Grayloc Products Canada
1129 Northside Road
Burlington, ON L7M 1H5
Tel.: 905-842-3150 Fax: 905-842-1785

Certificate of Conformance

Date: September 20, 2018

Customer: Husky Oil Operations Ltd.
Hwy 16 East, #1 Upgrader Road
Lloydminster, SK
S9V 1M6

Customer Purchase Order No.: 8401284587
Grayloc Sales Order No CC00004847

This is to certify that the product listed below has undergone a planned inspection process and that the final product meets the supplied specifications and or the contract as established.
The product has therefore been approved for shipment.

Line	Size	Part No.	Description	Qty	Job No.	Material	Lot No.
1	4	512004-HLU	SEAL RING	11	JC12597 – 1 to 11	A638 GR 660	S17232

Certified for Grayloc Products:

Rob McMillan
Chief Engineer

MATERIAL CERTIFICATION REPORT and CERTIFICATION OF QUALITY CONFORMANCE

ELECTRALLOY
G. O. CARLSON PLATE
175 Main Street
Oil City PA 16301
1 (800) 458-7273

Customer Address	Shipping Address	Print Date Time	Ship Note
DIVERSIFIED METALS, INC. P O BOX 65 MONSON, MA 01057-0065	DIVERSIFIED METALS, INC. 49 MAIN STREET MONSON, MA 01057	10-Oct-2016 11:20	123196
		Certification ID	Revision
		149366-3	2
		Customer Order	Sales Order
		57294	116266

Grade: A286
Specification: Type A286 VAR (UNS S66286) - AMS 5737P, ASTM A638/A638M-10 Grade 660 (Type 1), ASTM A453/A453M-16 Grade 660 Class A, ASME SA453 2013 Edition, ASME SA638 2013 Edition, ANSI/NACE MR0175/ISO 15156-3:2009, GE S-400/GE-S1000.
Condition: HOT ROLLED / HOT FORGED, SOLUTION ANNEALED, 1650F, WATER QUENCHED, AGED
Finish: PEELED

Sales Order	Quantity	Heat	Lot ID	Weight	Size	Customer Mark
116266-1	5	52186-6V	52186-6VBA	1,963 LB	Diam: 3.5260 in; Length: 98.7500 in	

Lot	Test	Result	Low Limit	High Limit
SPECIFICATION RESULTS				
FINAL CHEMISTRY FOR REMELTED PRODUCT				
52186-6V	C	0.037	0.000	0.080
52186-6V	Mn	0.18	0.00	2.00
52186-6V	P	0.011	0.000	0.025
52186-6V	S	0.001	0.000	0.025
52186-6V	Si	0.04	0.00	1.00
52186-6V	Cr	13.85	13.50	16.00
52186-6V	Ni	24.50	24.00	27.00
52186-6V	Mo	1.20	1.00	1.50
52186-6V	Cu	0.06	0.00	0.50
52186-6V	Co	0.02	0.00	1.00
52186-6V	Ti	2.22	1.90	2.35
52186-6V	Al	0.24	0.00	0.35
52186-6V	B	0.0064	0.0030	0.0100
52186-6V	V	0.24	0.10	0.50
REDUCTION AREA				
52186-6VBA	RA TT (%)	34.1	18	100
TENSILE				
52186-6VBA	TT (PSI)	153000	140000	200000
.2% YIELD OFFSET				
52186-6VBA	TT (PSI)	101000	95000	200000
ELONGATION 4D				
52186-6VBA	TT (%)	22.3	15	100
BRINELL				
52186-6VBA	(BHN)	316	277	363
GRAIN SIZE				
52186-6VBA	Grain Size (GRS)	6.5	1	20

STRESS RUPTURE				
52186-6VBA	LT Temp (F)	1200	1200	1200
52186-6VBA	Final Stress (PSI)	80000	0	200000
52186-6VBA	LT Elong (%)	18.3	5	100
52186-6VBA	LT RA (%)	17.36	0	100
52186-6VBA	LT Time (Hrs)	117.7	48	200
52186-6VBA	LT Stress 2nd (F)	1200	1200	1200
52186-6VBA	LT Elong 2nd (%)	16.3	5	100
52186-6VBA	LT Time (Hrs)	220.3	100	250
52186-6VBA	LT Stress 2nd	86000	56000	150000

DIVERSIFIED METALS, INC
49 MAIN STREET, MONSON, MA
P: 413-267-5101 F: 413-267-3151
SOLD TO: ROLLED ALLOYS - CANADA, INC.
PO: 0053917ME ITEM: 1

Grayloc Canada QA #3 APPROVED

APPROVED BY: SB
DATE: 10/11/16
SHARON BROWN
Q.C MANAGER

Grayloc Canada APPROVED
DESC: XBA0350T660-1
MAT'L: A638 gr 660
HEAT #: 52186-6V
LOT #: 517237.
PO #: 7068 DATE: 9-26-2016

The recording of false, fictitious, or fraudulent statements or entries on this document may be punishable as a felony under Federal Statute.
The above are true and correct results of tests on samples of the material. Results conform to the specification(s) listed above and are on record.
At time of shipment, items and/or material produced under this order have not come into contact with Mercury or its compounds.

P/N 516004-HC0

MATERIAL CERTIFICATION REPORT and CERTIFICATION OF QUALITY CONFORMANCE

ELECTRALLOY
G. O. CARLSON PLATE

175 Main Street
Oil City PA 16301
1 (800) 458-7273

Customer Address	Shipping Address	Print Date Time	Ship Note
DIVERSIFIED METALS, INC. P O BOX 65 MONSON, MA 01057-0065	DIVERSIFIED METALS, INC. 49 MAIN STREET MONSON, MA 01057	10-Oct-2016 11:20	123196
		Certification ID	**Revision**
		149366-3	2
		Customer Order	**Sales Order**
		57294	116266

Quality Statements:

ASTM E1019-08. ASTM E572-02a (2006)e2 and ASTM E1086-08 are methods used to determine the chemical analysis for Fe Base (High Alloy) alloys utilizing XRF, OES and Combustion and Fusion Methods.

