



Casco Bay Steel Structures
 One Wallace Avenue, South Portland ME 04106
AWS - Welding Procedure Specification (WPS)
 WeldOffice WPS

WPS record number Date	201 4/24/2014	Revision 1	Qualified to Company name	AWS D1.5 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		With PWHT	
	Min.	Max.	Min.	Max.
Complete pen.	-	-	-	-
Impact tested	-	-	-	-
Partial pen.	-	-	-	-
Fillet welds	1/8	All	-	-

DIAMETER RANGE QUALIFIED (in.)

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

FILLER METALS

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	THICKNESS RANGE QUALIFIED (in.)			
						As-welded		With PWHT	
						Min.	Max.	Min.	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	FBA2-ENi1K-Ni1-H8
Notes	

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

	3/8 single pass flat 5/16 single pass Horizontal												
	<table border="1"> <thead> <tr> <th>Amps</th> <th>Volts</th> <th>Travel Speed</th> </tr> </thead> <tbody> <tr> <td>AVG 604 /</td> <td>29.5 /</td> <td>17.1 IPM</td> </tr> <tr> <td>MIN 544 /</td> <td>27.4 /</td> <td>14.5 IPM</td> </tr> <tr> <td>MAX 644 /</td> <td>31.6 /</td> <td>19.7 IPM</td> </tr> </tbody> </table>	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
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											
<p>* 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</p>													

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.

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Signature 1

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

Signature 3

Name	Signature	Signature 4	
		Name	Signature
Date		Date	



Casco Bay Steel Structures
 One Wallace Avenue, South Portland ME 04106
AWS - Welding Procedure Specification (WPS)
 WeldOffice WPS

WPS record number Date	250 6/10/2014	Revision	Qualified to Company name	AWS D1.5 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		With PWHT	
	Min.	Max.	Min.	Max.
Complete pen.	-	-	-	-
Impact tested	0.625	no max.	-	-
Partial pen.	-	-	-	-
Fillet welds	no min.	no max.	-	-

DIAMETER RANGE QUALIFIED (in.)

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

FILLER METALS

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	THICKNESS RANGE QUALIFIED (in.)			
						As-welded		With PWHT	
						Min.	Max.	Min.	Max.
SAW	5.23	ENi1K	6		LincolnElectric LA-75	0.125	no max.	-	-
Flux Sup. filler	5.23	F8A2			LincolnElectric Lincolnweld960	- Required -			
Flux type									
Flux from recrush. slag	No								
Suppl. filler metal vol. (fl ³)	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	FH
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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JOINTS: Typical joint(s). See actual production drawings and engineering specifications for details.

	3/8 single pass flat 5/16 single pass Horizontal																
	<table border="1"> <thead> <tr> <th></th> <th>Amps</th> <th>Volts</th> <th>Travel Speed</th> </tr> </thead> <tbody> <tr> <td>AVG</td> <td>363.3 /</td> <td>31.6 /</td> <td>12.8</td> </tr> <tr> <td>MIN</td> <td>326.9 /</td> <td>29.4 /</td> <td>10.8</td> </tr> <tr> <td>MAX</td> <td>399.6 /</td> <td>33.8 /</td> <td>14.7</td> </tr> </tbody> </table>		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
	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														
<p>* 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</p>																	

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

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	Signature 2	Signature 3	Signature 4
Name	Name	Name	Name
Matthew Cote			
Date	Date	Date	Date
6/10/14			
Matthew J Cote CWI 08051341 QC1 EXP. 5/1/2017			

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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

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

Base metals <small>* Datum, As Detailed (As Fit-Up)</small>	
Spec., type or grade	Gr 50/ Gr50W
Thickness: Groove (in.)	
Fillet (in.)	1/8" and above
Diameter (Pipe) (in.)	

Filler metals	
AWS Specification	A5.5
AWS Classification	E-8018 H4R

Shielding	
Flux	-
Electrode-flux (class)	-
Gas composition	-
Gas flow rate (cft/h)	-
Gas cup size (in.)	-

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

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Name	Signature	Name	Signature
Matthew J Cote			
Date		Date	
7/22/2014	Matthew J Cote CWI 08051341		
Signature 3		Signature 4	
Name	Signature	Name	Signature
Date		Date	

Identification #	480	Rev.
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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 bigger 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 (G-MAW)
 Manual or machine Semi AUTO
 Position of welding Flat + Horizontal
 Filler metal specification AWS-A5.28
 Filler metal classification E80C-Nil ESAB
 Flux NA
 Shielding gas 90% AR / 10% Co² Flow rate 35CFH + 8/-4₃ Elec. StickOut 5/8
 Single or multiple pass single + multiple
 Single or multiple arc Single
 Welding current DC
 Polarity DC EP
 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
 Postheat 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]

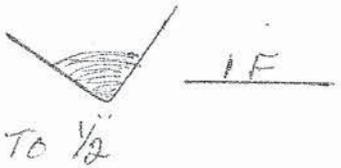
Preheats to the NYSSCM

	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

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)])	10 [50]	20 [70]	65 [150]	110 [225]
FCM Gr 50	150 ^{oF}	200 ^{oF}	225 ^{oF}	325 ^{oF}
FCM Gr 50W	150 ^{oF}	250 ^{oF}	325 ^{oF}	350 ^{oF}

WELDING PROCEDURE

Max Interpass 440^{oF}

Pass no.	Electrode size	Welding current		Travel speed	Joint detail
		Amperes	Volts		
AS REQ	.052	307	29.2	15.5	Sec 5.12.4.2 AWS D1.5 Fillet 2F 
		338.7	31	17.5	
		To	To	To	
* 1 Pass	.052	276.3	27	13.5	IF 
		338.7	31	17.5	
		to	to	to	
		281.3	28.0	13.5	

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 Contractor Casco Bay Steel
 Revision no. _____ Authorized By Paul E. Goodale
 Date 8-1-2013

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