



INDUSTRIAL TESTING LABORATORY SERVICES, LLC
635 Alpha Drive – RIDC Park
Pittsburgh, PA 15238 Phone: 412.963.1900 Fax: 412.963.1926
e-mail: info@itls.com website: itls.com

TEST REPORT
L19072
February 17, 2012

Purchase Order No: 694689-000-CGD008

To: Shaw Modular Solutions LLC
3191 West Lincoln Road
Lake Charles, LA 70605

Attn: Nicholas Koseski

Sample Received:

On February 16, ITLS received Two (2) samples of 3/4" Stainless steel (Duplex) Plate for Ferrite evaluation, identified as follows:

Sample #	Heat #	Plate #	Supplier:	Supplier PO
1	401858	6336-2101	Outokumpu	726795

Acceptance:

Sample #	Test	Acceptance
1	Ferrite	APP-VL52-Z0-023, Rev. 1, ASTM E1245-03 (2008)

Test References:

Specification	Title
ASTM E3-11	Standard Guide for Preparation of Metallographic Specimens
ASTM E1245-03 (2008)	Standard Practice for Determining the Inclusion or Second-Phase Constituent Content of Metals by Automatic Image Analysis

Quality References:

Reference
10CFR21, 10CFR50.55(e) and 10CFR50 App.B
ASME NQA-1 – 1994 Basic and Supplementary Requirements
USNRC Regulatory Guide 1.28 Rev. 3
ITLS QA Manual Rev. 3 dated 06/20/08
No ITLS subcontractors used for completion of this order



**SHAW
POWER**

SEP 06 2012

003



Shaw Modular Solutions, LLC
ITLS Report L19072
February 17, 2012

Results:

Ferrite Testing – ASTM E1245-03 (2008)

Sample #	Ferrite (%)
A	52
B	48
Required	40 - 60%

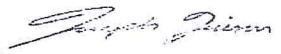
Acceptable

Ferrite Volume fraction based on image analysis of 25 fields per sample.



This certification affirms that the contents are correct and accurate, and that the test operations performed by Industrial Testing Laboratory Services are in compliance with the material specification, ITLS Quality Assurance Manual Rev. 3 dated 6/20/2008, ASME NQA-1 1994, Regulatory Guide 1.28, 10 CFR 50 App. B, 10 CFR Part 21 and any additional requirements of SMS Purchase Order # 694689. Test Results comply with the PO required material specification(s) as noted below.

All Samples: **ACCEPTABLE**

Signature 

Date 2/17/2012

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SEP 06 2012

003

CERTIFICATE - ZEUGNIS - CERTIFICAT		Page Seite 1(2)	OUTOKUMPU
EN 10 204-3.1			
Date - Datum	Load - Ládung - Chargé No	Cert.No - Zeugnis Nr	
120717		2071686.R00	

Your order - Ihre Bestellung - Votre commande	Outokumpu Order - Auftrag - Ordre	Pack - Kolli - Colis No
775291 OI.	200731	
Purchaser - Besteller - Acheteur	Requirements - Anforderungen - Exigences	
Shaw Modular Solutions, LLC 3191 W. Lincoln Road 70605 LAKE CHARLES, LA USA Dest To buyer by mail Product - Erzeugnisform - Produit Stainless steel plate, hot rolled Solution annealed, pickled/No.1 Finish Grade - Werkstoff - Nuance * LDX 2101 UNS S32101	ASTM A240M-11a APP-VL52-Z0-023 Rev.1 ASTM A 577-90 ASTM A578 A480/A480M Charpy impact test acc. ASTM A923 Method B at -40°C Min average=27J/27J single Ultrasonic examination: ASTM A 577 and A 578 Level B	

Brand-Mark Herstellerzeichen Signe du Producteur		Inspector's stamp Abnahme - Stempel Estamp de l'expert		Melting process Erschmelzungsart Procédé de fusion	E+AOD
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Marking - Kennzeichnung - Marquage						
Plate No, Dimension, Heat No, Lot No, Incl. *						
Extent of delivery - Lieferumfang - Étendue de livraison						
Item	Pcs	Kg	Dimension	Abmessung	Heat No	Lot No
Pos	Anzahl				Schmelze Nr	Los Nr
	Nombre		mm		Coulée	Lot No
2	5		19.05 * 2286 * 11887		421625	243531
Plate No 9080 3001,-3101,-3201,-3401,-3501						
Blech Nr						
Tôle No						

Chemical composition - Chemische Zusammensetzung - Composition chimique %											
Heat - Schmelze - Coulée No	C	Si	Mn	P	S	Cr	Ni	Mo	Cu	N	
Min	0.000	0.00	4.00	0.000	0.000	21.0	1.35	0.10	0.10	0.20	
Max	0.040	1.00	6.00	0.040	0.030	22.0	1.70	0.80	0.80	0.25	
421625	0.025	0.67	4.72	0.020	0.001	21.4	1.56	0.26	0.36	0.22	

Test results - Prüfergebnisse - Résultats des essais (1N/mm² = 1 MPa)	Direc. T = Transverse L = Longitudinal	Top/Bot F = Front B = Back	Form P = Flat C = Round	Location 1 = Center 2 = Close to Surface 3 = Standard 4 = At 1/4 of thickness
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Mechanical Properties

Tensile testing/Hardness Brinell

Plate-No	Direc.	Top/Bot	Location	Form Temp.	Rp 0,2	Rm	A50	HB
					C	N/mm2	N/mm2	%
Min						450	650	30
Max								290
3501	T	F	3	P	20	484	710	42
								216

Charpy impact test A923 B (V-notch)

Plate-No	Direc.	Top/Bot	Location	Form Temp.	Value 1	Value 2	Value 3	Average
					C	Joule	Joule	Joule
Min						27	27	27
Max								27
3501	T	F	3	P	-40	59	63	69
								64

The results comply with the requirements of the order.

Outokumpu Stainless AB
Business Line Special Plate
Quarto Plate Europe
SE-693 81 Degerfors, Sweden
Tel. +46 586 470 00, Fax +46 586 470 16, www.outokumpu.com
Registered office: Stockholm, Sweden.
Reg. No. 556001-8748, Vat No. SE556001874801



Computer generated original
Quality Inspector

Björn Olsson

CERTIFICATE - ZEUGNIS - CERTIFICAT		Page Seite 2(2)	OUTOKUMPU
EN 10 204-3.1			
Date - Datum	Load - Ladung - Charge No	Cert.No - Zeugnis Nr	
120717		2071686.R00	

Corrosion

3501 EN ISO 3651-2 Method A : Approved

Test report no. 2012-039 see appendix:

Metallography

3501F Microstructure examination: Approved

Ferrite examination acc. to ASTM E562

Plate-NoDirec. Top/BotLocation Form Temp. Ferrite
C %

Test report no. 2012-039 see appendix:

Min 40
Max 60
3501 T F 3 P 52.5

Chemical Composition

Productanalysis

	C	Si	Mn	P	Ni	Cr	Mo	N	S	Al	Nb	Ti	Cu	Co
	%	%	%	%	%	%	%	%	%	%	%	%	%	%
3501	0.027	0.68	4.67	0.024	1.59	21.33	0.26	0.211	0.001	0.022	0.005	0.003	0.36	0.047
	V													
	%													
	0.053													

Other Information

Heat treated at 1050°C and Quenched in water.

Ultrasonic testing see appendix:

SHAW
POWER
APR 20 2013
005

MAM
10-30-12
ISO 9001
12



Björn Olsson

ULTRASONIC INSPECTION CERTIFICATE
ULTRASCHALLPRÜFZEUGNIS
CERTIFICAT DE CONTRÔLE PAR ULTRA-SONS

OUTO
KUMPU

Ref. Gunnar Karlsson	Testing date - Prüfungsdatum - Date de contrôle 2012-06-27	Certificate No. - Zeugnis Nr - Certificat No. 2071686.R00
	Date of certificate - Zuegnisdatum - Date de certificate 2012-07-01	Appendix - Anlage - Annexe 1

MATERIAL IDENTIFICATION - MATERIALIDENTIFIKATION - IDENTIFICATION DU MATERIEL

Purchaser - Besteller - Acheteur Shaw Modular Solutions, LLC 3191 W. Lincoln Road 70605 LAKE CHARLES, LA USA	Your order - Ihre Bestellung - Votre commande 775291 OI.	Outokumpu order - Auftrag - Ordre 200731	Item - Pos 2
Grade - Werkstoff - Nuance LDX 2101; UNS S32101	Lot No - Los Nr - Lot No 243 531	Heat No - Schmelz Nr - Coulée 421625	Dimension - Abmessungen - Dimension (mm) 19.05 x 2286 x 11887
Plate No - Blech Nr - Tôle No 9080 3001, -3101, -3201, -3401, -3501			

TESTING PRESUMPTIONS - PRÜFVORAUSSETZUNG - CONDITIONS D'ESSAI

Testing method - Prüfmethode - Méthode d'essai Pulse echo/contact technique - Impuls-Echo kontakttechnik - Contrôle par contact/réflexion	Testing specification - Prüf spezifikation - Spécification d'essai Outokumpu specification: KF-10.4230 Other spec.-Andere spez.-Autre: KF-10.4231	Rev. 2 3
Inspection by - Überwachung von - Contrôle par Outokumpu Stainless, Degerfors	Acceptance standard - Zulässigkeitsgrenze - Critère d'acceptation A 578/A 577 Level B	
Testing scope - Prüfumfang - Etendue d'essai Straight, One side 100%, 10% overlap/Angel, Grid, 225mm; Edges 50mm 100%		
Notes - Bemerkung - Remarques		

EQUIPMENT - GERÄT - EQUIPMENT

Instrument - Gerät - Appareil P-scan 4/USM 35 X		No - Nr - No 206/2397a	
Probe - Prüfkopf - Palpeur TRL 4/MWB 45-2	Dim. probe - Apm. prüfkopf - Dim. Palpeur 6x20mm/8x9mm	Frequency - Frequenz - Fréquence 3MHz/2MHz	Angle - Einschallwinkel - Angle 0/45
Couplant - Ankopplung - Couplage Water	Notes - Bemerkung - Remarques		

SETTINGS

Reference method - Bezugsmethode - Methode de référence Backwall-Reflection (BR)		Ref. level - Bezugshöhe - Eche de référence TVG/DAC	
Sensitivity - Empfindlichkeit - Sensibilité Reference level +6dB		Scanning rate - Prüfgeschwindigkeit - Vitesse d'essai ≤150 mm/s	Pulse energy - Impulsstärke - Puissance 1
Notes - Bemerkung - Remarques			

TESTING CONDITIONS

Surface condition - Oberfläche - Etat de surface Stainless Steel, Hot rolled, Pickled
Notes - Bemerkung - Remarques

TEST RESULTS - PRÜFERGEBNISSE - RESULTAT D'ESSAI

Reporting level - Registrierschwelle - Seuil d'enregistrement			
☒	No discontinuity indications above the reporting level - Keine Fehler grösser als registrierschwelle - Aucune indications supérieure seuil 'enregistrement	☐	See annexure - Siehe anlage - Voir annexe
☒	Disposition - Beschluss - Evaluation Accepted - Akzeptiert - Approuvé	☐	Further investigation - Weiter untersuchung- Examen supplémentaire
Notes - Bemerkung - Remarques			

