Casco Bay Steel Structures, Inc.

WELDING PROCEDURE SPECIFICATION

Material specification ASTM Gr 50 (345)
Welding process Flux Core Arc Welding (FCAW)
Manual or machine Semi AUTO
Position of welding Flat & Horizontal
Filler metal specification AWS 5-21
Filler metal classification E71T-1 - Lincoln Ultracore 71A75 Dule
Flux ~A
Shielding gas 75% AR / 25% CO2 Flow rate 35 CFH +8/-4, Eles. stickout 5/8 +-
Single or multiple pass Single & Multiple
Single or multiple arc Single
Welding current DC
Polarity DC EP
Welding progression See Detaile
Root treatment blast Clean - wirebrush - area Free of Slag - Rust & Moisture
Preheat and interpass temperature See Table
Postheat temperature As. Req.
Heat Input Min 22.4 KJ/in Max 35.2 KJ/in PQR # FCM-SP2, 32 KJ/in

Vermont AOT
Warren Br No 166
Proj. No. BRF-013-4(32)
CBSS No 548

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

Welding Process (Base Metal)	To 20 mm [3/4 in] Incl.	Thickness of Thickest Part at Point of Welding, mm [in]: 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]
AW; OMAW; FCAW; SMAW (M270M [M270] A 709M [A 709]) Gr. 250 [36], 345 [50], 345W 50W); HPS 345W [HPS 50W])	10 [50]	20 [70]	65 [150]	110 [225]
FCM Gr50	150°F	200°F	225°F	325°F - H8

Max Interpass 400°F

WELDING PROCEDURE

Pass no.	Electrode size	Welding current: Amperes	Welding current: Volts	Travel speed	Sec. 5.12.4.2 AWS D1-5 Joint detail Fillet
		297	29	16.4	2F 1F
1 TO 4	1/16	326 TO 267.3	31 TO 27	18.9 TO 13.9	5/16 To 5/8* 5/16 To 5/8*

VTrans Received
CK'D ____ OK'd BY JWC
FEB 03 2014

* Weld Size May use Multiple Pass

Resubmit ____ APPROVED ✓
BY ____ DATE 2/3/14

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 101-C, ST VT AOT
Revision no REV #1

Contractor Casco Bay Steel
Authorized By Paul E. Goodale
Date 1-11-2013

Casco Bay Steel Structures, Inc.

WELDING PROCEDURE SPECIFICATION

Material specification ASTM Gr 50 + 50W
Welding process Submerged ARC welding
Manual or machine Machine
Position of welding Flat + Horizontal
Filler metal specification AWS A5-23
Filler metal classification F8A2-EN1K-N1-H8
Flux Lincoln 960-Elec LA-75
Shielding gas NA Flow rate NA
Single or multiple pass Single & Multiple
Single or multiple arc Single
Welding current DC
Polarity DCEP
Welding progression See Detail
Root treatment Grind-Wire Brush-Area Free of Slag-Rust & Moisture
Preheat and interpass temperature See Table
Postheat temperature NA
Heat Input Min 51.3 KJ/in Max 73.4 KJ/in PQR-1-64.1 KJ/in

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

Welding Process (Base Metal)	To 20 mm [3/4 in] Incl.	Thickness of Thickest Part at Point of Welding, mm [in]: 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)] Gr. 250 [36], 345 [50], 345W [50W], HPS 345W [HPS 50W])	10 [50]	20 [70]	65 [150]	110 [225]
SAW; GMAW; FCAW; SMAW (M270M [M270] [A 709M (A 709)] Gr. HPS 485W [HPS 70W], 690 [100], 690W [100W])	10 [50]	50 [125]	80 [175]	110 [225]

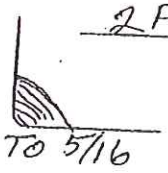
Vermont AOT
Warren Br No 166
Proj. No. BRF-013-4(32)
CBSS NO 548

WELDING PROCEDURE

Pass no.	Electrode size	Welding current: Amperes	Volts	Travel speed
		620	31	18 IPM
	5/32	570 TO 650	29 TO 33	15 TO 20

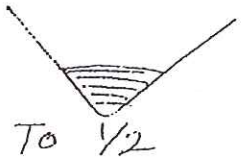
See 5.13 AWS D1-5 Joint detail Fillet

2F



To 5/16

1F



To 1/2

Vtrans Received
O.K'D O.K'd BY Jwe

FEB. 03 2014

Resubmit BY APPROVED DATE 2/3/14

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 201 - ST OF VT
Revision no
Contractor Casco Bay Steel
Authorized By Paul E. Frankli
Date April-13-2012

Casco Bay Steel Structures, Inc.

