

Abstract Submitted
for the SHOCK11 Meeting of
The American Physical Society

On the thermal expansion hysteresis of a UK PBX DAVID WILLIAMSON, STEWART PALMER, University of Cambridge, REBECCA GOVIER, AWE — The thermal expansion coefficient of a UK PBX has been measured over the temperature range -40 to +80 ° C. A subtle but measurable hysteresis in length as a function of temperature was observed. This is attributed to a mismatch between the thermal expansion coefficients of its solid-fill and binder constituents. On heating or cooling this induces mechanical stresses within the binder system, which being viscous it can flow to relieve. A change in sample temperature results in an asymptotic relaxation to a mechanical equilibrium length, which is described by an exponential dependence on time. This is analogous to the type of stress relaxation and creep behaviour normally associated with the bulk response of viscoelastic materials when more conventional stresses are applied.

David Williamson
University of Cambridge

Date submitted: 17 Feb 2011

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