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## **METAL AUGMENTED CHARGE BEHAVIOR WITH FLUORINE COMPOUNDS**

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One interesting group of “thermobaric” mixtures fall in the category of metal augmented charges. These are explosive charges surrounded by fine aluminum powder or flakes. The most effective combinations that we have thus far evaluated indicate that the dispersal charge should be a near ideal explosive, that VITON or TEFLON coated aluminum flakes burn relatively efficiently and that a medium to heavy case enhances the aluminum burn. Aluminum mass to explosive mass ratios may range from less than 1 to more than 3. This should be compared to 0.20 to 0.35 for most aluminized explosives.

A series of calculations have been conducted to examine the efficiency of aluminum burn as a function of Al/HE mass ratio, dispersion device design and relative confinement. Calculations have been conducted in a number of structures at scales ranging from a few pounds to nearly 1000 pounds. Several experiments have been conducted at relatively small scale. Manufacture of large devices has proven difficult.

The calculations indicate that the fluorine in the aluminum coating interacts with the aluminum and Aluminum-oxide in such a way that the ignition temperature is reduced from 2050 K to about 1150 K. Comparisons with experimental data show the efficient burning of aluminum calculated is consistent with pressure and temperature measurements in multi-room structures.