

PREHEAT

AND INTERPASS TEMPERATURES

FOR ASTM A709 GRADE 36, 50, 50W STRUCTURAL STEEL
IN ACCORDANCE WITH AASHTO/AWS D1.5-2010

THICKNESS OF THICKEST PART AT POINT OF WELDING	MINIMUM PREHEAT/INTERPASS AT POINT OF WELDING
to 3/4" inclusive	50°F
over 3/4" to 1-1/2"	70°F
over 1-1/2" to 2-1/2"	150°F
over 2-1/2"	225°F

MAXIMUM PREHEAT TEMPERATURE 450°F
MAXIMUM INTERPASS TEMPERATURE 550°F

REVISED: 7/06/14
ORIGINAL ISSUE: 1/1/92

WELDING PROCEDURE FOR AWS PREQUALIFIED JOINTS
GMAW-P 2F TACKS

MATERIAL SPECIFICATION _____ ASTM A709 GRADE 36, 50, 50W
WELDING PROCESS _____ GAS METAL ARC WELDING - PULSED SPRAY
POWER SOURCE/WAVEFORM _____ MILLER ACCESS 450/ACCU-PULSE/LOCKED FILE
SEMI-AUTOMATIC OR MACHINE _____ SEMIAUTOMATIC OR MACHINE
POSITION OF WELDING _____ 2F (HORIZONTAL)
FILLER METAL SPECIFICATION _____ AWS A5.18
CLASSIFICATION _____ ER70S-6
MANUFACTURER/PRODUCT _____ LINCOLN SUPERARC L-56
WIRE DIAMETER _____ .052"
SINGLE OR MULTIPLE ARC _____ SINGLE ARC
CURRENT/POLARITY _____ DCEP
ROOT TREATMENT _____ REMOVE LOOSE/THICK SCALE, RUST & CONTAMINANTS. REMOVE ALL SCALE FOR WEB TO FLANGE.

PREHEAT TEMPERATURE _____ *SEE PREHEAT CHART
ELECTRICAL STICK-OUT _____ 3/4"
SHIELDING GAS _____ 92% AR / 8% CO2
GAS FLOW _____ 32-40 CFH

PASS NO.	AMPS	WIRE FEED SPEED/ft/min	VOLTS	TRAVEL SPEED/in.min.	TYPICAL JOINT DETAILS
1	223-260	255-300*	24.2-26	19.25-22*	3/16" TACK WELDS -- 2F

USED FOR SINGLE-PASS TACKS
WEB TO FLANGE, CROSSFRAMES AND MISC. DETAILS

*TACKS THAT ARE COMPLETELY REMELTED BY THE SUBMERGED ARC WELDING PROCESS (530Amps/37.4Volts) ONLY REQUIRE 50°F PREHEAT. REFER TO PREHEAT CHART FOR EVERYTHING ELSE.

QUALIFIED IN ACCORDANCE WITH 5.12.4
SOUNDNESS TESTS T-08-03B, T-08-04, T-09-21, T-13-66
WELDING PROCEDURE QUALIFICATION RECORD AWS-14-09 (EXP. 4/30/19)

REVISED: 6/19/14
ORIGINAL ISSUE: 5/21/08

WELDING PROCEDURE FOR AWS PREQUALIFIED JOINTS
W13X-2

MATERIAL SPECIFICATION _____ ASTM A709 GRADE 36, 50, 50W
WELDING PROCESS _____ SUBMERGED ARC WELDING
SEMI-AUTOMATIC OR MACHINE _____ SEMIAUTOMATIC OR MACHINE
POSITION OF WELDING _____ 2F (HORIZONTAL)
FILLER METAL SPECIFICATION _____ AWS A5.23
CLASSIFICATION _____ F8A2-ENiK-N1-H8
MANUFACTURER/PRODUCT _____ LINCOLN LA-75/960
WIRE DIAMETER _____ 3/32"
SINGLE OR MULTIPLE ARC _____ SINGLE ARC
CURRENT/POLARITY _____ DCEN/DCEP
ROOT TREATMENT _____ REMOVE ALL SCALE RUST & CONTAMINANTS FOR WEB TO FLANGE AND LOOSE/THICK SCALE RUST & CONTAMINANTS FOR OTHER APPLICATIONS.

PREHEAT TEMPERATURE _____ SEE PREHEAT CHART
ELECTRICAL STICK-OUT _____ 1-INCH

PASS NO.	AMPS	WIRE FEED SPEED/ft/min	VOLTS	TRAVEL SPEED/in.min.	CURRENT-POLARITY	JOINT DETAIL
1	530-550	185-195*	37.4-39	17-22*	DCEN	
2+	500-550	107-125*	30-38	14-22*	DCEP	

PRIMARYLY USED FOR CONVENTIONAL WEB TO FLANGE

SINGLE-PASS FILLET WELDS UP TO 5/16"
MULTI-PASS FILLET WELDS 3/8" AND GREATER

*DCEN PARAMETERS MAY BE REDUCED TO 425-550 AMPS/139-195 WFS AND 32-37.6 VOLTS WHEN TACKING WITH THE SMAW PROCESS. THIS IS GENERALLY HELPFUL WHEN WELDING THINNER MATERIALS.

