103E-08	9.02376301327E-04
2.50000000000E-01	1.48384103090E-01				
6.19101733038E-02	1.85020035783E+00	3.21950012005E-03	2.01795604405E-11	1.86973641709E-01	2.58523117833E-02
1.30909110992E-03	3.99555938869E-08	2.59278327079E-08	7.49345441481E-01	2.10036408348E-08	5.25737454372E-04
2.50000000000E-01	1.51740309053E-01				
7.11966992994E-02	1.85149007046E+00	2.55605375218E-03	5.08361673673E-11	1.86073329434E-01	2.63632138745E-02
1.10670138956E-03	5.44543525024E-08	5.60934047605E-08	7.49446621259E-01	6.03587456213E-10	3.64398088084E-04
2.50000000000E-01	1.52291058603E-01				
8.18762041943E-02	1.85254819023E+00	1.99869781384E-03	1.01232359168E-10	1.85397239261E-01	2.66572116700E-02
9.25260757162E-04	7.23780826216E-08	1.18730773237E-07	7.49537310256E-01	6.42140538875E-10	2.50092154231E-04
2.50000000000E-01	1.52787456914E-01				
9.41576348235E-02	1.85353225147E+00	1.47302931376E-03	3.50510030822E-10	1.85304740387E-01	2.58579961102E-02
7.38267103186E-04	8.55913174925E-08	2.29177898036E-07	7.49630751859E-01	4.17698813030E-08	1.61127441716E-04
2.50000000000E-01	1.53768136061E-01				
1.08281280047E-01	1.85432960476E+00	1.04690733299E-03	6.47306321605E-10	1.85554172873E-01	2.45615793313E-02
5.72170240999E-04	9.52938089235E-08	4.23827740752E-07	7.49713702966E-01	4.50405143640E-08	1.00081189120E-04
2.50000000000E-01	1.54876166607E-01				
1.24523472054E-01	1.85494699102E+00	7.20003044401E-04	1.07888811862E-09	1.86057238342E-01	2.29377249664E-02
4.31744274492E-04	1.01020813552E-07	7.59340394137E-07	7.49783748193E-01	4.58287285085E-08	6.01580478399E-05
2.50000000000E-01	1.56036878644E-01				
1.43201992862E-01	1.85541062400E+00	4.78971820592E-04	1.66553697523E-09	1.86754305493E-01	2.10793939134E-02
3.16942510354E-04	1.02269849229E-07	1.32363007177E-06	7.49840866930E-01	4.41437860746E-08	3.49586056284E-05
2.50000000000E-01	1.57223341988E-01				
1.64682291791E-01	1.85574963733E+00	3.07474295352E-04	1.78223340513E-08	1.87597894315E-01	1.90522494875E-02
2.25790573446E-04	9.88122702252E-08	2.24867683833E-06	7.49885980375E-01	4.02290596908E-08	1.95664961222E-05
2.50000000000E-01	1.58422289701E-01				
1.89384635560E-01	1.85599092368E+00	1.89772458535E-04	4.03612988368E-08	1.88545979783E-01	1.69132754306E-02
1.55512321353E-04	9.08947019812E-08	3.72612275794E-06	7.49920380778E-01	3.44748917301E-08	1.04863453385E-05
2.50000000000E-01	1.59622258441E-01				
2.17792330894E-01	1.85615761559E+00	1.12086900900E-04	8.92374487167E-08	1.89558448722E-01	1.47192814996E-02
1.03052006307E-04	7.93334237448E-08	6.02638847655E-06	7.49945460803E-01	6.02110561438E-10	5.33976510125E-06
2.50000000000E-01	1.60808930014E-01				
2.50461180528E-01	1.85626886794E+00	6.30057653655E-05	1.93315111598E-07	1.90595845802E-01	1.25295296099E-02
6.53174294007E-05	6.54449788636E-08	9.52365682309E-06	7.49962579457E-01	5.61172168481E-10	2.55857478434E-06
2.50000000000E-01	1.61964066013E-01				
2.88030357608E-01	1.85634022051E+00	3.34912310510E-05	4.12138811921E-07	1.91620187582E-01	1.04038480793E-02
3.93219279656E-05	5.06638674112E-08	1.47314603095E-05	7.49972973306E-01	5.11868318513E-10	1.13989085031E-06
2.50000000000E-01	1.63066824448E-01				
3.31234911249E-01	1.85638389667E+00	1.67089093000E-05	8.69891558472E-07	1.92596534341E-01	8.39892747671E-03
2.22943811360E-05	3.67856409404E-08	2.23592919875E-05	7.49977673163E-01	8.10046779070E-09	4 65205356422E-07
2.50000000000E-01	1.64096072977E-01				
3.80920147936E-01	1.85640923582E+00	7.75295716305E-06	1.83191333563E-06	1.93494890278E-01	6.56391024763E-03
1.17796712481E-05	5.86709458551E-10	3.34091600058E-05	7.49977405584E-01	3.91830165779E-10	1.70613946100E-07
2.50000000000E-01	1.65033028861E-01				
4.38058170127E-01	1.85642299712E+00	3.30771199560E-06	3.88909916357E-06	1.94291171640E-01	4.93752009964E-03
5.72257207107E-06	2.29504275496E-09	4.93602513453E-05	7.49972458580E-01	1.05204495138E-09	5.48191664339E-08
2.50000000000E-01	1.65863253441E-01				
5.03766895646E-01	1.85642995447E+00	1.27839630972E-06	8.44402491104E-06	1.94967368014E-01	3.54586434927E-03
2.51050085198E-06	4.48467997416E-10	7.25568467116E-05	7.49962466326E-01	2.54063371535E-10	5.14095241085E-10
2.50000000000E-01	1.66578767123E-01				
5.79331929992E-01	1.85643310669E+00	4.38435122421E-07	1.91722246553E-05	1.95510329781E-01	2.40073201394E-03
9.69291936935E-07	3.70141861962E-10	1.07157099950E-04	7.49945936804E-01	1.84959293854E-10	3.30172706730E-10
2.50000000000E-01	1.67180937874E-01				
6.66231719491E-01	1.85643439840E+00	1.28909031739E-07	4.76236130489E-05	1.95906435413E-01	1.49513376181E-03