WELDING PROCEDURE SPECIFICATION

Material specification ASTM Gr 50 + 50W
Welding process Submerged ARC welding
Manual or machine Machine
Position of welding Flat + Horizontal
Filler metal specification AWS A5-23
Filler metal classification F8A2-EN1K-N1-H8
Flux Lincoln 960-Elec LA-75
Shielding gas NA Flow rate NA
Single or multiple pass Single & Multiple
Single or multiple arc Single
Welding current DC
Polarity DCEP
Welding progression See Detail
Root treatment Grind-Wire Brush-Area Free of Slag-Rust & Moisture
Preheat and interpass temperature See Table
Postheat temperature NA
Heat Input Min 51.3 KJ/in Max 73.4 KJ/in PGR-1 = 64.1 KJ/in

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

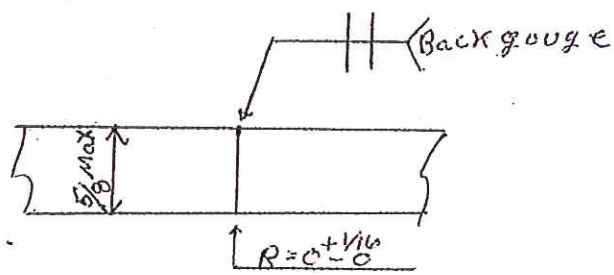
Welding Process (Base Metal)	To 20 mm [3/4 in] Incl.	Over 20 mm [3/4 in] to 40 mm [1-1/2 in] Incl.	Over 40 mm [1-1/2 in] to 65 mm [2-1/2 in] Incl.	Over 65 mm [2-1/2 in]
		Thickness of Thickest Part at Point of Welding, mm [in]		
SAW; GMAW; FCAW; SMAW (M270M [M270] [A 709M (A 709)] Gr. 250 [36], 345 [50], 345W [50W], HPS 345W [HPS 50W])	10 [50]	20 [70]	65 [150]	110 [225]
SAW; GMAW; FCAW; SMAW (M270M [M270] [A 709M (A 709)] Gr. HPS 485W [HPS 70W], 690 [100], 690W [100W])[a]	10 [50]	50 [125]	80 [175]	110 [225]

Vermont AOT
Warren Br No 166
Proj. No. BRF-013-4(32)
CBSS NO 548

WELDING PROCEDURE Max InterPass - 430°F

Pass no.	Electrode size	Welding current Amperes	Welding current Volts	Travel speed
	5/32	620	31	18 IPM
		570 TO 650	29 TO 33	15 TO 20

Sec 5.13
AWS D1-5 Joint detail BL1a-5



Vtrans Received
CK'D OK'D BY Jux
FEB 03 2014

Resubmit APPROVED ✓
BY DATE 2/3/14

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. 202A ST of VT
Revision no

Contractor Casco Bay Steel
Authorized By Paul E. Gardello
Date April-13-2012

Casco Bay Steel Structures, Inc.

WELDING PROCEDURE SPECIFICATION

Material specification ASTM Gr 50 + 50W
Welding process Submerged ARC Welding
Manual or machine Machine
Position of welding Flat + Horizontal
Filler metal specification AWS A5-23
Filler metal classification F8A2-EN11K-N11-H8
Flux Lincoln 960-Elec LA-75
Shielding gas NA Flow rate NA
Single or multiple pass Single & Multiple
Single or multiple arc Single
Welding current DC
Polarity DCEP
Welding progression See Detail
Root treatment Grind-Wire Brush-Area Free of Slag-Rust & Moisture
Preheat and interpass temperature See Table
Postheat temperature NA
Heat Input Min 51.3 KJ/in Max 73.4 KJ/in PQR-1 = 64.1 KJ/in