QUALIFIED IN ACCORDANCE WITH 5.12.2 (EXP. 7/10/18)
FWST T-13-76, T-10-01, T-09-10, DCEN PGR AWS-13-68/AWS-13-69, DCEP PGR AWS-13-55/AWS-13-56

REVISED: 6/19/14
ORIGINAL ISSUE: 1/26/99

WELDING PROCEDURE FOR AWS PREQUALIFIED JOINTS
W44X-2

MATERIAL SPECIFICATION _____ ASTM A709 GRADE 36, 50, 50W
WELDING PROCESS _____ SUBMERGED ARC WELDING
SEMI-AUTOMATIC OR MACHINE _____ SEMIAUTOMATIC OR MACHINE
POSITION OF WELDING _____ 2F (HORIZONTAL)
FILLER METAL SPECIFICATION _____ AWS A5.23
CLASSIFICATION _____ F8A2-ENiK-N1-H8
MANUFACTURER/PRODUCT _____ LINCOLN LA-75/960
WIRE DIAMETER _____ 3/32"
SINGLE OR MULTIPLE ARC _____ SINGLE ARC
CURRENT/POLARITY _____ DCEN/DCEP
ROOT TREATMENT _____ REMOVE LOOSE/THICK SCALE RUST & CONTAMINANTS.
PREHEAT TEMPERATURE _____ SEE PREHEAT CHART
ELECTRICAL STICK-OUT _____ 1-INCH

PASS NO.	AMPS	WIRE FEED SPEED/ft/min	VOLTS	TRAVEL SPEED/in.min.	CURRENT-POLARITY	JOINT DETAIL
1+	412-457	134-153*	31.8-34.2	13-18*	DCEN	
2+	400-550	80-125*	29-36.6	14-22*	DCEP	

USED FOR STIFFENER TO FLANGE AND MISC. DETAILS

SINGLE-PASS FILLET WELDS UP TO 5/16"
MULTI-PASS FILLET WELDS 3/8" AND GREATER

QUALIFIED IN ACCORDANCE WITH 5.12.1 DCEN & 5.12.2 DCEP (EXP. 7/10/18)
FWST T-10-05, T-10-04, DCEN PGR AWS-13-60, DCEP PGR AWS-13-56/AWS-13-55

REVISED: 7/2/14
ORIGINAL ISSUE: 1/26/99

WELDING PROCEDURE QUESTIONS MAY BE REFERRED TO:
PAUL MUFFULETTO, HIGH STEEL STRUCTURES LLC
PMUFFULETTO@HIGH.NET
PHONE: (717)390-4253

WELDING PROCEDURE FOR AWS PREQUALIFIED JOINTS
W2

MATERIAL SPECIFICATION _____ ASTM A709 GRADE 36, 50, 50W
WELDING PROCESS _____ SHIELDED METAL ARC WELDING
MANUAL OR MACHINE _____ MANUAL
POSITION OF WELDING _____ ALL (EXCEPT VERTICAL DOWN)
FILLER METAL SPECIFICATION _____ AWS A5.1 AND A5.5
WELD METAL CLASSIFICATION _____ E7018-H4R AND E8018-C3-H4
WIRE/FLUX _____ EXCALIBUR E7018-MR AND E8018-C3-MR
ROOT TREATMENT _____ REMOVE LOOSE/THICK SCALE, RUST & CONTAMINANTS. GRIND TO SOUND METAL FOR GROOVE APPLICATION. REMOVE ALL SCALE FOR WEB TO FLANGE APPLICATION.
CURRENT/POLARITY _____ DCEP OR AC
PREHEAT AND INTERPASS TEMPERATURE _____ *SEE PREHEAT CHART

PASS NO.	WIRE DIA.	CURRENT/POLARITY	TRAVEL SPEED/in.min.	ELECTRODE (WIRE/ROD)	TYPICAL APPLICATIONS-TYPICAL JOINT DETAILS
1	1/8"	90-150	110-150	6-9"	E7018-MR TACK WELDS ONLY
ALL	5/32"	130-180	150-200	8-13"	
1	1/8"	90-150	110-150	6-9"	E8018-C3-MR TACK WELDS, GROOVE WELDS, FILLET WELDS AND REPAIR WELDS
ALL	5/32"	130-180	150-200	8-13"	
ALL	3/16"	200-300	200-300	9-15"	

USED FOR SINGLE-PASS TACKS
WEB TO FLANGE, CROSSFRAMES AND MISC. DETAILS

MEMBERS ARE TACKED IN THE OVERHEAD POSITION THEN RE-POSITIONED FOR FINAL WELDING.

*TACKS THAT ARE COMPLETELY REMELTED BY THE SUBMERGED ARC WELDING PROCESS (530Amps/37.4Volts) ONLY REQUIRE 50°F PREHEAT. REFER TO PREHEAT CHART FOR EVERYTHING ELSE.

