

Method Statement for Welding Splice of Cross Beam

1. General

The steel materials for cross beam of this project to use ASTM A572 Gr.50 or SM490YA and erector to be provide welding splice connection by FCAW process to use filler metal AWS A5.20 E71T-1C.

Welding method will be follow with WPS/PQR by qualified welder that include welding parameter such joint preparation(CJP - Single V with backing for splice weld connection) base metal thickness volt amp speed of welding process also preheat treatment.

Welding visual inspection acceptance criteria that refer AWS D1.1 Table 8 that respond by QC inspector to inspection of welding defect such crack porosity undercut incomplete penetration ect. 100% all of weld connection

NDT, for splice must be 100% UT by NDT qualified UT operator level II.

2. Welding Procedure

a. WPS/PQR (See Attached)

i. Filler metal select for FCAW

Erector provide filler metal is AWS A5.20 E71T-C follow with WPS/PQR

AWS D1.1/D1.1M:2020

CLAUSE 5. PREQUALIFICATION OF WPSs

Steel Specification		Table 5.3 (Continued) Approved Base Metals for Prequalified WPSs (see 5.3)			
		Minimum Yield Point/Strength		Tensile Range	
		ksi	MPa	ksi	MPa
ASTM A36	All thicknesses	36	250	58-80	400-550
ASTM A131	Grades AH32, EH32, FH32	46	315	64-85	440-590
	Grades AH36, EH36, FH36	51	355	71-90	490-620
ASTM A501	Grade B	50	345	70 min.	485 min.
ASTM A516	Grade 65	35	240	65-85	450-585
	Grade 70	38	260	70-90	485-620
ASTM A529	Grade 50	50	345	65-100	450-690
	Grade 55	55	380	70-100	485-690
ASTM A537 Class 1	≤ 2 1/2 in [≤ 65 mm]	50	345	70-90	485-620
	> 2 1/2 in [65 mm] ≤ 4 in [100 mm]	45	310	65-85	450-585
ASTM A572	Grade 42	42	290	60 min.	415 min.
	Grade 50	50	345	65 min.	450 min.
	Grade 55	55	380	70 min.	485 min.
ASTM A588 ^a	≤ 4 in [100 mm]	50	345	70 min.	485 min.
	> 4 in [100 mm] ≤ 5 in [125 mm]	46	315	67 min.	460 min.
	> 5 in [125 mm] ≤ 8 in [200 mm]	42	290	63 min.	435 min.
	All Shapes	50	345	70 min.	485 min.
ASTM A595	Grade A	55	380	65 min.	450 min.
	Grades B and C	60	410	70 min.	480 min.
ASTM A606 ^a	Cold-rolled Grade 45	45	310	65 min.	450 min.
	Hot-rolled Grade 50 (AR)	50	340	70 min.	480 min.
	Hot-rolled Grade 50 (A or N)	45	310	65 min.	450 min.
ASTM A618	Grades B, II wall ≤ 1/2 in [19 mm]	50	345	70 min.	485 min.
	Grades B, II wall > 1/2 in ≤ 1-1/2 in [19 mm ≤ 38 mm]	46	315	67 min.	460 min.
	Grade III	50	345	65 min.	450 min.

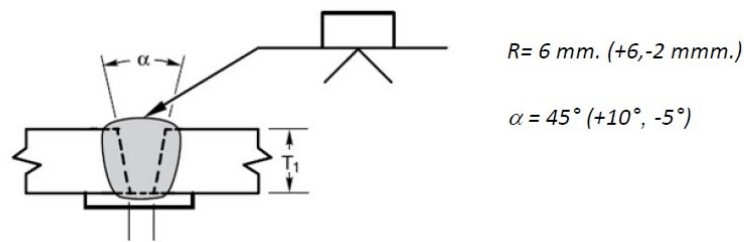
(Materials group (II) for ASTM A572 Gr.50 or SM490YA)