Aging Time and Temp - Held at 1325 deg F (+/-25 deg F) for 16 hours and air cooled.

Method of Manufacture - Electric Arc Furnace Melted, AOD Refined and (VAR)Vacuum Arc Remelted.

Annealing Time and Temp - Held @ 1650 deg F (+/-25 deg F) for 2 hours minimum, then water quenched.

At time of shipment, items and/or material produced under this order have not come in contact with Mercury or its compounds.

Compliant with DFARS 252.225-7014 Alt. 1. Preference for Domestic Specialty Metals

It is hereby certified that all items furnished in this shipment are in full compliance with the purchase order and specification requirements. It is further certified that the test reports represent the actual attributes of the items furnished and are in full conformance with all applicable specifications and order requirements.

Material Certification conforms to Certificate 3.1 as in EN 10204:2010

Material represented was melted and manufactured in the USA

Material represented was not weld repaired.

Material represented was produced in accordance with the Electralloy Quality Control Program dated 06/07/2011, which meets the requirements of ISO9001(2008), MIL-I-45208A including Amendment 1 and 2. ASME Code Section 3, Subsection NCA 3800.

Material represented was ultrasonically inspected in accordance with Electralloy's in-house procedure WU1001, and found acceptable.

Material was not exposed to Radium or other radioactive materials while at our facility.

Mechanical tests have been performed at Modern Industries, Material Research Division located at 613 West 11th Street, Erie, PA 16512-0399. Attached: Modern Lab ID M1303202.

Melting and Refining Source - Electralloy

Version 2, Rev. 1 - Corrected annealing statement. BMP 5/30/13.

rev 2 - Added ASME SA638 to the specifications, DAF, 10/10/16.

Meets EU Electrical "RoHS". Contains NO "WEEE" relevant substances. Complies with DFARS-225.1-Buy American Act-Supplies. HWRR = Minimum Hot Working Reduction Ratio. Electralloy only accepts residual and trace elements to the limits invoked by the specification and or customer. This document shall not be reproduced, except in full, without the written approval of Electralloy / GOC Plate. We hereby affirm that the reported results on this certification are correct and accurate. All tests and results and operations performed by (Electralloy/G.O. Carlson Plate) or its subcontractors are in compliance with the applicable material/customer specification(s).

Name: David A. Fulkerson

Title: QC Technician/Works Inspector

By:

The parties agree that when title transfers for the products subject to this agreement, or when the products are delivered to purchaser, whichever occurs first, responsibility for the submission of any required export or re-export licenses or related export control approvals for these products also transfers to purchaser. Any export license requirement under any applicable export control statute, regulation, or practice, from any U.S. government agency, including but not limited to the Department of Commerce's Bureau of Industry and Security, the Department of Treasury, Office of Foreign Assets Control, the U.S. Department of State. Directorate of Defense Trade Controls, and the Nuclear Regulatory Commission, are solely the responsibility of the purchaser. Further, purchaser warrants that it will comply with all applicable export and re-export controls related to these products.

The recording of false, fictitious, or fraudulent statements or entries on this document may be punishable as a felony under Federal Statute.
The above are true and correct results of tests on samples of the material. Results conform to the specification(s) listed above and are on record.
At time of shipment, items and/or material produced under this order have not come into contact with Mercury or its compounds.

S1e33

MATERIALS RESEARCH DIVISION
Modern Industries, Inc.
613 WEST 11th STREET • P.O. BOX 399
ERIE, PENNSYLVANIA 16512-0399
TEL. (814) 455-8061 FAX (814) 451-0686
www.modernind.com
Complete Material Testing and Research Services

Certificate of Analysis

Electralloy
Wrought Products Division
175 Main Street
Oil City, PA 16301-1048
Attn: Mr. Bill Mong

Lab ID: M1303202
Sample ID: S-048585

Registered: 04/02/2013 11:30:00A
Received: 04/02/2013 11:30:00AI

HT#: 52186-6VBA, TOP
MH/Lot#:
Size: 3.5" DIA BAR
Sample Info:
Sample Info:
Sub. Number: Elect. A286 VAR(5)
Sub. Name: Testing per AMS 5737/A638/A453

Submitter: Outside Customer

Purchase Order: 37003
Release: 25922
Material: A286
Batch Code 1:
Batch Code 2:

Sample Notes:

1. Certified to ASTM A453/A453-10 Cl A, ASTM A638/A638-10 Type 1, ASTM E112-10, ASME SA638/SA638M-10, and AMS 5737P.
2. HT 52186-6VBA qualifies itself.
3. AMS 5737 Stress Rupture sample uploaded 5 ksi every 8 hours after 48 hrs of running time.
4. A453 Stress Rupture sample uploaded 5 ksi every 8-10 hours after 100 hrs of running time.