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

Welding Process (Base Metal)	To 20 mm [3/4 in] Incl.	Thickness of Thickest Part at Point of Welding, mm [in]: 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)] Gr. 250 [36], 345 [50], 345W [50W], HPS 345W [HPS 50W])	10 [50]	20 [70]	65 [150]	110 [225]
SAW; GMAW; FCAW; SMAW (M270M [M270] [A 709M (A 709)] Gr. HPS 485W [HPS 70W], 690 [100], 690W [100W])	10 [50]	50 [125]	80 [175]	110 [225]

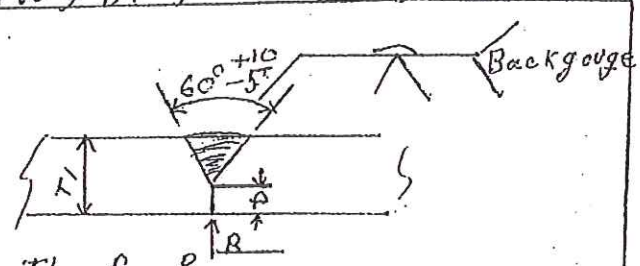
Vermont AOT
Warren Br No 166
Proj. No. BRF-013-4(32)
CBSS No 548

WELDING PROCEDURE

Max Interpass - 430°F

Pass no.	Electrode size	Welding current: Amperes	Volts	Travel speed
	5/32	620	31	18 IPM
		570 TO 650	29 TO 33	15 TO 20

Sec 5.13
AWS D1-5 Joint detail BL2c-S



T1	f	R
1/2 to 1"	1/4 min	0
1" to 1 1/2	3/8 min	0
1 1/2 to 2"	1/2 min	0

VTrans Received
CK'D OK'd BY JWC
FEB 03 2014

Resubmit BY APPROVED ✓
DATE 2/3/14

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. 202B ST of VT
Revision no

Contractor Casco Bay Steel
Authorized By [signature]
Date April-13-2012

Casco Bay Steel Structures, Inc.

WELDING PROCEDURE SPECIFICATION

Material specification ASTM - Gr 50 - 50W
Welding process Submerged Arc welding Power Wave
Manual or machine Machine
Position of welding Flat + Horizontal
Filler metal specification A5-23
Filler metal classification F8A2-ENi1-Ni1-H8
Flux Lincoln 960 - Elec. LA 75
Shielding gas NA Flow rate NA
Single or multiple pass Single - multiple
Single or multiple arc Single
Welding current Alternating
Polarity AC
Welding progression See Detail
Root treatment Grind - wire brush - Area Free of Slag - Rust - Moisture
Preheat and interpass temperature See Table
Posfheat temperature NA
Heat Input Min 47.1 KJ/in Max 74.0 KJ/in PQR - PW1 - 67.3 KJ/in

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

Welding Process (Base Metal)	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]
		Thickness of Thickest Part at Point of Welding, mm [in]		
SAW; GMAW; FCAW; SMAW (M270M [M270] [A 709M (A 709)] Gr. 250 [36], 345 [50], 345W [50W], HPS 345W [HPS 50W])	10 [50]	20 [70]	65 [150]	110 [225]
SAW; GMAW; FCAW; SMAW (M270M [M270] [A 709M (A 709)] Gr. HPS 485W [HPS 70W], 690 [100], 690W [100W])[a]	10 [50]	50 [125]	80 [175]	110 [225]

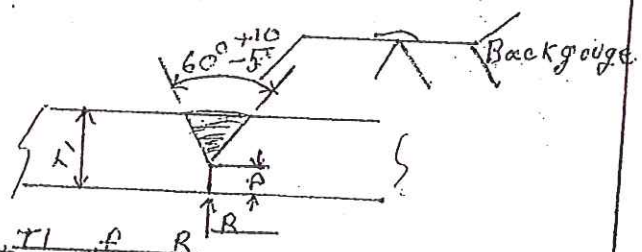
Vermont AOT
Warren Br No 166
Proj. No. BRF-013-4(32)
CBSS NO 548