OPERATOR, INSPECTOR - PRÜFER, PRÜFAUFSICHT - OPERATEUR, CONTRÔLEUR

Testing performed by - Abnahme durch - Opérateur Gunnar Karlsson	Level acc. - Niveau gem. - Niveau s. SNT-TC-1A II	Sign.
Testing performed by - Abnahme durch - Opérateur Peter Smith	Level acc. - Niveau gem. - Niveau s. SNT-TC-1A II	Sign.
Approved by - Akzeptiert von - Approuvé par Outokumpu Stainless/Gunnar Karlsson	Inspector - Prüfaufsicht - Contrôleur	Inspector - Prüfaufsicht - Contrôleur
Position - Stellung - Poste Level II acc. to SNT-TC-1A	Agency - TUO - Agence d'inspection	Agency - TUO - Agence d'inspection
Sign. 	Sign.	Sign.
Notes - Bemerkung - Remarques		No - Nr - No

This certificate is based on internal report -
Dieses zeugnis basiert auf dem internen prübericht -
Ce certificat est basé sur le procès-verbal interne

OUTOKUMPU



RAPPORT

utfärdat av ackrediterat laboratorium
REPORT issued by Accredited Laboratory

1098
ISO/IEC 17025

TEST REPORT
No. 2012-039

Report Date 2012-07-04
Page 1/2

Customer Order No :

P.O. No. 775291 OI

Customer:

Shaw Modular Solutions
3191 W. Lincoln Road
70605 LAKE CHARLES, LA
USA

Test Specification:

Test material:

Outokumpu Order No:

200731

Report Issued by

Jonas Balderud
Mgr Testing
+46(0)58647628

ID	Heat No	Lot No	Grade
9080-3501	421625	243531	UNS S32101

Corrosion Test According to: ISO 3651-2:1998, Method A

Test Date: 12-05-19
Sample ID: 9080-3501

Method of preparation

Mechanical grinding in the longitudinal plane on all surfaces and sharp edges with grade 120

Chemical. Pickling is done at 50-60 ° C in a 136ml consisting of nitric acid, HNO₃ (65 w / o), 65ml of hydrofluoric acid, HF (38 w / o) and 1900ml deionised water.

Nature of the test piece

60(±3) x 20(±3) x 5(±0.5) mm

Test result

Approved (No cracks after bending)

SHAW
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APR 20 2013
005



Outokumpu Stainless AB (publ)

POSTADDRESS/POSTAL ADDRESS
SE-693 81 DEGERFORS
Sweden

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Nat 0586 - 470 00
Int +046 (0)586 470 00

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Org nr/Reg. No.: 556001-8748 Moms nr/V.A.T. No.: SE556001874801
Säte/Registered office Stockholm Sweden

**OUTO
KUMPU****RAPPORT**utfärdad av ackrediterat laboratorium
REPORT issued by Accredited Laboratory1098
ISO/IEC 17025**TEST REPORT**
No. 2012-039Report Date 2012-07-04
Page 2/2**Ferrite Fraction According to ASTM E562:2008**Test Date: 12-05-18
Sample ID: 9080-3501**Grid Selection**

Rectangular grid with 100 points

Number of fields

20

Magnification

X 400

Preparation, including etchant, if used

The sample is ground in two steps and then polished with 3µm diamond suspension / paste. Cleaning is done between each step with water and ethyl alcohol (96%).

Etchant: The samples are etched in room temperature.

Etched solution: V2A consisting of 100 ml de-ionized water, 100 ml of hydrochloric acid, HCl (37 w / o), and 10 ml of nitric acid, HNO₃ (65 w / o)**Raw data****Volume fraction**

Fields	%									
1 - 10	55	51	48	52	52	55	49	54	52	54
11 - 20	48	53	54	53	54	53	53	54	53	53
21 - 30	0	0	0	0	0	0	0	0	0	0
31 - 40	0	0	0	0	0	0	0	0	0	0
41 - 50	0	0	0	0	0	0	0	0	0	0
51 - 60	0	0	0	0	0	0	0	0	0	0
61 - 70	0	0	0	0	0	0	0	0	0	0
71 - 80	0	0	0	0	0	0	0	0	0	0

Num. Fields	Avg. vol. fraction	Standard Dev.	95% CI	% RA
20	52,50	2,06	0,90	1,72

Requirements

Minimum average volume fraction (%) > 40%. Maximum average volume fraction (%) < 60%

Test Result

Approved

Customer informationASTM E562:2008 is not included in the Swedac accreditation.
This report shall only be reproduced in its entirety.

The corrosion test results and Ferrite tests results satisfies the specified requirements.

Approved by:

Jonas Balderud
Mgr Testing/Provningschef**Outokumpu Stainless AB (publ)**

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SE-693 81 DEGERFORS	Nat 0586 - 470 00	Nat 0586 - 470 19
Sweden	Int +046 (0)586 470 00	Int +046 (0)586 470 19

Org nr/Reg. No.: 556001-8748 Moms nr/V.A.T. No.: SE556001874801
Site/Registered office Stockholm SwedenCHAW
POWER
APR 20 2013

005



Arbetskort syningG
**OUTO
KUMPU**Datum 06/21/2012 12
Kl. 16:16:22

Stålsort

Kund	Land	A-kod	Använd	Beställd	ChargeNr	TO-nr	Mtrl id
Shaw Modular Solutions, LLC	US	61130	2101 LDX	LDX 2101	421625	200731-2-1	9080-30-01
US - XXXXXX							
Emb	Kontrollant	Mär.nr	Ordertyp	Dimy	Yta	Max.kolli	Svetskod
905	CLIENT	900	OV		01		99
							Figur
							Kpartinr
							Nej
							243531

Skärprogram ProdNorm

Processinstruktioner enl OS2449

	Längd	Bredd	Tjocklek	Tol.	Dia	Kilo	Antal	Lagerplats	Prio
Beställd dim:	11887-11944	2286-2305	19,05	-0,25/+1,52	10	4027	1	GOLV - 16	

Senaste dim:	11911	2300	20,05			4225	Planhet L = 1000, Tol = 7.9		
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Dimensioner

Op.kod	Benämning	Period	Optimal	Fig	Längd	Bredd	Tjocklek	Antal	DK	Anvisning
403	OPF Vit	225-3	219-2		11887	2286	19,05	1		
310	Renbetning	225-4	218-2		11887	2286	19,05	1		Processinstruktioner enl OS2449 Planhet L = 1000 Tol = 7.9
325	Slutsyning	225-4	220-2		11887	2286	19,05	1		Processinstruktioner enl OS2449
480	WMS-Tr	225-4	220-5		11887	2286	19,05	1		PLM-900
481	WMS-In	225-4	220-5		11887	2286	19,05	1		
312	Provgodk	226-1	220-5		11887	2286	19,05	1		
482	Pack WMS	226-1	221-2		11887	2286	19,05	1		

Avvikelse: Nej Kö: 325

Kolli:

U-ljud:

Lager:

Op.kod	Mtrl.identitet	Anmärkning
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Ytfeilkod

Sida

Omfattning

Spectro

Status

Sign

Ytfin (Max)

Ferrit

2101 LDX

OK

Wiendl Andreas

Mätvärden

L1: 11921

L2: 11922

B1: 2297

B2: 2297

D1: 12140

D2: 12138

T1: 20,28

T2: 19,83

T3: 20,00

T4: 20,47

T5: 19,91

T6: 19,81

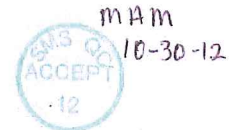
Sign: Wunder Laila

Plåtmärkning

ASME SA240/ASTM A240

UNS S32101

3.2/CLIENT



JSA 6-25-2012

Arbetskort syningG
**OUTO
KUMPU**Datum 06/21/2012 12
Kl. 16:16:20

Kund	Land	A-kod	Använd	Beställd	ChargeNr	TO-nr	Mtrl id		
Shaw Modular Solutions, LLC	US	61130	2101 LDX	LDX 2101	421625	200731-2-2	9080-31-01		
US - XXXXXX									
Emb	Kontrollant	Mär.nr	Ordertyp	Dimy	Yta	Max.kolli	Svetskod	Figur	Kpartnr
905	CLIENT	900	OV		01		99	Nej	243531

Skärprogram ProdNorm

Processinstruktioner enl OS2449: * *

Längd	Bredd	Tjocklek	Tol.	Dia	Kilo	Antal	Lagerplats	Prio
Beställd dim: 11887-11944	2286-2305	19,05	-0.25/+1.52	10	4027	1	GOLV - 17	

Senaste dim: 11911 2299 20,20 4245 Planhet L = 1000, Tol = 7.9

Op.kod	Benämning	Period	Optimal	Fig	Längd	Bredd	Tjocklek	Antal	DK	Anvisning
403	OFF Vit	225-3	220-5		11887	2286	19,05	1		
310	Renbetning	225-4	223-1		11887	2286	19,05	1		Processinstruktioner enl OS2449 Planhet L = 1000 Tol = 7.9
325	Slutsyning	225-4	224-4		11887	2286	19,05	1		Processinstruktioner enl OS2449
480	WMS-Tr	225-4	225-2		11887	2286	19,05	1		PLM-900
481	WMS-In	225-4	225-2		11887	2286	19,05	1		
312	Provgödk	226-1	225-2		11887	2286	19,05	1		
482	Pack WMS	226-1	225-4		11887	2286	19,05	1		

Avvikelse: Nej Kö: 325

Kolli:

U-ljud:

Op.kod	Mtrl.identitet	Anmärkning
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Lager:

Yt felkod

Sida

Omfattning

Spectro

Status

Sign

Ytfin (Max)

Ferrit

2101 LDX

OK

Wiendl Andreas

Mätvärden

L1: 11921

L2: 11923

B1: 2298

B2: 2298

D1: 12139

D2: 12140

T1: 20,46

T2: 19,98

T3: 20,25

T4: 20,40

T5: 20,22

T6: 19,96

Sign: Wunder Laila

Plåtmärkning

ASME SA240/ASTM A240

UNS S32101

3.2/CLIENT



JBA 6-25-2012

Arbetskort syningG
**OUTO
KUMPU**Datum 06/21/2012 12
Kl. 16:16:14

Kund	Land	A-kod	Använd	Stålsort	Beställd	ChargeNr	TO-nr	Mtrl id	
Shaw Modular Solutions, LLC	US	61130	2101 LDX	LDX 2101	421625	200731-2-3		9080-32-01	
US - XXXXXX									
Emb	Kontrollant	Mär.nr	Ordertyp	Dimy	Yta	Max.kolli	Svetskod	Figur	Kpartnr
905	CLIENT	900	OV		01		99	Nej	243531

Skärprogram

ProdNorm

Processinstruktioner enl OS2449

Längd	Bredd	Tjocklek	Tol.	Dia	Kilo	Antal	Lagerplats	Prio
Beställd dim: 11887-11944	2286-2305	19,05	-0.25/+1.52	10	4027	1	GOLV - 18	

Senaste dim: 11911 2299 20,04 4245 Planhet L = 1000, Tol = 7.9

Op.kod	Benämning	Period	Optimal	Fig	Dimensioner	Längd	Bredd	Tjocklek	Antal	DK	Anvisning
403	OFP Vit	225-3	220-5			11887	2286	19,05	1		
310	Renbetning	225-4	223-1			11887	2286	19,05	1		Processinstruktioner enl OS2449 Planhet L = 1000 Tol = 7.9
325	Slutsyning	225-4	224-4			11887	2286	19,05	1		Processinstruktioner enl OS2449
480	WMS-Tr	225-4	225-2			11887	2286	19,05	1		PLM-900
481	WMS-In	225-4	225-2			11887	2286	19,05	1		
312	Provgodk	226-1	225-2			11887	2286	19,05	1		
482	Pack WMS	226-1	225-4			11887	2286	19,05	1		

Avvikelse: Nej KÖ: 325

Kolli:

U-ljud:

Op.kod	Mtrl.identitet	Anmärkning
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Lager:

Ytfeilkod

Sida

Omfattning

Spectro
2101 LDXStatus
OKSign
Wiendl Andreas

Ytfin (Max)

