

METALLIZED EXPLOSIVES

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DEVELOPMENT DIVISION

OCTOBER - DECEMBER 1971

Normal Process Development
Endeavor No. 204

MASTER

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This project consists of exploring the possible value and the characteristics of very thin coatings of metal on explosive particles, along with the development of processes to obtain such coatings.

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October - December 1971
Endeavor No. 204
Acct. No. 22-2-44-01-204

Section G

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ABSTRACT

In addition to the DTA, X-ray diffraction, and Henkin test results on silvered BTF reported earlier; impact sensitivity via drop hammer and chemical reactivity via gas chromatography were conducted with all results generally indicating no significant compatibility problems. One larger batch, ~ 15 grams of silvered BTF, was made from which pressed-to-shape pellets were fabricated at a desired density of approximately 90% of TMD.

DISCUSSION

The 12A impact sensitivities on BTF and silvered-BTF, $H_{50} = 14.0$ cm and 12.1 cm respectively are not significantly different because of the statistical overlap of the two tests.

Results of the chemical reactivity test on BTF and silvered BTF, summarized in Table I, indicated no significant compatibility problems.

Table I. Chemical Reactivity Test
(0.25 Gram Sample at 120 C for 22 Hours)

| Sample | Gas Evolved, μl @ STP | | | | | Total |
|--------|----------------------------------|------|-------|---------------|----------------------|--------|
| | N_2 | CO | NO | CO_2 | N_2O | |
| BTF | 256.62 | 3.84 | 21.01 | 32.99 | 4.37 | 318.83 |
| Ag/BTF | 221.46 | 1.74 | 42.50 | 44.15 | 3.66 | 313.51 |

One larger batch, Batch No. 171-10-14-1B, of 15 grams of silvered BTF was made to provide material for 26 pressed-to-shape pellets at approximately 90% of TMD. Analysis of the silvered BTF via helium air pycnometry yielded a TMD of 2.00 g/cc with a composition by volume percent of 1.2/98.8 Ag/BTF. The pellets were pressed mechanically in a punch and die under vacuum at 25,000 psi with a one-minute dwell time. Average density of the pellets was 1.81 g/cc or 90.5% of TMD.

FUTURE WORK; COMMENTS; CONCLUSIONS

The source of some incompatibility indications in silvered HMX and PETN remains an area for further investigation along with measurement of their detonation velocities and pressures. Efforts will also be considered to investigate possible processes for aluminum coating of explosive powders.