American Institute of Steel Construction

is proud to recognize

Newport Industrial Fabrication, Inc.

Newport, ME

for successfully meeting the quality certification requirements for

Standard for Steel Building Structures

Certified Bridge Fabrication - Intermediate (Major)

Fracture Critical Endorsement

Sophisticated Paint Endorsement - Enclosed

Roger E. Ferch

200111051-2014

Certificate Number

Certification valid through: November **2014**

American Institute of Steel Construction
www.aisc.org
One East Wacker Drive Suite 700
Chicago, IL 60601
312.670.2400

January 5, 2015

Jeffrey Welcome
Newport Industrial Fabrication, Inc.
P.O. Box D.
Newport, ME 04953

SENT VIA EMAIL

Re: AISC Quality Management Certification Status

Dear Mr. Welcome:

Thank you for taking the steps necessary to be in the process of maintaining certification in the category(s) of Standard for Steel Building Structures, Certified Bridge Fabrication-Intermediate(Major), Sophisticated Paint Endoresment-Enclosed, and Fracture Critical Endorsement by the American Institute of Steel Construction(AISC).

The certification for your facility located in Newport, ME will expire on 11/30/14. This letter is to officially extend the certification for your company untill 02/15/15 and our records will be revised to show that your existing certificate is in good standing until that time.

For all certification program inquiries, please feel free to contact certification@aisc.org or 312.670.7520 – for all technical inquiries, please contact the Steel Solutions Center at solutions@aisc.org or 866.ASK.AISC.

Sincerely,

Jacques Cattan
Vice President
American Institute of Steel Construction

CC: File
Program Engineer

Newport Industrial Fabrication

Procedure: # 41
Date: 9/10/08
Revision: 0

Purpose: To ensure proper application of metalizing

Responsible for Implementation: Q.C. Manager

Review By: President

Records Generated: None

Process: Application of metalizing on properly prepared substrate

Surface Prep: *The steel substrate shall be prepared to:*

(1) White metal finish, SSPC-SP5/NACE No.2, for marine or immersion service
(2) The minimum of near-white metal finish, SSPC-SP10/NACE No. 2, for other service applications.
(3) The level of soluble- salt contamination shall conform to the contract specs.
(4) The steel substrate shall have a minimum <u>angular</u> profile of 2.5 mils.

Steel Temp: *(1) The steel temperature shall be at least 5 degrees above the dew point.*

Bend Test: *(1) The bend test (180 degrees on a mandrel) is used as a qualitative test for proper surface preparation, equipment setup, and spray parameters.*
(2) This test should be performed at the start of each shift or as specified by contract specs.

Equipment Setup: *Equipment shall be set up per manufacturer's specs.*

Adjusting Parameters: *Set the wire feed volt dial on 80% & amp dial on 40%, start spraying at this setting and while machine is running, adjust amperage to desired setting, then lower voltage to minimum given in spray tables or until erratic arc is noticed. Then, raise voltage until arc smoothes out.*

Bridge Master Parameters

Material	Size	Volts	Amps	Air Pressure
Aluminum	(1/8"-3/16")	28-32	350-500	90-110 PSI
Zinc	(1/8"-3/16")	24-28	325-500	90-110 PSI
Zinc-Aluminum	(1/8"-3/16")	26-32	300-500	90-110 PSI
Steels	(1/16"-3/32")	28-35	200-250	90-110 PSI
Bronzes	(1/16"-3/32")	28-35	200-250	90-110 PSI
400 Stainless	(1/16"-3/32")	28-35	200-250	90-110 PSI
300 Stainless	(1/16"-3/32")	28-35	200-250	90-110 PSI

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Spray Technique: (1) *The specified coating thickness shall be applied in several passes with each pass approximately 2-3 mils thick. The thickness is kept thin to maintain good coating tensile-bond strength. Laying down an excessively thick spray pass increases the internal stresses in the thermal spray coating and decreases the ultimate tensile-bond strength of the coating.*

(2) *The spray gun stand off distance is 6-10 inches from the substrate. When the spray head is moved farther away from the substrate more of the metalizing material will not be applied and instead will drop off in the form of dust. An excessive spray distance will also decrease the bond strength of the coating.*

(3) *The spray gun should be perpendicular to the substrate to maintain the highest bond strengths.*

(4) *Coating should be applied in a block pattern, typically 3 feet by 3 feet. each spray pass should be applied parallel to and over lapping the previous pass by about 40%. Successive spray coats should be applied at right angles to the previous coat until the specified coating thickness is attained. This method is preferred to achieve the most uniform coating thickness and the best possible coating quality.*

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NACE International Recognizes

