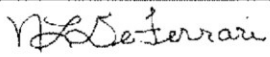
 ATI Flat Rolled Products 500 Green Street Washington, PA 15301	Certificate of Test		 Noreen DeFerrari - Sr. Manager, Quality	
	Mill Information		Customer Information	
	Cert Number 0188590-00 Sales Order 50-108-356 Cert Date Jan-29-2019	Name PO CRP-19804-LT PO Date Oct-15-2018		
		TI QA 3/13/19		

Material Information


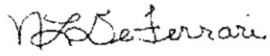
ATI GRADE 2 UNALLOYED TITANIUM	
PMP HOT ROLLED PLATE ANNEALED POLISHED FINISH COMMERCIAL CUT EDGE	
SPE 113591	ASTM-E-112-13
ASTM-F-67-13 R2017	ISO 5832-2:1999E
ASTM-B-265-15 - GRADE 2	

Piece Information

	Gauge	Width	Length					Total Wt
Pcs	(in)	(in)	(in)	Heat #	Piece ID	Section Id	Lot #	(lbs)
Item: 003	Cust-Id:		Govt-Contract-#:			Govt-DO-Rating:		
	Cust-Job:		ScheduleB:					
1	.7874	51.9300	149.9300	UCR8F78	CE92383-0001	A4A	482027	999
1	.7874	51.9300	149.9300	UCR8F78	CE92383-0002	A4B	482027	999
Item: 005	Cust-Id:		Govt-Contract-#:			Govt-DO-Rating:		
	Cust-Job:		ScheduleB:					
1	.9843	54.0000	140.0000	UCR8F78	CE92382-0001	A3A	482028	1213
1	.9843	54.0000	140.0000	UCR8F78	CE92382-0002	A3B	482028	1213

Chemistry Testing

Element (wt %)	Requirements		Final Heat Analysis		Final Heat Analysis	
	Min	Max	UCR8F78 BOT	Loc	UCR8F78 TOP	Loc
C	---	.08	.01	RW	.01	RW
TI	---	---	BAL	--	BAL	--
N	---	.03	.01	RW	< .01	RW
FE	---	.30	.13	RW	.12	RW
O2	---	.25	.16	RW	.15	RW
ROE	---	.10	< .10	--	< .10	--
ROT	---	.40	< .40	--	< .40	--

 ATI Flat Rolled Products 500 Green Street Washington, PA 15301	Certificate of Test		 Norson DeFerrari - Sr. Manager, Quality
	Mill Information		Customer Information
	Cert Number 0188590-00 Sales Order 50-108-356 Cert Date Jan-29-2019	Name PO CRP-19804-LT PO Date Oct-15-2018	

Chemistry Testing

ATI Flat Rolled Products performs chemical analysis by following techniques for testing locations TC, BN, & LO:
C, S by combustion/infrared; N, C, H by inert fusion/thermal conductivity;
Mn, P, Si, Cr, Ni, Mo, Cu, Sb, Co, V, by WDXRF; Pb, Bi, Ag by GFAA;
B by OES; Al and Ti (>=0.10%) by WDXRF, otherwise by OES.

UCR8F78 - Material was produced by EB melting.
USA melt and manufacture

ROE = Residuals - Others Each

ROT = Residuals - Others Total

Chemistry results are reported in weight percent (wt.%)


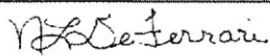
Mechanical Testing

	LOT 482028			LOT 482028			LOT 482027			LOT 482027		
Condition:	ANNEALED			ANNEALED			ANNEALED			ANNEALED		
Direction:	LONGITUDINAL			TRANSVERSE			LONGITUDINAL			TRANSVERSE		
Temperature:	ROOM TEMP			ROOM TEMP			ROOM TEMP			ROOM TEMP		
Spec:												
Test Limit	Units	Result	Loc	Result	Loc	Result	Loc	Result	Loc	Result	Loc	Loc
YS 0.2% OFFSET	psi	47400.	TC	56100.	TC	46500.	TC	56800.	TC			TC
TENSILE	psi	72200.	TC	74500.	TC	72200.	TC	75000.	TC			TC
ELONG. IN 2"	%	27.	TC	25.	TC	28.	TC	27.	TC			TC
A(5.65) ELONG.	%	23.	TC	22.	TC	25.	TC	24.	TC			TC
RED OF AREA	%	56.	TC	61.	TC	56.	TC	57.	TC			TC
HARDNESS	---	164. HBW	TC	---	---	168. HBW	TC	---	---			---

When hardness is measured using the Brinell scale, the indentation measuring device is Type A.