Nickel base - Tensile Test — **Pass**

Test Method: ASTM E8/E8M - 11
Tension Testing of Metallic Materials

Component	Result	Units	Spec. Min	Spec. Max
Area	0.0489	sq.in.		
Tensile	153	ksi	140	
Yield	101	ksi	95.0	
Offset	0.2%	%		
Elong	22.3	%	15.0	
Gage	1			
R/A	34.1	%	18.0	
Hard	316		248	341
Scale	HBW10/3000			
Condition	Ann/Aged			
Temp.	R.T.			
Orientation	Transverse			
Location	--			

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APR 19 2013
BY:

Timothy E. Ekstrom - Technical Services 4/18/2013

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MATERIALS RESEARCH DIVISION
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Certificate of Analysis

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Wrought Products Division
175 Main Street
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Grain Size Determination per E112-10

Test Method: ASTM E112-10
Grain Size Determination

Component	Results	Units	Spec. Min	Spec. Max
Grain Size	6.5			
Magnification	100X			
Etchant	HCl			
Location	Mid Radius			

Rockwell Hardness Test

Test Method: ASTM E18-11
Rockwell Hardness of Metallic Materials

Component	Result	Units	Spec. Min	Spec. Max
Sample ID	6VBA-TOP			
Location	--			
Hardness	34			
Scale	HRC			
Comments				

Timothy E. Ekstrom - Technical Services 4/18/2013

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Electralloy
Wrought Products Division
175 Main Street
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Attn: Mr. Bill Mong

Certificate of Analysis

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Mill/Lot# :
Size : 3.5" DIA BAR
Sample Info :
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Sub. Number : Elect. A286 VAR(5)
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Submitter : Outside Customer

Purchase Order : 37003
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Batch Code 1 :
Batch Code 2 :

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3. AMS 5737 Stress Rupture sample uploaded 5 ksi every 8 hours after 48 hrs of running time.
4. A453 Stress Rupture sample uploaded 5 ksi every 8-10 hours after 100 hrs of running time.

Combination Rupture Test per E139/E292

Test Method : ASTM E139-11/E292-01

Rupture Notch Tension Tests of Materials

Sample ID	AMS 5737	Area(sqin):	0.0503"	Time to Rupture(hrs):	117.7 hrs.
Initial Gage Wd(in):	--	Initial Gage(in):	1.00"	Spec.Min.	23 hrs.
Initial Thk(in):	--	Final Gage(in):	1.183"	Spec.Max.	—
Initial Dia.(in):	0.253"	Final Dia.(in):	0.230"		
Initial Load(lbs):	3268 lbs.	Test Unit #:	2420	Loc. of Rupture:	Smooth
Final Load(lbs):	4022 lbs.	Temp Deg(F):	1200 F	Type of Rupture:	Ductile
Atmosphere:	Room Air				
Final Rup Str(ksi):	80 ksi	Elongation(%):	18.30%	R/A(%):	17.36%
Spec.Min.	65 ksi	Spec.Min.	3%	Spec.Min.	--
Spec.Max.	—			Spec.Max.	--
Acceptance:	Pass	Comments:			

Sample ID	A453	Area(sqin):	0.0509"	Time to Rupture(hrs):	220.3 hrs.
Initial Gage Wd(in):	--	Initial Gage(in):	1.00"	Spec.Min.	100 hrs.
Initial Thk(in):	--	Final Gage(in):	1.163"	Spec.Max.	—
Initial Dia.(in):	0.2545"	Final Dia.(in):	0.218"		
Initial Load(lbs):	2849 lbs.	Test Unit #:	2415	Loc. of Rupture:	Smooth
Final Load(lbs):	4375 lbs.	Temp Deg(F):	1200 F	Type of Rupture:	Ductile
Atmosphere:	Room Air				
Final Rup Str(ksi):	86 ksi	Elongation(%):	16.30%	R/A(%):	26.63%
Spec.Min.	56 ksi	Spec.Min.	5%	Spec.Min.	--
Spec.Max.	—			Spec.Max.	--

Timothy E. Ekstrom - Technical Services 4/18/2013

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MATERIALS RESEARCH DIVISION

Modern Industries, Inc.
613 WEST 11th STREET • P.O. BOX 399
ERIE, PENNSYLVANIA 16512-0399
TEL. (814) 455-8061 FAX (814) 451-0886
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Complete Material Testing and Research Services

Electralloy
Wrought Products Division
175 Main Street
Oil City, PA 16301-1048
Attn: Mr. Bill Mong

Certificate of Analysis

Lab ID: M1303202
Sample ID: S-048585

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Received: 04/02/2013 11:30:00AM

HT#: 52186-6VBA, TOP
Mill/Lot#:
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Sample Info:
Sub. Number: Elect. A286 VAR(5)
Sub. Name: Testing per AMS 5737/A638/A453

Submitter: Outside Customer

Purchase Order: 37003
Release: 25922
Material: A286
Batch Code 1:
Batch Code 2:

Sample Notes:

1. Certified to ASTM A453/A453-10 Cl A, ASTM A638/A638-10 Type 1, ASTM E112-10, ASME SA638/SA638M-10, and AMS 5737P.
2. HT 52186-6VBA qualifies itself.
3. AMS 5737 Stress Rupture sample uploaded 5 ksi every 8 hours after 48 hrs of running time.
4. A453 Stress Rupture sample uploaded 5 ksi every 8-10 hours after 100 hrs of running time.

Acceptance: Pass Comments:

Brinell Hardness Test — **Pass**

Test Method: ASTM E10-07A
Brinell Hardness of Metallic Materials

Component	Result	Units	Spec. Min	Spec. Max
Sample ID	6VBA-TOP			
Hardness	302		248.00	341.0000
Scale	HBW10/3000			

Timothy E. Ekstrom - Technical Services 4/18/2013

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517232

ALL-SOURCE HEAT TREATING INC.
484 Eastchester Ave E.
St. Catharines, ON CANADA L2M 6S3
Tel: (905) 682-2289 Fax: (905) 682-1344
E-mail: admin@all-sourceheattreating.com

