

HT # 59149-4C

**MATERIAL CERTIFICATION REPORT and  
CERTIFICATION OF QUALITY CONFORMANCE**



ELECTRALLOY  
B. O. CARLSON PLATE



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

**Customer Address**

COPPER & BRASS SALES  
ACCOUNTS PAYABLE  
P.O. BOX 5116  
SOUTHFIELD, MI 48086-5116

**Shipping Address**

COPPER & BRASS SALES  
WESTERN REGION MATERIALS  
13338 ORDENDR., BUILDING H  
SANTA FE SPRINGS, CA 90670

**Print Date Time**

03-Oct-2017 13:18

**Ship Note**

142632

**Certification ID**

171466-1

**Customer Order**

3400367695-r05

**Sales Order**

130582

Grade: 316L

Specification: Type 316/316L(UNS S31600/S31603) - ASTM A182/A182M-16a, AMS 5648M, AMS 5653H, ASTM A193/A193M-16(316), ASTM A320/A320M-15a (316), ASTM A479/A479M-17, ASTM A314-15, ASTM A473-16, ASTM A276-17, ANSI/NACE MR0175/ISO 15156-1:2015, QQ-S-763F, ASTM A336/A336M-15, ASME SA-182/SA-182M, ASME SA-336/SA-336M, ASME SA-320/SA-320M (316), ASME SA-479/SA-479M, SA-193/A193M all ASME 2015 Editions, ASTM A484/A484M-16 and any additional specifications which may be listed below.

Condition: HOT ROLLED / HOT FORGED, ANNEALED

Finish: ROUGH TURNED

Sales Order	Quantity	Heat	Lot ID	Weight	Size	Customer Mark
130582-1	1	59149	59149-4C	2,474 LB	Diam: 8.5960 in; Length: 148.2500 in	

Lot	Test	Result	Low Limit	High Limit
<b>SPECIFICATION RESULTS</b>				
<b>FINAL LADLE CHEMISTRY FOR AIRMELT</b>				
59149	C	0.011	0.000	0.030
59149	Mn	1.76	1.25	2.00
59149	P	0.024	0.000	0.040
59149	S	0.023	0.020	0.025
59149	Si	0.49	0.00	1.00
59149	Cr	16.36	16.00	18.00
59149	Ni	10.60	10.00	14.00
59149	Mo	2.08	2.00	3.00
59149	Cu	0.46	0.00	0.50
59149	N	0.089	0.000	0.100
59149	Co	0.15	0.00	0.20
<b>PASS / FAIL TESTS</b>				
59149-4C	Carb Net	PASS		
59149-4C	Macro Etch	PASS		
<b>REDUCTION AREA</b>				
59149-4C	RA LT (%)	79	50	999
<b>TENSILE</b>				
59149-4C	LT (PSI)	82800	75000	400000
<b>2% YIELD OFFSET</b>				
59149-4C	LT (PSI)	36300	30000	400000
<b>ELONGATION 4D</b>				
59149-4C	LT (%)	62	45	999
<b>BRINELL</b>				

59149-4C	(BBF)	148	140	200
<b>GRAIN SIZE</b>				
59149-4C	Grain Size TT (GRS)	3.5	0	9999
<b>ASTM PRACTICES - ASTM A262</b>				
59149-4C	Prac E LT	PASS		

This certificate or document shall not be reproduced except in full, without written approval of Electralloy/G. O. Carlson Inc.  
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.

From: TK Materials CA, Ltd.

Cust. M2M MACHINING

CstAr



Wgt.: 473 LB

Del.: 2405550618

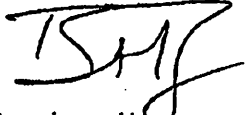
CstOr 2017-822

Date 11/10/2017

*Tomas Sanchez*

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 <b>ELECTRALLOY</b> G. O. CARLSON PLATE	 175 Main Street 04 City PA 16301 1 (800) 455-7273	COPPER & BRASS SALES	COPPER & BRASS SALES	03-Oct-2017 13:18	142632
		ACCOUNTS PAYABLE	WESTERN REGION MATERIALS	<u>Certification ID</u>	
		P.O. BOX 5116	13338 ORDENDR., BUILDING H	171466-1	
		SOUTHFIELD, MI 48086-511	SANTA FE SPRINGS, CA 90670	<u>Customer Order</u>	<u>Sales Order</u>
				5400367695-r05	130582

**Quality Statements:**  
 ASTM B1019-11, ASTM E572-13 and ASTM E1086-14 are methods used to determine the chemical analysis for Fe Base (High Alloy) alloys utilizing XRF, OES and Combustion and Fusion Methods.  
 The mechanical tests have been performed at Modern Industries, Materials Research Division located at 613 West 11th Street Erie, PA 16512-0399  
 At time of shipment, items and/or material produced under this order have not come in contact with Mercury or its compounds.  
 HWRR - 7.0:1 from a 25"x25" square ingot  
 Material Certification conforms to Certificate 3.1 as in EN 10204:2010  
 Material represented was Ultrasonically Inspected to Electralloy in house procedure WU1001 and found acceptable with no rejectable indications.  
 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 12/01/2015, which meets the requirements of AS9100C ISO9001(2008), MIL-I-45208A including Amendment 1 and 2, ASME Code Section 3, Subsection NCA 3800.  
 Material represented was solution annealed at 1925 degrees F +/-25 degrees F, held minimum 30 minutes per inch of thickness and water quenched.  
 Material was not exposed to Radium or other radioactive materials while at our facility.  
 Melting and Refining Source - Electralloy  
 Method of Manufacture - Electric Arc Furnace Melt AOD Refined  
 Restriction on Acquisition of Specialty Metals.  
 All items are in full compliance with all purchase order and specification requirements.

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. 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: Bart Plyler  
 Title: QC Technician  
 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.  
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