COMPATIBILITY OF EXTEX WITH TETRYL

By

THERMAL METHODS

L. C. Myers

DEVELOPMENT DIVISION

JULY - SEPTEMBER 1971

MASTER

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Section V

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ABSTRACT

A progress report is given on the study of the compatibility of XTX 8003 and tetryl. The 100 C coupon test samples were discarded after 8 weeks because of excessive decomposition. There is no indication of a compatibility problem of XTX with tetryl as long as they are in a solid phase. The 80 C coupon test evaluations are continuing.

DISCUSSION

The purpose of this study is to evaluate the compatibility of XTX 8003 with tetryl. Differential thermal analysis and the chemical reactivity test, (CRT) were used as initial screening tests and the data from these indicated that these explosives are compatible at temperatures below 100 C.

Initial runs made on XTX and tetryl in the CRT run at 120 C gave a definite indication that the two were reactive. But runs made at 100 C did not show any indication of reactivity. This difference results from the partial melting of tetryl at 120 C, liquid phase kinetics being considerably different from the solid phase kinetics.

Coupon test assemblies were made using 1/2-inch pellets of tetryl and XTX sandwiched together. Twenty of these coupons were sealed in stainless steel containers evacuated and backfilled with helium. Ten were stored at 80 C and the others at 100 C.

A 100 C sample was taken at weekly intervals for evaluation which included gas analysis of the atmosphere, a visual inspection of the coupons and then DTA of the XTX and tetryl. The 100 C test was terminated after 57 days due to considerable decomposition of the explosive because the tetryl was in a liquid phase.

The gas analysis of the atmosphere in the 100 C samples are given in Table I to show that there are no serious compatibility problems with these materials until a liquid phase exists. There was very little reactivity between the XTX and tetryl for five weeks (35 days) or before the tetryl passed into a liquid phase.

The 80 C samples are sampled every three or four weeks and the same evaluation is made on the samples as was made on the 100 C samples.

No detail evaluation of the data can be made until the 80 C tests have been completed.

TABLE I. Analysis of the Atmosphere in the XTX
and Tetryl Coupon Test Assemblies Conditioned
at 100 C

Sample No.	43	44*	42*	45	46	47
Days @ 100 C	8	14	21	29	35	42
	%	%	%	%	%	%
N ₂	.31	3.87	75.68	1.43	1.11	2.08
O ₂			21.08	.18		
CO						
NO	.50			.63	1.03	1.54
CO ₂	.25			.45	.90	1.79
N ₂ O		.79	.13			
He	98.62	95.08	2.22	96.94	96.68	94.32
H ₂	.09			.08		
Acetone	.23	.26		.29	.28	.27
Argon			.89			

**Samples appeared to have leaked.*