LHe Tank Material Heat Log

HEAT LOG
LIQUID HELIUM TANK
FEED BOX C

Item	Part No	Description	Qty	Unit	PoNo	Heat No
25I111-1	25I106	304LSS-SA240 3/8"PL x 55.45" x 42.50" Hot Rolled Annealed & Pick	1	EA	008640	818965
25I111-2	25I898	304LSS-SA479 3" OD Rnd Bar x 1.25" Annealed & Pickled	4	EA	008608	D90155A
25I111-4	25I102	304LSS-SA276/SA479 1"x4" Bar x 55.43" long Hot Rolled Annealed	1	EA	008678	233636
25I111-5	25I103	304LSS-SA276/SA4791"x3" Bar x 55.43" long Hot Rolled Annealed	1	EA	008678	288340
25I111-6	25I104	304LSS-SA240 3/4" per Sketch LBL-25I104	1	EA	008640	02F3
25I111-7	25I105	304LSS-SA240 3/8"PL x 55.45" x 35" Hot Rolled Annealed & Pickled	1	EA	008640	821424
25I111-8	25I107	304LSS-SA240 3/8" PL to Sketch LBL-25I107	5	EA	008640	817467
25I111-9	25I108	304LSS-SA240 1/4"PL to Sketch LBL-25I108	4	EA	008640	819785
25I111-10	25I109	304LSS-SA240 1/4"PL to Sketch LBL-25I109	4	EA	008640	819785
25I111-11	25M860	304LSS-SA479 2" OD Rnd Bar x 1.44" Annealed & Pickled	4	EA	008608	150467
25I111-20	25I899	304LSS-SA479 2.25" Sq Bar x 5.13" Annealed & Pickled	2	EA	008609	B5802
25I111-21	25I907	304LSS-SA269 2.50" OD x .065" w Tube	6.5	IN	008678	731741
25I111-22	25I908	304LSS-SA312 1/2" SCH5 Pipe	2.75	IN	008678	KC88
25I111-23	25I909	304LSS-SA269 1" OD x .065" w Tube	11	IN	008678	898613
25I111-24	25I900	304LSS-SA479 1.5" x 2.5" Bar x 3.25"Hot Rolled Annealed & Pickld	2	EA	008609	B5802
25I111-26	25I115	304LSS-SA240 1"PL Sketch LBL-25I115	1	EA	008640	602194
25I111-30	25I110	304LSS-SA511 Seamless Mech.Tubing 6" OD x .25" w Tube	2	FT	008712	412340

CERTIFIED MATERIAL TEST REPORT

SSC ORDER NO.

SANDMEYER STEEL COMPANY

(Incorporated)

ONE SANDMEYER LANE • PHILADELPHIA, PA 19116-3598
800-523-3663 • FAX 215-677-1430 • www.SandmeyerSteel.com

Family Owned and Managed—
Making Stainless Steel and Nickel Alloy Plate Products
Since 1952

BILL TO

CERTIFICATE OF TEST

SANDMEYER STEEL COMPANY

QUALITY CONTROL DEPARTMENT

CUSTOMER ORDER NO.

DATE:

GRADE: SPECIFICATION: HEAT NO.:

PIECES DESCRIPTION

P.O. 6640

00918-251106

HEAT NO.								

HEAT NO.	Yield	Tensile	Elong	Hardness		

115C RLV03/02

RECORDS OF ALL TESTS ARE MAINTAINED AT SANDMEYER STEEL COMPANY

CERTIFIED MATERIAL TEST REPORT

SSC ORDER NO. [illegible]

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Since 1952

BILL TO

[illegible]

CERTIFICATE OF TEST

WE CERT BY THAT THE CHEMICAL ANALYSIS AND MECHANICAL TEST RESULTS APPEARING IN THIS CERTIFICATE ARE CORRECT AND TRUE AS REPORTED BY THE MANUFACTURER

SANDMEYER STEEL COMPANY

[illegible]

QUALITY CONTROL DEPARTMENT

CUSTOMER ORDER NO. [illegible]

DATE: [illegible]

GRADE: [illegible]

SPECIFICATION: [illegible]

HEAT NO.: [illegible]

PIECES	DESCRIPTION
	[illegible]
[illegible]	[illegible]

R0.8640

00918-25106

HEAT NO.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

HEAT NO.	Yield	Tensile	Elong	Hardness		
[illegible]	[illegible]	[illegible]	[illegible]	RB [illegible]		

[illegible] MATERIAL SOLUTION ANNEALED AT [illegible] DEGREES [illegible]
AND WATER QUENCHED OR RAPIDLY COOLED BY [illegible]
MATERIAL MANUFACTURED BY [illegible]

RECORDS OF ALL TESTS ARE MAINTAINED AT SANDMEYER STEEL COMPANY

CERTIFIED MATERIAL TEST REPORT

SSC ORDER NO. [illegible]

SANDMEYER STEEL COMPANY

(Incorporated)

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Family Owned and Managed —
Making Stainless Steel and Nickel Alloy Plate Products
Since 1952

BILL TO

[illegible]
SOUTHWEST HIGHWAY
[illegible]

CERTIFICATE OF TEST

WE CERTIFY THAT THE CHEMICAL ANALYSIS AND MECHANICAL TEST RESULTS APPEARING IN THIS CERTIFICATE ARE CORRECT AND [illegible] AS REPORTED BY THE MANUFACTURER

SANDMEYER STEEL COMPANY

[illegible]

QUALITY CONTROL DEPARTMENT

CUSTOMER ORDER NO [illegible]

DATE: [illegible]

GRADE: [illegible] SPECIFICATION: [illegible] HEAT NO.: [illegible]

PIECES DESCRIPTION

[illegible]

PLATE NO [illegible]