Base Metal Group		Table 5.4 (Continued) Filler Metals for Matching Strength for Table 5.3, Group II Metals—FCAW and GMAW Metal Cored (see 5.6)						
		WELDING PROCESS(ES)						
		GMAW	FCAW		Carbon Steel GMAW and FCAW		Carbon & Low-Alloy Steel GMAW and FCAW	
AWS Electrode Specification	A5.18, Carbon Steel	A5.28 ^a , Low-Alloy Steel	A5.20, Carbon Steel	A5.29 ^a , Low-Alloy Steel	A5.36, Fixed Classification ^b	A5.36 ^c , Open Classification ^d	See Note 8 for Annex M	
AWS Electrode Classification	E70S-X E70C-XC E70C-XM (Electrodes with the -GS suffix shall be excluded)	E70S-XXX E70C-XXX	E7XT-X E7XT-XC E7XT-XM (Electrodes with the -2C, -2M, -3, -10, -13, -14, and -GS suffix shall be excluded and electrodes with the -11 suffix shall be excluded for thicknesses greater than 1/2 in [12 mm])	E7XTX-X E7XTX-XC E7XTX-XM	FCAW Carbon Steel E7XT-1C E7XT-1M E7XT-5C E7XT-5M E7XT-9C E7XT-9M E7XT-12C E7XT-12M E70T-4 E7XT-6 E7XT-7 E7XT-8	FCAW Carbon Steel E7XTX-XAX-CS1 E7XTX-XAX-CS2 E7XTX-XAX-CS3		
II				(Flux Cored Electrodes with the T1S, T3S, T10S, T14S, and -GS suffix shall be excluded and electrodes with the T11 suffix shall be excluded for thicknesses greater than 1/2 in [12 mm])		(Flux Cored Electrodes with the T1S, T3S, T10S, T14S, and -GS suffix shall be excluded and electrodes with the T11 suffix shall be excluded for thicknesses greater than 1/2 in [12 mm])		

(FCAW Filler Metal Matching for ASTM A572 Gr.50 or SM490YA)

Method Statement for Welding Splice of Cross Beam

ii. Joint preparation



(Joint preparation: CJP, Butt Single V with backing plate)

iii. Welder Qualification

1. Welder must be qualified FCAW follow with AWS D1.1

iv. Welding sequence

1. Pre-heating: min. 10°C or required by project specification

Table 5.8 Prequalified Minimum Preheat and Interpass Temperature (see 5.7)						
C A T E G O R Y	Steel Specification	Welding Process	Thickness of Thickest Part at Point of Welding		Minimum Preheat and Interpass Temperature	
			in	mm	°F	°C
B	ASTM A139 Grade B	SMAW with low-hydrogen electrodes, SAW, GMAW, FCAW	1/8 to 3/4 incl.	3 to 20 incl.	32*	0*
	ASTM A381 Grade Y35					
	ASTM A500 Grades A, B, C					
	ASTM A501 Grades A, B					
	ASTM A516 Grades 55, 60, 65, 70		Over 3/4 thru 1-1/2 incl.	Over 20 thru 38 incl.	50	10
	ASTM A524 Grades I, II					
	ASTM A529 Grades 50, 55					
	ASTM A537 Classes 1, 2		Over 1-1/2 thru 2-1/2 incl.	Over 38 thru 65 incl.	150	65
	ASTM A572 Grades 42, 50, 55					
	ASTM A573 Grades 58, 65					
	ASTM A588		Over 2-1/2	Over 65	225	110

(AWS D1.1 Table 8)

2. Root pass : Root pass should be full penetration through backing plate.
3. Hot pass : Should be complete weld penetration and cleaning/remove slag all of welding layer to layer.
4. Cover pass : Should be cleaning remove slag or defect of weld.

v. Visual Inspection

1. Welding visual inspection by welding inspector.
2. Criteria for visual inspection refer to AWS D1.1 Table 8.1 (See Attached)

vi. NDT

1. For welding splice connection of cross beam must be 100% UT

Method Statement for Welding Splice of Cross Beam

Filler Metal for FCAW

Table 5.3 (Continued)
Approved Base Metals for Prequalified WPSs (see 5.3)

