

IMR TEST LABS

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May 30, 2018

Malcolm MacDougall
Servometer
501 Little Falls Road
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TEST REPORT

IMR Report Number 201805857B

cc: Joe Madonna

PO Number
SVP180540

SUMMARY

Date Received
May 22, 2018

Two samples were received for tensile testing and one sample was received for chemical and microhardness testing.

Description
Low Sulfur Nickel

The results are on the following page(s).

Reference Date
June 2018



Reviewed by

Andrew Ensign, Manager
Chemistry Department

Reviewed by

Alex Montelione for Shawn Levey
Metallurgical Lab Supervisor



All procedures were performed in accordance with the IMR Quality Manual, current revision, and related procedures; and the PWA MCL Manual F 23 and related procedures. The information contained in this test report represents only the material tested and may not be reproduced, except in full, without the written approval of IMR Test Labs ("IMR"). IMR maintains a quality system in compliance with the ISO/IEC 17025 and is accredited by the American Association for Laboratory Accreditation (A2LA), certificates #1140.01 and #1140.02. IMR will perform all testing in good faith using the proper procedures, trained personnel, and equipment to accomplish the testing required. IMR's liability to the customer or any third party is limited at all times to the amount charged for the services provided. All samples will be retained for a minimum of 6 months and may be destroyed thereafter unless otherwise specified by the customer. The recording of false, fictitious, or fraudulent statements or entries on this document may be punished as a felony under federal statutes. IMR Test Labs is a GEAE S-400 approved lab (Supplier Code T3983).

TENSILE PROPERTIES (AVERAGE OF TWO REPLICATES)

	Tensile Strength (ksi)	Yield Strength (ksi)	Elongation (%)
Sample	182	137	1.3

The width of the samples was 0.37 inches; gauge length was 2.00 inches. Yield strength was determined by the 0.2% offset method. Crosshead speed was 0.01 in./min. to yield and 0.1 in./min. to fracture. Method(s): ASTM E 8-16a

CHEMISTRY

Element	Sample
Ni Alloy	99.77
Ni ¹	96.30
S ²	0.013

¹Determined by difference

²Determined combustion-infrared absorbance

Results in weight percent unless otherwise indicated

Method(s): CAP-017P (ICP-AES) and ASTM E 1019-11 (Comb./IGF)

MICROHARDNESS

	HV₁₀₀¹
Sample	531

¹Average of three readings

Method(s): ASTM E 384-16 (modified for edge spacing recommendations). Per ASTM E 384, 2.5 indent diameters are recommended between the center of the indent and the edge of the specimen. These indents are closer to the edge of the specimen, but no bulging or other evidence of inadequate support of the indenter force were observed.