P.O. 2640
00918-251106

HEAT NO.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

HEAT NO.	Yield #	Tensile #	Elong	Hardness		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		

[illegible] MATERIAL SOLUTION ANNEALED AT [illegible] DEGREES F MINIMUM
AND WATER QUENCHED OR RAPIDLY COOLED TO AIR
MATERIAL MANUFACTURED BY ANESTA [illegible]

RECORDS OF ALL TESTS ARE MAINTAINED AT SANDMEYER STEEL COMPANY

25I898

ISO 9002 Cert# 011227

****
* CERTIFICATION *
****

HEAT D90155A ORDER 0436011/007 SON 222793 BOL 0117823 TAG 1497810 12/17/02

SHIP TO:
A.M. CASTLE METALS
14001 ORANGE AVE.
310 630-1400
PARAMOUNT CA 90723

YOUR ORDER & DATE

02-16634 12/17/02 CUST# CASTLE01 CUST TAG#IAC-14858

ITEM DESCRIPTION

GRADE 304L/304
Size 304L CFA RND BAR 3 STD
Ship Condition A

Country of Melt : SWE
Country of Mfg. : USA

Total Bundles 1 SON Weight 2154

SPECIFICATIONS

AMS 5639G, 5647G
ASME SA182 E01 A02
ASME SA479 E01
ASTM A193 01A EX P 6.3
ASTM A276 00A
ASTM A484 00
AISI 304L,UNS S30403,SAES30403
AM CASTLE 3304-97 REV 22
SOL ANNEALED @ 1900 F MIN. WQ
NO WELD REPAIR

AMS QQ-S-763
ASME SA193 B8 E01 A02 EX P 6.3
ASTM A182-01
ASTM A262 98 PRACTICE E
ASTM A479 01
DIN 50049/EN 10204 3.1B
FED STD QQ-S-763F
WESTINGHOUSE 10705DH
WATER QUENCHED
FREE OF MERCURY CONTAMINATION

MECHANICAL & OTHER TESTS

Test Condition		A			
Hardness as shipped	HB	178	Hardness as tested	HB	178
Hardness as shipped	HRB	87	Hardness as tested	HRB	87
Grain size		7.0	Tensile strength,KSI (MPa)		85.0 (586)
Micro		OK	0.2% Yield Strngth,KSI(MPa)		32.6 (225)
Intergranular corrosion		OK			
Macro		OK	Elongation % in 4D		57.9
			Reduction of area %		77.6

CHEMICAL COMPOSITION

Carbon	(C)	.019	Manganese	(Mn)	1.610
Phosphorus	(P)	.023	Sulphur	(S)	.026
Silicon	(Si)	.430	Chromium	(Cr)	18.180
Nickel	(Ni)	8.380	Cobalt	(Co)	.130
Copper	(Cu)	.330	Moly	(Mo)	.350
Nitrogen	(N)	.064	Columbium	(Cb)	.009
Titanium	(Ti)	.004	Aluminum	(Al)	.003
Tin	(Sn)	.009	Ceriam	(Ce)	.007
Columbium/		.000			.000
Tantalum (Cb+Ta)		.003			.000
Iron	(Fe)	Balance			
Melt Practice		EAF			
Refining Practice		AOD			
De-long Ferrite		6.5			

Knowingly & willfully falsifying or concealing a material act on this form, or making false, fictitious or fraudulent statements or representations herein could constitute a felony punishable under federal statutes.

We hereby certify that the chemical analysis and/or test results shown in this report are correct as contained in the records of the company.

CASTLE METALS-LA
DATE REC'D 12-30-02
REC'D FROM Avesta
APPROVED BY DE
IAC 14858

M.F. Marcanio, Quality Manager

M F Marcanio

vestaPolarit, Inc.
ir Products
43 Crenshaw Pkwy.
chburg, SC 29729

Item 251102 PO008678

ATTN: John ABRAM

Acciaierie Valbruna s.p.a.

36100 VICENZA (Italia) - Viale della Scienza, 25 z.i.

TEST REPORT

EN 10204-2.2

N. 58477/2001

2028700
251102

Buyer: VALBRUNA CORP.
USA OAKLAND NJ 07436

Buyers P.o. No: 112-1686 / STOCK

Mill Order No: 01 E 48764 - 27 Packing List No: 2001/ 11763-P

Delivery Condition: COND.A, PICKLED

Size: FLAT 4" 1" Qty.Lbs.: 2366 Heat Paint:

SPECIFICATION

ASME (1) SA479,98,S30400/03,A
QQ-S-763,F,304/304L,A
ASTM A276,2000A,S30400/03,A
ASTM A262,98,PRACTICE E
ASTM A479,2000,S30400/03,A
ASTM A484,2000,.

(1) SECTION II PART A 98 EDITION THRU 00 ADD.

CHEMICAL ANALYSIS

Heat No.	C	Mn	P	S	Si	Ni	Cr	Mo	Cu
233636	0.018	1.54	0.028	0.027	0.49	8.14	18.35	0.50	0.61

Ti	Co		Sn	N					
	0.09			0.080					

MECHANICAL PROPERTIES

TS ksi	YS 0.2% ksi	E %	RA %	HARDNESS BRINELL	ROCKWELL 'B'	ROCKWELL 'C'	AS SHIPPED HARDNESS		
92	54	46	58	189			189		

MECHANICAL CAPABILITIES FOR HEAT TREATED CONDITION									

OTHER TEST(S) and/or REQUIREMENTS :

Material is free from contamination by mercury
Material is solution heat treated free from continuous carbide network.
Grain size method ASTM E112/96 : 6
Annealing temperature 1960 F for 0.5h / water
No welding or weld repair.
Micro and macro etch test : OK
Made in Italy
Intergranular corrosion test per ASTM A262,98,pract. E: OK.