Gary A. McLaughlin

NACE Certified Coating Inspector—Level 3

CERTIFICATION NUMBER *36804*

Certification Awarded

June 2012

Executive Director

NACE INTERNATIONAL

340423

NACE INTERNATIONAL INSTITUTE

Certificate of Achievement

The NACE International Institute Recognizes

Adam Guiggey

NACE Coating Inspector Level 1—Certified

CIP Certification Number 54577

Helena Sulinger

Executive Director
NACE International Institute

Awarded
September 2014

646609

Newport Industrial Fabrication

WELDING PROCEDURE SPECIFICATION – D1.1

Identification No:	NIF-AWS-TC-U4a-GF	Date:	2-25-13
Revision:	0	Welding Process:	FCAW
Authorized by:	Adam Guiggey	Type:	Semi-automatic
Supporting PQR No.:	Prequalified		

Joint Design

Type:	Single bevel groove
Size:	As specified on design drawings
Root Opening:	3/16" – ½"
Backing:	Required.
Groove Angle:	40-50 deg.
Root Face:	0
Back Gouging:	N/A

Electrical Characteristics

Transfer Mode:	N/A
Current & Polarity:	DCEP

Base Metals

Material Spec.:	A 588/A 709/M 270
Type/Grade:	B/50W
Thickness:	1/4" to unlimited.
Diameter (Pipe):	24" and greater.

Filler Metals

AWS Spec.:	A5.20
AWS Class.:	E71T-1C
Manufacturer:	Hobart Excel Arc 71

Shielding

Gas:	CO2	Comp.:	100%
Flow Rate:	30 – 40 CFH		
Cup Size:	5/8"		

Position

Position of Welds:	All
Vertical Progression:	Upward

Technique

Bead Type:	Stringer
Multi/Single Pass:	Single or multiple
# of Electrodes:	Single
Stick-out:	7/8"+-1/8"
Peening:	Not allowed.
Interpass Cleaning:	Wire brush, grinder, needle gun.

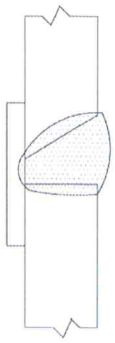
Heat Modulation

Preheat & Inter-pass:

t ≤ 1-1/2":	50° F.	1-1/2" < t > 2-1/2":	150° F.
t > 2 ½":	225° F.	Interpass:	400° max

Post Heat:

Temp:	N/A	Time:	N/A

Pass or Layer	Heat Input, KJ/in	Process	Filler Metal		Current Type and Polarity	Amps	Volts	Travel Speed, IPM	Joint Detail
			Class.	Dia.					
All	N/A	FCAW	E71T-1C	.045	DCEP	191-300	24-28	10.6-14.8	
All	N/A	FCAW	E71T-1C	.052	DCEP	191-315	24-28	10.6-14.8	

Adam S Guiggey
CWI 99050241
QC1 EXP. 5/1/2017

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Newport Industrial Fabrication

WELDING PROCEDURE SPECIFICATION – D1.1

Identification No:	NIF-AWS-BTC-P10-GF	Date:	3-5-13
Revision:	0	Welding Process:	FCAW
Authorized by:	Adam Guiggey	Type:	Semi-automatic
Supporting PQR No.:	Prequalified		

Joint Design

Type:	Flare bevel groove
Size:	As specified on design drawings
Root Opening:	0-1/8"
Backing:	N/A
Groove Angle:	N/A
Root Face:	N/A
Back Gouging:	N/A

Electrical Characteristics

Transfer Mode:	N/A
Current & Polarity:	DCEP

Base Metals

Material Spec.:	A 500/A 709/M 270
Type/Grade:	B/50W
Thickness:	3/16" to unlimited.
Diameter (Pipe):	24" and greater.

Filler Metals

AWS Spec.:	A5.20
AWS Class.:	E71T-1C
Manufacturer:	Hobart Excel Arc 71

Shielding

Gas:	CO2	Comp.:	100%
Flow Rate:	30 – 40 CFH		
Cup Size:	5/8"		

Position

Position of Welds:	All
Vertical Progression:	Upward

Technique

Bead Type:	Stringer
Multi/Single Pass:	Single or multiple
# of Electrodes:	Single
Stick-out:	7/8"+-1/8"
Peening:	Not allowed.
Interpass Cleaning:	Wire brush, grinder, needle gun.

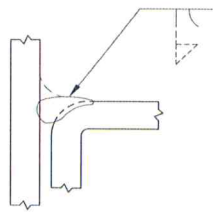
Heat Modulation

Preheat & Inter-pass:

t ≤ ¾":	50° F.	¾" < t ≤ 1 ½":	150° F.
t > 1 ½":	225° F.	Interpass:	400° max

Post Heat:

Temp:	N/A	Time:	N/A

Pass or Layer	Heat Input, KJ/in	Process	Filler Metal		Current Type and Polarity	Amps	Volts	Travel Speed, IPM	Joint Detail
			Class.	Dia.					
All	N/A	FCAW	E71T-1C	.045	DCEP	191-300	24-28	10.6-14.8	
All	N/A	FCAW	E71T-1C	.052	DCEP	191-315	24-28	10.6-14.8	