Ferrit

Mätvärden

L1: 11921

L2: 11924

B1: 2298

B2: 2298

D1: 12140

D2: 12142

T1: 20,52

T2: 20,04

T3: 20,02

T4: 20,50

T5: 20,03

T6: 20,02

Sign: Wunder Laila

Plåtmärkning

ASME SA240/ASTM A240

UNS S32101

3.2/CLIENT



JAA 6-25-2012

Arbetskort syningOUTO
KUMPUDatum 06/20/2012 12
Kl. 19:01:04

Kund Land A-kod Använd Stålsort Beställd ChargeNr TO-nr Mtrl id
Shaw Modular Solutions, LLC US 61130 2101 LDX LDX 2101 421625 200731-2-5 9080-34-01
US - XXXXXX

Emb Kontrollant Mär.nr Ordertyp Dimy Yta Max.kolli Svetskod Figur Kpartnr
905 CLIENT 900 OV 01 99 Nej 243531

Skärprogram ProdNorm

Processinstruktioner enl OS2449: * *

Längd	Bredd	Tjocklek	Tol.	Dia	Kilo	Antal	Lagerplats	Prio
Beställd dim: 11887-11944	2286-2305	19,05	-0.25/+1.52	10	4027	1	GOLV - 1	

Senaste dim: 11913 2300 20,07 4250 Planhet L = 1000, Tol = 7.9

Op.kod	Benämning	Period	Optimal	Fig	Dimensioner			Antal	DK	Anvisning
					Längd	Bredd	Tjocklek			
403	OPF Vit	225-1	220-5		11887	2286	19,05	1		
310	Renbetning	225-4	221-3		11887	2286	19,05	1		Processinstruktioner enl OS2449 Planhet L = 1000 Tol = 7.9
325	Slutsyning	225-3	223-5		11887	2286	19,05	1		Processinstruktioner enl OS2449
480	WMS-Tr	225-4	224-2		11887	2286	19,05	1		PLM-900
481	WMS-In	225-4	224-2		11887	2286	19,05	1		
312	Provgodk	225-4	224-2		11887	2286	19,05	1		
482	Pack WMS	225-4	224-4		11887	2286	19,05	1		

Avvikelse: Nej Kö: 325

Kolli:
U-ljud:

Op.kod	Mtrl.identitet	Anmärkning
--------	----------------	------------

Lager:

Ytfelkod

Sida

Omfattning

Spectro Status Sign
2101 LDX OK Wiendl Andreas

Ytfin (Max) Ferrit

Mätvärden

L1: 11921	L2: 11920	B1: 2297	B2: 2299	D1: 12139	D2: 12139
T1: 19,92	T2: 19,99	T3: 20,42	T4: 19,93	T5: 19,94	T6: 20,42

Sign: Irebäck Johan

Plåtmärkning

ASME SA240/ASTM A240
UNS S32101

3.2/CLIENT

MAM
10-20-12

BA 6-25-2012

Arbetskort syning

G
OUTO
KUMPUDatum 06/21/2012 12
Kl. 16:16:11

Stålsort

Kund	Land	A-kod	Anyänd	Beställd	ChargeNr	TO-nr	Mtrl id
Shaw Modular Solutions, LLC	US	61130	2101 LDX	LDX 2101	421625	200731-2-6	9080-35-01
US - XXXXXX							
Emb	Kontrollant	Mär.nr	Ordertyp	Dimy	Yta	Max.kolli	Svetskod
905	CLIENT	900	OV		01		99
							Figur Kpartnr
							Nej 243531

Skärprogram

ProdNorm

Processinstruktioner enl OS2449. **

Längd	Bredd	Tjocklek	Tol.	Dia	Kilo	Antal	Lagerplats	Prio
Beställd dim: 11887-11944	2286-2305	19,05	-0.25/+1.52	10	4027	1	GOLV - 19	

Senaste dim:	11911	2299	20,08	4215	Planhet L = 1000, Tol = 7.9
--------------	-------	------	-------	------	-----------------------------

		Dimensioner								
Op.kod	Benämning	Period	Optimal	Fig	Längd	Bredd	Tjocklek	Antal	DK	Anvisning
403	OPF Vit	225-3	220-5		11887	2286	19,05	1		
310	Renbetning	225-4	223-1		11887	2286	19,05	1		Processinstruktioner enl OS2449 Planhet L = 1000 Tol = 7.9
325	Slutsyning	225-4	224-4		11887	2286	19,05	1		Processinstruktioner enl OS2449
480	WMS-Tr	225-4	225-2		11887	2286	19,05	1		PLM-900
481	WMS-In	225-4	225-2		11887	2286	19,05	1		
312	Provgodk	226-1	225-2		11887	2286	19,05	1		
482	Pack WMS	226-1	225-4		11887	2286	19,05	1		

Avvikelse: Nej Kö: 325

Kolli:
U-ljud:

Op.kod Mtrl.identitet Anmärkning

Lager:

Ytfelkod

Sida

Omfattning

Spectro Status Sign
2101 LDX OK Wiendl Andreas

Mätvärden

L1: 11920	L2: 11920	B1: 2298	B2: 2299	D1: 12140	D2: 12140
T1: 20,33	T2: 19,89	T3: 20,09	T4: 20,53	T5: 20,07	T6: 19,84

Sign: Wunder Laila

Plåtmärkning

ASME SA240/ASTM A240
UNS S32101

3.2/CLIENT

mam
10-30-12

gla
6-25-2012



INDUSTRIAL TESTING LABORATORY SERVICES, LLC
635 Alpha Drive – RIDC Park
Pittsburgh, PA 15238 Phone: 412.963.1900 Fax: 412.963.1926
e-mail: info@itls.com website: itls.com

TEST REPORT
L20665 Rev. 1
October 10, 2012
Revised October 19, 2012

Purchase Order No: 694689-000 OP

To: Shaw Modular Solutions LLC
3191 West Lincoln Road
Lake Charles, LA 70605

Attn: Nick Koseski

Sample Received:

ITLS received seventeen (17) samples for Chemical, Mechanical, Hardness, Impact, Ferrite and Intergranular Corrosion evaluation, identified as follows:

Sample #	Coupon # Sent to ITLS	Heat #	Lot #	Description	Supplier
1	9096-32-02	421716	244903	1 pc. – 0.5" Thick Duplex Plate	Outokumpu
2	9096-27-02	421716	243906	1 pc. – 1" Thick Duplex Plate	Outokumpu
3	9099-32-02	421717	243988	1 pc. – 0.5" Thick Duplex Plate	Outokumpu
4	9096-23-03	421716	243891	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
5	9099-27-03	421717	243892	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
6	9099-22-02	421717	243907	1 pc. – 1" Thick Duplex Plate	Outokumpu
7	9096-35-03	421716	243990	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
8	9096-22-05	421716	244095	1 pc. – 0.25" Thick Duplex Plate	Outokumpu
9	9080-25-02	421625	243526	1 pc. – 0.5" Thick Duplex Plate	Outokumpu
10	9099-28-02	421717	243890	1 pc. – 0.5" Thick Duplex Plate	Outokumpu
11	9081-12-04	421626	245018	1 pc. – 0.25" Thick Duplex Plate	Outokumpu
12	9080-35-02	421625	243531	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
13	9080-33-03	421625	245672	1 pc. – 0.5" Thick Duplex Plate	Outokumpu
14	9096-31-02	421716	244281	1 pc. – 1" Thick Duplex Plate	Outokumpu
15	9081-24-02	421626	243533	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
16	9081-36-02	421626	243904	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
17	9099-29-02	421717	243991	1 pc. – 1" Thick Duplex Plate	Outokumpu



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Shaw Modular Solutions, LLC
ITLS Report L20665 Rev. 1
October 10, 2012

Acceptance:

Sample #	Test	Acceptance
All	Chemical Analysis	APP-VL52-Z0-023, Rev. 1, ASTM A240-12 (UNS S32101)
All	Mechanical	APP-VL52-Z0-023, Rev. 1, ASTM A240-12 (UNS S32101), A480-12
All	Rockwell B	ASTM A240-12 (UNS S32101), A480-12
All	Ferrite	APP-VL52-Z0-023, Rev. 1, ASTM E562-11, Method A
All	Impact	APP-VL52-Z0-023, Rev. 1, ASTM A923-08, Method B
All	Intergranular Corrosion	ISO 3651-2 Method A

Test References:

Specification	Title
ASTM A751-11	Standard Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products
ASTM A370-12	Standard Test Methods and Definitions for Mechanical Testing of Steel Products
ASTM E8-11	Standard Test Methods for Tension Testing of Metallic Materials
ASTM E140-07	Standard Hardness Conversion Tables for Metals
ASTM E23-07a ⁶¹	Standard Test Methods for Notched Bar Impact Testing of Metallic Materials
ASTM E3-11	Standard Guide for Preparation of Metallographic Specimens
ASTM E18-11	Standard Test Methods for Rockwell Hardness of Metallic Materials
ASTM E1245-03 (2008)	Standard Practice for Determining the Inclusion of Second-Phase Constituent Content of Metals by Automatic Image Analysis
ASTM E562-11	Standard Test Method for Determining Volume Fraction by Systematic Manual Point Count

Quality References:

Reference
10CFR21, 10CFR50.55(e) and 10CFR50 App. B
ASME NQA-1 – 1994 Basic and Supplementary Requirements
USNRC Regulatory Guide 1.28 Rev. 3
ITLS QA Manual Rev. 4 dated 12/3/11
No ITLS subcontractors used for completion of this order



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Shaw Modular Solutions, LLC
ITLS Report L20665 Rev. 1
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Results:

Impact Test – ASTM A923-08 Method B

Sample #	Temperature (°F)	Absorbed Energy (ft-lbs)
1	-40	96
2	-40	68
3	-40	93
4	-40	83
5	-40	82
6	-40	74
7	-40	84
*8	-40	96
9	-40	87
10	-40	97
*11	-40	88
12	-40	90
13	-40	91
14	-40	67
15	-40	90
16	-40	84
17	-40	66
Required	-40 or below	20 Min

*Note: Specimen size 10mm x 5mm, 1/2 size per ASTM A923. Absorbed energy values converted per ASTM A923 Table 2.

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Shaw Modular Solutions, LLC
ITLS Report L20665 Rev. 1
October 10, 2012

Results (cont.):

Ferrite Testing – ASTM E562-11 Method A

Sample #	Ferrite (%)
1	42
2	44
3	43
4	43
5	41
6	41
7	44
8	41
9	41
10	42
11	44
12	41
13	43
14	41
15	44
16	44
17	42
Required	40 - 60%

Ferrite volume fraction tested with Image Analysis per ASTM E1245-03(2008). ASTM E562 offers the use of ASTM E1245 to determine the same measurements.