TRACER# 055092

Melting process : E+AOD

Vicenza, 20/12/2001

Quality Control Manager M. MEZZOTTO

Inspector

cer 33 F MOD.LATEVIW

PO.8678

00918-251103

WALZWERKE EINSAL GMBH

UST-IdNr. DE 123 841 325

Walzwerke Einsal GmbH · Postfach 30 · 58766 Nachrodt (Westf.)

Abnahmeprüfzeugnis 3.1.B
nach DIN EN 10204
Inspection certificate
Certificat de reception

Nr. (No.) (No.): 12097 / 99 vom (of) (du): 03.11.99

Bestell-Nr. Your Order-No. No. de Commande: 01D99181

Herstellerzeichen Symbol of Manufacturers Sigle de L'usine: (E W)

Zeichen des Werkssachverständigen Inspector's stamp Poinçon de l'expert: (WEE)

Auftrags-Nr. our works No No. Ref	Pos. item	Abmessung mm Size Dimension	Gewicht kg weight poids lbs	Netto net/net	Anzahl Quantity Nombre
2191	22	76,200 X 25,400 mm flat 3 x 1 12-90	11.946	5.418	10

Werkstoff-Nr. Material-No No. de matière: 1.4399

Werkstoff-Normbezeichnung Standard Grade of Material Norme de matière: AISI 304/304L

Erzeugnis/Lieferbedingungen Product/Terms of delivery Produit/Conditions de livraison:

Steel bars AISI304/L,hot rolled,DIN 1o17,tol.acc.to ASTM A 484,quench.,pickl.,straight.,bars of 3658-4267mm+aris.shorts fr. 3o5o mm unt.1o% (12-14'+shorts fr.1o'unt.1o%),otherw.acc to ASTM A276-96,QQS 763 F Cond.A,ASTM A 193-97a B8, A32o-97 B8, A479/A479 97a, A182/A182 97c,ASME SA 193/98,SA 32o/98, SA 479/SA 479 A97,SA 182/SA 182 M95,intercr.corr.test acc.to ASTM A262,Prac.E:o.k.,AMS5639 G,AMS5647 G,Inspec.cert.Engl.

Schmelzen-Nr. Cast No. coulée No.: 288340

Erschmelzung Steelmaking Process Procédé d'élaboration: E

Chemische Zusammensetzung % Chemical Composition %/ Composition chimique %

C ,017	SI ,43	MN 1,73	P ,027	S ,023	CR 18,59
NI 10,23	MO ,31	CO ,077	N ,073	CU ,15	

Probe-Nr. Test-No. Essai-No	Streckgrenze Yield Point Limite d'allon.	1%-Dehngrenze 1% Point 1% Limite élast.	Zugfestigkeit Tensile strength Résistance à la traction	Dehnung Elongation Allongement	Einschnürung Reduction of Area Striction	Kerbschlagarbeit Impact Valve/ Resilience
	Rp0,2	Rp 1,0	Rm	A50	Z	Form: Type/Type Lage: Position Temp.: °C
	~~N/mm²~~	N/mm²	~~N/mm²~~	%	%	J
	psi 43067		psi 84674	69,0	68,0	

Härte/ Hardness/ Dureté: HB

Wärmebehandlung/ Heat treatment/ Traitement thermique:

Solution annealed 1050 Grad C quenched. No weld repair. ASTM-grain size: 5

Verwechslungsprüfung Test of identity Contrôle de identification

Maßkontrolle Dimension Inspection Inspection des Dimension

168,0

Bemerkung :/ remarks/ remarques:

Mercury: No contamination. Macro and Micro Tests / Satisfactory

Besichtigung Visual inspection Inspection visuelle

Nach DIN 50 914 ist der Werkstoff interkristallin beständig
according DIN 50 914 Material is resistant against intercryst. corrosion
selon DIN 50 914 le matériau est résistant à la corrosion intercristalline

Es wird bestätigt, daß die Lieferung den Anforderungen der angeführten Lieferbedingung entspricht.
The delivery corresponds to the requirements mentioned.
La livraison correspond aux exigences mentionnées.

Das Zeugnis wurde maschinell erstellt und ist gemäß EN 10204 ohne Unterschrift rechtsverbindlich.
The certificate has been established by machine and acc. to EN 10204 it is legal without signature.
Le certificat a été établi à la machine et selon EN 10204 et il est valide sans signature.

Anlagen Encls. Annexes

Walzwerke Einsal GmbH
Qualitätsstelle
Feldmann

Der Werks-Sachverständige
The Works Expert
L'expert d'usine

Host frei

CERTIFIED MATERIAL TEST REPORT

SSC ORDER NO.

SANDMEYER STEEL COMPANY

(Incorporated)

ONE SANDMEYER LANE • PHILADELPHIA, PA 19116-3598
800-523-3663 • FAX 215-677-1430 • www.SandmeyerSteel.com

Family Owned and Managed —
Making Stainless Steel and Nickel Alloy Plate Products
Since 1952

BILL TO

CERTIFICATE OF TEST

WE CERTIFY THAT THE CHEMICAL ANALYSIS AND MECHANICAL TEST RESULTS APPEARING IN THIS CERTIFICATE ARE CORRECT AND WERE AS REPORTED BY THE MANUFACTURER

SANDMEYER STEEL COMPANY

CUSTOMER ORDER NO

QUALITY CONTROL DEPARTMENT

DATE:

GRADE:

SPECIFICATION:

HEAT NO.