Adam S Guiggey
CWI 99050241
QC1 EXP. 5/1/2017

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Newport Industrial Fabrication

WELDING PROCEDURE SPECIFICATION – D1.1

Identification No:	NIF-Fillet Welds	Date:	1-13-15
Revision:	0	Welding Process:	FCAW
Authorized by:	Adam Guiggey	Type:	Semi-automatic
Supporting PQR No.:	Prequalified		

Joint Design

Type:	Fillet Weld
Size:	As specified on design drawings
Root Opening:	0 – 3/16"
Backing:	N/A
Groove Angle:	N/A
Root Face:	N/A
Back Gouging:	N/A

Electrical Characteristics

Transfer Mode:	N/A
Current & Polarity:	DCEP

Base Metals

Material Spec.:	A588/A709/M270*
Type/Grade:	B/50
Thickness:	1/8" to unlimited.
Diameter (Pipe):	24" and greater.

Filler Metals

AWS Spec.:	A5.20
AWS Class.:	E71T-1C
Manufacturer:	Hobart Excel Arc 71

Shielding

Gas:	CO2	Comp.:	100%
Flow Rate:	30 – 40 CFH		
Cup Size:	5/8"		

Position

Position of Welds:	All
Vertical Progression:	Upward

Technique

Bead Type:	Stringer
Multi/Single Pass:	Single or multiple
# of Electrodes:	Single
Stick-out:	7/8"+-1/8"
Peening:	Not allowed.
Interpass Cleaning:	Wire brush, grinder, needle gun.

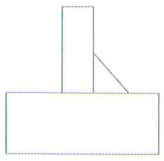
Heat Modulation

Preheat & Inter-pass:

t ≤ 1-1/2":	50° F.	1-1/2" < t ≤ 2 ½":	150° F.
t > 2 ½":	225° F.	Interpass:	400° max

Post Heat:

Temp:	N/A	Time:	N/A

Pass or Layer	Heat Input, KJ/in	Process	Filler Metal		Current Type and Polarity	Amps	Volts	Travel Speed, IPM	Joint Detail: Fillet Welds
			Class.	Dia.					
All	N/A	FCAW	E71T-1C	.045	DCEP	252-315	25-28	10.6-14.8	
All	N/A	FCAW	E71T-1C	.052	DCEP	252-315	25-28	10.6-14.8	

*All base metals listed in AWS D1.1, Table 3.1 are qualified.

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CWI 99050241
QC1 EXP. 5/1/2017

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N.I.F. WELDER CONTINUITY LOG

Year *2014*

Revised By Adam Guiggey

	I.D.	Process / Date certified	January	February	March	April	May	June	July	August	September	October	November	December
Phil Foley	A	FCAW 7/2/02			X			X			X		X	
		SAW 10/14/02			X			X			X		X	
		GMAW 6/30/04						X			X		X	
Dave Reynolds	B	FCAW 11/12/01			X			X			X		X	
John Senter fillet	C	FCAW 6/14/02			X									
Dave Jeans	D	FCAW 12/23/10			X									
Mason Caron	E	FCAW 5-20-14					X	X			X		X	
Brett MacLean	F	FCAW 6/6/03 (tack)												
Zac Foster	I	FCAW 5-30-13			X			X			X		X	
		SAW 8/14/13		X	X						X		X	
Brian Kain	J	FCAW 2/22/03			X			X			X		X	
		SMAW			X			X			X		X	
		GMAW 7/2/04												
		SAW 7/5/06			X			X			X		X	
Josh Damon	K	FCAW 3/19/12			X			X			X		X	
		SAW 4/4/14				X					X		X	
Gabe Petrcelly	L	FCAW 10/08/10			X			X			X		X	
		SAW 9/3/13									X		X	
John Frontiero	M	FCAW 6/12/00			X			X			X		X	
		GMAW 6/30/04												
		GTAW 2/19/98			X			X			X		X	
Daniel Wagner	N	FCAW 6/26/13			X			X			X		X	
						X		X			X		X	
Devin Stock	O	FCAW 2/7/11			X			X			X		X	
		SAW 4/4/14				X		X			X		X	
Josh Doore	P	FCAW 4/26/13			X			X			X		X	
David Goucher	Q	FCAW 7/12/00			X			X			X		X	
		GMAW 6/29/04												
Adam Fuller	R	FCAW 4/16/13			X			X			X		X	
		SAW 9/27/13			X			X			X		X	
Nick Searls	S	FCAW 6/20/14						X			X		X	
Fred Sprague	T	FCAW 2/18/11												
Josh Sheritan	U	FCAW 2/25/14			X			X			X		X	
	V													
	W													
Vance Nash	X	FCAW 9/24/04			X			X			X		X	
		SAW 6/20/06												
Chris Schmitt	Y	FCAW 1,2F 3-8-13			X			X			X		X	
Mike Brown	Z	FCAW 7/29/13			X			X			X		X	
		SAW 4/17/14				X					X		X	