CERTIFICATE OF HEAT TREATING

CUSTOMER: **Grayloc Products Canada Ltd.**
AHT PACKING SLIP NO. **119183**
CHART NO. **57902**
LOT NO. / HEAT CODE: **Lot# S17232/Job# JC11253**
CUSTOMER ORDER NO. **PC00007189**
MATERIAL: **ASTM A638 GR 660**
PCS SHIPPED: **8**
TEST BARS SHIPPED: **0**
AHT WORK ORDER NO. **103172-1**

REQUIRED HARDNESS
BHN: N/A

FINAL RESULTS
BHN: No Results

PROCESS

☑ **Solution Anneal, Water Quench**

Heat Treating in compliance with:

☑ Customer Specifications PER SMS-114-SM REV 1

Ryan Potter
Authorized Signature

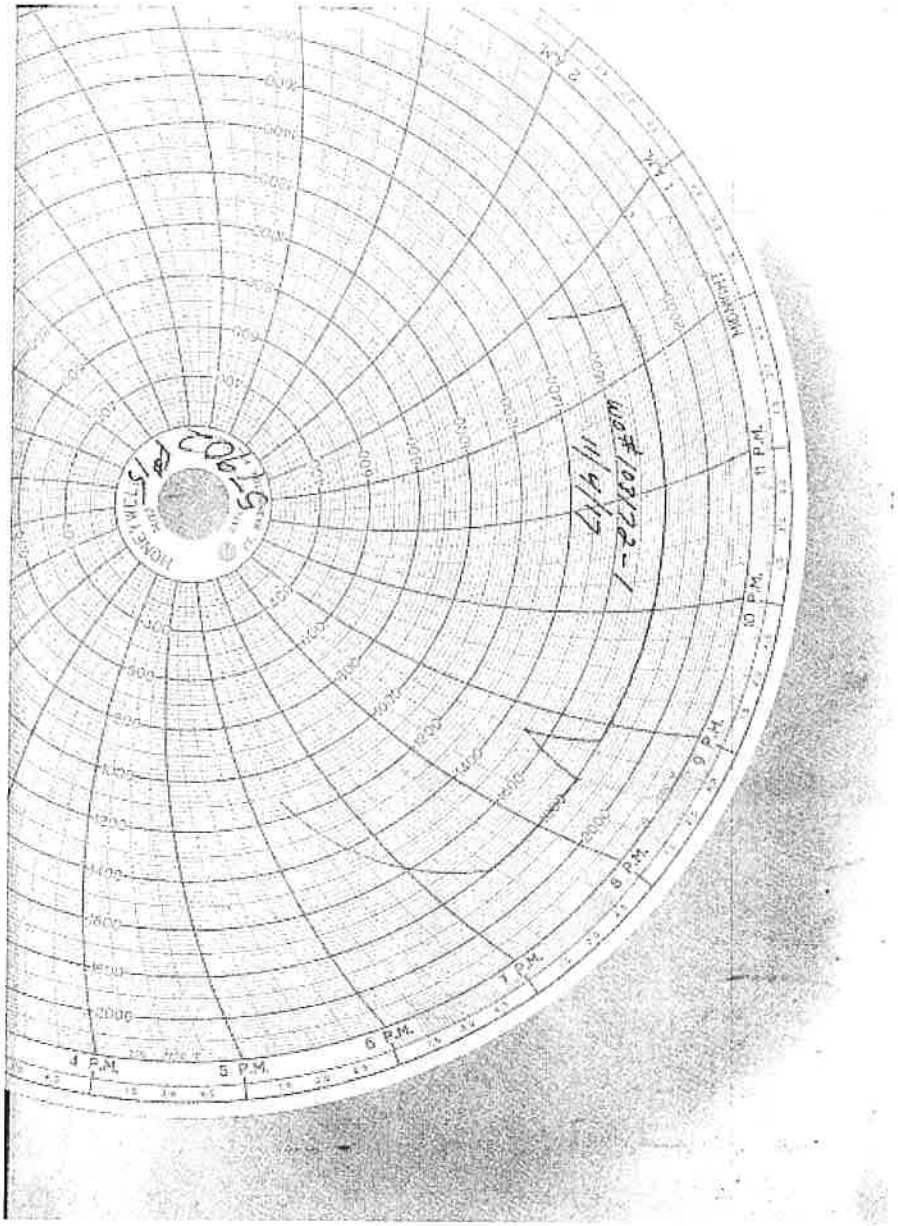
11/06/2017
Date

Ryan Potter
Printed Name

Form QAF005 Rev.8, 09/13/11

S17232

ALL SOURCE HEAT TREATING INC.
484 Eastchester Ave E., St. Catharines, ON L2M 6S3 Tel: (905) 682-2289



Customer Name: Grayloc Products Canada Ltd.

Customer Order #: PC00007189

Work Order #: 103172-1

Chart #: 57902

Heat Treatment Stage: SOLUTION ANNEAL

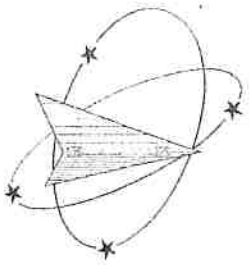
Lot # / Heat Code: Lot# S17232/Job# JC11253

Qty of Load: 8 PCS

Test bars shipped: 0

Item Number: ALL-SASMS-114-SM

S17232



Westmoreland Mechanical Testing & Research, Inc.
P.O.Box 388; 221 Westmoreland Drive
Youngstown, PA 15696-0388 U.S.A.
Telephone: 724-537-3131 Fax: 724-537-3151
Website: www.wmtr.com E-Mail: admin@wmtr.com
WMT&R is a technical leader in the material testing industry

31 October 2017

M Page 1 of 1

Grayloc Products Canada LTD
837 Fourth Line
Oakville, ON L6L 5B8
Canada

WMT&R Report 7-78143
P.O. No. PC00007130 Line No. 3
Job No. JC11253
Lot No. S17232
Heat No. 52186-6V
Item MXBA0350T660SA

Attention: Mr. Bob McIsaac

Subject: Heat Treatment, Grain Size, and Hardness Test of Submitted Sample per ASTM A638/A638M-10

Introduction: One (1) sample, submitted as A638 Gr. 660 Type 2 material, was received in the laboratory, heat treated, sectioned, and prepared for testing with the following results.