PIECES

DESCRIPTION

HEAT NO.	C	Mn	P	S	Si	Ni	Cr	Mo

HEAT NO.	Yield	Tensile	Elong	Hardness		

MATERIAL SOLUTION ANNEALED AT 1950 DEGREES F MINIMUM AND WATER QUENCHED OR RAPIDLY COOLED BY AIR
MATERIAL MANUFACTURED BY NORTH AMERICAN STAINLESS

RECORDS OF ALL TESTS ARE MAINTAINED AT SANDMEYER STEEL COMPANY

CERTIFIED MATERIAL TEST REPORT

SSC ORDER NO. [illegible]

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BILL TO

[illegible] MANUFACTURING
[illegible] SOUTHWEST HIGHWAY
[illegible]

CERTIFICATE OF TEST

WE CERTIFY THAT THE CHEMICAL ANALYSIS AND MECHANICAL TEST RESULTS APPEARING IN THIS CERTIFICATE ARE CORRECT AND TRUE AS REPORTED BY THE MANUFACTURER

SANDMEYER STEEL COMPANY

[illegible] - MANAGER QUALITY ASSURANCE

QUALITY CONTROL DEPARTMENT

CUSTOMER ORDER NO. [illegible]

DATE: [illegible]

GRADE: [illegible] SPECIFICATION: [illegible] HEAT NO.: [illegible]

PIECES	DESCRIPTION
	[illegible]
[illegible]	[illegible]

PLATE [illegible]

PO. 6640

00918-251105

HEAT NO.	C	Mn	P	S	Si	Ni	Cr	N
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

HEAT NO.	Yield *	Tensile *	Elong.	Hardness		
[illegible]	[illegible]	[illegible]	[illegible]	RF [illegible]		

[illegible] MATERIAL [illegible] AT [illegible] DEGREES [illegible] MINIMUM
AND WATER [illegible] RAPIDLY COOLED BY AIR
MATERIAL MANUFACTURED BY AVESTA INC

[illegible] REV03/02

RECORDS OF ALL TESTS ARE MAINTAINED AT SANDMEYER STEEL COMPANY

CERTIFIED MATERIAL TEST REPORT

SSC ORDER NO [illegible]

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(Incorporated)

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BILL TO

[illegible]

CERTIFICATE OF TEST

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SANDMEYER STEEL COMPANY

[illegible]

QUALITY CONTROL DEPARTMENT

CUSTOMER ORDER NO [illegible]

DATE [illegible]

GRADE [illegible] SPECIFICATION [illegible] HEAT NO. [illegible]

PIECES DESCRIPTION

[illegible]

PLATE NO [illegible]

P.O. 8640

00912-25116-5

HEAT NO.	C	Mn	P	S	Si	Ni	Cr	N
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

HEAT NO.	Yield	Tensile	Elong	Hardness		
[illegible]	[illegible]	[illegible]	[illegible]	RB [illegible]		

[illegible] MATERIAL [illegible] AT [illegible] AND WATER QUENCHED OR RAPIDLY [illegible] AIR
MATERIAL MANUFACTURED BY [illegible]

RECORDS OF ALL TESTS ARE MAINTAINED AT SANDMEYER STEEL COMPANY

CERTIFIED MATERIAL TEST REPORT

SSSC ORDER NO. [illegible]

SANDMEYER STEEL COMPANY

(Incorporated)

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Since 1952

BILL TO

[illegible] MANUFACTURING
[illegible] SOUTHWEST HIGHWAY
[illegible]

CERTIFICATE OF TEST

WE CERTIFY THAT THE CHEMICAL ANALYSIS AND MECHANICAL TEST RESULTS APPEARING IN THIS CERTIFICATE ARE CORRECT AND TRUE AS REPORTED BY THE MANUFACTURER

SANDMEYER STEEL COMPANY

[illegible] MANAGER QUALITY ASSURANCE

QUALITY CONTROL DEPARTMENT

CUSTOMER ORDER NO [illegible]

DATE: [illegible]

GRADE: [illegible] SPECIFICATION: [illegible] HEAT NO: [illegible]

PIECES | DESCRIPTION

[illegible] PLATE

[illegible] PLATE NO [illegible]

(C0916)

HEAT NO.	C	Mn	P	S	Si	Ni	Cr	N
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

HEAT NO.	Yield A	Tensile A	Elong	Hardness		
[illegible]	[illegible]	[illegible]	[illegible] IN [illegible]	[illegible]		

[illegible] MATERIAL SOLUTION ANNEALED AT [illegible] DEGREES F MINIMUM AND WATER QUENCHED OR RAPIDLY COOLED BY [illegible]
MATERIAL MANUFACTURED BY AVESTA INC

[illegible] REV03/02

RECORDS OF ALL TESTS ARE MAINTAINED AT SANDMEYER STEEL COMPANY

CERTIFIED MATERIAL TEST REPORT

SSC ORDER NO. [illegible]

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Making Stainless Steel and Nickel Alloy Plate Products
Since 1952

BILL TO

[illegible] TOOL & MANUFACTURING
[illegible] SOUTHWEST HIGHWAY
[illegible] DAWN [illegible]

CERTIFICATE OF TEST

WE CERTIFY THAT THE CHEMICAL ANALYSIS AND MECHANICAL TEST RESULTS APPEARING IN THIS CERTIFICATE ARE CORRECT AND TRUE AS REPORTED BY THE MANUFACTURER

SANDMEYER STEEL COMPANY

[illegible] MANAGER QUALITY ASSURANCE

QUALITY CONTROL DEPARTMENT

CUSTOMER ORDER NO. [illegible]

DATE: [illegible]

GRADE: [illegible] | SPECIFICATION: ASME SA-240 2001 ED | HEAT NO.: [illegible]

PIECES | DESCRIPTION

[illegible] PLATE

[illegible] THK
[illegible]
[illegible]

PLATE NO [illegible]

00918

HEAT NO.	C	Mn	P	S	Si	Ni	Cr	N
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

HEAT NO.	Yield	Tensile	Elong	Hardness		
[illegible]	[illegible]	[illegible]	[illegible]	RB [illegible]		

DESCRIPTION: MATERIAL SOLUTION ANNEALED AT [illegible] DEGREES F MINIMUM AND WATER QUENCHED OR RAPIDLY COOLED BY AIR
MATERIAL MANUFACTURED BY AVESTA INC

SSC REV03/02

RECORDS OF ALL TESTS ARE MAINTAINED AT SANDMEYER STEEL COMPANY

CERTIFIED MATERIAL TEST REPORT

SSC ORDER NO. [illegible]

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BILL TO

[illegible] MANUFACTURING [illegible]
[illegible] SOUTHWEST HIGHWAY
[illegible]

CERTIFICATE OF TEST

WE CERTIFY THAT THE CHEMICAL ANALYSIS AND MECHANICAL TEST RESULTS APPEARING IN THIS CERTIFICATE ARE CORRECT AND [illegible] AS REPORTED BY THE MANUFACTURER.

