Casco Bay Steel Structures

One Wallace Avenue, South Portland ME 04106

AWS - Welding Procedure Specification (WPS)

WeldOffice WPS

WPS record number	201 Revision 1	Qualified to	AWS D1.5
Date	4/24/2014	Company name	Casco Bay Steel Structures
Supporting PQR(s) Reference docs.	SAW DC + FCM 2-21-14 - Rev 1		

Scope	Fillet, no PWHT (As-welded)
Joint	Joint details for this welding procedure specification in: JOINTS section of this WPS

BASE METALS

Type	Gr50/Gr50W	P-no.	Grp-no. -
Welded to	Gr50/Gr50W	P-no.	Grp-no. -
Backing:	None	P-no.	Grp-no. -
Retainers			
Notes	All A709 steels with 50 ksi or less are also qualified		

THICKNESS RANGE QUALIFIED (in.)

	As-welded Min.	As-welded Max.	With PWHT Min.	With PWHT Max.
Complete pen.	-	-	-	-
Impact tested	-	-	-	-
Partial pen.	-	-	-	-
Fillet welds	1/8	All	-	-

DIAMETER RANGE QUALIFIED (in.)

	As-welded Min.	As-welded Max.	With PWHT Min.	With PWHT Max.
			-	-

FILLER METALS

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	THICKNESS RANGE QUALIFIED (in.) As-welded Min.	As-welded Max.	With PWHT Min.	With PWHT Max.
SAW	5.23	ENi1K	6		Lincolnweld LA-75	1/8	All	-	-
Flux	-	-	-	-	- Lincolnweld 960	- None -			
Sup. filler	-	-	-	-	-	- None -			

WELDING PROCEDURE

Welding process		SAW
Type		Machine
Minimum preheat/interpass temperature	(°F)	See Backpage
Maximum interpass temperature	(°F)	490
Filler metal size	(in.)	5/32
Layer number		
Position		F,H
Current/polarity		DCEP
Amperes		604
Volts		29.5
Travel speed	(in./min)	17.1
Maximum heat input	(kJ/in.)	62.5193
Wire feed type		Hot wire
Wire feed speed	(in./min)	N/A
String or weave		Stringer
C.T.W.D	(in.)	
Multi/Single pass per side		Single or Multiple passes
Multiple or single layer		Single or Multiple layer
Oscillation		None
Multi/single electrode		Single electrode
Electrode angle	(deg.)	As needed
Maximum pass thickness	(in.)	See Backpage
Weld deposit chemistry		F8A2-ENi1K-Ni1-H8
Notes		

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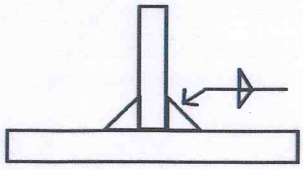
Date	4/24/2014		Company name	Casco Bay Steel Structures

JOINTS: Typical joint(s). See actual production drawings and engineering specifications for details.



3/8 single pass flat
5/16 single pass Horizontal

	Amps	Volts	Travel Speed
AVG	604 /	29.5 /	17.1 IPM
MIN	544 /	27.4 /	14.5 IPM
MAX	644 /	31.6 /	19.7 IPM

*** Multiple passes may be used if drawing details call for a larger size fillet weld than noted above in the position welding is being performed**

Type of groove	Fillet weld	Minimum groove angle	(deg.)	N/A
		Minimum root opening	(in.)	N/A
		Maximum root face	(in.)	N/A

PREHEAT TABLE

Applicable standard	
AWS D1.5 Bridge Welding Code	For thickness 1/8 to 3/4(in.): 50(°F). Preheat to 70(°F) if the base metal temperature is below 32(°F). Over 3/4 thru 1-1/2(in.): 70(°F). Over 1-1/2 thru 2-1/2(in.): 150(°F). Over 2-1/2(in.): 225(°F). Refer to AWS D1.5 2010 Table 4.3 (pg 85)
AWS D1.5 2010 FCM	For thickness 1/8 to 3/4(in.): 100°F). Over 3/4 thru 1-1/2(in.): 200(°F). Over 1-1/2 thru 2-1/2(in.): 300(°F). Over 2-1/2(in.): 350(°F). No welding to be done if ambient temperature in immediate area is below 0(°F)
New York SCM	Up to 3/4 ----------100 (F) Over 3/4 to 1-1/2 ----------200 (F) Over 1-1/2 to 2-1/2 --------300 (F) Over 2-1/2 ----------350 (F)

TECHNIQUE

Supplementary MF control	
Peening	
Surface preparation	Grind/Blast/chemical/wirebrush clean to be free of moisture, slag, millscale, oils, dust
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None

NOTES

AWS FCM preheats are taken from AWS D1.5 2010 Clause 12 Table 12.4 and are based upon calculated heat input calculated in accordance with section 5.12 with an as welded H8 designation for the electrode combination we are using. This higher preheat will be used on non weathering steels also.