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Shaw Modular Solutions, LLC
ITLS Report L20665 Rev. 1
October 10, 2012

Results (cont.):

Mechanical Properties – ASTM E8-11 (flat) & ASTM E18-11 (HRB)

Sample #	Test Temp (°F)	Initial Dimensions (in)	Initial Area (in ²)	*Yield Strength (ksi)	Tensile Strength (ksi)	Elongation in 2" (%)	Hardness HRB** (Avg. of 3)
1	Room	0.503 x 0.526	0.2646	74	106	45	98
2	Room	0.500 x 1.040	0.5200	74	104	48	97
3	Room	0.503 x 0.543	0.2731	72	104	45	95
4	Room	0.502 x 0.785	0.3941	78	104	47	96
5	Room	0.502 x 0.780	0.3916	75	104	46	97
6	Room	0.501 x 1.020	0.5110	68	102	50	96
7	Room	0.502 x 0.788	0.3956	74	104	46	97
8	Room	0.489 x 0.258	0.1262	85	115	45	95
9	Room	0.502 x 0.552	0.2771	74	105	47	96
10	Room	0.503 x 0.533	0.2681	74	105	46	97
11	Room	0.489 x 0.249	0.1218	87	115	41	98
12	Room	0.502 x 0.786	0.3946	74	104	46	95
13	Room	0.503 x 0.525	0.2641	77	104	43	98
14	Room	0.501 x 1.040	0.5210	75	105	48	96
15	Room	0.501 x 0.795	0.3983	75	105	45	95
16	Room	0.501 x 0.784	0.3928	75	105	46	96
17	Room	0.501 x 1.040	0.5210	75	103	49	96
Required				65 Min	94 Min	30 Min	290 HBW Max

*Yield calculated at 0.20% offset

ACCEPTABLE

**Customer requested hardness in Rockwell B. All measured values were between 95 and 98 HRB which is approximately equal to Brinell 210 to 240 based on ASTM E140 Tables 2 and 5. These values are well below the specified max of 290 HBW and are therefore acceptable.



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Shaw Modular Solutions, LLC
ITLS Report L20665 Rev. 1
October 10, 2012

Results (cont.):

Chemical Analysis – ASTM A751-11 (OES/Leco)

Sample #	Composition (wt%)													
	C	Mn	P	S	Si	Ni	Cr	Mo	N	Cu	Co*	Al*	V*	Total Others*
1	0.027	5.00	0.018	<0.002	0.54	1.44	21.7	0.20	0.23	0.38	0.01	0.02	0.07	0.09
2	0.026	4.95	0.018	<0.002	0.52	1.40	21.8	0.18	0.23	0.38	0.01	0.02	0.07	0.09
3	0.029	5.11	0.016	<0.002	0.52	1.42	21.7	0.21	0.23	0.39	<0.01	0.02	0.06	0.08
4	0.025	4.94	0.017	<0.002	0.53	1.40	21.7	0.19	0.21	0.37	0.01	0.02	0.06	0.08
5	0.027	5.03	0.014	<0.002	0.51	1.36	21.7	0.21	0.22	0.38	<0.01	0.02	0.06	0.08
6	0.026	5.39	0.015	<0.002	0.52	1.45	21.8	0.21	0.23	0.39	0.01	0.02	0.07	0.08
7	0.024	4.93	0.016	<0.002	0.54	1.39	21.7	0.20	0.22	0.38	0.01	0.02	0.07	0.09
8	0.029	5.03	0.019	<0.002	0.55	1.44	21.8	0.19	0.23	0.39	0.02	0.01	0.07	0.09
9	0.033	4.99	0.019	<0.002	0.57	1.41	21.7	0.27	0.22	0.39	0.02	0.02	0.08	0.10
10	0.030	5.13	0.018	<0.002	0.53	1.40	21.7	0.21	0.23	0.39	0.02	0.02	0.06	0.08
11	0.029	5.34	0.018	<0.002	0.56	1.44	21.8	0.32	0.23	0.38	0.02	0.02	0.08	0.09
12	0.031	5.11	0.019	<0.002	0.56	1.42	21.6	0.26	0.22	0.38	0.02	0.02	0.08	0.09
13	0.034	5.13	0.021	<0.002	0.57	1.45	21.6	0.26	0.22	0.38	0.02	0.02	0.07	0.09
14	0.029	4.94	0.019	<0.002	0.57	1.45	21.7	0.19	0.23	0.39	0.02	0.02	0.07	0.08
15	0.029	5.11	0.019	<0.002	0.54	1.43	21.8	0.31	0.22	0.38	0.02	0.02	0.08	0.09
16	0.027	5.04	0.020	<0.002	0.56	1.39	21.8	0.32	0.23	0.39	0.01	0.02	0.08	0.10
17	0.028	5.13	0.019	<0.002	0.55	1.40	21.8	0.22	0.23	0.40	<0.01	0.02	0.07	0.09
Required	0.040 Max	4.00 6.00	0.040 Max	0.030 Max	1.00 Max	1.35 1.70	21.0 22.0	0.10 0.80	0.20 0.25	0.10 0.80	0.05 Max	0.10 Max	0.10 Max	0.50 Max

*Note: Customer-supplied requirement

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APR 20 2013

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Shaw Modular Solutions, LLC
ITLS Report L20665 Rev. 1
October 10, 2012

Results (cont.):

Intergranular Corrosion Test – ISO 3651-2 Method A

Sample #	Bend Radius	Bend	Result
1	1T	90°	Accept – No Cracking Observed
2	1T	90°	Accept – No Cracking Observed
3	1T	90°	Accept – No Cracking Observed
4	1T	90°	Accept – No Cracking Observed
5	1T	90°	Accept – No Cracking Observed
6	1T	90°	Accept – No Cracking Observed
7	1T	90°	Accept – No Cracking Observed
8	1T	90°	Accept – No Cracking Observed
9	1T	90°	Accept – No Cracking Observed
10	1T	90°	Accept – No Cracking Observed
11	1T	90°	Accept – No Cracking Observed
12	1T	90°	Accept – No Cracking Observed
13	1T	90°	Accept – No Cracking Observed
14	1T	90°	Accept – No Cracking Observed
15	1T	90°	Accept – No Cracking Observed
16	1T	90°	Accept – No Cracking Observed
17	1T	90°	Accept – No Cracking Observed
Required	1T	90°	No Cracking @ 10X

ACCEPTABLE

This certification affirms that the contents are correct and accurate, and that the test operations performed by Industrial Testing Laboratory Services are in compliance with the material specification, ITLS Quality Assurance Manual Rev. 4 dated 12/3/11, ASME NQA-1 1994, Regulatory Guide 1.28, 10 CFR 50 App. B, 10 CFR Part 21 and any additional requirements of SMS Purchase Order # 694689. Test Results comply with the PO required material specification(s) as noted below.

All Samples **ACCEPTABLE**

Signature 

Date 10/19/12

Electronic Copy – Original and Signed Report Located at ITLS



**SHAW
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APR 20 2013

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Rev. 1 – Made to update year of acceptance specifications. All samples remain acceptable (10/19/12 – RDR)

Page 7 of 7

DURING OUR MANUFACTURING PROCESSES, TESTS, AND INSPECTIONS, THE PRODUCT DID NOT COME IN DIRECT CONTACT WITH MERCURY OR ANY OF ITS COMPOUNDS NOR WITH ANY MERCURY CONTAINING DEVICES EMPLOYING A SINGLE BOUNDARY OF CONTAINMENT.
"NOTE: THE RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES".



INDUSTRIAL TESTING LABORATORY SERVICES, LLC
635 Alpha Drive – RIDC Park
Pittsburgh, PA 15238 Phone: 412.963.1900 Fax: 412.963.1926
e-mail: info@itls.com website: itls.com

TEST REPORT
L20665 Rev. 1
October 10, 2012
Revised October 19, 2012

Purchase Order No: 694689-000 OP

To: Shaw Modular Solutions LLC
3191 West Lincoln Road
Lake Charles, LA 70605

Attn: Nick Koseski

Sample Received:

ITLS received seventeen (17) samples for Chemical, Mechanical, Hardness, Impact, Ferrite and Intergranular Corrosion evaluation, identified as follows:

Sample #	Coupon # Sent to ITLS	Heat #	Lot #	Description	Supplier
1	9096-32-02	421716	244903	1 pc. – 0.5" Thick Duplex Plate	Outokumpu
2	9096-27-02	421716	243906	1 pc. – 1" Thick Duplex Plate	Outokumpu
3	9099-32-02	421717	243988	1 pc. – 0.5" Thick Duplex Plate	Outokumpu
4	9096-23-03	421716	243891	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
5	9099-27-03	421717	243892	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
6	9099-22-02	421717	243907	1 pc. – 1" Thick Duplex Plate	Outokumpu
7	9096-35-03	421716	243990	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
8	9096-22-05	421716	244095	1 pc. – 0.25" Thick Duplex Plate	Outokumpu
9	9080-25-02	421625	243526	1 pc. – 0.5" Thick Duplex Plate	Outokumpu
10	9099-28-02	421717	243890	1 pc. – 0.5" Thick Duplex Plate	Outokumpu
11	9081-12-04	421626	245018	1 pc. – 0.25" Thick Duplex Plate	Outokumpu
12	9080-35-02	421625	243531	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
13	9080-33-03	421625	245672	1 pc. – 0.5" Thick Duplex Plate	Outokumpu
14	9096-31-02	421716	244281	1 pc. – 1" Thick Duplex Plate	Outokumpu
15	9081-24-02	421626	243533	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
16	9081-36-02	421626	243904	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
17	9099-29-02	421717	243991	1 pc. – 1" Thick Duplex Plate	Outokumpu



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APR 20 2013

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Shaw Modular Solutions, LLC
ITLS Report L20665 Rev. 1
October 10, 2012

Acceptance:

Sample #	Test	Acceptance
All	Chemical Analysis	APP-VL52-Z0-023, Rev. 1, ASTM A240-12 (UNS S32101)
All	Mechanical	APP-VL52-Z0-023, Rev. 1, ASTM A240-12 (UNS S32101), A480-12
All	Rockwell B	ASTM A240-12 (UNS S32101), A480-12
All	Ferrite	APP-VL52-Z0-023, Rev. 1, ASTM E562-11, Method A
All	Impact	APP-VL52-Z0-023, Rev. 1, ASTM A923-08, Method B
All	Intergranular Corrosion	ISO 3651-2 Method A

Test References:

Specification	Title
ASTM A751-11	Standard Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products
ASTM A370-12	Standard Test Methods and Definitions for Mechanical Testing of Steel Products
ASTM E8-11	Standard Test Methods for Tension Testing of Metallic Materials
ASTM E140-07	Standard Hardness Conversion Tables for Metals
ASTM E23-07a ⁶¹	Standard Test Methods for Notched Bar Impact Testing of Metallic Materials
ASTM E3-11	Standard Guide for Preparation of Metallographic Specimens
ASTM E18-11	Standard Test Methods for Rockwell Hardness of Metallic Materials
ASTM E1245-03 (2008)	Standard Practice for Determining the Inclusion of Second-Phase Constituent Content of Metals by Automatic Image Analysis
ASTM E562-11	Standard Test Method for Determining Volume Fraction by Systematic Manual Point Count

Quality References:

Reference
10CFR21, 10CFR50.55(e) and 10CFR50 App. B
ASME NQA-1 – 1994 Basic and Supplementary Requirements
USNRC Regulatory Guide 1.28 Rev. 3
ITLS QA Manual Rev. 4 dated 12/3/11
No ITLS subcontractors used for completion of this order



SHAW
POWER

APR 20 2013

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Shaw Modular Solutions, LLC
ITLS Report L20665 Rev. 1
October 10, 2012

Results:

Impact Test – ASTM A923-08 Method B

Sample #	Temperature (°F)	Absorbed Energy (ft-lbs)
1	-40	96
2	-40	68
3	-40	93
4	-40	83
5	-40	82
6	-40	74
7	-40	84
*8	-40	96
9	-40	87
10	-40	97
*11	-40	88
12	-40	90
13	-40	91
14	-40	67
15	-40	90
16	-40	84
17	-40	66
Required	-40 or below	20 Min

*Note: Specimen size 10mm x 5mm, 1/2 size per ASTM A923. Absorbed energy values converted per ASTM A923 Table 2.

