

Abstract Submitted  
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**Comparison of the Influence of Temperature on the High Strain Rate Mechanical Responses of EDC37 and PBX 9501** R.K. GOVIER, AWE, G.T. GRAY III, W.R. BLUMENTHAL, Los Alamos National Laboratory, MST-8 TEAM, AWE TEAM — For the plastic bonded explosive PBX9501, many high strain rate compression measurements have been reported using a specially designed Split Hopkinson Pressure Bar. In contrast, limited amount of data exists for the UK PBX, EDC37. The binder system for each PBX is very different; EDC37 contains a nitro-plasticised nitrocellulose, whilst PBX9501 contains a nitro-plasticised Estane. It is widely believed that the mechanical responses depend strongly on the binder, and evidence for this is presented in this paper. Both PBXs exhibit an increasing elastic loading moduli,  $E$ , with increasing strain rate or decreasing temperature, behaviour which is similar to other polymeric composite materials. PBX 9501 exhibited nearly invariant fracture strains of  $\sim 1.5\%$  as a function of temperature at high strain rate. EDC37 also displayed an invariant peak strain to failure of  $\sim 2-2.5\%$ . Maximum compressive strengths for both PBXs were measured at 150MPa at  $-55^\circ\text{C}$ . However, at  $55^\circ\text{C}$  PBX9501 was found to be stronger than EDC37, with maximum compressive strengths of  $\sim 55\text{MPa}$  and  $\sim 20\text{MPa}$  respectively.

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