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Comparison of Porter-Gould constitutive model with Compression Test data for HTPB/Sugar PHILIP CHURCH, PETER GOULD, WILLIAM HUNTINGTON-THRESHER, QinetiQ, DANIEL DRODGE, WILLIAM PROUD, University of Cambridge — QinetiQ has been developing the physically based QinetiQ Porter-Gould (P-G) model for the mechanical response of PBXs over a number of years and applying to solving real scenarios involving impact and blast. The main difficulty with these models is predicting the intermediate strain rate regime where the relaxation time for the polymer is of the same order as the duration of the Hopkinson bar test. The other main issue is the ability of the model to predict the stress/strain data as a function of temperature up to and through the glass transition temperature. The paper presents predictions from the QinetiQ P-G model compared to quasi-static compression and Hopkinson bar compression test data and discusses the results in terms of requirements for future developments of the model.

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