ACCEPTABLE



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APR 20 2013

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Shaw Modular Solutions, LLC
ITLS Report L20665 Rev. 1
October 10, 2012

Results (cont.):

Ferrite Testing – ASTM E562-11 Method A

Sample #	Ferrite (%)
1	42
2	44
3	43
4	43
5	41
6	41
7	44
8	41
9	41
10	42
11	44
12	41
13	43
14	41
15	44
16	44
17	42
Required	40 - 60%

Ferrite volume fraction tested with Image Analysis per ASTM E1245-03(2008). ASTM E562 offers the use of ASTM E1245 to determine the same measurements.

ACCEPTABLE



**SHAW
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APR 20 2013

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Shaw Modular Solutions, LLC
ITLS Report L20665 Rev. 1
October 10, 2012

Results (cont.):

Mechanical Properties – ASTM E8-11 (flat) & ASTM E18-11 (HRB)

Sample #	Test Temp (°F)	Initial Dimensions (in)	Initial Area (in ²)	*Yield Strength (ksi)	Tensile Strength (ksi)	Elongation in 2" (%)	Hardness HRB** (Avg. of 3)
1	Room	0.503 x 0.526	0.2646	74	106	45	98
2	Room	0.500 x 1.040	0.5200	74	104	48	97
3	Room	0.503 x 0.543	0.2731	72	104	45	95
4	Room	0.502 x 0.785	0.3941	78	104	47	96
5	Room	0.502 x 0.780	0.3916	75	104	46	97
6	Room	0.501 x 1.020	0.5110	68	102	50	96
7	Room	0.502 x 0.788	0.3956	74	104	46	97
8	Room	0.489 x 0.258	0.1262	85	115	45	95
9	Room	0.502 x 0.552	0.2771	74	105	47	96
10	Room	0.503 x 0.533	0.2681	74	105	46	97
11	Room	0.489 x 0.249	0.1218	87	115	41	98
12	Room	0.502 x 0.786	0.3946	74	104	46	95
13	Room	0.503 x 0.525	0.2641	77	104	43	98
14	Room	0.501 x 1.040	0.5210	75	105	48	96
15	Room	0.501 x 0.795	0.3983	75	105	45	95
16	Room	0.501 x 0.784	0.3928	75	105	46	96
17	Room	0.501 x 1.040	0.5210	75	103	49	96
Required				65 Min	94 Min	30 Min	290 HBW Max

*Yield calculated at 0.20% offset

ACCEPTABLE

**Customer requested hardness in Rockwell B. All measured values were between 95 and 98 HRB which is approximately equal to Brinell 210 to 240 based on ASTM E140 Tables 2 and 5. These values are well below the specified max of 290 HBW and are therefore acceptable.



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Shaw Modular Solutions, LLC
ITLS Report L20665 Rev. 1
October 10, 2012

Results (cont.):

Chemical Analysis – ASTM A751-11 (OES/Leco)

Sample #	Composition (wt%)													
	C	Mn	P	S	Si	Ni	Cr	Mo	N	Cu	Co*	Al*	V*	Total Others*
1	0.027	5.00	0.018	<0.002	0.54	1.44	21.7	0.20	0.23	0.38	0.01	0.02	0.07	0.09
2	0.026	4.95	0.018	<0.002	0.52	1.40	21.8	0.18	0.23	0.38	0.01	0.02	0.07	0.09
3	0.029	5.11	0.016	<0.002	0.52	1.42	21.7	0.21	0.23	0.39	<0.01	0.02	0.06	0.08
4	0.025	4.94	0.017	<0.002	0.53	1.40	21.7	0.19	0.21	0.37	0.01	0.02	0.06	0.08
5	0.027	5.03	0.014	<0.002	0.51	1.36	21.7	0.21	0.22	0.38	<0.01	0.02	0.06	0.08
6	0.026	5.39	0.015	<0.002	0.52	1.45	21.8	0.21	0.23	0.39	0.01	0.02	0.07	0.08
7	0.024	4.93	0.016	<0.002	0.54	1.39	21.7	0.20	0.22	0.38	0.01	0.02	0.07	0.09
8	0.029	5.03	0.019	<0.002	0.55	1.44	21.8	0.19	0.23	0.39	0.02	0.01	0.07	0.09
9	0.033	4.99	0.019	<0.002	0.57	1.41	21.7	0.27	0.22	0.39	0.02	0.02	0.08	0.10
10	0.030	5.13	0.018	<0.002	0.53	1.40	21.7	0.21	0.23	0.39	0.02	0.02	0.06	0.08
11	0.029	5.34	0.018	<0.002	0.56	1.44	21.8	0.32	0.23	0.38	0.02	0.02	0.08	0.09
12	0.031	5.11	0.019	<0.002	0.56	1.42	21.6	0.26	0.22	0.38	0.02	0.02	0.08	0.09
13	0.034	5.13	0.021	<0.002	0.57	1.45	21.6	0.26	0.22	0.38	0.02	0.02	0.07	0.09
14	0.029	4.94	0.019	<0.002	0.57	1.45	21.7	0.19	0.23	0.39	0.02	0.02	0.07	0.08
15	0.029	5.11	0.019	<0.002	0.54	1.43	21.8	0.31	0.22	0.38	0.02	0.02	0.08	0.09
16	0.027	5.04	0.020	<0.002	0.56	1.39	21.8	0.32	0.23	0.39	0.01	0.02	0.08	0.10
17	0.028	5.13	0.019	<0.002	0.55	1.40	21.8	0.22	0.23	0.40	<0.01	0.02	0.07	0.09
Required	0.040 Max	4.00 6.00	0.040 Max	0.030 Max	1.00 Max	1.35 1.70	21.0 22.0	0.10 0.80	0.20 0.25	0.10 0.80	0.05 Max	0.10 Max	0.10 Max	0.50 Max

*Note: Customer-supplied requirement

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Shaw Modular Solutions, LLC
ITLS Report L20665 Rev. 1
October 10, 2012

Results (cont.):

Intergranular Corrosion Test – ISO 3651-2 Method A

Sample #	Bend Radius	Bend	Result
1	1T	90°	Accept – No Cracking Observed
2	1T	90°	Accept – No Cracking Observed
3	1T	90°	Accept – No Cracking Observed
4	1T	90°	Accept – No Cracking Observed
5	1T	90°	Accept – No Cracking Observed
6	1T	90°	Accept – No Cracking Observed
7	1T	90°	Accept – No Cracking Observed
8	1T	90°	Accept – No Cracking Observed
9	1T	90°	Accept – No Cracking Observed
10	1T	90°	Accept – No Cracking Observed
11	1T	90°	Accept – No Cracking Observed
12	1T	90°	Accept – No Cracking Observed
13	1T	90°	Accept – No Cracking Observed
14	1T	90°	Accept – No Cracking Observed
15	1T	90°	Accept – No Cracking Observed
16	1T	90°	Accept – No Cracking Observed
17	1T	90°	Accept – No Cracking Observed
Required	1T	90°	No Cracking @ 10X

ACCEPTABLE

This certification affirms that the contents are correct and accurate, and that the test operations performed by Industrial Testing Laboratory Services are in compliance with the material specification, ITLS Quality Assurance Manual Rev. 4 dated 12/3/11, ASME NQA-1 1994, Regulatory Guide 1.28, 10 CFR 50 App. B, 10 CFR Part 21 and any additional requirements of SMS Purchase Order # 694689. Test Results comply with the PO required material specification(s) as noted below.

All Samples **ACCEPTABLE**

Signature _____

Date 10/19/12

Electronic Copy – Original and Signed Report Located at ITLS



**SHAW
POWER**

APR 20 2013

005

Rev. 1 – Made to update year of acceptance specifications. All samples remain acceptable (10/19/12 – RDR)

Page 7 of 7

DURING OUR MANUFACTURING PROCESSES, TESTS, AND INSPECTIONS, THE PRODUCT DID NOT COME IN DIRECT CONTACT WITH MERCURY OR ANY OF ITS COMPOUNDS NOR WITH ANY MERCURY CONTAINING DEVICES EMPLOYING A SINGLE BOUNDARY OF CONTAINMENT.
"NOTE: THE RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES".



INDUSTRIAL TESTING LABORATORY SERVICES, LLC
635 Alpha Drive – RIDC Park
Pittsburgh, PA 15238 Phone: 412.963.1900 Fax: 412.963.1926
e-mail: info@itls.com website: itls.com

TEST REPORT
L20665 Rev. 1
October 10, 2012
Revised October 19, 2012

Purchase Order No: 694689-000 OP

To: Shaw Modular Solutions LLC
3191 West Lincoln Road
Lake Charles, LA 70605

Attn: Nick Koseski

Sample Received:

ITLS received seventeen (17) samples for Chemical, Mechanical, Hardness, Impact, Ferrite and Intergranular Corrosion evaluation, identified as follows:

Sample #	Coupon # Sent to ITLS	Heat #	Lot #	Description	Supplier
1	9096-32-02	421716	244903	1 pc. – 0.5" Thick Duplex Plate	Outokumpu
2	9096-27-02	421716	243906	1 pc. – 1" Thick Duplex Plate	Outokumpu
3	9099-32-02	421717	243988	1 pc. – 0.5" Thick Duplex Plate	Outokumpu
4	9096-23-03	421716	243891	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
5	9099-27-03	421717	243892	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
6	9099-22-02	421717	243907	1 pc. – 1" Thick Duplex Plate	Outokumpu
7	9096-35-03	421716	243990	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
8	9096-22-05	421716	244095	1 pc. – 0.25" Thick Duplex Plate	Outokumpu
9	9080-25-02	421625	243526	1 pc. – 0.5" Thick Duplex Plate	Outokumpu
10	9099-28-02	421717	243890	1 pc. – 0.5" Thick Duplex Plate	Outokumpu
11	9081-12-04	421626	245018	1 pc. – 0.25" Thick Duplex Plate	Outokumpu
12	9080-35-02	421625	243531	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
13	9080-33-03	421625	245672	1 pc. – 0.5" Thick Duplex Plate	Outokumpu
14	9096-31-02	421716	244281	1 pc. – 1" Thick Duplex Plate	Outokumpu
15	9081-24-02	421626	243533	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
16	9081-36-02	421626	243904	1 pc. – 0.75" Thick Duplex Plate	Outokumpu
17	9099-29-02	421717	243991	1 pc. – 1" Thick Duplex Plate	Outokumpu



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Shaw Modular Solutions, LLC
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Acceptance:

Sample #	Test	Acceptance
All	Chemical Analysis	APP-VL52-Z0-023, Rev. 1, ASTM A240-12 (UNS S32101)
All	Mechanical	APP-VL52-Z0-023, Rev. 1, ASTM A240-12 (UNS S32101), A480-12
All	Rockwell B	ASTM A240-12 (UNS S32101), A480-12
All	Ferrite	APP-VL52-Z0-023, Rev. 1, ASTM E562-11, Method A
All	Impact	APP-VL52-Z0-023, Rev. 1, ASTM A923-08, Method B
All	Intergranular Corrosion	ISO 3651-2 Method A

Test References:

Specification	Title
ASTM A751-11	Standard Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products
ASTM A370-12	Standard Test Methods and Definitions for Mechanical Testing of Steel Products
ASTM E8-11	Standard Test Methods for Tension Testing of Metallic Materials
ASTM E140-07	Standard Hardness Conversion Tables for Metals
ASTM E23-07a ⁶¹	Standard Test Methods for Notched Bar Impact Testing of Metallic Materials
ASTM E3-11	Standard Guide for Preparation of Metallographic Specimens
ASTM E18-11	Standard Test Methods for Rockwell Hardness of Metallic Materials
ASTM E1245-03 (2008)	Standard Practice for Determining the Inclusion of Second-Phase Constituent Content of Metals by Automatic Image Analysis
ASTM E562-11	Standard Test Method for Determining Volume Fraction by Systematic Manual Point Count

Quality References:

Reference
10CFR21, 10CFR50.55(e) and 10CFR50 App. B
ASME NQA-1 – 1994 Basic and Supplementary Requirements
USNRC Regulatory Guide 1.28 Rev. 3
ITLS QA Manual Rev. 4 dated 12/3/11
No ITLS subcontractors used for completion of this order



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Shaw Modular Solutions, LLC
ITLS Report L20665 Rev. 1
October 10, 2012

Results:

Impact Test – ASTM A923-08 Method B

Sample #	Temperature (°F)	Absorbed Energy (ft-lbs)
1	-40	96
2	-40	68
3	-40	93
4	-40	83
5	-40	82
6	-40	74
7	-40	84
*8	-40	96
9	-40	87
10	-40	97
*11	-40	88
12	-40	90
13	-40	91
14	-40	67
15	-40	90
16	-40	84
17	-40	66
Required	-40 or below	20 Min

*Note: Specimen size 10mm x 5mm, 1/2 size per ASTM A923. Absorbed energy values converted per ASTM A923 Table 2.