American Welding Society®

Certifies that Welding Inspector

Adam S Guiggey

has complied with the requirements of AWS QC1,
Standard for AWS Certification of Welding Inspectors

99050241
CERTIFICATE NUMBER

May 1 2017
EXPIRATION DATE

AWS PRESIDENT

AWS QUALIFICATION COMMITTEE CHAIR

AWS CERTIFICATION COMMITTEE CHAIR

Newport Industrial Fabrication

Ultrasonic Inspection Procedure for Angle Beam Inspection of Welds

NIF-UT-abw-1
August 1, 2014

Approvals:

Level III:	**Robert Wiswesser**	**Date:**	**8-1-14**
Quality Manager	**Adam Guiggey**	**Date:**	**8-1-14**
Plant Manager	**Daniel Gerry**	**Date:**	**8-1-14**

1. Scope

This procedure describes the ultrasonic inspection methods and equipment to be used for angle beam inspection of welds with and without backing bars using the Olympus Epoch 600 or Sonatest Master scan 330 ultrasonic flaw detector or an instrument with similar capabilities.

Because ultrasonic reflections from the backing bars may interfere with the identification of defects near the ID weld edge, this test is done on a "best effort basis". If critical ultrasonic inspection is to be performed, backing bars should be removed.

2. References

a. ASNT Recommended Practice SNT-TC-1A
b. NIF Written Practice
c. Olympus Epoch 600 Operating Manual or Sonatest Master scan 330 Operating Manual
d. ANSI/AWS D1.1 Structural Welding Code, 1996 or later

3. Personnel

a. Level I and II ultrasonic inspectors shall be trained, qualified, and certified in accordance with NIF's Written Practice. A limited certification: Level I or Level II (carbon steel weld inspection) is acceptable for this procedure.

b. Level I ultrasonic inspectors shall be capable of calibrating the ultrasonic flaw detector using specific standards, measuring and recording readings and, if applicable, making acceptance or rejection determinations based on written instructions.

c. Level II ultrasonic inspectors shall be capable of setting up and calibrating the ultrasonic flaw detector and interpreting and evaluating results with respect to applicable codes, standards, and specifications. The Level II ultrasonic inspector shall be thoroughly familiar with the scope and limitations of ultrasonic inspection, and is responsible for on-the-job training and guidance of Level I ultrasonic inspectors and trainees. The Level II ultrasonic inspector shall be responsible for organizing data and reporting results of the inspections.

4. Equipment

a. Sonatest Master scan 330, Olympus Epoch 600, or similar instrument shall be used for this procedure.

b. For angle beam inspection, transducers shall be AWS approved angle beam transducers and wedges with a frequency between 2 and 2.5 MHz. Angles shall be 45^{o}, 60^{o} or 70^{o}.

c. For straight beam transducers, the diameter shall be between 1/2" and 1", and frequency shall be between 2 MHz and 6 MHz.

c. Couplants shall be cellulose gum-based, or any other suitable couplant with adequate wetting properties.

d. Reference block: The International Institute of Welding (IIW) Type 1 or Type 2 ultrasonic reference block shall be used for both distance and sensitivity calibration, in addition to checking the beam index point (BIP) and actual refracted angle.

5. Calibration Procedure: Straight Beam

a. The range shall be set to at least twice the thickness, and velocity shall be set to the longitudinal velocity of steel (approximately .2330 in/μsec).

b. Set the 1" back wall amplitude from 50% to 75% full screen height. Using the side of the IIw calibration Block which is 1" in thickness.

a. Calibration Procedure: Angle Beam

a. On the Sonascan unit, set the Range to 10" and Material Velocity to .1300 in/μsec.

b. Verify that the transducer is properly coupled to the Plexiglas wedge. If there is any evidence of air bubbles between the transducer face and the wedge, reapply the couplant. Approved couplants are petroleum jelly, silicon grease, or other suitable couplant.

c. Position the transducer on the IIW block as shown in Figure 1 of Appendix A.
Mark the beam index point by maximizing the signal from the 4" radius, and marking the wedge at the "0" mark on the IIW block.
Set the distance calibration (IIW, Type 1 block: 4" and 9" signals, IIW Type 2 block: 2" and 4" signals). Set up the gate to "positive" logic, then use the "zero" control to position the first signal to 4.000" (Type 1) or 2.000" (Type 2) then use the "Material Velocity" control to position the second signal to 9.000" (Type 1) or 4.000" (Type 2).

d. Position the transducer on the IIW block as shown in Figure 2 of Appendix A.
Measure the actual refracted angle (use Figure 2A for 70^{O} and 2B for 45^{O} or 60^{O})

e. Position the transducer on the IIW block as shown in Figure 3 of Appendix A.
Use the gain control to set the amplitude of the signal from the .060" SDH to 50% FSH.
Record the reference level.

a. Inspection Procedure

a. The inspection surface should be free of weld spatter, excessive dirt and scale.

b. For straight beam testing for laminations, set the range to at least twice the wall thickness. Scan the entire skip distance area (see 5.f.).

