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Experimental determination of Grunieisen gamma for two dissimilar materials (PEEK and Al 5083) via the shock-reverberation technique ANDREW ROBERTS, GARETH APPLEBY-THOMAS, PAUL HAZELL, Cranfield University — Following multiple loading events the resultant shock state of a material will lie away from the principle Hugoniot. Prediction of such states requires knowledge of a materials equation-of-state. The material-specific variable Grunieisen gamma (Γ) defines the shape of "off-Hugoniot" points in energy-volumepressure space. Experimentally the shock-reverberation technique (based on the principle of impedance-matching) has previously allowed estimation of the firstorder Grunieisen gamma term (Γ_1) for a silicone elastomer. Here, this approach was employed to calculate Γ_1 for two dissimilar materials, Polyether ether ketone (PEEK) and the armour-grade aluminium alloy 5083 (H32); thereby allowing discussion of limitations of this technique in the context of plate-impact experiments employing Manganin stress gauges. Finally, the experimentally determined values for Γ_1 were further refined by comparison between experimental records and numerical simulations carried out using the commercial code ANYSYS Autodyn®.

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