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Isotherms Reduced from Isentropes and Hugoniots up to several 100 GPa AKOBUIJE D. CHIJIOKE, W.J. NELLIS, ISAAC F. SILVERA, Harvard University, Cambridge MA 02138 — To obtain pressure standards for use in diamond anvil cells at static pressures as high as 300 GPa, we have reduced Hugoniot curves of Al, Cu, Ta and W to 300-K isotherms. These shock-wave reduced isotherms (SWRIs) are used to obtain pressures of metal markers whose densities are determined by x-ray diffraction, which in turn can be used to calibrate the shift with pressure of the ruby fluorescence line. Hugoniot data were reduced to isotherms using calculated thermal pressures and measurements of strengths along these Hugoniots. At still higher shock pressures, calculated thermal pressures are sufficiently large to introduce significant systematic uncertainties. For this reason, quasi-isentropes measured under dynamic compression are needed as reference curves for calibration of static pressures well above 300 GPa. Thus, measured quasi-isentropes, material strengths, and some Hugoniot data are needed for metals, including Al, Cu, Mo, Ta, W, Pt, and Au, up to dynamic pressures significantly higher than 300 GPa.

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