c. The entire base metal through which the ultrasound must travel to test the weld shall be tested for laminar reflectors. If any area of the base metal exhibits total loss of back reflection or any indication equal to or greater than the original back reflection height is located in a position that will interfere with the normal weld scanning procedure, its size, location, and depth shall be reported on the ultrasonic test report, and an alternate weld scanning procedure shall be used. This shall include at least one of the following: testing from the opposite surface of the weld if accessible, scanning from the opposite side of the weld using other search unit angles.

d. For angle beam inspection, the range on the instrument shall be at 5" or 10" based on the V-path (range must be greater than the V-path; V-path = $2T / \cos \beta$)

e. Calculate the skip distance (skip distance = $2T \times \tan \beta$). Scanning distance to and from the weld shall be at least equal to the skip distance. Scanning shall be such that the beam overlap is at least 25%. Inspection shall be from both top sides of the weld.

f. Scanning levels shall be according Table 6.2 or 6.3 as applicable. If a high scanning gain prohibits proper evaluation of discontinuities, scanning levels may be reduced to a reasonable level.

8. Acceptance

a. AWS dB Rating system shall be used for angle beam weld acceptance criteria. The indication rating shall be based on the following calculation: A - B - C = D

Where: A = Indication Level
B = Reference Level
C = Attenuation Factor: C = 2(SP - 1)

b. Ultrasonic Acceptance-Rejection Criteria is shown in Appendix B, Table 6.2 or 6.3 as applicable.

c. Ultrasonic indications that result from weld geometry or echoes from the backer bar shall not be valid cause for rejection.

d. All rejected welds shall be reported on the applicable inspection form.

Appendix A

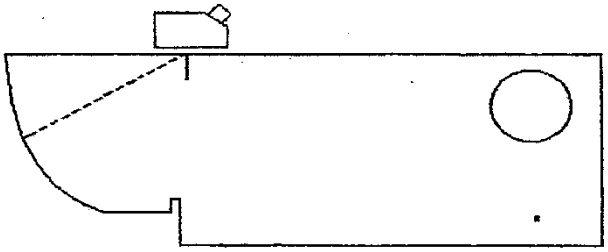

Figure 1: Position of transducer to mark the beam index point (BIP) and calibrate for distance

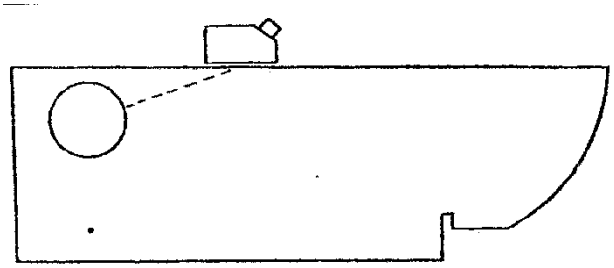

Figure 2A: Position to measure wedge angle for 70° transducers

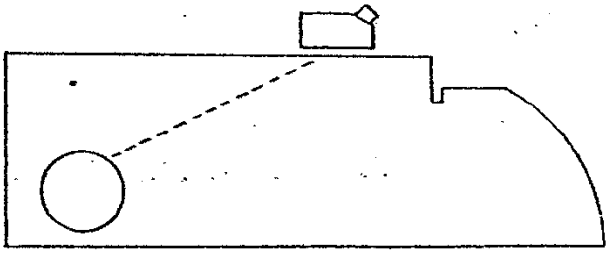

Figure 2B: Position to measure wedge angle for 45° and 60° transducers

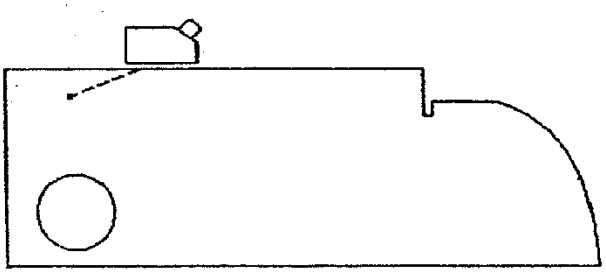

Figure 3: Position to calibrate for sensitivity using the .060" SDH

Appendix B

Scanning Levels	
Sound path[2] in. [mm]	Above Zero Reference, dB
through 2-1/2 [65 mm]	14
> 2-1/2 through 5 [65–125 mm]	19
> 5 through 10 [125–250 mm]	29
> 10 through 15 [250–380 mm]	39

Note:
2. This column refers to sound path distance; NOT material thickness.