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Results (cont.):

Ferrite Testing – ASTM E562-11 Method A

Sample #	Ferrite (%)
1	42
2	44
3	43
4	43
5	41
6	41
7	44
8	41
9	41
10	42
11	44
12	41
13	43
14	41
15	44
16	44
17	42
Required	40 - 60%

Ferrite volume fraction tested with Image Analysis per ASTM E1245-03(2008). ASTM E562 offers the use of ASTM E1245 to determine the same measurements.

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Shaw Modular Solutions, LLC
ITLS Report L20665 Rev. 1
October 10, 2012

Results (cont.):

Mechanical Properties – ASTM E8-11 (flat) & ASTM E18-11 (HRB)

Sample #	Test Temp (°F)	Initial Dimensions (in)	Initial Area (in ²)	*Yield Strength (ksi)	Tensile Strength (ksi)	Elongation in 2" (%)	Hardness HRB** (Avg. of 3)
1	Room	0.503 x 0.526	0.2646	74	106	45	98
2	Room	0.500 x 1.040	0.5200	74	104	48	97
3	Room	0.503 x 0.543	0.2731	72	104	45	95
4	Room	0.502 x 0.785	0.3941	78	104	47	96
5	Room	0.502 x 0.780	0.3916	75	104	46	97
6	Room	0.501 x 1.020	0.5110	68	102	50	96
7	Room	0.502 x 0.788	0.3956	74	104	46	97
8	Room	0.489 x 0.258	0.1262	85	115	45	95
9	Room	0.502 x 0.552	0.2771	74	105	47	96
10	Room	0.503 x 0.533	0.2681	74	105	46	97
11	Room	0.489 x 0.249	0.1218	87	115	41	98
12	Room	0.502 x 0.786	0.3946	74	104	46	95
13	Room	0.503 x 0.525	0.2641	77	104	43	98
14	Room	0.501 x 1.040	0.5210	75	105	48	96
15	Room	0.501 x 0.795	0.3983	75	105	45	95
16	Room	0.501 x 0.784	0.3928	75	105	46	96
17	Room	0.501 x 1.040	0.5210	75	103	49	96
Required				65 Min	94 Min	30 Min	290 HBW Max

*Yield calculated at 0.20% offset

ACCEPTABLE

**Customer requested hardness in Rockwell B. All measured values were between 95 and 98 HRB which is approximately equal to Brinell 210 to 240 based on ASTM E140 Tables 2 and 5. These values are well below the specified max of 290 HBW and are therefore acceptable.



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Shaw Modular Solutions, LLC
ITLS Report L20665 Rev. 1
October 10, 2012

Results (cont.):

Chemical Analysis – ASTM A751-11 (OES/Leco)

Sample #	Composition (wt%)													
	C	Mn	P	S	Si	Ni	Cr	Mo	N	Cu	Co*	Al*	V*	Total Others*
1	0.027	5.00	0.018	<0.002	0.54	1.44	21.7	0.20	0.23	0.38	0.01	0.02	0.07	0.09
2	0.026	4.95	0.018	<0.002	0.52	1.40	21.8	0.18	0.23	0.38	0.01	0.02	0.07	0.09
3	0.029	5.11	0.016	<0.002	0.52	1.42	21.7	0.21	0.23	0.39	<0.01	0.02	0.06	0.08
4	0.025	4.94	0.017	<0.002	0.53	1.40	21.7	0.19	0.21	0.37	0.01	0.02	0.06	0.08
5	0.027	5.03	0.014	<0.002	0.51	1.36	21.7	0.21	0.22	0.38	<0.01	0.02	0.06	0.08
6	0.026	5.39	0.015	<0.002	0.52	1.45	21.8	0.21	0.23	0.39	0.01	0.02	0.07	0.08
7	0.024	4.93	0.016	<0.002	0.54	1.39	21.7	0.20	0.22	0.38	0.01	0.02	0.07	0.09
8	0.029	5.03	0.019	<0.002	0.55	1.44	21.8	0.19	0.23	0.39	0.02	0.01	0.07	0.09
9	0.033	4.99	0.019	<0.002	0.57	1.41	21.7	0.27	0.22	0.39	0.02	0.02	0.08	0.10
10	0.030	5.13	0.018	<0.002	0.53	1.40	21.7	0.21	0.23	0.39	0.02	0.02	0.06	0.08
11	0.029	5.34	0.018	<0.002	0.56	1.44	21.8	0.32	0.23	0.38	0.02	0.02	0.08	0.09
12	0.031	5.11	0.019	<0.002	0.56	1.42	21.6	0.26	0.22	0.38	0.02	0.02	0.08	0.09
13	0.034	5.13	0.021	<0.002	0.57	1.45	21.6	0.26	0.22	0.38	0.02	0.02	0.07	0.09
14	0.029	4.94	0.019	<0.002	0.57	1.45	21.7	0.19	0.23	0.39	0.02	0.02	0.07	0.08
15	0.029	5.11	0.019	<0.002	0.54	1.43	21.8	0.31	0.22	0.38	0.02	0.02	0.08	0.09
16	0.027	5.04	0.020	<0.002	0.56	1.39	21.8	0.32	0.23	0.39	0.01	0.02	0.08	0.10
17	0.028	5.13	0.019	<0.002	0.55	1.40	21.8	0.22	0.23	0.40	<0.01	0.02	0.07	0.09
Required	0.040 Max	4.00 6.00	0.040 Max	0.030 Max	1.00 Max	1.35 1.70	21.0 22.0	0.10 0.80	0.20 0.25	0.10 0.80	0.05 Max	0.10 Max	0.10 Max	0.50 Max

*Note: Customer-supplied requirement

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Shaw Modular Solutions, LLC
ITLS Report L20665 Rev. 1
October 10, 2012

Results (cont.):

Intergranular Corrosion Test – ISO 3651-2 Method A

Sample #	Bend Radius	Bend	Result
1	1T	90°	Accept – No Cracking Observed
2	1T	90°	Accept – No Cracking Observed
3	1T	90°	Accept – No Cracking Observed
4	1T	90°	Accept – No Cracking Observed
5	1T	90°	Accept – No Cracking Observed
6	1T	90°	Accept – No Cracking Observed
7	1T	90°	Accept – No Cracking Observed
8	1T	90°	Accept – No Cracking Observed
9	1T	90°	Accept – No Cracking Observed
10	1T	90°	Accept – No Cracking Observed
11	1T	90°	Accept – No Cracking Observed
12	1T	90°	Accept – No Cracking Observed
13	1T	90°	Accept – No Cracking Observed
14	1T	90°	Accept – No Cracking Observed
15	1T	90°	Accept – No Cracking Observed
16	1T	90°	Accept – No Cracking Observed
17	1T	90°	Accept – No Cracking Observed
Required	1T	90°	No Cracking @ 10X

ACCEPTABLE

This certification affirms that the contents are correct and accurate, and that the test operations performed by Industrial Testing Laboratory Services are in compliance with the material specification, ITLS Quality Assurance Manual Rev. 4 dated 12/3/11, ASME NQA-1 1994, Regulatory Guide 1.28, 10 CFR 50 App. B, 10 CFR Part 21 and any additional requirements of SMS Purchase Order # 694689. Test Results comply with the PO required material specification(s) as noted below.

All Samples **ACCEPTABLE**

Signature 

Date 10/19/12

Electronic Copy – Original and Signed Report Located at ITLS



**SHAW
POWER**

APR 20 2013

005

Rev. 1 – Made to update year of acceptance specifications. All samples remain acceptable (10/19/12 – RDR)

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DURING OUR MANUFACTURING PROCESSES, TESTS, AND INSPECTIONS, THE PRODUCT DID NOT COME IN DIRECT CONTACT WITH MERCURY OR ANY OF ITS COMPOUNDS NOR WITH ANY MERCURY CONTAINING DEVICES EMPLOYING A SINGLE BOUNDARY OF CONTAINMENT.
"NOTE: THE RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES".



INDUSTRIAL TESTING LABORATORY SERVICES, LLC
635 Alpha Drive – RIDC Park
Pittsburgh, PA 15238 Phone: 412.963.1900 Fax: 412.963.1926
e-mail: info@itls.com website: itls.com

TEST REPORT
L18237
March 14, 2012

Purchase Order No: 694689-000 OP

To: Shaw Modular Solutions LLC
3191 West Lincoln Road
Lake Charles, LA 70605

Attn: Nick Koseski

Sample Received:

ITLS received nine (9) samples for Chemical, Mechanical, Hardness, Impact, Ferrite and Intergranular Corrosion evaluation, identified as follows:

Sample #	Heat #	Lot #	Gauge	Supplier	Result
1	609452-3A	277805-05	1.25	Outokumpu	Not Acceptable
2	609454-2A	277805-03	0.75	Outokumpu	Acceptable
3	609454-2A	277805-03	0.75	Outokumpu	Acceptable
4	852473-1A	277805-08	1.50	Outokumpu	Acceptable
5	852473-1A	277805-08	1.50	Outokumpu	Acceptable
6	852473-3A	277805-06	1.50	Outokumpu	Acceptable
7	852473-3A	277805-06	1.50	Outokumpu	Acceptable
8	852473-4A	277805-03	0.75	Outokumpu	Acceptable
9	852473-4A	277805-03	0.75	Outokumpu	Acceptable

Acceptance:

Sample #	Test	Acceptance
1-9	Chemical Analysis	APP-VL52-Z0-023, Rev. 1, ASTM A240-11b (UNS S32101)
1-9	Mechanical	APP-VL52-Z0-023, Rev. 1, ASTM A240-11b (UNS S32101), A480-11b
1-9	Rockwell B	ASTM A240-11b (UNS S32101), A480-11b
1-9	Ferrite	APP-VL52-Z0-023, Rev. 1, ASTM E562-11, Method A
1-9	Impact	APP-VL52-Z0-023, Rev. 1, ASTM A923-08, Method B
1-9	Intergranular Corrosion	ISO 3651-2 Method A

**SHAW
POWER**

OCT 15 2012

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8-13-12



Shaw Modular Solutions, LLC
ITLS Report L18237
March 14, 2012

Test References:

Specification	Title
ASTM A751-11	Standard Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products
ASTM A370-11a	Standard Test Methods and Definitions for Mechanical Testing of Steel Products
ASTM E8-09	Standard Test Methods for Tension Testing of Metallic Materials
ASTM E140-07	Standard Hardness Conversion Tables for Metals
ASTM E23-07a ^{e1}	Standard Test Methods for Notched Bar Impact Testing of Metallic Materials
ASTM E3-11	Standard Guide for Preparation of Metallographic Specimens
ASTM E18-08b	Standard Test Methods for Rockwell Hardness of Metallic Materials

Quality References:

Reference
10CFR21, 10CFR50.55(e) and 10CFR50 App.B
ASME NQA-1 – 1994 Basic and Supplementary Requirements
USNRC Regulatory Guide 1.28 Rev. 3
ITLS QA Manual Rev. 3 dated 06/20/08
No ITLS subcontractors used for completion of this order

**SHAW
POWER**

OCT 15 2012

003



8-13-12



Shaw Modular Solutions, LLC
ITLS Report L18237
March 14, 2012

Results:

Chemical Analysis – ASTM A751-11 (OES)

Sample #	Composition (wt%)													
	C	Mn	P	S	Si	Ni	Cr	Mo	N	Cu	Co	Al	V	Total Others
1	0.029	4.84	0.019	<0.002	0.73	1.65	21.7	0.20	0.22	0.38	0.05	0.10	0.04	0.14
2	0.025	4.64	0.018	<0.002	0.73	1.65	21.6	0.20	0.23	0.39	0.05	0.10	0.04	0.14
3	0.023	4.68	0.019	<0.002	0.72	1.63	21.7	0.20	0.22	0.39	0.05	0.10	0.04	0.14
4	0.033	4.99	0.019	<0.002	0.79	1.62	21.6	0.20	0.22	0.46	0.05	0.10	0.02	0.12
5	0.033	4.86	0.019	<0.002	0.79	1.62	21.7	0.20	0.22	0.46	0.05	0.10	0.04	0.14
6	0.031	4.83	0.017	<0.002	0.78	1.60	21.8	0.20	0.22	0.46	0.05	0.10	0.02	0.12
7	0.031	4.96	0.018	<0.002	0.77	1.59	21.7	0.21	0.22	0.47	0.05	0.09	0.02	0.12
8	0.030	4.96	0.018	<0.002	0.77	1.59	21.5	0.21	0.22	0.47	0.05	0.10	0.03	0.12
9	0.029	4.98	0.016	<0.002	0.77	1.59	21.6	0.21	0.22	0.47	0.05	0.10	0.03	0.12
Required	0.040 Max	4.00 6.00	0.040 Max	0.030 Max	1.00 Max	1.35 1.70	21.0 22.0	0.10 0.80	0.20 0.25	0.10 0.80	0.05 Max	0.10 Max	0.10 Max	0.50 Max

ACCEPTABLE

Ferrite Testing – ASTM E562-11 Method A

Sample #	Ferrite (%)
1	46
2	54
3	52
4	45
5	47
6	42
7	46
8	43
9	49
Required	40 - 60%

ACCEPTABLE

Ferrite Volume fraction based on manual point count of 80 fields per sample.

Page 3 of 5

ISO – 17025 Certified - Mechanical 1938.01; Nondestructive 1938.02

DURING OUR MANUFACTURING PROCESSES, TESTS, AND INSPECTIONS, THE PRODUCT DID NOT COME IN DIRECT CONTACT WITH MERCURY OR ANY OF ITS COMPOUNDS NOR WITH ANY MERCURY CONTAINING DEVICES EMPLOYING A SINGLE BOUNDARY OF CONTAINMENT.
"NOTE: THE RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES".

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Shaw Modular Solutions, LLC
ITLS Report L18237
March 14, 2012

Results (cont.):

Mechanical Properties – ASTM E8-09 (Round) & ASTM E18-08b (HRB)

Sample #	Initial Dimensions (in)	Initial Area (in ²)	*Yield Strength (ksi)	Tensile Strength (ksi)	Elongation (%) in 2"	Hardness HRB** (Avg. of 3)
1	0.498 dia.	0.1948	73	99	42	98
2	0.500 dia.	0.1963	72	100	44	96
3	0.500 dia.	0.1963	70	100	42	95
4	0.500 dia.	0.1963	72	100	44	94
5	0.500 dia.	0.1963	74	102	44	94
6	0.498 dia.	0.1948	72	103	45	94
7	0.498 dia.	0.1948	71	103	48	95
8	0.498 dia.	0.1948	73	103	43	96
9	0.498 dia.	0.1948	72	103	44	95
Required			65 Min	94 Min	30 Min	290 HBW Max

*Yield calculated at 0.20% offset

ACCEPTABLE

**Customer requested hardness in Rockwell B. All measured values were between 94 and 98 HRB which is approximately equal to Brinell 205 to 240 based on ASTM E140 Tables 2 and 5. These values are well below the specified max of 290 HBW and are therefore acceptable.

Intergranular Corrosion Test – ISO 3651-2 Method A

Sample #	Bend Radius	Bend	Result
1	1T	90°	Accept – No Cracking Observed
2	1T	90°	Accept – No Cracking Observed
3	1T	90°	Accept – No Cracking Observed
4	1T	90°	Accept – No Cracking Observed
5	1T	90°	Accept – No Cracking Observed
6	1T	90°	Accept – No Cracking Observed
7	1T	90°	Accept – No Cracking Observed
8	1T	90°	Accept – No Cracking Observed
9	1T	90°	Accept – No Cracking Observed
Required	1T	90°	No Cracking @ 10X

ACCEPTABLE

Page 4 of 5

ISO – 17025 Certified - Mechanical 1938.01; Nondestructive 1938.02

DURING OUR MANUFACTURING PROCESSES, TESTS, AND INSPECTIONS, THE PRODUCT DID NOT COME IN DIRECT CONTACT WITH MERCURY OR ANY OF ITS COMPOUNDS NOR WITH ANY MERCURY CONTAINING DEVICES EMPLOYING A SINGLE BOUNDARY OF CONTAINMENT.
"NOTE: THE RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES".

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ITLS Report L18237
March 14, 2012

Results (cont.):

Impact Test – ASTM A923-08 Method B

Sample #	Temperature (F)	Absorbed Energy (ft-lbs)
1	-40	17
1 Retest A	-40	11
1 Retest B	-40	11
2	-40	24
3	-40	20
4	-40	40
5	-40	65
6	-40	48
7	-40	49
8	-40	44
9	-40	45
Required	-40	20 Min

Sample 1: **NOT ACCEPTABLE**
Samples 2-9: **ACCEPTABLE**

This certification affirms that the contents are correct and accurate, and that the test operations performed by Industrial Testing Laboratory Services are in compliance with the material specification, ITLS Quality Assurance Manual Rev. 3 dated 6/20/2008, ASME NQA-1 1994, Regulatory Guide 1.28, 10 CFR 50 App. B, 10 CFR Part 21 and any additional requirements of SMS Purchase Order # 694689. Test Results comply with the PO required material specification(s) as noted below.

Sample 1: **NOT ACCEPTABLE**
All Other Samples: **ACCEPTABLE**

Signature 

Date 3/14/2012

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INDUSTRIAL TESTING LABORATORY SERVICES, LLC
635 Alpha Drive – RIDC Park
Pittsburgh, PA 15238 Phone: 412.963.1900 Fax: 412.963.1926
e-mail: info@itls.com website: itls.com

TEST REPORT
L18237
March 14, 2012

Purchase Order No: 694689-000 OP

To: Shaw Modular Solutions LLC
3191 West Lincoln Road
Lake Charles, LA 70605

Attn: Nick Koseski

Sample Received:

ITLS received nine (9) samples for Chemical, Mechanical, Hardness, Impact, Ferrite and Intergranular Corrosion evaluation, identified as follows:

Sample #	Heat #	Lot #	Gauge	Supplier	Result
1	609452-3A	277805-05	1.25	Outokumpu	Not Acceptable
2	609454-2A	277805-03	0.75	Outokumpu	Acceptable
3	609454-2A	277805-03	0.75	Outokumpu	Acceptable
4	852473-1A	277805-08	1.50	Outokumpu	Acceptable
5	852473-1A	277805-08	1.50	Outokumpu	Acceptable
6	852473-3A	277805-06	1.50	Outokumpu	Acceptable
7	852473-3A	277805-06	1.50	Outokumpu	Acceptable
8	852473-4A	277805-03	0.75	Outokumpu	Acceptable
9	852473-4A	277805-03	0.75	Outokumpu	Acceptable

Acceptance:

Sample #	Test	Acceptance
1-9	Chemical Analysis	APP-VL52-Z0-023, Rev. 1, ASTM A240-11b (UNS S32101)
1-9	Mechanical	APP-VL52-Z0-023, Rev. 1, ASTM A240-11b (UNS S32101), A480-11b
1-9	Rockwell B	ASTM A240-11b (UNS S32101), A480-11b
1-9	Ferrite	APP-VL52-Z0-023, Rev. 1, ASTM E562-11, Method A
1-9	Impact	APP-VL52-Z0-023, Rev. 1, ASTM A923-08, Method B
1-9	Intergranular Corrosion	ISO 3651-2 Method A

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Shaw Modular Solutions, LLC
ITLS Report L18237
March 14, 2012

Test References:

Specification	Title
ASTM A751-11	Standard Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products
ASTM A370-11a	Standard Test Methods and Definitions for Mechanical Testing of Steel Products
ASTM E8-09	Standard Test Methods for Tension Testing of Metallic Materials
ASTM E140-07	Standard Hardness Conversion Tables for Metals
ASTM E23-07a ^{e1}	Standard Test Methods for Notched Bar Impact Testing of Metallic Materials
ASTM E3-11	Standard Guide for Preparation of Metallographic Specimens
ASTM E18-08b	Standard Test Methods for Rockwell Hardness of Metallic Materials

Quality References:

Reference
10CFR21, 10CFR50.55(e) and 10CFR50 App.B
ASME NQA-1 – 1994 Basic and Supplementary Requirements
USNRC Regulatory Guide 1.28 Rev. 3
ITLS QA Manual Rev. 3 dated 06/20/08
No ITLS subcontractors used for completion of this order

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Shaw Modular Solutions, LLC
ITLS Report L18237
March 14, 2012

Results:

Chemical Analysis – ASTM A751-11 (OES)

Sample #	Composition (wt%)													
	C	Mn	P	S	Si	Ni	Cr	Mo	N	Cu	Co	Al	V	Total Others
1	0.029	4.84	0.019	<0.002	0.73	1.65	21.7	0.20	0.22	0.38	0.05	0.10	0.04	0.14
2	0.025	4.64	0.018	<0.002	0.73	1.65	21.6	0.20	0.23	0.39	0.05	0.10	0.04	0.14
3	0.023	4.68	0.019	<0.002	0.72	1.63	21.7	0.20	0.22	0.39	0.05	0.10	0.04	0.14
4	0.033	4.99	0.019	<0.002	0.79	1.62	21.6	0.20	0.22	0.46	0.05	0.10	0.02	0.12
5	0.033	4.86	0.019	<0.002	0.79	1.62	21.7	0.20	0.22	0.46	0.05	0.10	0.04	0.14
6	0.031	4.83	0.017	<0.002	0.78	1.60	21.8	0.20	0.22	0.46	0.05	0.10	0.02	0.12
7	0.031	4.96	0.018	<0.002	0.77	1.59	21.7	0.21	0.22	0.47	0.05	0.09	0.02	0.12
8	0.030	4.96	0.018	<0.002	0.77	1.59	21.5	0.21	0.22	0.47	0.05	0.10	0.03	0.12
9	0.029	4.98	0.016	<0.002	0.77	1.59	21.6	0.21	0.22	0.47	0.05	0.10	0.03	0.12
Required	0.040 Max	4.00 6.00	0.040 Max	0.030 Max	1.00 Max	1.35 1.70	21.0 22.0	0.10 0.80	0.20 0.25	0.10 0.80	0.05 Max	0.10 Max	0.10 Max	0.50 Max

ACCEPTABLE

Ferrite Testing – ASTM E562-11 Method A

Sample #	Ferrite (%)
1	46
2	54
3	52
4	45
5	47
6	42
7	46
8	43
9	49
Required	40 - 60%

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ACCEPTABLE

Ferrite Volume fraction based on manual point count of 80 fields per sample.

