

Abstract Submitted
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Comparison of Internal-Blast Explosive Performance in Small- and Large-Scale Tests RICHARD GRANHOLM, NSWC Indian Head Division — Small-scale internal blast measurements were correlated with large-scale test data. Highly confined small explosive samples <0.5 g were subjected to the output from a PETN detonator while enclosed in a 3-liter chamber. Large-scale tests up to 22.7 kg were generally unconfined and shot in a 180-m³ chamber. When sample mass was expressed as total sample energy/chamber volume, theoretical peak quasi-static blast pressures for both small and large-scale tests fell on the same curve. Blast explosives may comprise high levels of fuels and reactive materials to enhance or control the release of energy, and may be insensitive and slow-reacting, with performance that may not scale well to small size tests. High confinement of a small sample can compensate for low sensitivity, but at the expense of heat loss to the metal confinement. This heat loss can be measured to improve the correlation between large and small-scale measurements, unless the released energy becomes too low to sustain complete reaction of the sample, either with itself or with air in the chamber.

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