Results:

HEAT TREATMENT

1800°F ± 25°F / 1 Hr / Water Quench
1425°F ± 15°F / 16 Hrs / Air Cool
1200°F ± 10°F / 16 Hrs / Air Cool

HARDNESS – ASTM E18-17e1 / ASTM E140be1
REQUIREMENTS: 248 HBW minimum

Actual	Disposition	Test Log No.
(33.09 HRC) 306 HBW	*Acceptable*	7638LH

GRAIN SIZE – ASTM E112-13 (Etchant: HCl + H2O + H2O2)
Requirements: Shall be 1 or finer

Sample ID: Grain Size: Average Grain Size ASTM No. 7 – *Acceptable* (Test Log No. 7633LH)

If you have any questions concerning this report, please feel free to contact me.
At your service,

Andrew M. Wisniewski
Metallographic/Chemical Analysis Manager
00/SW-JS/RM/RTM
K:/DRAWERS-ANDY W\GRAYLOC/2017/7-78143

S17232

Westmoreland Mechanical Testing & Research, Inc.
P.O.Box 388; 221 Westmoreland Drive
Youngstown, PA 15696-0388 U.S.A.
Telephone: 724-537-3131 Fax: 724-537-3151
Website: www.wmtr.com E-Mail: admin@wmtr.com
WMT&R is a technical leader in the material testing industry.

ACCREDITED
TESTING CERT 621-01 & 621-02

Accredited Nadcap Materials Testing Laboratory

CERTIFICATION

November 7, 2017
Grayloc Products Canada LTD
837 Fourth Line
Oakville, ONTARIO L6L 5B8

WMT&R Report No. 7-78143
P.O. No./Line Item No. PC00007130 / 3
Job No. JC11253
Heat No. 52186-6V
Lot No. S17232

Attention: Bob McIsaac

Subject: All processes, performed upon the material as received, were conducted at WMT&R, Inc. in accordance with the WMT&R Quality Assurance Manual, Rev. 11, dated 12/03/2008.
The following tests were performed on this order: HEAT TREAT, HARDNESS, MICRO, STRESS and TENSILE

HEAT TREATMENT

1800°F ± 25°F/1 Hr/Water Quench
1425°F ± 15°F/16 Hr/Air Cool
1200°F ± 10°F/16 Hr/Air Cool

TENSILE RESULTS: ASTM E8-16a
REQUIREMENTS: UTS ksi (Min 130\Max ---) 0.2% YS ksi (Min 85\Max ---) 4D Elong. % (Min 15\Max ---) RA% (Min 18\Max ---)
SPEED OF TESTING: 0.005 in./in./min., 0.05 in./min./in.
MATERIAL: ASTM A638 Grade 660 Type 2 (Modified)

DISPOSITION: Acceptable

Item	Sample	TestLog Number	Temp.	UTS ksi	0.2% YS ksi	Elong %	RA %	Modulus Msi	Ult. Load lbf	0.2% YLD. lbf	Orig. Dia. (in.)	Final Dia. (in.)	4D Orig GL (in.)	4D Final GL (in.)	Orig. Area (sq. in.)	Machine Number	A\U\R
MXBA0350T660SA	Tensile	7637LH	Room	155.5	109.9	21	36	26.1	31214	22072	0.5056	0.4044	2.00	2.41	0.20077240	M10	A

A\U\R: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

Matt Wojton
Tensile Supervisor

November 7, 2017

S17363

Westmoreland Mechanical Testing & Research, Inc.
P.O.Box 388; 221 Westmoreland Drive
Youngstown, PA 15696-0388 U.S.A.
Telephone: 724-537-3131 Fax: 724-537-3151
Website: www.wmtr.com E-Mail: admin@wmtr.com
WMT&R is a technical leader in the material testing industry.

ACCREDITED
TESTING CERT 621-01 & 621-02

Accredited Nadcap
Materials Testing Laboratory

November 6, 2017

CERTIFICATION

Section 1 of 1

WMT&R Report No. 14-17011412
PO Number PC00007130/3
Job Number JC11253
Item MXBA0350T660SA
Heat Number 52186-6V
Lot Number S17232

Grayloc Products Canada LTD
837 Fourth Line
Oakville, Ontario L6L 5B8
Canada

Attention: Bob McIsaac

Subject: All processes, performed upon the material as received, were conducted at WMT&R, Inc. in accordance with the WMT&R Quality Assurance Manual, Rev. 11, dated 12/03/2008. The following tests were performed on this order: Stress Rupture

STRESS RESULTS: ASTM E292-09e1
REQUIREMENTS: 23.0 Hours, 3.0% Elong
SOAK TIME: 90 Mins.
MATERIAL: A638 GR 660 TYPE 2

DISPOSITION: Acceptable

Sample ID	TestLog Number	Temp °F/°C	Rupture Time Hrs.	Elong %	RA %	Pan Ld. (LBS/KGS)	Stress (KSI/MPa)	Final Stress (KSI/MPa)	Change (Hrs.)	Orig Dia (In/mm)	Final Dia (in/mm)	RR/RD (in.)	Orig GL (in/mm)	Final GL (In/mm)	Machine Number	A/U/R
Stress 1	1854BB	1200/649	32.4*	34.0	54.7	203.4/92.3	65/448.2	75/517.1	31.4	0.2525/6.4135	0.1700/4.318	0.0075/0.2529	1.00/25.4	1.340/34.036	417	A
Stress 2	1855BB	1200/649	36.8*	35.4	54.7	202.8/92	65/448.2	75/517.1	31.4	0.2521/6.4033	0.1697/4.3104	0.0075/0.2526	1.00/25.4	1.354/34.3916	416	A

