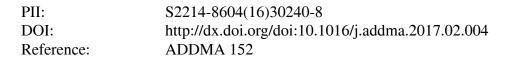
### Accepted Manuscript

Title: Mechanical Properties of Additive Manufactured Nickel Alloy 625

Authors: By Harvey Hack, Richard Link, Erik Knudsen, Brad Baker, Scott Olig



To appear in:

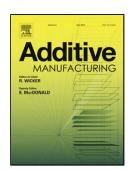
 Received date:
 23-9-2016

 Revised date:
 21-12-2016

 Accepted date:
 8-2-2017

Please cite this article as: By Harvey Hack, Richard Link, Erik Knudsen, Brad Baker, Scott Olig, Mechanical Properties of Additive Manufactured Nickel Alloy 625, http://dx.doi.org/10.1016/j.addma.2017.02.004

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



## ACCEPTED MANUSCRIPT

Mechanical Properties of Additive Manufactured Nickel Alloy 625

By Harvey Hack<sup>a</sup>, Richard Link<sup>b</sup>, Erik Knudsen<sup>c</sup>, Brad Baker<sup>b</sup>, and Scott Olig<sup>d</sup>

<sup>a</sup> Corresponding Author, Northrop Grumman Corporation, Undersea Systems, P. O. Box 1488, MS 9105, Annapolis, MD 21409, USA, harvey.hack@ngc.com

<sup>b</sup> United States Naval Academy

<sup>c</sup> Vision Point Systems, Fairfax VA 22030

<sup>d</sup> Naval Research Laboratory, Washington, D.C., 20375

#### ABSTRACT

The mechanical, metallurgical and corrosion properties of Alloy 625 produced using the laser powder bed fusion (L-PBF) manufacturing process were investigated and compared with typical performance of the alloy produced using conventional forging processes. Test specimens were produced near net shape along with several demonstration pieces that were produced to examine the geometric complexity that could be achieved with the process. The additively manufactured specimens exhibited strength, fracture toughness and impact toughness that was equal to or better than properties typically achieved for wrought product. There was no evidence of stress corrosion cracking susceptibility in 3.5% NaCl solution at stress intensities up to 70 ksi-in<sup>1/2</sup> after 700 hours exposure. The microstructure was equiaxed in the plane of the powder bed build platform (X-Y) and exhibited a columnar shape in the Z direction although there was not any significant evidence of anisotropy in the mechanical properties.

#### **KEYWORDS**

additive manufacturing; Alloy 625; laser powder bed fusion; mechanical properties; fracture toughness

Download English Version:

# https://daneshyari.com/en/article/5020088

Download Persian Version:

https://daneshyari.com/article/5020088

Daneshyari.com