SANDMEYER STEEL COMPANY

[illegible] QUALITY ASSURANCE

QUALITY CONTROL DEPARTMENT

CUSTOMER ORDER NO [illegible]

DATE: [illegible]

GRADE: [illegible] SPECIFICATION: [illegible] HEAT NO. [illegible]

PIECES	DESCRIPTION		
	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]
	[illegible] — 00918-25106		
[illegible]	[illegible]	[illegible]	[illegible]
	[illegible] — 00918-25109		

HEAT NO.	C	Mn	P	S	Si	Ni	Cr	N
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

HEAT NO.	Yield *	Tensile *	Elong	Hardness		
[illegible]	42 [illegible]	[illegible]	[illegible] IN 2	RB [illegible]		

[illegible] MATERIAL SOLUTION ANNEALED [illegible] AND WATER [illegible] RADIOLOGICAL [illegible] MATERIAL MANUFACTURED BY [illegible]

RECORDS OF ALL TESTS ARE MAINTAINED AT SANDMEYER STEEL COMPANY

CERTIFICATE OF TESTS **ABNAHMEPRUEFZEUGNIS** **CERTIFICAT DE CONTRO**

CERT SERIAL# 000382589

TALLEY METALS
A Carpenter Company

Talley Metals Technology, Inc
P.O. Box 2498
Hartsville, SC 29551 Tel 843.335.7540 Fax 843.335.6465

- THE RECORDING OF FALSE, FICTICIOUS OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL STATUTES INCLUDING FEDERAL LAW, TITLE 18, CHAPTER 47.
- THE VALUES AND OTHER TECHNICAL DATA REPRESENT THE RESULTS OF ANALYSES AND TESTS MADE ON SAMPLES COLLECTED FROM THE TOTAL LOT. ORIGINAL DATA RECORDS CAN BE TRACED BY REFERENCE TO THE CARPENTER ORDER NUMBER.
- MATERIAL IS MANUFACTURED FREE FROM MERCURY, RADIUM AND ALPHA SOURCE CONTAMINATION.
- THIS DOCUMENT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF CARPENTER TECHNOLOGY CORPORATION.

25M860

03/27/03

CUSTOMER / BESTELLER / CLIENT

A.M. CASTLE & CO
3400 N WOLF RD
FRANKLIN PARK ,IL 60131

SELLER / VERKÄUFER / VENDEUR PAGE -

TALLEY METALS TECH, INC.
ACCOUNTS PAYABLE
P. O. BOX 2498
HARTSVILLE ,SC 29551

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/
01-76406	TLY352201 L10515	03/27/03	2105.0

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 150467

PRODUCT DESCRIPTION: TYPE 304-L0 ANNEALED COLD FINISH

CASTLE METALS F.R.
DATE REC'D 03/03 INC 14844
APPROVED BY DKC

SPECIFICATION: TALLEY 304L-T1A (12/10/98)
QQ-S-763F (06/27/96)
AMS 5639 REV H (07/ /02)
AMS 5647 REV H (07/ /02)
ASTM-A182-02 (CHEM ONLY)
ASTM-A193-01B (CL 1 EXCEPT PAR 6.3.1)
ASTM-A276-02A
ASTM-A314-97 REAPPROVED(2002)
ASTM-A320-02 (EXCEPT PAR 4.3.1)
ASTM-A479-02A
ASTM-A484-00
ASTM-A580-98 (SIZES .500" AND UNDER ONLY)
ASME-SA182 2001 EDITION-A02 ADDENDA (CHEM ONLY)
ASME-SA193 2001 EDITION (CL 1 EXCEPT PAR 6.3.1)
ASME-SA320 2001 EDITION (EXCEPT PAR 4.3.1)
ASME-SA479 2001 EDITION
AMS-QQ-S-763A (02/ /03)

SIZE 2.000000 IN.(50.80 MM) RD BAR

PRIMARY HEAT CHEMISTRY:

C	MN	SI	P	S	CR
0.022	1.74	0.46	0.020	0.023	18.29
NI	**MO**	**CU**	**CO**	**N**	
8.56	0.08	0.14	0.06	0.062	

INTERGRANULAR CORROSION TESTED TO ASTM-A262, PRACTICE E - ACCEPTABLE.
ANNEALED MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY CARBIDE PRECIPITATION (NETWORK).
THIS MATERIAL CONFORMS TO THE TECHNICAL REQUIREMENTS OF THE AMS SPECIFICATION REFERENCED ABOVE.
THIS MATERIAL IS CAPABLE OF CONFORMING TO THE TECHNICAL REQUIREMENTS OF ASTM A 182.
THIS MATERIAL WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REVISION 22, DATED 3/02.