Signature 1

Name	Signature
Matthew Cote	Matthew J Cote CWI 08051341 QC1 EXP. 5/1/2017
Date	
6/2/2014	

Signature 2

Name	Signature
Date	

Signature 3

Name	Signature
Date	

Signature 4

Name	Signature
Date	

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Casco Bay Steel Structures

One Wallace Avenue, South Portland ME 04106

AWS - Welding Procedure Specification (WPS)

WeldOffice WPS

WPS record number	250	Revision		Qualified to	AWS D1.5
Date	6/10/2014			Company name	Casco Bay Steel Structures
Supporting PQR(s) Reference docs.	SAW FCM 3/32 DC- 5/7/14				

Scope	Fillet, no PWHT (As-welded), impact testing
Joint	Joint details for this welding procedure specification in: JOINTS section of this WPS

BASE METALS

Type	Gr50/Gr50W	P-no.	Grp-no. -
Welded to	Gr50/Gr50W	P-no.	Grp-no. -
Backing:	Yes	P-no.	Grp-no.
Retainers			
Notes	All A709 with 50 ksi or less are also qualified		

THICKNESS RANGE QUALIFIED (in.)

	As-welded Min.	As-welded Max.	With PWHT Min.	With PWHT Max.
Complete pen.	-	-	-	-
Impact tested	0.625	no max.	-	-
Partial pen.	-	-	-	-
Fillet welds	no min.	no max.	-	-

DIAMETER RANGE QUALIFIED (in.)

	As-welded Min.	As-welded Max.	With PWHT Min.	With PWHT Max.
	N/A	N/A	-	-

FILLER METALS

THICKNESS RANGE QUALIFIED (in.)

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	As-welded Min.	As-welded Max.	With PWHT Min.	With PWHT Max.
SAW	5.23	ENi1K	6		LincolnElectric LA-75	0.125	no max.	-	-
Flux	5.23	F8A2			LincolnElectric Lincolnweld960	- Required -			
Sup. filler						- Required -			

Flux type	
Flux from recrush. slag	No
Suppl. filler metal vol. (ft³)	N/A

WELDING PROCEDURE

Welding process		SAW
Type		Machine
Minimum preheat/interpass temperature	(°F)	See Back Page
Maximum interpass temperature	(°F)	400
Filler metal size	(in.)	3/32
Layer number		
Position		F,H
Current/polarity		DCEN (straight polarity)
Amperes		363.3
Volts		31.6
Travel speed	(in./min)	12.8
Maximum heat input	(kJ/in.)	53.8138
Wire feed type		Cold wire
Wire feed speed	(in./min)	N/A
String or weave		Stringer
C.T.W.D	(in.)	
Multi/Single pass per side		Single or Multiple passes
Multiple or single layer		Single or Multiple layer
Oscillation		None
Multi/single electrode		Single electrode
Electrode angle	(deg.)	Varies
Maximum pass thickness	(in.)	See Back Page
Weld deposit chemistry		F8A2-ENi1K-Ni1-H8
Notes		

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Casco Bay Steel Structures

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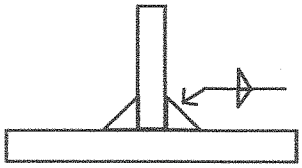
AWS - Welding Procedure Specification (WPS)

WeldOffice WPS

WPS record number	250	Revision		Qualified to	AWS D1.5
Date	6/10/2014			Company name	Casco Bay Steel Structures

JOINTS: Typical joint(s). See actual production drawings and engineering specifications for details.



3/8 single pass flat
5/16 single pass Horizontal

	Amps		Volts		Travel Speed
AVG	363.3	/	31.6	/	12.8
MIN	326.9	/	29.4	/	10.8
MAX	399.6	/	33.8	/	14.7

*** Multiple passes may be used if drawing details call for a larger size fillet weld than noted above in the position welding is being performed**

Type of groove	Fillet weld	Minimum groove angle	(deg.)	N/A
		Minimum root opening	(in.)	N/A
		Maximum root face	(in.)	N/A