A/U/R: A=ACCEPTABLE, U=UNACCEPTABLE, R=REPORT

*Upload after 23 hrs/5 ksi/Every 8-10 hrs
Additional Specification: ASTM 638-(04) Paragraph 8.2
Reference WMTR Report Number 7-78143

S17232

SITE: 14 Bayhill Drive

Shane Staiger
Quality Representative

November 06, 2017

Grayloc Products Canada Limited

Unit 1, 1129 Northside Road, Burlington, Ontario, Canada, L7H 1H5
Telephone: 905-842-3150 Fax: 905-842-1785

CERTIFICATE OF HEAT TREATING

DATE:	September 11, 2018
BATCH NO:	524A
MATERIAL:	SA638 gr. 660
HEAT TREAT PROCEDURE:	1291-DOC-007/SMS-101/GPMS-14.0/SMS-116
HEAT TREAT PROCESS TYPE:	First Aging (1425 F)
LEAD OPERATOR:	B. Bartlett/R. Stakorac
FURNACE NUMBER:	F-1
CALIBRATION RECORD NUMBER FURNACE:	TUS05177
LOAD WEIGHT (lbs):	500
HARDNESS:	N/A (HRC)

Heat Treated Parts List: S181

Part	Quantity	Work Order	Serial Number	Lot Number
163023	2	JC12859		S17232
512004-HLU	11	JC12597		S17232
H90027-23	14	JC12717		S17232
512014-HLU	9	JC12600		S17232
H90031-52	10	JC12718		S17353
H90210-1	10	JC12729		S17233
H90659-23	12	JC12725		S17129

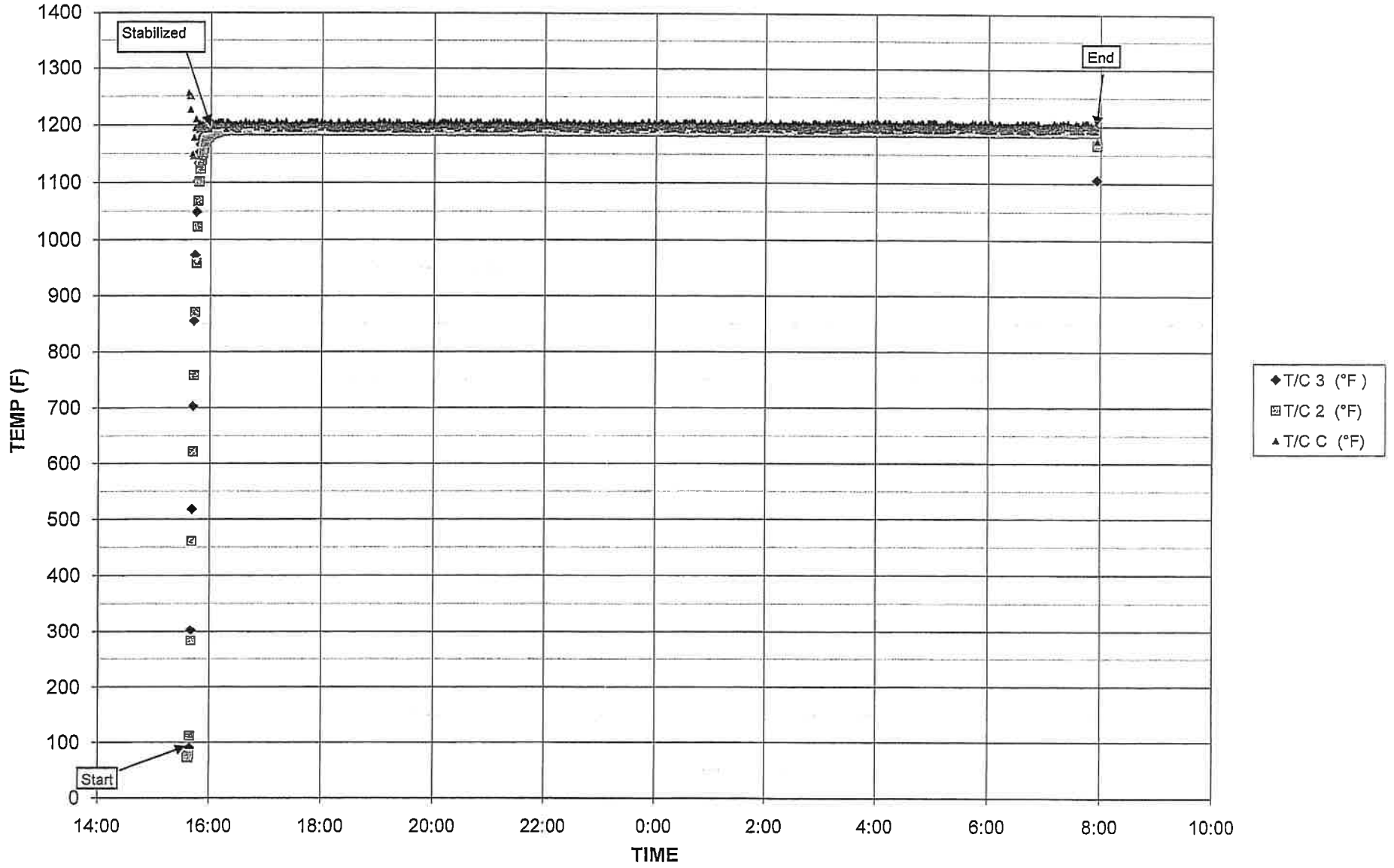
Heat Treated in compliance with the heat treatment procedure identified above.