DISCS MACROETCHED AND APPROVED

HARDNESS AS SHIPPED, HB - 185 (MIDRADIUS)

GRAIN SIZE PER ASTM E112: 8

CONTINUED ON NEXT PAGE

CERTIFICATE OF TESTS ABNAHMEPRUEFZEUGNIS CERTIFICAT DE CONTRO

CERT SERIAL# 000382589

TALLEY METALS
A Carpenter Company

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Talley Metals Technology, Inc.
P.O. Box 2498
Hartsville, SC 29551 Tel. 843.335.7540 Fax. 843 335 6465

03/27/03

CUSTOMER/BESTELLER/CLIENT

A.M. CASTLE & CO
3400 N WOLF RD
FRANKLIN PARK ,IL 60131

SELLER/VERKÄUFER/VENDEUR PAGE -

TALLEY METALS TECH, INC.
ACCOUNTS PAYABLE
P. O. BOX 2498
HARTSVILLE ,SC 29551

CUSTOMER ORDER NO./BESTELL-NR./N° DE COMMANDE	CARPENTER NO./WERKS-NR./N° DE REFERENCE INTERNE	DATE/DATUM/DATE	WEIGHT/GEWICHT/
01-76406	TLY352201 L10515	03/27/03	2105.0

HEAT NUMBER / SCHMELZE-NR. / N° DE COULEE : 150467

YIELD STRENGTH, (0.20 %) KSI(MPA)	47.9(330)
TENSILE STRENGTH, KSI(MPA)	91.0(627)
ELONGATION IN 2.00", %	52.0
REDUCTION OF AREA, %	75.0

WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS.

STEPHANIE E. MCCULLUM
QUALITY ASSURANCE ENGINEER
CARPENTER TECHNOLOGY CORPORATION

14844 CASTLE 3304-97

Stephanie McCullum

LUKENS

TEST CERTIFICATE

CUSTOMER P.O.: B342791 PT.6
DESCRIPTION: 2" MIN -X- 92.9133" -X- 83.1689"
4 - RECTANGLE 50.8MM -X- 2360MM -X- 2113MM

FILE NO: 8074-01-99
DATE: 03/31/98
MILL ORDER NO: 62729-002

SOLD TO: [redacted]

SEND TO: [redacted] 03-C

SHIP TO: 251899 & 251900

THIS MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASE ORDER REQUIREMENTS AND SPECIFICATION(S)

ASTM A240 YR 95A 304L/304
TYPE 304L/304, AMS 5511F (WAIVE CLM)
UNS S30403, ASTM A262-93A PRACT. A & E

ASTM A240-95A TYPE 304L/304, ASME SA240 95ED 96AD
ASTM A666-94A TYPE 304L/304, ASTM A480-95A

CHEMICAL ANALYSIS

MELT/SLAB	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	B	N			
B5802 /3																
B5802	.013	1.79	.032	.008	.39	.43	8.44	18.32	.44				.0740			
PROD ANALYSIS	.012	1.80	.030	.007	.38	.42	8.40	18.30	.44				.0760			

PRACTICES

TENSILES

	YLD (PSI X 100)	TENS X 100)	% ELONG 2"	% R.A.
3X	443	836	60.0	72.0

CHARPY V IMPACTS

TYPE	TEMP				MILS LATERAL EXPANSION			% SHEAR		

OTHER TESTS PERFORMED

BRINELL	- 170	TEST LOC-7
CORROSION	A262E	SATISFACTORY
CORROSION	A262E	SATISFACTORY

INFORMATION

EIGHT PER PIECE = 4509 LBS. 2050 KG.
ERCURY OR MERCURY COMPOUNDS ARE NOT USED IN THE
ANUFACTURE OF LUKENS®/WASHINGTON'S PRODUCTS.
☆ CORROSION TEST PER ASTM A262 PRACTICE A & E. ☆☆
ART NO. P53
/L☆ 04597
☆ SIZE = 2.0000"NOM X 92.9133"NOM X 83.3750"ACT X WGT. = 4458
LATE ID☆ P53-77, P53-78, P53-79, P53-80

HEAT TREAT CYCLES - MATL. OR TESTS - DEG FAHR.

MATL.	TEST	NOM TEMP	MIN TEMP	MAX TEMP	HOLD MINS	COOL METHOD	END TEMP
X	X	1950			0062	WQ	

HEAT TREAT CYCLES - TESTS ONLY - DEG FAHR.

START END TEMP	NOM TEMP	MIN TEMP	MAX TEMP	HOLD MINS	HEAT RATE MAX	COOL RATE MAX

E HEREBY CERTIFY THE ABOVE INFORMATION IS CORRECT:

Quality Assurance Laboratory

P.O. 8678

LTV COPPERWELD
TUBULAR PRODUCTS

LTV COPPERWELD MECHANICAL
GROUP STAINLESS
ELIZABETHTOWN, KY 42701
Telephone (888)855-8823
FAX (888)855-9123

Laser Tube
STAINLESS STEEL TUBING

00916-251907

MATERIAL TEST REPORT

STAINLESS ORDER 191066

SPECIFICATION
ASTM A249/A269
ASTM A249 01
ASTM A269 01
ASME SA249 01
ASTM A554 98

CUSTOMER ORDER
60-035879
FAX: (630)739-6783

GRADE	SIZE(O.D x WALL)	QUANTITY		SHIPPED	DATE
TP304/TP304L	2.500 X .065	1909 LB	1200.00 FT	04/24/03	04/24/03

CONDITION: TW STNLS TUBE AVG. WALL BRIGHT ANNEAL

PART NO. 2.5.065840

S# 00001947
50047818

CHEMICAL ANALYSIS

HEAT NO.	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	Al	N	OTHER	GRAIN SIZE
731741	.022 .00000	1.830	.032	.0090	.450	8.130	18.270	.390	.360		.086	Co .100	00 00

MECHANICAL PROPERTIES

HEAT NO	LOAD NO.	YIELD PSI	TENSILE PSI	ELONG %	RED AREA %	HARDNESS BHN	HARDNESS ROCKWELL	IMPACT FT.-LBS
731741	T3122340	46320	92320	2.0" 65			RB 87	