PREHEAT TABLE

Applicable standard	
AWS D1.5 Bridge Welding Code	For thickness 1/8 to 3/4(in.): 50(°F). Preheat to 70(°F) if the base metal temperature is below 32(°F). Over 3/4 thru 1-1/2(in.): 70(°F). Over 1-1/2 thru 2-1/2(in.): 150(°F). Over 2-1/2(in.): 225(°F). Refer to AWS D1.5 2010 Table 4.3 (pg 85)
AWS D1.5 2010 FCM	For thickness 1/8 to 3/4(in.): 100°F). Over 3/4 thru 1-1/2(in.): 200(°F). Over 1-1/2 thru 2-1/2(in.): 300(°F). Over 2-1/2(in.): 350(°F). No welding to be done if ambient temperature in immediate area is below 0(°F)
New York SCM	Up to 3/4 ----------100 (F) Over 3/4 to 1-1/2 ----------200 (F) Over 1-1/2 to 2-1/2 --------300 (F) Over 2-1/2 ----------350 (F)

TECHNIQUE

Supplementary MF control	
Peening	Not used
Surface preparation	Grind/Blast/chemical/wirebrush clean to be free of moisture, slag, millscale, oils, dust
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	None

NOTES

AWS FCM preheats are taken from AWS D1.5 2010 Clause 12 Table 12.4 and are based upon calculated heat input calculated in accordance with section 5.12 with an as welded H8 designation for the electrode combination we are using. This higher preheat will be used on non weathering steels also.

Signature 1

Name	Signature
Matthew Cote	Matthew J Cote CWI 08051341 QC1 EXP. 5/1/2017
Date	
6/10/14	

Signature 2

Name	Signature
Date	

Signature 3

Name	Signature
Date	

Signature 4

Name	Signature
Date	

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Casco Bay Steel Structures

One Wallace Ave, South Portland ME 04106

AWS - Prequalified Welding Procedure Specification (pWPS)

WeldOffice WPS

Company name	Casco Bay Steel Structures
Welding process	SMAW
Process type	Manual

Identification #	480	Rev.
Originated by	Matthew Cote	
Date	7/22/2014	
Authorized by	Matthew J Cote	
Date	7/22/2014	

Joint design used

Joint type		T - T joint
Joint design		Fillet Weld
Backing		No
Backing material		Not Applicable
Root opening (R)*	(in.)	
Root face (f)*	(in.)	
Groove angle (a)*	(deg.)	
Radius (J - U)*	(deg.)	
Back gouging		No
Back gouging method		None

Position

Welding position:	Groove	
	Fillet	All
Vertical progression		Up

Electrical characteristics

Transfer mode (GMAW)	N/A
Current type	Other
Other	DC+ and AC

Base metals

* Datum, As Detailed (As Fit-Up)

Spec., type or grade		Gr 50/ Gr50W
Thickness:	Groove (in.)	
	Fillet (in.)	1/8" and above
Diameter (Pipe)	(in.)	

Technique

Stringer or weave bead		Stringer or Weave
Multi/single pass (per side)		Single or Multiple
Number of electrodes		Varies
Spacing:	Longitudinal (in.)	-
	Lateral (in.)	-
	Angle (deg.)	-
Contact tube to work	(in.)	-
Peening		Not permitted
Interpass cleaning		Brushing or grinding

Filler metals

AWS Specification	A5.5
AWS Classification	E-8018 H4R

Preheat

Preheat temp.:	Min.	(°F)	See notes
Interpass temp.:	Min.	(°F)	See notes
	Max.	(°F)	450

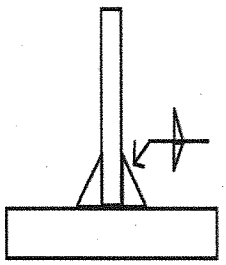
Shielding

Flux		-
Electrode-flux (class)		-
Gas composition		-
Gas flow rate	(cfh)	-
Gas cup size	(in.)	-

Post weld heat treatment

Temperature	(°F)	None
Time	(hrs)	-

Welding procedure

Layer	Pass	Process	Filler metal class	Filler metal diameter (in.)	Current type / polarity	Amps	Wire feed speed (in./min)	Volts	Travel speed (in./min)	Joint details
1	All	SMAW	E-8018 H4R	1/8	DCEP	100-160	-	n/a	varies	
1	All	SMAW	E-8018 H4R	1/8	AC	90-160	-	n/a	varies	
1	All	SMAW	E-8018 H4R	5/32	DCEP	140-210	-	n/a	varies	
1	All	SMAW	E-8018 H4R	5/32	AC	130-210	-	n/a	varies	
1	All	SMAW	E-8018 H4R	3/16	DCEP	200-300	-	n/a	varies	
1	All	SMAW	E-8018 H4R	3/16	AC	180-300	-	n/a	varies	
								Designation		FILLET

Notes

LINCOLN ELECTRIC EXCALIBUR 8018-C3 MR

SEE BACKSIDE FOR MORE DETAILS

Signature 1

Name	Signature
Matthew J Cote	
Date	
7/22/2014	

Matthew J Cote
CWI 08051341
QC1 EXP 5/1/2017

Signature 2

Name	Signature
Date	

Signature 3

Name	Signature
Date	

Signature 4

Name	Signature
Date	

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Identification #	480	Rev.