Table 6.2
UT Acceptance-Rejection Criteria (Statically Loaded Nontubular Connections) (see 6.13.1)

Discontinuity Severity Class	Weld Thickness[1] in. [mm] and Search Unit Angle										
	5/16 through 3/4 [8–20]	> 3/4 through 1-1/2 [20–38]	> 1-1/2 through 2-1/2 [38–65]			> 2-1/2 through 4 [65–100]			> 4 through 8 [100–200]		
	70°	70°	70°	60°	45°	70°	60°	45°	70°	60°	45°
Class A	+5 & lower	+2 & lower	–2 & lower	+1 & lower	+3 & lower	–5 & lower	–2 & lower	0 & lower	–7 & lower	–4 & lower	–1 & lower
Class B	+6	+3	–1 0	+2 +3	+4 +5	–4 –3	–1 0	+1 +2	–6 –5	–3 –2	0 +1
Class C	+7	+4	+1 +2	+4 +5	+6 +7	–2 to +2	+1 +2	+3 +4	–4 to +2	–1 to +2	+2 +3
Class D	+8 & up	+5 & up	+3 & up	+6 & up	+8 & up	+3 & up	+3 & up	+5 & up	+3 & up	+3 & up	+4 & up

Class A (Large discontinuities)
Any indication in this category shall be rejected (regardless if length).

Class B (Medium discontinuities)
Any indication in this category having a length greater than ¾ in.
[20 mm] shall be rejected.

Class C (Small discontinuities)
Any indication in this category having a length greater than 2 in.
[50 mm] shall be rejected.

Class D (Minor discontinuities)
Any indication in this category shall be accepted reguardless of length or location in the weld.

Welder Training and Testing Institute

Certificate of Completion

Be it known that

Adam Guiggey

Has attended and successfully completed the

Professional Development Course

Ultrasonic Testing (UT)

Level I

(40 Hours)

Awarded this 10th day of May 2013

Thomas R. Martin
Instructor / NDT Level III

Robert K. Wiswesser
Director / ASNT Level III

Newport Industrial Fabrication, Inc.
NDE CERTIFICATION RECORD

Last Name: Deroo

First Name: Phil

EDUCATION LEVEL		HIGH SCHOOL	
		TECHNICAL SCHOOL	YRS
	X	COLLEGE Eastern Maine Technical College	DEGREE 2 year Diploma

TECHNICAL TRAINING

	METHOD	LEVELS	TOTAL HOURS	DATES	TRAINERS
RT	Radiography				
MT	Magnetic Particle				
PT	Liquid Penetrant				
UT	Ultrasonic	II	104	6/99; 1/00; 2/06	Krautkramer NDT; Martin NDT
VT	Visual				

NDE EXPERIENCE

Company	From	To	Method and Highest Level
Newport Industrial Fab	1/04	Present	UT, Level II
Cianbro Corporation	1/09	Present	UT, Level II
Cives Steel Company	2/99	1/03	UT, Level II

CERTIFICATION

NDE METHOD	LEVEL	CERT EXPIRES
Radiography (RT)		
Magnetic Particle (MT)		
Liquid Penetrant (PT)		
Ultrasonic (UT)	II	5-25-17
Visual (VT)		

Certification Records:
Supporting documents for this certification, i.e. initial certification and recertification records shall be maintained with this form in the employee file.

Qualification Statement:
The above individual has met the requirements for qualification and certification in the stated method(s) in Accordance with Newport Industrial Fabrication, Inc.'s policy/procedure for personnel qualification and certification which follows the guidelines of the ASNT recommended practice SNT-TC-1A.

Certification Statement:
Newport Industrial Fabrication, Inc. does hereby certify that the above named individual has met the requirements for certification in the above stated method(s) and skill level(s) in accordance with the Newport Industrial Fabrications, Inc.'s written practice for personnel qualification and certification.

Robert K. Wiswesser

7-16-14
Date

Robert K. Wiswesser
ASNT NDE Level III
Certificate no. 57962

Newport Industrial Fabrication

MAGNETIC PARTICLE INSPECTION PROCEDURE

YOKE METHOD

Procedure number 0019 Rev. 2
5-31-13

NIF QC MANAGER: Adam Guiggey DATE: 5-31-13

LEVEL III: Ron Strout DATE: 5-31-13

445 Elm Street – P.O. Box D – Newport, ME 04953 – (207) 368 – 4344 – Fax 368 – 5552 – www.nif-inc.com

1.0 Scope

1.1 This procedure contains the specified minimum requirements to be used in performing Magnetic Particle testing of weldments, materials, and components when Magnetic Particle examination is required by contract requirements or materials specifications.

1.2 The magnetic particle examination (MT) method is applied to detect cracks and other discontinuities on or very near the surfaces of ferromagnetic materials.

1.3 This procedure is limited to the "yoke technique" with dry magnetic particles.

2.0 References (latest acceptable edition of the following):

2.1 NIF Quality Control Manual

2.2 AWS D1.5 Bridge Welding Code

2.3 AWS D1.1 Structural Welding Code

2.4 ASTM E-709 Standard Guide for Magnetic Particle Testing

2.5 ASME Code Section V, Article 7

2.6 SNT-TC-1A

3.0 Personnel Qualifications

3.1 Personnel performing magnetic particle examination (MT) in accordance with the requirements of AWS and ASME Codes shall be qualified and certified as a Level I Special or Level II Limited as a minimum by the Q.C. Manager in accordance with the recommendations described in SNT-TC-1A. Performance demonstration, when required by the referencing Code Section, shall be documented.