OTHER TESTING

Flange Test	Flattening Test	Reverse Bend	Au Under Water (PSI)
OK	OK	OK	
Flare Test	**Reverse Flattening**	**Eddy Current**	**Hydro (PSI)**
OK	OK	OK	

J K RATING

HEAT NO	A	B	C	D

LTV Copperweld Stainless Tubing Division does not use mercury, lead, sulfur or any other special metal alloy which is liquid at ambient temperature in its product or facility. Weld repair was not used to manufacture this product.
LTV Copperweld stainless steel tubing does not use any of the products targeted in the U.S. Clean Air Act of 1990

OTHER INSPECTION

BLH

MANUFACTURED IN USA

THIS TEST REPORT NOTARIZED WHEN REQUIRED
SWORN AND SUBSCRIBED BEFORE ME
THIS _____ DAY OF _____

NOTARY PUBLIC

Q. C. REVIEWED

Brent Hipdon, Quality Technician

MATERIAL PRODUCED TO THE SPECIFICATION(S) SHOWN ABOVE. NO ADDITIONAL SPECIFICATION(S) IS IMPLIED OR WARRANTED.

ST 2.5.065 840

00918-251908

☒ HEADQUARTERS:
795 REYNOLDS INDUSTRIAL PARK ROAD
GREENVILLE, PA 16125
PHONE (724) 646-1500
FAX (724) 646-1505 (LAB)

MARCEGAGLIA USA, Inc.

☐ 1001 EAST WATERFRONT DR.
MUNHALL, PA 15120
PHONE (412) 462-2185
FAX (412) 462-4160

:RTIFICATE OF TEST

SHIP TO SAME

MILL ORDER NO.	202460-00
PURCHASE ORDER NO.	60-34184
DATE SHIPPED	01/27/2003

SPECIFICATIONS

ASTM A312-01a AMD ASME SA312-98 EDITION/99 ADDENDA

OTHER SPECIFICATIONS

WE CERTIFY THAT THIS MATERIAL IS FREE FROM MERCURY CONTAMINATION & CONTINUOUS CARBIDE

FLAR	HYDRO	FLAT	FLAN	EDDY	RBND	RFLT
OK		OK		OK		

ADDITIONAL INFO

NETWORK DURING ITS MANUFACTURE AND PROCESSING. BRIGHT ANNEALED MATERIAL IS COLD WORKED - WELDED

ITEM	TYPE	O.D./N.P.S.	GA./SCH.	HEAT NO.	CARBON	MANG.	PHOS.	SULPHUR	SILICON	CHROMIUM	NICKEL	MOLY.	COPPER	COBALT	TI				
01	TP304/TP304L	1/2"	5	KC88	.022	1.49	.031	.015	.43	18.19	8.50	.36	.42	.11					
02	TP316/TP316L	4"	5	7703488	.023	1.48	.029	.017	.50	17.14	10.20	2.07	.28	.20					

ITEM	ROCKWELL HARDNESS	YIELD STRENGTH (PSI)	TENSILE STRENGTH (PSI)	ELONGATION	HYDRO PSI (IF APPLICABLE)	MELT SOURCE (IF APPLICABLE)	PIECES	FOOTAGE
01	B80	48,900	88,400	57%		F1	24	504'
02	B83	44,500	85,900	57%		D	10	203'

Q. C. REVIEWED 1/28

WE CERTIFY THAT THE CHEMICAL, PHYSICAL OR MECHANICAL TESTS REPORTED HEREIN ARE CORRECT AS SHOWN ON OUR RECORDS.

Q.C. MANAGER

3970-B (Rev. 12/94)

SP .84.065 831 SP 4.5.083 832

TRACER# 055095

P.O. 8678

E48

LTV COPPERWELD
TUBULAR PRODUCTS LTV

LTV COPPERWELD MECHANICAL
GROUP STAINLESS
ELIZABETHTOWN, KY 42701
Telephone (888)855-8823
FAX (888)855-9123

Laser Tube®
STAINLESS STEEL TUBING

00918 - 251909

00918 - 257635

MATERIAL TEST REPORT

STAINLESS ORDER NO.: 188535

CUSTOMER	SPECIFICATION	CUSTOMER ORDER
CHICAGO TUBE & IRON CO. 2531 WEST 48TH STREET CHICAGO IL 60632	ASTM A249/A269 ASTM A249 01 ASTM A269 01 ASME SA249 01 ASTM A554 98	CC2777 FAX: (773)523-1375

GRADE	SIZE(O.D x WALL)	QUANTITY	SHIPPED	DATE
TP304/TP304L	1.000 X .065	951 LB 1506.24 FT	04/10/03	04/10/03

CONDITION	PART NO	
LW STNLS TUBE AVG. WALL BRIGHT ANNEAL	CK0193	S# 00001883 50037281

CHEMICAL ANALYSIS

HEAT NO.	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	Al	N	OTHER	GRAIN SIZE
898613	.019 00000	1.800	.029	.0100	.530	8.310	18.170	.410	.460		.050		7 00

MECHANICAL PROPERTIES

HEAT NO	LOAD NO.	YIELD PSI	TENSILE PSI	ELONG %	RED AREA %	HARDNESS BHN	HARDNESS ROCKWELL	IMPACT FT-LBS	
898613	T3007349	49640	98860	2.0" 61			RB 87		

OTHER TESTING

Flange Test	Flattening Test	Reverse Bend	Air Under Water (PSI)
OK	OK	OK	
Flare Test	**Reverse Flattening**	**Eddy Current**	**Hydro (PSI)**
OK	OK	OK	

J-K RATING

HEAT NO.	A	B	C	D

LTV Copperweld Stainless Tubing Division does not use mercury, lead, sulfur or any other special metal alloy which is liquid at ambient temperature in its product or facility. Weld repair was not used to manufacture this product.
LTV Copperweld stainless steel tubing does not use any of the products targeted in the U.S. Clean Air Act of 1990

OTHER INSPECTION BLH

THIS TEST REPORT NOTARIZED WHEN REQUIRED
SWORN AND SUBSCRIBED BEFORE ME
THIS _____ DAY OF _____

NOTARY PUBLIC

Brent Higdon, Quality Technician

MATERIAL PRODUCED TO THE SPECIFICATION(S) SHOWN ABOVE. NO ADDITIONAL SPECIFICATION(S) IS IMPLIED OR WARRANTED.