Authorized Signature

September 20, 2018
Date

Robert McMillan
Printed Name

Grayloc Products Canada Ltd. FURNACE F1 CHART - Batch 524B September 12, 2018



Grayloc Products Canada Limited

Unit 1, 1129 Northside Road, Burlington, Ontario, Canada, L7H 1H5
Telephone: 905-842-3150 Fax: 905-842-1785

CERTIFICATE OF HEAT TREATING

DATE:	September 12, 2018
BATCH NO:	524B
MATERIAL:	SA638 gr. 660
HEAT TREAT PROCEDURE:	1291-DOC-007SMS-101/GPMS-14.0/SMS-116
HEAT TREAT PROCESS TYPE:	Second Aging (1200 F)
LEAD OPERATOR:	B. Bartlett/ R.Stakorac
FURNACE NUMBER:	F-1
CALIBRATION RECORD NUMBER FURNACE:	TUS05177
LOAD WEIGHT (lbs):	500
HARDNESS:	N/A (HRC)

Heat Treated Parts List:

Part	Quantity	Work Order	Serial Number	Lot Number
163023	2	JC12859		S17232
512004-HLU	11	JC12597		S17232
H90027-23	14	JC12717		S17232
512014-HLU	9	JC12600		S17232
H90031-52	10	JC12718		S17353
H90210-1	10	JC12729		S17233
H90659-23	12	JC12725		S17129

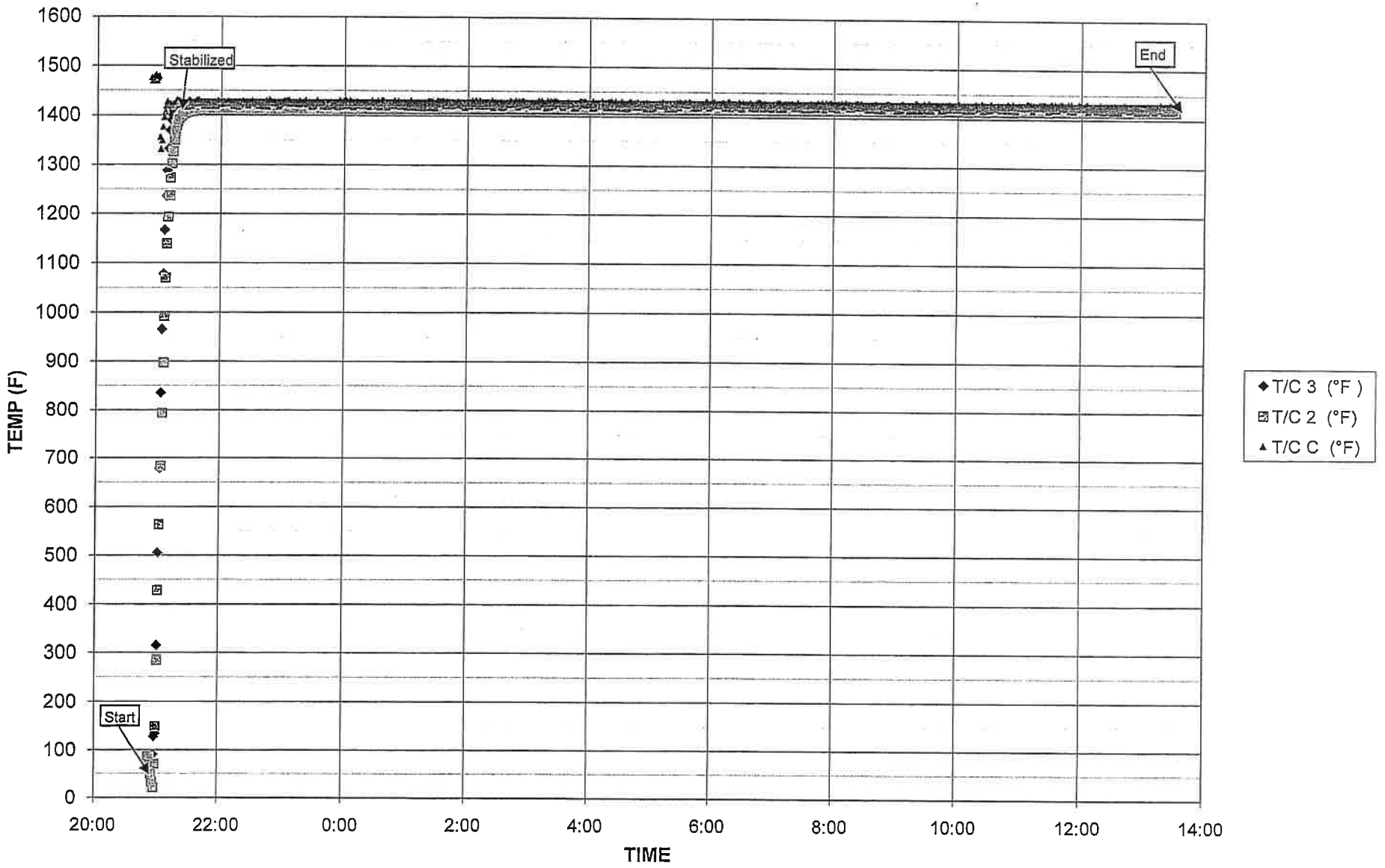
Heat Treated in compliance with the heat treatment procedure identified above.