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ISO – 17025 Certified - Mechanical 1938.01; Nondestructive 1938.02

DURING OUR MANUFACTURING PROCESSES, TESTS, AND INSPECTIONS, THE PRODUCT DID NOT COME IN DIRECT CONTACT WITH MERCURY OR ANY OF ITS COMPOUNDS NOR WITH ANY MERCURY CONTAINING DEVICES EMPLOYING A SINGLE BOUNDARY OF CONTAINMENT.
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Shaw Modular Solutions, LLC
ITLS Report L18237
March 14, 2012

Results (cont.):

Mechanical Properties – ASTM E8-09 (Round) & ASTM E18-08b (HRB)

Sample #	Initial Dimensions (in)	Initial Area (in ²)	*Yield Strength (ksi)	Tensile Strength (ksi)	Elongation (%) in 2"	Hardness HRB** (Avg. of 3)
1	0.498 dia.	0.1948	73	99	42	98
2	0.500 dia.	0.1963	72	100	44	96
3	0.500 dia.	0.1963	70	100	42	95
4	0.500 dia.	0.1963	72	100	44	94
5	0.500 dia.	0.1963	74	102	44	94
6	0.498 dia.	0.1948	72	103	45	94
7	0.498 dia.	0.1948	71	103	48	95
8	0.498 dia.	0.1948	73	103	43	96
9	0.498 dia.	0.1948	72	103	44	95
Required			65 Min	94 Min	30 Min	290 HBW Max

*Yield calculated at 0.20% offset

ACCEPTABLE

**Customer requested hardness in Rockwell B. All measured values were between 94 and 98 HRB which is approximately equal to Brinell 205 to 240 based on ASTM E140 Tables 2 and 5. These values are well below the specified max of 290 HBW and are therefore acceptable.

Intergranular Corrosion Test – ISO 3651-2 Method A

Sample #	Bend Radius	Bend	Result
1	1T	90°	Accept – No Cracking Observed
2	1T	90°	Accept – No Cracking Observed
3	1T	90°	Accept – No Cracking Observed
4	1T	90°	Accept – No Cracking Observed
5	1T	90°	Accept – No Cracking Observed
6	1T	90°	Accept – No Cracking Observed
7	1T	90°	Accept – No Cracking Observed
8	1T	90°	Accept – No Cracking Observed
9	1T	90°	Accept – No Cracking Observed
Required	1T	90°	No Cracking @ 10X

ACCEPTABLE

Page 4 of 5

ISO – 17025 Certified - Mechanical 1938.01; Nondestructive 1938.02

DURING OUR MANUFACTURING PROCESSES, TESTS, AND INSPECTIONS, THE PRODUCT DID NOT COME IN DIRECT CONTACT WITH MERCURY OR ANY OF ITS COMPOUNDS NOR WITH ANY MERCURY CONTAINING DEVICES EMPLOYING A SINGLE BOUNDARY OF CONTAINMENT.
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Shaw Modular Solutions, LLC
ITLS Report L18237
March 14, 2012

Results (cont.):

Impact Test – ASTM A923-08 Method B

Sample #	Temperature (F)	Absorbed Energy (ft-lbs)
1	-40	17
1 Retest A	-40	11
1 Retest B	-40	11
2	-40	24
3	-40	20
4	-40	40
5	-40	65
6	-40	48
7	-40	49
8	-40	44
9	-40	45
Required	-40	20 Min

Sample 1: **NOT ACCEPTABLE**
Samples 2-9: **ACCEPTABLE**

This certification affirms that the contents are correct and accurate, and that the test operations performed by Industrial Testing Laboratory Services are in compliance with the material specification, ITLS Quality Assurance Manual Rev. 3 dated 6/20/2008, ASME NQA-1 1994, Regulatory Guide 1.28, 10 CFR 50 App. B, 10 CFR Part 21 and any additional requirements of SMS Purchase Order # 694689. Test Results comply with the PO required material specification(s) as noted below.

Sample 1: **NOT ACCEPTABLE**
All Other Samples: **ACCEPTABLE**

Signature 

Date 3/14/2012

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OCT 15 2012

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INDUSTRIAL TESTING LABORATORY SERVICES, LLC
635 Alpha Drive – RIDC Park
Pittsburgh, PA 15238 Phone: 412.963.1900 Fax: 412.963.1926
e-mail: info@itls.com website: itls.com

TEST REPORT
L19428
April 9, 2012

**SHAW
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OCT 09 2012

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Purchase Order No: 694689-000 OP

To: Shaw Modular Solutions LLC
3191 West Lincoln Road
Lake Charles, LA 70605

Attn: Nick Koseski

Sample Received:

ITLS received six (6) samples for Chemical, Mechanical, Hardness, Impact, Ferrite and Intergranular Corrosion evaluation, identified as follows:

Sample #	Heat #	Gauge	Supplier
1	853601-1A	1.500	Outokumpu
2	853601-1A	1.500	Outokumpu
3	853736-1B	0.750	Outokumpu
4	853736-1B	0.750	Outokumpu
5	609633-5A	0.250	Outokumpu
6	609633-5A	0.250	Outokumpu

Acceptance:

Sample #	Test	Acceptance
All	Chemical Analysis	APP-VL52-Z0-023, Rev. 1, ASTM A240-11b (UNS S32101)
All	Mechanical	APP-VL52-Z0-023, Rev. 1, ASTM A240-11b (UNS S32101), A480-11b
All	Rockwell B	ASTM A240-11b (UNS S32101), A480-11b
All	Ferrite	APP-VL52-Z0-023, Rev. 1, ASTM E562-11, Method A
All	Impact	APP-VL52-Z0-023, Rev. 1, ASTM A923-08, Method B
All	Intergranular Corrosion	ISO 3651-2 Method A

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Shaw Modular Solutions, LLC
ITLS Report L19428
April 9, 2012

Test References:

Specification	Title
ASTM A751-11	Standard Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products
ASTM A370-11a	Standard Test Methods and Definitions for Mechanical Testing of Steel Products
ASTM E8-11	Standard Test Methods for Tension Testing of Metallic Materials
ASTM E140-07	Standard Hardness Conversion Tables for Metals
ASTM E23-07a ^{e1}	Standard Test Methods for Notched Bar Impact Testing of Metallic Materials
ASTM E3-11	Standard Guide for Preparation of Metallographic Specimens
ASTM E18-08b	Standard Test Methods for Rockwell Hardness of Metallic Materials
ASTM E1245-03 (2008)	Standard Practice for Determining the Inclusion of Second-Phase Constituent Content of Metals by Automatic Image Analysis
ASTM E562-11	Standard Test Method for Determining Volume Fraction by Systematic Manual Point Count

Quality References:

Reference
10CFR21, 10CFR50.55(e) and 10CFR50 App.B
ASME NQA-1 – 1994 Basic and Supplementary Requirements
USNRC Regulatory Guide 1.28 Rev. 3
ITLS QA Manual Rev. 3 dated 06/20/08
No ITLS subcontractors used for completion of this order

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Shaw Modular Solutions, LLC
ITLS Report L19428
April 9, 2012

Results:

Chemical Analysis – ASTM A751-11 (OES/Leco)

Sample #	Composition (wt%)													
	C	Mn	P	S	Si	Ni	Cr	Mo	N	Cu	Co	Al	V	Total Others
1	0.029	5.12	0.021	0.002	0.69	1.49	21.3	0.19	0.22	0.36	<0.01	0.02	0.06	0.08
2	0.023	5.00	0.019	0.002	0.67	1.43	21.3	0.19	0.22	0.35	<0.01	0.02	0.06	0.08
3	0.021	5.10	0.023	0.002	0.63	1.57	21.2	0.18	0.23	0.38	<0.01	0.01	0.06	0.07
4	0.023	5.05	0.025	0.002	0.64	1.59	21.1	0.19	0.23	0.40	<0.01	0.01	0.06	0.07
5	0.023	4.87	0.023	0.002	0.62	1.57	21.2	0.18	0.22	0.40	<0.01	0.03	0.06	0.09
6	0.022	4.93	0.023	0.002	0.61	1.57	21.3	0.18	0.21	0.39	<0.01	0.02	0.06	0.09
Required	0.040 Max	4.00 6.00	0.040 Max	0.030 Max	1.00 Max	1.35 1.70	21.0 22.0	0.10 0.80	0.20 0.25	0.10 0.80	0.05 Max	0.10 Max	0.10 Max	0.50 Max

ACCEPTABLE

Impact Test – ASTM A923-08 Method B

Sample #	Temperature (°F)	Absorbed Energy (ft-lbs)
1	-40	22
2	-40	31
3	-40	47
4	-40	55
5	-40	28
6	-40	27
Required	-40	20 Min

ACCEPTABLE

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OCT 09 2012

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Shaw Modular Solutions, LLC
ITLS Report L19428
April 9, 2012

Results (cont):

Mechanical Properties – ASTM E8-11 (Round/Flat) & ASTM E18-08b (HRB)

Sample #	Test Temp (°F)	Initial Dimensions (in)	Initial Area (in ²)	*Yield Strength (ksi)	Tensile Strength (ksi)	Elongation (%) in 2"	Hardness HRB** (Avg. of 3)
1	Room	0.495 dia.	0.1924	72	105	41	95
2	Room	0.495 dia.	0.1924	76	104	40	96
3	Room	0.504 x 0.780	0.3931	74	102	50	97
4	Room	0.498 x 0.783	0.3899	74	104	49	96
5	Room	0.499 x 0.262	0.1307	91	109	37	99
6	Room	0.502 x 0.257	0.1290	97	112	34	99
Required				65 Min	94 Min	30 Min	290 HBW Max

*Yield calculated at 0.20% offset

ACCEPTABLE

**Customer requested hardness in Rockwell B. All measured values were between 95 and 99 HRB which is approximately equal to Brinell 210 to 248 based on ASTM E140 Tables 2 and 5. These values are well below the specified max of 290 HBW and are therefore acceptable.

Ferrite Testing – ASTM E562-11 Method A

Sample #	Ferrite (%)
1	53
2	53
3	48
4	50
5	50
6	48
Required	40 - 60%

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7-12-12

Ferrite volume fraction tested with Image Analysis per ASTM E1245-03(2008). ASTM E562 offers the use of ASTM E1245 to determine the same measurements.

ACCEPTABLE



Shaw Modular Solutions, LLC
ITLS Report L19428
April 9, 2012

Results (cont.):

Intergranular Corrosion Test – ISO 3651-2 Method A

Sample #	Bend Radius	Bend	Result
1	1T	90°	Accept – No Cracking Observed
2	1T	90°	Accept – No Cracking Observed
3	1T	90°	Accept – No Cracking Observed
4	1T	90°	Accept – No Cracking Observed
5	1T	90°	Accept – No Cracking Observed
6	1T	90°	Accept – No Cracking Observed
Required	1T	90°	No Cracking @ 10X

ACCEPTABLE

This certification affirms that the contents are correct and accurate, and that the test operations performed by Industrial Testing Laboratory Services are in compliance with the material specification, ITLS Quality Assurance Manual Rev. 3 dated 6/20/2008, ASME NQA-1 1994, Regulatory Guide 1.28, 10 CFR 50 App. B, 10 CFR Part 21 and any additional requirements of SMS Purchase Order # 694689. Test Results comply with the PO required material specification(s) as noted below.

All Samples: **ACCEPTABLE**

Signature _____

A handwritten signature in black ink, appearing to be 'A. D. R.', is written over a horizontal line.

Date 4/9/2012

SMS QO
ACCEPT

13

7-12-12

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