CERTIFIED MATERIAL TEST REPORT

SSC ORDER NO [illegible]

SANDMEYER STEEL COMPANY

(Incorporated)

ONE SANDMEYER LANE • PHILADELPHIA, PA 19116-3598
800-523-3663 • FAX 215-677-1430 • www.SandmeyerSteel.com

Family Owned and Managed —
Making Stainless Steel and Nickel Alloy Plate Products
Since 1952

BILL TO

[illegible] MANUFACTURING
[illegible] SOUTHWEST HIGHWAY
[illegible]

CERTIFICATE OF TEST

WE CERTIFY THAT THE CHEMICAL ANALYSIS AND MECHANICAL TEST RESULTS APPEARING IN THIS CERTIFICATE ARE CORRECT AND TRUE AS REPORTED BY THE MANUFACTURER

SANDMEYER STEEL COMPANY

[illegible] MANAGER QUALITY ASSURANCE

QUALITY CONTROL DEPARTMENT

CUSTOMER ORDER NO [illegible]

DATE: [illegible]

GRADE: [illegible]

SPECIFICATION: [illegible]

HEAT NO.: [illegible]

PIECES

DESCRIPTION

[illegible] PLATE

[illegible] - 00918-251132 PLATE NO [illegible]

[illegible] PLATE NO [illegible]

[illegible] 00918-251576
251115

HEAT NO.	C	Mn	P	S	Si	Ni	Cr	N
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

HEAT NO.	Yield #	Tensile #	Elong	Hardness		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		

[illegible] MATERIAL SOLUTION ANNEALED AT [illegible] DEGREES F MINIMUM
AND WATER QUENCHED OR RAPIDLY COOLED BY AIR
MATERIAL MANUFACTURED BY AVESTA INC

[illegible] REV03/02

RECORDS OF ALL TESTS ARE MAINTAINED AT SANDMEYER STEEL COMPANY

P.O. 8712

00918-
251110

DMV STAINLESS France

B.P. 10 - 21501 Montbard Cedex -
Tel : 03 80 89 52 00 Fax : 03 80 89 52 37
Email : dmvfrance@dmv-stainless.com

No / Nr. / N°: 0291371

Page : 1 / 2

INSPECTION CERTIFICATE
ABNAHMEPRUEFZEUGNIS
CERTIFICAT DE RECEPTION
3-1-B - EN 10204: 1991 + A1:1997

PURCHASER / Besteller / Client : PRUDENTIAL STAINLESS PIPE CORP.
CUSTOMER'S ORDER No / Kundenbestellnr / N° Commande client : F07766
DMV ORDER No / Werksauftragsnr / N° Commande DMV : 204727360

Product :	Seamless Pipes	Hot finished	Annealed	Pickled Passivated
Erzeugnis :	Nathlose Stahlrohre	Warmgefertig	Abgeschreckt	Gebeitz
Type de Produit :	*Tubes sans soudure*	*Finis à chaud*	*Hypertrempés*	*Décapés Passivés*

Grade(s) and Specification(s) / Stahlsorte und lieferrorschriften / *Nuance(s) et spécification(s) :*
MT304L/MT304 VALIMA
ASTMA511/96

Marking of the product / Kennzeichnung / *Marquage:*
SUPREME -SEAMLESS- 6.000 OD X 0.250 WT ASTM A 511 - MT304L/304 -
HEAT NUMBER : 412340 - 204727360 - A AND P - LENGTH %%%% FT -

Supplementary requirements / Zusätzlic Anforderungen / *Prescriptions supplémentaires:*
Size Tolerances / Tolleranze / Tolérances Dimensionnelles: according to ASTM A511/96 AW TABLE 4

Pcs No	Weight	Total Length	OD	W.T	Min Length	Max Length
10	1454 Kg	62.482 m	152.40 mm	6.35 mm	6019 mm	6472 mm
	3205.46 Lbs	204.99 Ft	6.000 "	0.250 "	19.74 Ft	21.23 Ft

Chemical Analysis / Chemische Zusammensetzung / *Caractéristiques Chimiques : (%)*
Melting Process / Erschmelzungsart / *Elaboration :* *Electric/ Elektrisch / Electrique + AOD or VOD*
Heat No / Schmelzen Nr. / N° Coulée : 412340

		C	Mn	P	S	Si	Ni	Cr
Min							8.00	18.00
Max		0.035	2.00	0.040	0.030	1.00	11.00	20.00
Heat/Schmelzen/Coulée		0.010	1.66	0.027	.0280	0.39	10.07	18.29
Product	1	0.018	1.64	0.028	.0297	0.310	10.010	18.310

Mechanical and Metallurgical Properties / Mechanische und Metallurgische Kennwerte / *Caractéristiques Mécaniques et Métallurgiques*

TENSILE TEST 20 °C / Zugfestigkeit / *Traction*		Y.S 0.2% (PSI) Rp 0.2% / *Re 0.2%*	T. S(PSI) Rm	Elongation (2") A %
Long	Requirements :	Min 30000	Min 75000	Min 35
J985	Results :	40901	82184	53.1

HARDNESS TEST / HAERTE / *DURETE :*
J985 Requirements : <=90HRB 84