GROUP

Steel Specification Requirements						
Steel Specification		Minimum Yield Point/Strength		Tensile Range		
		ksi	MPa	ksi	MPa	
II	ASTM A36	All thicknesses	36	250	58–80	400–550
	ASTM A131	Grades AH32, DH32, EH32	46	315	64–85	440–590
		Grades AH36, DH36, EH36	51	355	71–90	490–620
	ASTM A501	Grade B	50	345	70 min.	485 min.
	ASTM A516	Grade 65	35	240	65–85	450–585
		Grade 70	38	260	70–90	485–620
	ASTM A529	Grade 50	50	345	65–100	450–690
		Grade 55	55	380	70–100	485–690
	ASTM A537 Class 1	≤ 2 ½ in [≤ 65 mm]	50	345	70–90	485–620
		> 2 ½ [65 mm] ≤ 4 in [100 mm]	45	310	65–85	450–585
	ASTM A572	Grade 42	42	290	60 min.	415 min.
		Grade 50	50	345	65 min.	450 min.
		Grade 55	55	380	70 min.	485 min.
	ASTM A588 ^b	≤ 4 in [100 mm]	50	345	70 min.	485 min.
		> 4 in [100 mm] ≤ 5 in [125 mm]	46	315	67min.	460 min.
		> 5 in [125 mm] ≤ 8 in [200 mm]	42	290	63 min.	435 min.
		All Shapes	50	345	70 min.	485 min.
	ASTM A595	Grade A	55	380	65 min.	450 min.
		Grades B and C	60	410	70 min.	480 min.
	ASTM A606 ^b	Cold-rolled Grade 45	45	310	65 min.	450 min.
		Hot-rolled Grade 50 (AR)	50	340	70 min.	480 min.
		Hot-rolled Grade 50 (A or N)	45	310	65 min.	450 min.
	ASTM A618	Grades Ib, II wall ≤ ¾ in [19 mm]	50	345	70 min.	485 min.
		Grades Ib, II wall > ¾ in ≤ 1-1/2 in [> 19 mm ≤ 38 mm]	46	315	67 min.	460 min.
		Grade III	50	345	65 min.	450 min.
	ASTM A633	Grade A	42	290	63–83	430–570
		Grades C, D	50	345	70–90	485–620
		≥ 2-1/2 in [65 mm]	50	345	70–90	485–620
	ASTM A709	Grade 36 Plates ≤ 4 in [100 mm]	36	250	58–80	400–550
		Grade 36 Shapes ≤ 3 in [75 mm]	36	250	58–80	400–550
		Grade 36 Shapes > 3 in [75 mm]	36	250	58 min.	400 min.
		Grade 50	50	345	65 min.	450 min.
Grade 50W ^b		50	345	70 min.	485 min.	
Grade 50S		50–65	345–450	65 min.	450 min.	
Grade HPS 50W ^b		50	345	70 min.	485 min.	
ASTM A710	Grade A, Class 2 > 2 in ≤ 4 in [> 50 mm ≤ 100 mm] > 4 in [100 mm]	55	380	65 min.	450 min.	
		50	345	60 min.	415 min.	
		50	345	70 min.	485 min.	
ASTM A847		50	345	70 min.	485 min.	
ASTM A913	Grade 50	50	345	65 min.	450 min.	
ASTM A992		50–65	345–450	65 min.	450 min.	
ASTM A1008 HSLAS	Grade 45 Class 1	45	310	60 min.	410 min.	
	Grade 45 Class 2	45	310	55 min.	380 min.	
	Grade 50 Class 1	50	340	65 min.	450 min.	
	Grade 50 Class 2	50	340	60 min.	410 min.	
	Grade 55 Class 1	55	380	70 min.	480 min.	
	Grade 55 Class 2	55	380	65 min.	450 min.	

(Continued)

Table 5.4 (Continued)
Filler Metals for Matching Strength for Table 5.3, Group II Metals—FCAW and GMAW Metal Cored (see 5.6)

WELDING PROCESS(ES)

Base Metal Group	AWS Electrode Specification	GMAW		FCAW	Carbon Steel GMAW and FCAW		Carbon & Low-Alloy Steel GMAW and FCAW
		A5.18, Carbon Steel	A5.28 ^a , Low-Alloy Steel	A5.20, Carbon Steel	A5.29 ^a , Low-Alloy Steel	A5.36, Fixed Classification ^b	A5.36 ^c Open Classification ^d See Note 8 for Annex M
II	AWS Electrode Classification	ER70S-X	ER70S-XXX	E7XT-X	E7XTX-X	FCAW Carbon Steel	FCAW Carbon Steel
		E70C-XC	E70C-XXX	E7XT-XC	E7XTX-XC	E7XT-1C	E7XTX-XAX-CS1
		E70C-XM		E7XT-XM	E7XTX-XM	E7XT-1M	E7XTX-XAX-CS2
		(Electrodes with the –GS suffix shall be excluded)		(Electrodes with the –2C, –2M, –3, –10, –13, –14, and –GS suffix shall be excluded and electrodes with the –11 suffix shall be excluded for thicknesses greater than 1/2 in [12 mm])		E7XT-5C	E7XTX-XAX-CS3
						E7XT-5M	
						E7XT-9C	
						E7XT-9M	
						E7XT-12C	
						E7XT-12M	
						E70T-4	
						E7XT-6	
						E7XT-7	
						E7XT-8	
					(Flux Cored Electrodes with the T1S, T3S, T10S, T14S, and –GS suffix shall be excluded and electrodes with the T11 suffix shall be excluded for thicknesses greater than 1/2 in [12 mm])		(Flux Cored Electrodes with the T1S, T3S, T10S, T14S, and –GS suffix shall be excluded and electrodes with the T11 suffix shall be excluded for thicknesses greater than 1/2 in [12 mm])
						FCAW Low-Alloy Steel	FCAW Low-Alloy Steel
						E7XTX-AX-XXX	E7XTX-AX-XXX
						E7XTX-XAX-XXX	E7XTX-XAX-XXX
					GMAW-Metal Cored Carbon Steel	GMAW-Metal Cored Carbon Steel	GMAW-Metal Cored Carbon Steel
					E70C-6M	E70C-6M	E7XTX-XAX-CS1
					(Electrodes with the –GS suffix shall be excluded)	(Electrodes with the –GS suffix shall be excluded)	E7XTX-XAX-CS2
					(NOTE: A5.36 does not have fixed classifications for other carbon steel metal cored electrodes or for low-alloy steel flux cored or metal cored electrodes)		GMAW-Metal Cored Low-Alloy Steel
							E7XTX-XAX-XXX