Mechanical Property Requirements

Condition:	ANNEALED				ANNEALED	
Direction:	LONGITUDINAL				TRANSVERSE	
Temperature:	ROOM TEMP				ROOM TEMP	
Spec:						
Test Limit	Units	Min	Max	Min	Max	
YS 0.2% OFFSET	psi	40000.	65000.	40000.	65000.	

 ATI Flat Rolled Products 500 Green Street Washington, PA 15301	Certificate of Test		 Norree DeFerrari - Sr. Manager, Quality
	Mill Information		Customer Information
	Cert Number 0188590-00 Sales Order 50-108-356 Cert Date Jan-29-2019	Name PO CRP-19804-LT PO Date Oct-15-2018	

Mechanical Property Requirements

Condition:		ANNEALED		ANNEALED	
Direction:		LONGITUDINAL		TRANSVERSE	
Temperature:		ROOM TEMP		ROOM TEMP	
Spec:					
Test Limit	Units	Min	Max	Min	Max
TENSILE	psi	50000.	---	50000.	---
ELONG. IN 2"	%	20.	---	20.	---
A(5.65) ELONG.	%	20.	---	20.	---
RED OF AREA	%	---	---	---	---
HARDNESS	---	---	---	---	---

Other Testing


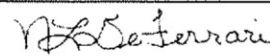
Test ID	Result Name	Result	Units	Loc	Requirements
CE92382	HYDROGEN PROD	.0002	%	TC	.0125 max
CE92383	HYDROGEN PROD	.0003	%	TC	.0125 max

Metallography - General

Test ID	Result Name	Condition	Test Result	Loc	Requirements
482028	GRAIN SIZE	ANNEALED	7.	TC	5. min
482027	GRAIN SIZE	ANNEALED	6.5	TC	5. min
CE92382	ALPHA CASE	ANNEALED	PASS	TC	---
CE92383	ALPHA CASE	ANNEALED	PASS	TC	---
482028	MICROSTRUCTURE	ANNEALED	PASS	TC	---
482027	MICROSTRUCTURE	ANNEALED	PASS	TC	---

Metallographic magnification: 100X; Etchant used KROLLS ETCH

For grain size measurements, a lower number corresponds to a coarser grain size

 ATI Flat Rolled Products 500 Green Street Washington, PA 15301	Certificate of Test		 <small>M. DeFerrari - Sr. Manager, Quality</small>
	Mill Information	Customer Information	
	Cert Number 0188590-00 Sales Order 50-108-356 Cert Date Jan-29-2019	Name PO CRP-19804-LT PO Date Oct-15-2018	

Certification Statements

ATI Flat Rolled Products processing and testing incorporates the removal of undesirable alpha case and other surface contamination.

EN 10204:2005 - 3.1 Certificate does not imply that material is an approved PED grade. For a complete listing of approved PED grades, visit our website at www.atimetals.com.

The manufacturer for ingot material is as follows: Heats beginning or ending in "UC", "EM", or "WC" were Electron Beam melted at ATI-Richland Operations, Richland, Washington (USA) and manufactured in the USA. Heats beginning or ending in "R", "VU" were multiple melted (VAR final melt) at VSMPO, Salda, Russia and manufactured in the USA. Heats beginning or ending in "VS" were Electron Beam melted at Strategy BM LTD., Kiev (Ukraine) and manufactured in the USA.

The supplied material has been stress relieved at low temperature.

ATI Flat Rolled Products does not use mercury in the testing or production of its products.

No welds/weld repairs performed.

EN 10204:2005 3.1 Certificate.

General Statements

The Finishing Location for ALL PIECES is ATI-FRP
The Shipping Location is ATI-FRP MONACA, PA

TESTING WAS PERFORMED AT THE FOLLOWING LOCATIONS

RW = ATI-Richland; 3101 Kingsgate Way; Richland, WA. 99354

TC = ATI FLAT ROLLED PRODUCTS; 1300 Pacific Avenue; Natrona Heights, PA 15065

Knowingly and willfully recording any false, fictitious or fraudulent statement or entry on this document may be punished as a felony under Federal Statutes, including Federal Law, Title 18, Chapter 47.

WARNING: Processing that makes fumes, dust, or solutions may cause lung disease. Please see Safety Data Sheet for further information which has been supplied to your Purchasing Department. For an additional copy, please refer to our website at:
www.atimetals.com/Products/ati-sds

For access to online Certifications of Test, please register at MyATI.ATIMetals.com

This Certified Material Test Report is a true representation of the data on file. The reported results conform to the sales contract and specification(s) as set forth in ATI Flat Rolled Products order acknowledgement. This Certificate of Test may not be reproduced except in full without the written authorization of the company.

ATI Flat Rolled Products website contains listing of material produced, general technical and contact information, and current quality and company accreditations including but not limited to ISO-9001, AS-9100, Nadcap, and ISO/IEC 17025. Please visit us at www.atimetals.com