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ANISOTROPIC HIGH CYCLE FATIGUE BEHAVIOR OF TI-6AL-4V OBTAINED BY POWDER BED LASER FUSION

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Abstract

An original fatigue test methodology aimed at PBF materials is presented and directed to the evaluation of the anisotropic fatigue behavior of DMLS Ti6Al4V. The presence of such anisotropy is intrinsic to the specific and complex microstructure obtained by the layer-by-layer development of the part produced by DMLS. Comparison of the present test results with data obtained with a variety of test methods and test parameters clarified the role of intrinsic (material-dependent) and extrinsic (test-method- dependent) factors on the measured fatigue behavior. The proposed testing method permits substantial cost saving in terms of material and process time, benefits that are especially welcome for developmental studies of PBF alloys and process parameters.