AWS D1.5 2010

Single Pass Fillet weld in 1F position, No bigger than 3/8 in a single pass
Single Pass Fillet weld in 2F, 4F position, No bigger than 5/16 in a single pass
Single Pass Fillet weld in 3F position, No biger than 1/2 in a single pass

For thickness 1/8 to 3/4(in.): 50°F). Preheat to 70(°F) if the base metal temperature is below 32(°F).
Over 3/4 thru 1-1/2(in.): 70(°F).
Over 1-1/2 thru 2-1/2(in.): 150(°F).
Over 2-1/2(in.): 225(°F). Refer to AWS D1.5 2010 Table 4.3 (pg85)

FOR FRACTURE CRITICAL WELDS

For thickness 1/8 to 3/4(in.): 125°F).
Over 3/4 thru 1-1/2(in.): 200(°F).
Over 1-1/2 thru 2-1/2(in.): 300(°F).
Over 2-1/2(in.): 350(°F). No welding to be done if ambient temperature in immediate area is below 0(°F)

ALL VERTICAL WELDING SHALL BE DONE UPWARD

IF A GAP FROM 1/16 TO 3/16 IS EVIDENT, INCREASE WELD SIZE 1/16 FOR EACH 1/16 GAP

EX 1/16 GAP IS +1/16 FROM DETAILED SIZE
1/8 GAP IS +1/8 FROM DETAILED SIZE
3/16 GAP IS +3/16 FROM DETAILED SIZE

Preheats to the NYSSCM

	Gr 50	Gr 50W
to 3/4	50F	100F
over 3/4 to 1-1/2	70F	200F
over 1-1/2 to 2-1/2	150F	300F
over 2-1/2	225	350F

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Casco Bay Steel Structures, Inc.

WELDING PROCEDURE SPECIFICATION

Material specification ASTM Gr. 50 + G-50W
Welding process Gas Metal ARC Welding (GMAW)
Manual or machine Semi Auto
Position of welding Flat + Horizontal
Filler metal specification AWS-A5.28 ESAB
Filler metal classification E80C-Ni1
Flux N A
Shielding gas 90%AR/10%CO2 Flow rate 35CFH +0/-4, Elec. Stickout 5/8
Single or multiple pass Single & multiple
Single or multiple arc Single
Welding current DC
Polarity DCEP
Welding progression See Detail
Root treatment Blast Clean-wire Brush-Area To be Free of slag-RUST-Moisture
Preheat and interpass temperature See Table and as Required
Posfheat temperature As Required
Heat Input Min 24.4 KJ/in Max 38.3 KJ/in P.Q.R. 418-FCM=34.8 KJ/IN
* 35.0 KJ/in Min for single pass

Minimum Preheat and Interpass Temperature, °C [°F]

Welding Process (Base Metal)	Thickness of Thickest Part at Point of Welding, mm [in]: To 20 mm [3/4 in] Incl.	Over 20 mm [3/4 in] to 40 mm [1-1/2 in] Incl.	Over 40 mm [1-1/2 in] to 65 mm [2-1/2 in] Incl	Over 65 mm [2-1/2 in]
SAW; GMAW; FCAW; SMAW (M270M [M270] [A 709M (A 709)] 345 [50],	10 [50]	20 [70]	65 [150]	110 [225]
FCM Gr50	150°F	200°F	225°F	325°F
FCM Gr50W	150°F	250°F	325°F	350°F

Preheats to the NYSSCM

	Gr 50	Gr 50W
to 3/4	50F	100F
over 3/4 to 1-1/2	70F	200F
over 1-1/2 to 2-1/2	150F	300F
over 2-1/2	225	350F

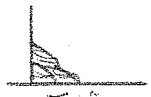
Max Interpass 440°F

WELDING PROCEDURE

Sec. 5.12.4.2
AWS D1.5 Joint detail Fillet

Pass no.	Electrode size	Welding current: Amperes	Welding current: Volts	Travel speed
		307	29.2	15.5
		338.7	31	17.5
AS		To	To	To
REQ	.052	276.3	27	13.5
* 1 Pass	.052	338.7 to 281.3	31 to 28.0	17.5 to 13.5

2F



1F

This procedure may vary due to fabrication sequence, fit-up, pass size, etc., within the limitation of variables given in applicable A.W.S. codes or contract specifications

Procedure no. FCM 610
Revision no. _____

Contractor Casco Bay Steel
Authorized By Paul L. Goodale
Date 8-1-2013