WELDING PROCEDURE

Max Interpass = 460°F

Pass no.	Electrode size	Welding current Amperes	Welding current Volts	Travel speed
AS Req.	5/32	827	38	28 IPM
		744 To 910	35 To 41	24 To 32

Sec 5.13
AWS D1-5 Joint detail BL2c-S



T1	f	R
1/2 To 1"	1/4 MIN	0
1" To 1 1/2	3/8 MIN	0
1 1/2 To 2"	1/2 MIN	0

CK'D ____ Trans Received OK'd BY JWC

FEB 03 2014

Resubmit ____ APPROVED ✓
BY ____ DATE 2/3/14

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. PW202B ST of VT
Revision no. ____

Contractor Casco Bay Steel
Authorized By Paul E Goodale
Date April-13-2012

Casco Bay Steel Structures, Inc.

WELDING PROCEDURE SPECIFICATION

Material specification ASTM - Gr 50 - 50W
Welding process Submerged Arc welding Powerwave
Manual or machine Machine
Position of welding Flat + Horizontal
Filler metal specification A 5 - 23
Filler metal classification F8A2-EN1L-N1L-H8
Flux Lincoln 960 - Elec. LA 75
Shielding gas NA Flow rate NA
Single or multiple pass Single - multiple
Single or multiple arc Single
Welding current Alternating
Polarity AC
Welding progression See Detail
Root treatment Grind - wire brush - Area Free of Slag - Rust - Moisture
Preheat and interpass temperature See Table
Postheat temperature NA
Heat Input Min 47.1 KJ/in Max 74.0 KJ/in PQR - PW1 - 67.3 KJ/in

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

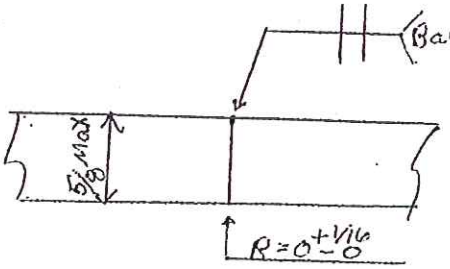
Welding Process (Base Metal)	To 20 mm [3/4 in] Incl.	Thickness of Thickest Part at Point of Welding, mm [in]: Over 20 mm [3/4 in] to 40 mm [1-1/2 in] Incl.	Over 40 mm [1-1/2 in] to 65 mm [2-1/2 in] Incl.	Over 65 mm [2-1/2 in]
SAW; GMAW; FCAW; SMAW (M270M [M270] [A 709M (A 709)] Gr. 250 [36], 345 [50], 345W [50W], HPS 345W [HPS 50W])	10 [50]	20 [70]	65 [150]	110 [225]
SAW; GMAW; FCAW; SMAW (M270M [M270] [A 709M (A 709)] Gr. HPS 485W [HPS 70W], 690 [100], 690W [100W])*	10 [50]	50 [125]	80 [175]	110 [225]

Vermont AOT
Warren Br No. 166
Proj. No. BRF-013-4(32)
CBSS NO. 548

WELDING PROCEDURE Max. Interpass - 480°F

Pass no.	Electrode size	Welding current: Amperes	Volts	Travel speed
AS REQ.	5/32	827	38	28 IPM
		744 TO 910	35 TO 41	24 TO 32

Sec 5.13
AWS D1-5 Joint detail B L1a-S



Vtrans Received
CK'D. OK'd by JWC
FEB 03 2014

Resubmit BY APPROVED DATE 2/3/14

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. PW 202C - ST of VT
Revision no.

Contractor Casco Bay Steel
Authorized By Paul E. Tordale
Date April - 13 - 2012

Casco Bay Steel Structures, Inc.

