# 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 Dual
Flux: ~A
Shielding gas: 75% AR / 25% CO2 Flow rate: 35 CFH +8/-4, 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 - 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

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 Thicker Part at Point of Welding, mm [in] | | |
| AW; 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] |
| FCM Gr50 | 150°F | 200°F | 225°F | 325°F - HB |

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

Max Interpass 400°F

WELDING PROCEDURE

Sec. 5.12.4.2
AWS D1-5

| Pass no. | Electrode size | Welding current Amperes | Welding current Volts | Travel speed |
|---|---|---|---|---|
| | | 297 | 29 | 16.4 |
| 1 To 4 | 1/16 | 326 To 267.3 | 31 To 27 | 18.9 To 13.9 |

Joint detail: Fillet

2F

5/16 To 5/8*

1F

5/16 To 5/8*

* Weld Size May use Multiple Pass

This procedure may vary due to fabrication sequence fill 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 — PowerWave
Manual or machine: Machine
Position of welding: Flat + Horizontal
Filler metal specification: A 5 - 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 Detaile
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

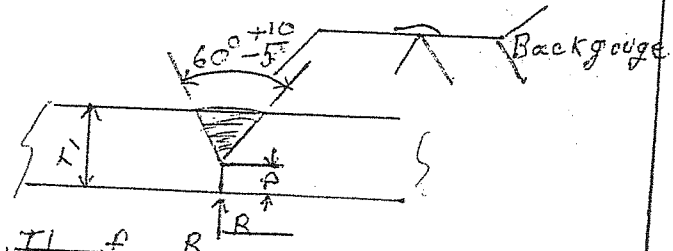
WELDING PROCEDURE

Max Interpass - 480°F

Sec 5.13

AWS D1-5 Joint detail BL2c-S

| 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 |




| 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 |

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
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])[a] | 10 [50] | 50 [125] | 80 [175] | 110 [225] |

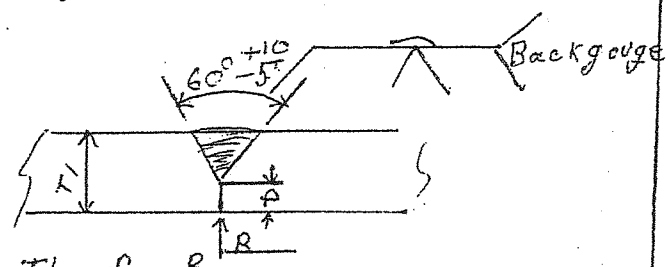
Vermont AOT
Warren Br No 166
Proj. No. BRF-013-4(32)
CBSS No 548

WELDING PROCEDURE

Max Interpass - 430°F

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

See 5.13 AWS D1-5 Joint detail BL2c-S




| T | 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 |

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 Paul E. Gordon
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 C/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. | 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] |

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

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
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] |

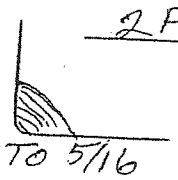
Vermont AOT
Warren Br No 166
Proj. No. BRF-013-4(32)
CBSS NO 548

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 |

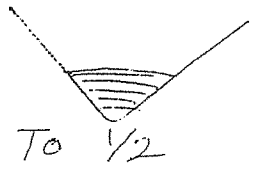
See 5.13
AWS D1-5 Joint detail Fillet

2F



To 5/16

1F



To 1/2

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. [illegible]
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-EN1-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 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] |

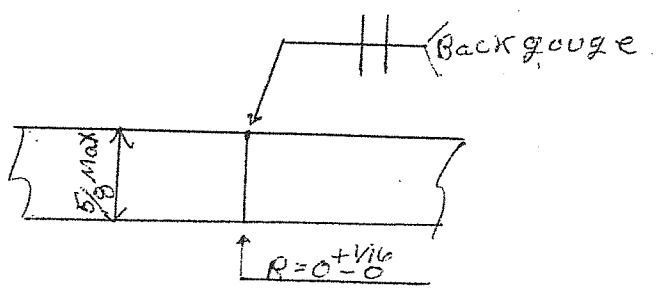
Vermont AOT
Warren Br No 166
Proj No. BRF-013-4(32)
CBSS NO 548

WELDING PROCEDURE

Max Interpass - 480°F

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

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




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 2020 - ST of VT
Revision no.

Contractor Casco Bay Steel
Authorized By Paul E. Tondale
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-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 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]**

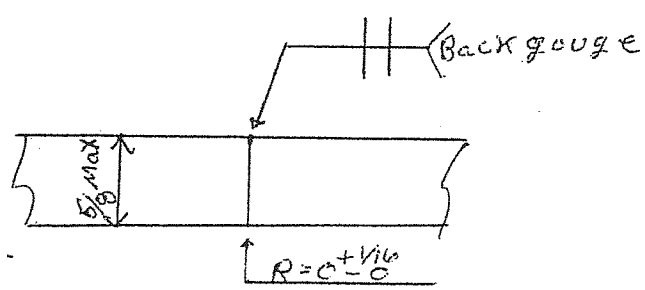
| Welding Process (Base Metal) | To 20 mm [3/4 in] Incl. | Thickness of Thickest Part at Point of Welding, mm [in]: Over 20 mm [3/4 in] to 40 mm [1-1/2 in] Incl. | Over 40 mm [1-1/2 in] to 65 mm [2-1/2 in] Incl. | Over 65 mm [2-1/2 in] |
|---|---|---|---|---|
| SAW; GMAW; FCAW; SMAW (M270M [M270] [A 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])[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 | 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-S




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 [signature]
Date April-13-2012