

Abstract Submitted
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The Response of Dyneema to Shock-Loading DAVID CHAPMAN, CHRISTOPHER BRAITHWAITE, WILLIAM PROUD, University of Cambridge, UK — Dyneema is a registered trademark of a self-reinforced polyethylene (manufactured by DSM) which is showing great promise as a replacement for brittle-fibre-reinforced epoxies in various dynamic applications. As part of an investigation of its high-rate mechanical properties, we have measured the response of Dyneema under the condition of uniaxial strain during shock-loading. Data on the principal-Hugoniot curve was obtained using in-material manganin stress gauges to measure both longitudinal stress and shock-wave velocity. Off-Hugoniot data was generated using a plate-impact reverberation technique, where a Dyneema sample was contained between two higher impedance copper anvils. Manganin stress gauges mounted on the interface between the Dyneema sample and copper anvils monitored the ring-up of stress in the specimen. Finally, the release curve from a given principal-Hugoniot state was measured using a reverse ballistic impact technique where free-surface velocity was measured using interferometric methods.

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