Authorized Signature

September 20, 2018
Date

Robert McMillan
Printed Name

Grayloc Products Canada Ltd. FURNACE F1 CHART - Batch 524A September 11, 2018



GRAYLOC® PRODUCTS
www.grayloc.com
An Oceaneering International Company

837 Fourth Line, Oakville, Ontario, Canada, L6L 5B8
Telephone: 905-842-3150 Fax: 905-842-1785

HARDNESS INSPECTION FORM

JC# 12597
Description: 5"1200#-HLV
Material: 660

Procedure: 1281-DOC-007
Acceptance Range: 30-35
Hardness Scale: HRc.
Test Eq ID# 7201

Serial #	Lot #:	Operator Initials:			
1	SIDE A			SIDE B	
1 33.4	2	3	1 33.8	2	3

Serial # 2	Lot #: 517232	Operator Initials:			
1	SIDE A			SIDE B	
1 34.3	2	3	1 32.9	2	3

Serial # 3	Lot #: 517232	Operator Initials:			
1	SIDE A			SIDE B	
1 34.5	2	3	1 34.4	2	3

Serial # 4	Lot #: 517232	Operator Initials:			
1	SIDE A			SIDE B	
1 33.3	2	3	1 34.4	2	3

Serial # 5	Lot #: 517232	Operator Initials:			
1	SIDE A			SIDE B	
1 33.5	2	3	1 33.7	2	3

Serial # 6	Lot #: 517232	Operator Initials:			
1	SIDE A			SIDE B	
1 33.8	2	3	1 34.0	2	3

Serial # 7	Lot #: 517232	Operator Initials:			
1	SIDE A			SIDE B	
1 33.9	2	3	1 34.1	2	3

Serial # 8	Lot #: 517232	Operator Initials:			
1	SIDE A			SIDE B	
1 33.6	2	3	1 33.1	2	3

Serial # 9	Lot #: 517232	Operator Initials:			
1	SIDE A			SIDE B	
1 34.3	2	3	1 33.7	2	3

Serial # 10	Lot #: 517232	Operator Initials:			
1	SIDE A			SIDE B	
1 34.1	2	3	1 34.1	2	3

Approved By: Name: Rick Signature: Date: 9/19/18

287.2

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837 Fourth Line, Oakville, Ontario, Canada, L6L 5B8
Telephone: 905-842-3150 Fax: 905-842-1785

HARDNESS INSPECTION FORM

JC #: 12597

Serial # 11			Lot #: S17232		Operator Initials: RAD / RAD
SIDE A			SIDE B		
1 33.4	2	3	1 34.1	2	3

Serial #			Lot #:		Operator Initials:
SIDE A			SIDE B		
1	2	3	1	2	3

Serial #			Lot #:		Operator Initials:
SIDE A			SIDE B		
1	2	3	1	2	3

Serial #			Lot #:		Operator Initials:
SIDE A			SIDE B		
1	2	3	1	2	3

Serial #			Lot #:		Operator Initials:
SIDE A			SIDE B		
1	2	3	1	2	3

Serial #			Lot #:		Operator Initials:
SIDE A			SIDE B		
1	2	3	1	2	3

Serial #			Lot #:		Operator Initials:
SIDE A			SIDE B		
1	2	3	1	2	3

Serial #			Lot #:		Operator Initials:
SIDE A			SIDE B		
1	2	3	1	2	3

Serial #			Lot #:		Operator Initials:
SIDE A			SIDE B		
1	2	3	1	2	3

Serial #			Lot #:		Operator Initials:
SIDE A			SIDE B		
1	2	3	1	2	3

Approved By: Name: [signature] Signature: [signature] Date: 9/19/18

Form #802 Rev.3, Hardness Inspection Test Form for Seal Rings
Revised by Mark Zirger/Approved By: Robert McMillan, January 2014

Grayloc Products Canada Ltd.

PMI Report Form

837 Fourth Line, Oakville
Ontario, Canada, L6L 5B8
Telephone: 905-842-3150
Fax: 905-842-1785

		Part Description:	Size 4 S/R
Date:	9.19.2018	Location:	Grayloc Products Canada Ltd.
Customer:	Husky O.I	Equipment:	Niton 800 Series Analyzer
Cust. PO:	8401254557	Serial No:	31160
Sales Order:	CC4847	Procedure:	1291-DOC-008A

Material:			Range of Elements	List of Elements															
A638 gr. 660 (A286)				Cr		Ni		Mo										Accept	Reject
			Min. %	13.5		24		1											
			Max %	16	X	27	X	1.5	X		X		X		X				
Job Order	Ser. No.	As Read by Analyzer	Grayloc Lot No. / Heat	As Read	± Error	As Read	± Error	As Read	± Error	As Read	± Error	As Read	± Error	As Read	± Error				
JC12597	1	A286	S17232	13.1	0.75	23.6	1.03	1.67	0.29									X	
JC12597	2	A286	S17232	14.5	0.73	23.6	0.99	1.68	0.27									X	
JC12597	3	A286	S17232	14.5	0.69	23.7	1.35	1	0.26									X	
JC12597	4	A286	S17232	13.4	0.87	23	1.19	1.85	0.35									X	
JC12597	5	A286	S17232	14.5	0.81	23.3	1.23	1.04	0.29									X	
JC12597	6	A286	S17232	13.5	0.7	23	1.3	1.34	0.25									X	
JC12597	7	A286	S17232	13.8	0.69	23.1	1.29	1.31	0.24									X	
JC12597	8	A286	S17232	15.1	0.74	23.3	1.25	1.58	0.27									X	
JC12597	9	A286	S17232	14.1	0.81	22.8	1.37	1.17	0.31									X	
JC12597	10	A286	S17232	14.7	0.69	23.5	1.27	1.34	0.25									X	
JC12597	11	A286	S17232	14.2	0.71	23.1	1.2	1.17	0.25									X	

	Print Name:	Signature:	
Grayloc Inspector:	R. Ch		9/19/18
Client Representative:			