GRX-810

(Exceptional high temperature performance)

Product

GRX-810 is a nickel superalloy first developed by NASA and now offered by Elementum 3D through a co-exclusive licensing agreement. The material offers excellent mechanical strength and exceptional creep performance at high temperatures. This datasheet provides typical performance data from NASA and Elementum 3D for PBF-LB printed GRX-810. The material offers superior high temperature creep and oxidation resistance compared to other available printable superalloys.

Properties

Material composition: Based on NiCoCrReW "medium entropy" alloy with nano yttria coating.

Printed relative density[1]**:** >99.5% (Theoretical maximum density: 8.44 g/cm^3)

Infill deposition rate[2]**:** 40µm layer 3.0 mm^3/s *(Further print speed optimization possible)*

Tensile properties [3] [4]**:**

	Temperature °C / °F	Orientation XY/Z	U.T.S. MPa/KSI	Y.S. MPa/KSI	El %
E3D*	25/77	XY	930/135	676/98	33
NASA*	25/77	Z	883/128	641/93	33
E3D**	1093/2000	XY	105/15	89/13	20
NASA**	1093/2000	XY	108/16	81/12	14

*As printed, ** HIP treatment applied

Your AM Materials Expert™ 400 Young Ct., Erie, CO 80516 | 720-545-9016 | www.elementum3d.com

Elevated Creep [5]

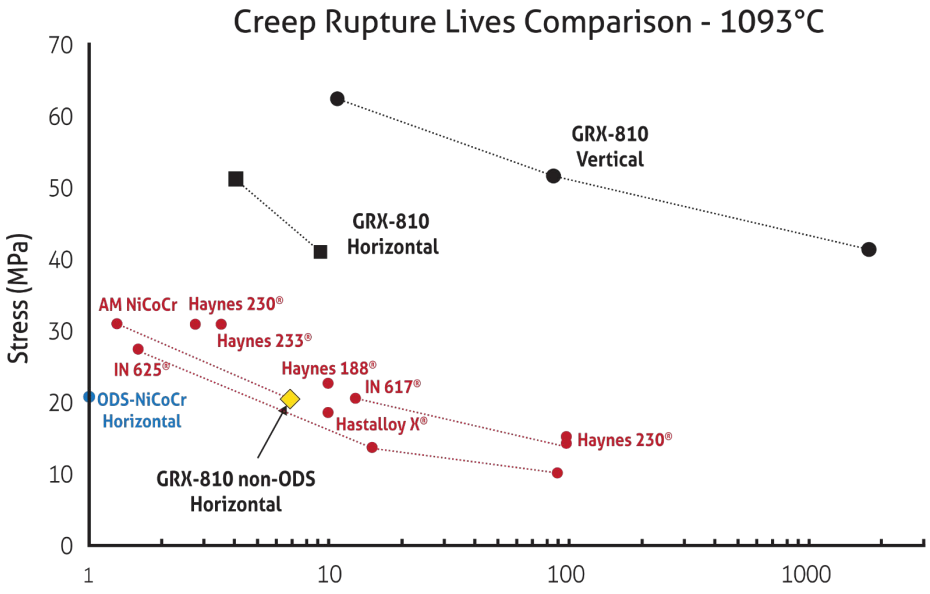

Figure 1: Creep rupture comparison of industry superalloys to GRX-810. The GRX-810 outperforms these other alloys by orders of magnitude.

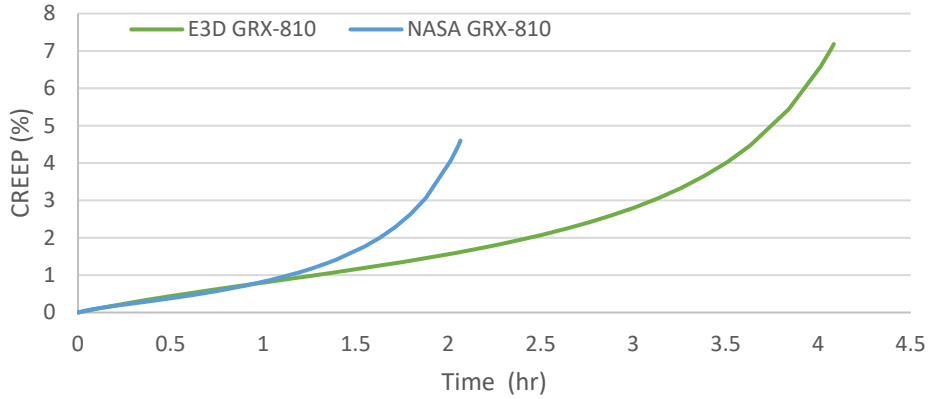

Figure 2: Exceptional creep rupture performance of NASA and Elementum 3D produced GRX-810 at 50MPa, 1093°C, printed in the XY-direction with optional HIP.

[1]ASTM B311 , [2]Deposition rate calculation is for comparison purposes on an EOS M290 and does not include recoating time, laser migration time, contour exposures, etc., [3]ASTM E8, [4]ASTM E21, [5]ASTM E139

All stated values are approximate values. All details given above are our current knowledge and experience, and are dependent on the equipment, parameters, and operating conditions. The data provided in this document is subject to change and only intended as general information on a material set that is continually improving and developing. The data does not provide a sufficient basis for engineering parts. All samples were produced on an EOS M290. All tensile tests were performed at third party certified test labs such as Westmoreland Mechanical Testing & Research and Product Evaluations Systems.

Please contact us at sales@elementum3d.com for additional information