

## DESIGN OF AN AUTOMATED DIAPHRAGM SYSTEM FOR THE LB/TS

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Design of a Large Blast Thermal Simulator (LBTS) is proceeding under the auspices of the US Army BRL and the DNA. The present design is based on the existing French facility at Gramat but has been enlarged to meet US testing requirements.

The LBTS utilizes a large number of drivers that contain pressurized ni-trogen or air that is heated to 600 degree F. All of the driver gas must be released simultaneously so as to create the proper shock front in the driver.

A study conducted by the authors for DNA and BRL investigated the design of the diaphragms, diaphragm containment systems and diaphragm opening systems for use on the multiple high pressure heated gas drivers of the LBTS. Diaphragms one m in diameter were analyzed structurally, mechanically and thermally. Different materials were studied with a view to thickness, formability, performances, safety and cost. A unique all tensile diaphragm was designed. Effects of heated gas, thermal shielding, cooling and operational pressure were examined.

Diaphragm opening systems were studied and designed for single and dual series in line diaphragms. Mechanical, pressure driven, explosive, hydraulic, pneumatic and hot gas diaphragm opening systems were designed and evaluated. Sealing was designed to contain the hot high pressure gas. Thermal cooling systems were designed for the critical structural areas and explosive opening systems.

Engineering drawings of the designs and plots of the thermal heating analyses will be included in the paper.