4.0 Materials and Equipment

4.1 Power Source: AC electromagnetic yoke. (A source of 110V, 60HZ AC is required.) Note: Equivalent items may be used without further notice.

4.1.1 The magnetic equipment shall be capable of inducing into the examined material or weld a magnetic field of sufficient intensity to reveal surface discontinuities. A lifting power of at least 10 lbs at the maximum pole spacing that will be used is required.

4.1.2 Prior to use, the magnetizing power of electromagnetic yokes shall have been checked within the past year.

4.1.3 The magnetic equipment shall be maintained and operated in accordance with the applicable equipment manufacturer's requirements, and shall be in good working order such that an optimum examination is possible and personnel safety requirements are met.

4.2 Dry Magnetic Powder:

4.2.1 Finely divided dry particles by Magnaflux Corporation or equivalent shall be used.

4.2.2 This material shall be in accordance with SE-709 and shall be of a color that will provide adequate contrast background of the inspection surfaces. (#1 grey, #3A black, or #8A red particles).

4.2.3 This material shall be of high permeability and low retentivity.

4.3 Calibration:

4.3.1 Each alternating current electromagnetic yoke shall have a lifting power of at least 10 lb. at the maximum pole spacing that will be used. Calibration is required prior to each use.

4.3.2 Each direct current magnetic yoke shall have a lifting power of at least 40 lbs. at a maximum pole spacing that will be used. Calibration is required prior to each use.

4.3.3 Each weight shall be weighed with a scale from a reputable manufacturer and stenciled with the applicable nominal weight prior to first use. A weight need only be verified again if damaged in a manner that could have caused potential loss of material.

4.3.4 Light meters shall be calibrated at least once a year or whenever the maters have been repaired.

5.0 Sequence of Operation

5.1 *Temperature* – The temperature of components to be examined shall not be greater than 600 F when using type 3A (black) and 8A (red) magnetic particles and not greater than 750 F for type 1 (grey).

5.2 *Time of Inspection* – Acceptance examination shall be performed after final post weld heat treatment, if performed, or as otherwise specified by code, contract, or customer requirements.

5.3 *Components for Inspection* - Operators shall ensure that the area(s) of interest is (are) located between the two poles of the yoke when magnetizing the component. When the area to be inspected exceeds the range of the poles operators are to ensure that proceeding inspections overlap the preceding inspections to ensure 100% inspection of the area(s) of interest. When these requirements can be met, all shapes and sizes of ferromagnetic materials may be inspected by Magnetic Particle Inspection.

5.4 *Preparation of surface* –

5.4.1 Welds: For welds and at least 1" of the base metal on either side, surfaces shall be smooth to the extent that proper interpretation can be accomplished. The surface shall be dry and free of dirt, grease, lint, etc. That could interfere with the examination. Satisfactory results can usually be obtained when the surfaces are in the "as welded" condition. However, surface preparation my grinding or machining may be necessary where surface irregularities could mask indications caused by discontinuities. Holes or other openings shall be plugged as required to prevent entrance of magnetic particles.

5.4.2 Components: The surface to be examined shall be free of loose scale, spatter, oil, grease, or other extraneous materials. Solvents such as trichloroethylene, oakite, etc. approved by the customer shall be used to remove grease and oil.

5.4.3 Prior to MT examination, any coating applied over the area to be inspected shall be removed to clean, shiny metal.

5.5 *Applying Magnetic Field* – Initiate magnetic current. The magnetic field shall be induced with the prods parallel to the longitudinal axis of the weld for the detection of transverse discontinuities. When possible, the yoke shall be rotated 90 degrees with respect to the original location for the detection of longitudinal discontinuities. When inspecting for transverse discontinuities, the yoke prod locations shall overlap by approximately 1 inch.

5.6 *Dry Powder Application* – While yoke is energized, the magnetic particles shall be applied using a hand squeeze powder blower in such a manner that a light, uniform dust-like coating that settles on the surface of the part. Dry Particles must not be applied to a wet surface or in an area where there is excessive wind.

5.7 *Excess Powder Removal* – Excess particles shall be removed by means of dry air of sufficient force to remove the excess without disturbing those that are indicative to discontinuities. Excess particles may be removed by using an appropriate air stream generated by a hand-actuated rubber bulb.

5.8 *Inspection and Interpretation* -

5.8.1 Inspection shall be carried out by the continuous method; that is, the magnetizing current shall remain on during the period while the Magnetic Particles are being applied and removed. It is essential to carefully observe the formation of indications throughout the process. Sufficient time for indication formation and examination should be allowed before switching the current off.

5.8.2 A minimum light intensity of 100 fc is required on the surface to be examined to ensure adequate sensitivity during the examination and evaluation of indications.

