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Gas loading system for LANL two-stage gas guns LEE GIBSON, BRIAN BARTRAM, DANA DATTELBAUM, JOHN LANG, JOHN MORRIS, LANL — A novel gas loading system was designed for the specific application of remotely loading high purity gases into targets for gas-gun driven plate impact experiments. The high purity gases are loaded into well-defined target configurations to obtain Hugoniot states in the gas phase at greater than ambient pressures. The small volume of the gas samples is challenging, as slight changing in the ambient temperature result in measurable pressure changes. Therefore, the ability to load a gas gun target and continually monitor the sample pressure prior to firing provides the most stable and reliable target fielding approach. We present the design and evaluation of a gas loading system built for the LANL 50 mm bore two-stage light gas gun. Targets for the gun are made of 6061 Al or OFHC Cu, and assembled to form a gas containment cell with a volume of approximately 1.38 cc. The compatibility of materials was a major consideration in the design of the system, particularly for its use with corrosive gases. Piping and valves are stainless steel with wetted seals made from Kalrez and Teflon. Preliminary testing was completed to ensure proper flow rate and that the proper safety controls were in place. The system has been used to successfully load Ar, Kr, Xe, and anhydrous ammonia with purities of up to 99.999 percent. The design of the system, and example data from the plate impact experiments will be shown. LA-UR-15-20521

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