TABLE IX (cont)

3.14774671481E-07	2.87690102063E-10	1.62349670536E-04	7.49918667777E-01	1.20946037417E-10	1.64812999713E-10
2.50000000000E-01	1.67690430661E-01				
7.66166477415E-G1	1.85643488150E+00	6.15202544208E-10	1.43428544317E-04	1.96101017760E-01	8.11189988341E-04
7.84483534291E-08	2.03160096894E·10	2.65035840487E-04	7.49867442856E-01	6.73484659350E-11	4.09969466041E-11
2.50000000000E-01	1.68179792211E-01				
8.81091449027E-01	1.85643499875E+00	3.96066917131E-10	4.88421953322E-04	1.95872096710E-01	3.95123760229E-04
5.19534767579E-10	1.24582173194E-10	4.48840130721E-04	7.49775579675E-01	2.78491841202E-11	1.00000000000E-11
2.50000000000E-01	1.68824779532E-01				



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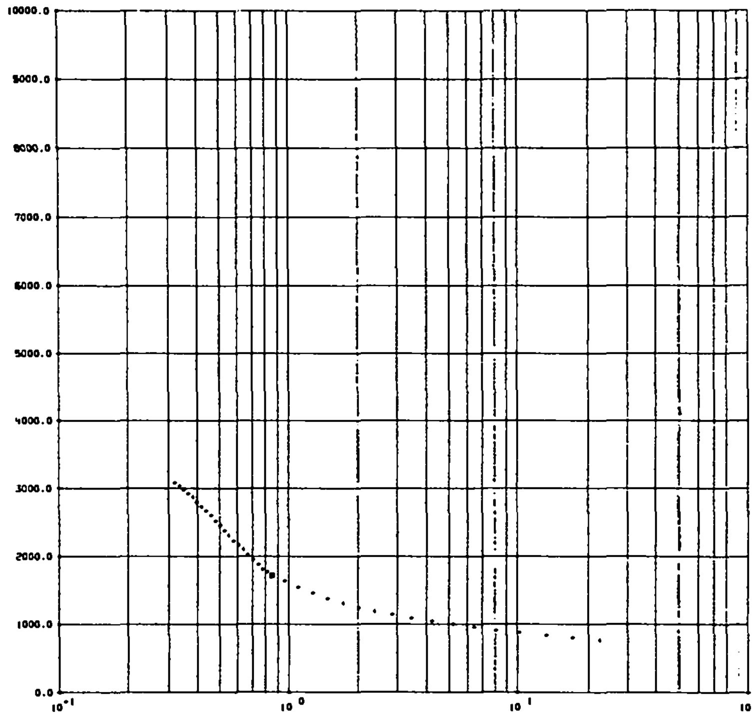
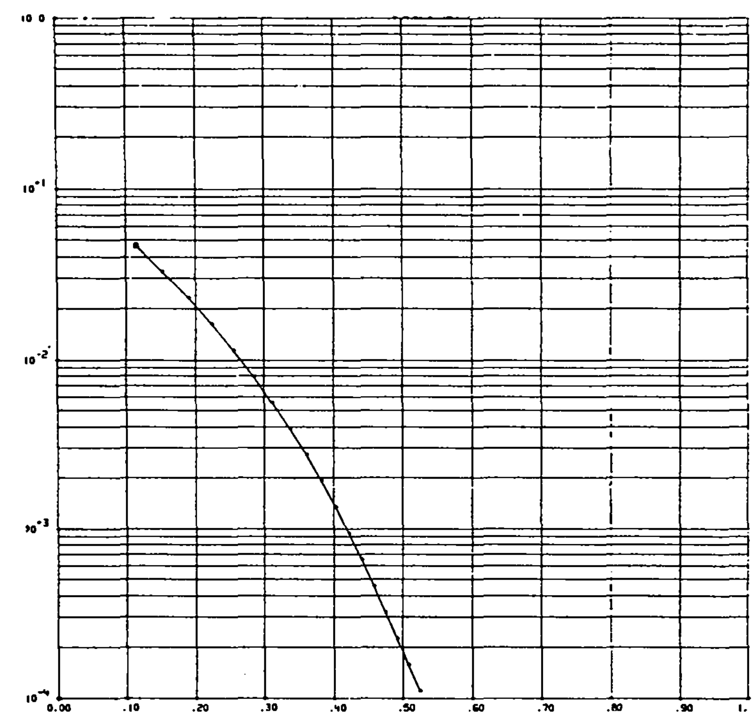
ANFO ONE/7OURTH AN INERT
PRESSURE-VOLUME ISENTROPE THRU THE C-J VALUE

TABLE IX (cont)



ANFO ONE/FOURTH AN INERT
TEMPERATURE -VOLUME ISENTROPE THRU THE C-J VALUE



ANFO ONE/FOURTH AN INERT
PRESSURE -PARTICLE VELOCITY ISENTROPE

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