5.8.3 All indications revealed by MT are not necessarily discontinuities since irrelevant indications are sometimes encountered. Irrelevant or "false" indications are quite common, but may be easily identified. All indications believed to be non-relevant shall be evaluated by removing the surface roughness, or shall be re-inspected by other nondestructive test methods. If subsequent re-inspection reveals any indications, they shall be considered as
relevant and shall be evaluated as discontinuities. Examples of such indications are as follows:

5.8.3.1 Magnetic Writing: The indication is fuzzy and will be destroyed by demagnetization. These indications are caused by contact with other steel or magnets while magnetized.

5.8.3.2 Change in Section: The distribution of the magnetic field in an area of change in section of the piece being tested is such that the test pattern is broad and fuzzy.

5.8.3.3 Flow Lines: These are large groups of parallel indications that occur in some forgings when magnetized with high currents.

5.8.4 Linear discontinuities are indications in which the length is greater than 3 times the width.

5.8.5 Rounded discontinuities are indications which are circular or elliptical with the length less than 3 times the width.

5.8.6 When indications are detected, the yoke shall be orientated in the best possible position to obtain the maximum sensitivity.

5.8.7 All indications shall be evaluated and compared to the acceptance criteria as specified in the applicable Code of Construction.

5.9 *Post Examination Cleaning* – Where residual magnetic particles interfere with subsequent processes or usage, remove all particulate material from component using brush, rags, or air blower after completion of examination.

5.10 *Demagnetization* – Demagnetizing shall be accomplished when required by applicable work instructions / customer requirements, or when residual magnetism in the part could interfere with subsequent processing or usage.

5.10.1 Local demagnetization shall be accomplished with alternating current yokes only.

5.10.2 The poles are to be placed in contact with the item / area which requires demagnetization. The poles are then to be moved around the area and slowly withdrawn while the yoke is energized.

5.10.3 Following demagnetization, the removal of the magnetic field shall be verified by a field indicating device to ensure that any remaining flux does not exceed 3 gauss.

5.11 *Record of Examination* –

5.11.1 A report of Magnetic Particle examination shall be completed for each examination. At a minimum, the report shall contain the following:

5.11.1.1 Work Order Number
5.11.1.2 Procedure identification and revision
5.11.1.3 Magnetic particle equipment and type of current
5.11.1.4 Magnetic particles (visible or fluorescent, wet or dry)
5.11.1.5 Examination personnel identity and, if required by referencing Code Section, qualification level.
5.11.1.6 Map or record of indications per T-792
5.11.1.7 Material and thickness
5.11.1.8 Lighting equipment
5.11.1.9 Date of examination

5.11.2 Nonrejectable indications shall be recorded as specified by the referencing Code Section.

5.11.3 Rejectable indications shall be recorded. As a minimum, the type of indications (linear or rounded), location and extent (length or diameter or aligned) shall be recorded.

5.11.4 Records shall be maintained in accordance with applicable Code section and Company Policy.

TO: Newport Industrial Fabrication, Inc.
445 Elm Street
Newport, Maine 04953

TO: ADAM S. GUIGGEY
V; 207-368-4344//e-mail [adam@ni-inc.com]

SUBJECT: Qualification and Certification, Level II Limited (Yoke) Magnetic Particle Test Method Inspector.

DATE: 25 May 2013

The following named personnel, your origination, your location, have participated in reoccurring training on the principles and practices of the, Level II Limited (Yoke) Magnetic Particle Test Method".

In accordance with the guidelines of Para.8.1.4. ASNT, SNT-TC-1A: And Para. 4.2.3.A.4.; Proc., 1810 Rev. 06, their achievement status for each examination section is as noted:

NAME	COMPOSITE GRADE (GENERAL, SPECIFIC, and PRACTICAL)
GUIGGEY, A.	94.3% // 93.0%/100%/90.0%
WELCOME, J.	89.0% // 87.0%/90.0%/90.0%

In accordance with the requirements of ASNT: SNT-TC-1A, ASME, ATA105, AWS, MIL-STD-410, and NAC-410, and receipt of satisfactory individual vision acuity examination(s); the above named personnel should be certified as
[1] Qualified to, and [2] Capable of, performing as a, Level II Limited (Yoke) Magnetic Particle Inspector, as defined in proc., 1810.

Above named personnel should be commended for their efforts.

If there are any questions concerning this matter, or if this office can be of further assistance, feel free to contact (207) 799-8911. Please reference this document.

Submitted By:
Ronald N. Strout
Resident Level III Examiner
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CERTIFICATION STATEMENT

The Above Individual(s) Have/Has Met The Requirements For Qualification And Certification In The Stated Methods In Accordance With The Company's Procedure For Personnel Qualification And Certification Which Follows The Guidelines Of ASNT Recommended Practice SNT-TC-1A.

SIGNED Newport Industrial Fabrication, Inc.
Manufacturer or Contractor
BY
TITLE
DATE 5-29-13