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Quasi-Isentropic Compression of Wrought and Additively Manufactures 304L Stainless Steel PAUL SPECHT, JUSTIN BROWN, JACK WISE, MICHAEL FURNISH, DAVID ADAMS, Sandia Natl Labs — The thermodynamic and constitutive responses of both additively manufactured (AM) and traditional wrought processed 304L stainless steel (SS) were investigated through quasi-isentropic compression to peak stresses near 1Mbar using Sandia National Laboratories' Z machine. The AM 304L SS samples were made with a laser engineered net shaping (LENS^{TM}) technique. Compared to traditional wrought processed 304L SS, the AM samples were highly textured with larger grain sizes (*i.e.* near 1mm) and residual stresses ($>$ 100 MPa). Interferometric measurements of interface velocities enabled inference of the quasi-isentropes for each fabrication type of 304L SS. Release from peak stress provided flow strength measurements of the wrought and AM 304L SS. Sandia National Laboratories is a multi-mission laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energys National Nuclear Security Administration under contract DE-AC04-94AL85000. Approved For Unclassified Unlimited Release SAND2017-2040A.

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