WELDING PROCEDURE SPECIFICATION

Material specification: ASTM Gr 50 - 50W
Welding process: Shielded Metal ARC
Manual or machine: Manual
Position of welding: Flat, Horizontal
Filler metal specification: ANSI/AWS A5.1 - A5-5
Filler metal classification: E 7018 - E 8018 C1/C3
Flux: NA
Shielding gas: NA Flow rate: NA
Single or multiple pass: Single & Multiple
Single or multiple arc: Single
Welding current: AC / DC
Polarity: Straight & Reverse
Welding progression: See Detail
Root treatment: Grind - Wire brush - Area Free of Slag - Rust - Moisture
Preheat and interpass temperature:
Postheat temperature: NA
Heat Input Min: NA Max: NA

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

Welding Process (Base Metal)	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]
		Thickness of Thickest Part at Point of Welding, mm [in]		
SAW; GMAW; FCAW; SMAW (M270M [M270] [A 709M (A 709)] Gr. 250 [36], 345 [50], 345W [50W], HPS 345W [HPS 50W])	10 [50]	20 [70]	65 [150]	110 [225]

Vermont AOT
Warren Br No 166
Proj. No. BRF-013-4(32)
CBSS NO 548

WELDING PROCEDURE

Pass no.	Electrode size	Welding current: Amperes	Welding current: Volts	Travel speed
AS REQ	7018			AS REQ
	1/8	70 To 170	22-26	
	5/32	120 To 225	22-26	
	3/16	170 To 300	24-27	
	8018			
	1/8	90 To 160	22-26	
	5/32	120 To 225	22-26	
	3/16	180 To 290	24-27	

AWS D1-5 Joint detail Fillet

2F

3/16 To 5/16

1F

3/16 To 3/8

VTrans Received
CKD: OK'd BY JWC
FEB 03 2014
Resubmit BY APPROVED DATE 2/3/14

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. 401 VT AOT
Revision no

Contractor Casco Bay Steel
Authorized By [signature]
Date April 13 - 2012

Casco Bay Steel Structures, Inc.

WELDING PROCEDURE SPECIFICATION

Material specification ASTM - Gr 50 - 50W NOTE - 1
Welding process Submerged ARC welding
Manual or machine Machine
Position of welding Flat - Horizontal
Filler metal specification AWS A5-23
Filler metal classification F8A2-EN1K-N1-H8
Flux Lincoln 960-, Elec- LA 75
Shielding gas NA Flow rate NA
Single or multiple pass Single & Multiple
Single or multiple arc Single
Welding current DC
Polarity DCEN
Welding progression See Detail
Root treatment Grind - Wire Brush - Area Free of Slag - Rust - Moisture
Preheat and interpass temperature See Table
Postheat temperature NA
Heat Input Min 40.9 KJ/in Max 64.2 KJ/in P.Q.R #2 - 58.4 KJ/in

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

Welding Process (Base Metal)	To 20 mm [3/4 in] Incl.	Thickness of Thickest Part at Point of Welding, mm [in]: 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)] Gr. 250 [36], 345 [50], 345W [50W], HPS 345W [HPS 50W])	10 [50]	20 [70]	65 [150]	110 [225]
SAW; GMAW; FCAW; SMAW (M270M [M270] [A 709M (A 709)] Gr. HPS 485W [HPS 70W], 690 [100], 690W [100W])*	10 [50]	50 [125]	80 [175]	110 [225]

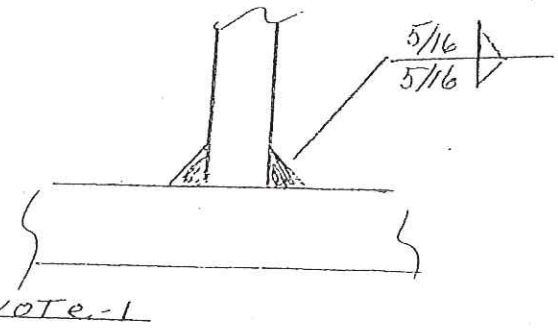
Vermont BOT
Warren Br No 166
Proj. No. BRF-013-4(32)
CBSS NO 548

WELDING PROCEDURE

Max. Interpass - 450°

Pass no.	Electrode size	Welding current: Amperes	Welding current: Volts	Travel speed
		365	32	12 IPM
	3/32	320 TO 350	30 TO 33	11 TO 14

Sec 5-13
AWS D1-5 Joint detail Fillet



NOTE - 1
use For welding Gr 5-50W To Gr HPS 7

VTrans Received
CK'D OK'd BY JWC
FEB 04 2014

Resubmit APPROVED ✓
BY DATE 1/4/14

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. 250 ST of VT
Revision no.

Contractor Casco Bay Steel
Authorized By Paul T. Goodale
Date April 13 - 2017