(Continued)

PROCEDURE QUALIFICATION RECORDS (PQR) YES
PREQUALIFIED NO QUALIFIED BY TESTING YES

Reference spec./code AWS D1.1

Identification # FCA-STE-001 Revision 0 Date : 10 Mar 2023 By
Company Name Authorized by Mr.Nattapong S. Date :
Welding Process (es) FCAW Type Manual ☐ Semi Automatic ☒
Supporting PQR No. (S) PQR-FCA-STE-001 PQR-FCA-STE-002 Machine ☐ Automatic ☐
PQR-SP-FCAW-003 PQR-SP-FCAW-004

JOINT DESIGN USED

Type : CJP BUTT WELD. (SEE ATTACHED 1) Full weld penetration
Single Weld ☒ Double Weld ☒
Backing : Yes ☒ No ☐

POSITION

Position of Groove : F,H,V Fillet N/A
Vertical Progression : Up ☒ Down ☐

BASE METALS

Material Spec. JIS G3106, JIS G3101, TIS 1227, TIS 1479, TIS 1499
Type or Grade. SM490, SM490YA, SM400, SM400B, SS400
or Equivalent in AWS D1.1 Table 3.1 Group I, II
Thickness: 3 mm. to Unlimited Fillet N/A
Diameter (Pipe). 24 & Over

ELECTRICAL CHARACTERISTICS

SEE AS BELOW
Transfer Mode (GMAW) Shot-Circuiting ☐
Globular ☐ Spray ☐
Current : AC ☐ DCEP ☒ DCEN ☐ Pulsed ☐
Other
Tungsten Electrode (GTAW)
Size : N/A
Type : N/A

FILLER METALS

AWS Specification A 5.20
AWS Classification E71T-1C
Electrod Trade name
Brand Name

TECHNIQUE

Stringer or Weave Bead : BOTH
Multi-pass or Single Pass (per side) MULTIPASS
Number of Electrodes 1
Electrode Spacing Longitudinal N/A
Lateral N/A
Angle N/A

SHIELDING

Flux N/A GAS CO₂
Composition 100%
Electrode-Flux (Class) N/A Flow Rate 10 - 25 L/min
Gas Cup Size 3/4"

CONTACT TUBE TO WORK DISTANCE

Contact Tube to Work Distance N/A
Peening NONE
Interpass Cleaning : Brushing & Grinding

PREHEAT

Preheat Temp., Min SEE AS BELOW
Interpass Temp. Max 250 °C
Remark: Preheat by burner torch

POSTWELD HEAT TREATMENT

Temp. N/A
Time N/A

WELDING PROCEDURE

Pass or Weld Layer(S)	Process	Filler Metals		Current		Volts	Wire Feed Speed	Travel Speed	Joint Details
		Class	Dia.	Type & Polarity	Amps				
ALL	FCAW	E71T-1	1.2 mm	DCEP	140 - 250 A.	22 - 29.2	110 - 260 A.	12.8 - 45.7 cm./min.	(SEE ATTACHED 1)
Back Gouging	FCAW	E71T-1	1.2 mm	DCEP	160 - 260 A.	26.5 - 28.5	160 - 260 A.	28.5 - 37.5 cm./min.	

MINIMUM PREHEAT AND INTERPASS TEMPERATURE

Over 20 mm. to 38 mm.	Over 36 mm. to 65 mm.	Over 65 mm.
10 °C	65 °C	110 °C

NOTE: When the base metal temperature is below 0 °C, the base metal shall be preheated to a minimum of 20 °C and the minimum interpass temperature shall be maintained during welding.

Pre-Heating as per
Base metal
thickness

COMPLETED BY

COMPANY

SIGNATURE

NAME

DATE

REVIEWED BY

CLIENT

ATTACHED SHEET 1