QUALIFIED IN ACCORDANCE WITH 5.12.4
SOUNDNESS TESTS T-08-03B, T-08-04, T-09-21, T-13-66
WELDING PROCEDURE QUALIFICATION RECORD AWS-13-58 (EXP. 7/18/18)

REVISED: 8/11/14
ORIGINAL ISSUE: 1/01/92

WELDING PROCEDURE FOR AWS PREQUALIFIED JOINTS
GMAW-P 4F TACKS

MATERIAL SPECIFICATION _____ ASTM A709 GRADE 36, 50, 50W
WELDING PROCESS _____ GAS METAL ARC WELDING - PULSED SPRAY
POWER SOURCE/WAVEFORM _____ MILLER ACCESS 450/ACCU-PULSE/LOCKED FILE
SEMI-AUTOMATIC OR MACHINE _____ SEMIAUTOMATIC OR MACHINE
POSITION OF WELDING _____ 4F (OVERHEAD)
FILLER METAL SPECIFICATION _____ AWS A5.18
CLASSIFICATION _____ ER70S-6
MANUFACTURER/PRODUCT _____ LINCOLN SUPERARC L-56
WIRE DIAMETER _____ .052"
SINGLE OR MULTIPLE ARC _____ SINGLE ARC
CURRENT/POLARITY _____ DCEP
ROOT TREATMENT _____ REMOVE LOOSE/THICK SCALE, RUST & CONTAMINANTS. REMOVE ALL SCALE FOR WEB TO FLANGE.

PREHEAT TEMPERATURE _____ *SEE PREHEAT CHART
ELECTRICAL STICK-OUT _____ 5/8"
SHIELDING GAS _____ 92% AR / 8% CO2
GAS FLOW _____ 35-43 CFH

PASS NO.	AMPS	WIRE FEED SPEED/ft/min	VOLTS	TRAVEL SPEED/in.min.	TYPICAL JOINT DETAILS
1	180-200	200-225*	20.9-22.5	17-20*	3/16" TACK WELDS -- 4F

USED FOR SINGLE-PASS TACKS
WEB TO FLANGE, CROSSFRAMES AND MISC. DETAILS

QUALIFIED IN ACCORDANCE WITH 5.12.4
SOUNDNESS TESTS T-08-03B, T-08-04, T-09-21, T-13-66
WELDING PROCEDURE QUALIFICATION RECORD AWS-13-58 (EXP. 7/18/18)

REVISED: 6/19/14
ORIGINAL ISSUE: 5/5/09

WELDING PROCEDURE FOR AWS PREQUALIFIED JOINTS
W13X-2 GB

MATERIAL SPECIFICATION _____ ASTM A709 GRADE 36, 50, 50W
WELDING PROCESS _____ SUBMERGED ARC WELDING
SEMI-AUTOMATIC OR MACHINE _____ MACHINE
POSITION OF WELDING _____ 2F (HORIZONTAL)
FILLER METAL SPECIFICATION _____ AWS A5.23
CLASSIFICATION _____ F8A2-ENiK-N1-H8
MANUFACTURER/PRODUCT _____ LINCOLN LA-75/960
WIRE DIAMETER _____ 5/32"
SINGLE OR MULTIPLE ARC _____ SINGLE ARC
CURRENT/POLARITY _____ DCEN/DCEP
ROOT TREATMENT _____ REMOVE ALL SCALE RUST & CONTAMINANTS.
PREHEAT TEMPERATURE _____ SEE PREHEAT CHART
ELECTRICAL STICK-OUT _____ 1-1/4"

PASS NO.	AMPS	VOLTS	TRAVEL SPEED/in.min.	CURRENT-POLARITY	JOINT DETAIL
1	684-760	34.4-37	24-27*	DCEN	
2+	530-600	32-34	22-25*	DCEP	

PRIMARYLY USED FOR GENTRY WEB TO FLANGE

SINGLE-PASS FILLET WELDS UP TO 5/16"
MULTI-PASS FILLET WELDS 3/8" AND GREATER

QUALIFIED IN ACCORDANCE WITH 5.12.1 (EXP. 7/26/18)
FWST T-13-75, T-13-66 DCEN PGR AWS-13-64, DCEP PGR AWS-13-65

REVISED: 6/19/14
ORIGINAL ISSUE: 2/03/10

WELDING PROCEDURE FOR AWS PREQUALIFIED JOINTS
W6

MATERIAL SPECIFICATION _____ ASTM A709 GRADE 36, 50, 50W
WELDING PROCESS _____ FLUX CORED ARC WELDING
MANUAL, SEMI-AUTOMATIC, MACHINE _____ SEMI-AUTOMATIC OR MACHINE
POSITION OF WELDING _____ ALL
FILLER METAL SPECIFICATION _____ AWS A5.20
WELD METAL CLASSIFICATION _____ E71T-1
WIRE/FLUX _____ HOBART FORMULA XL550
WIRE DIAMETER _____ .052"
SINGLE OR MULTIPLE ARC _____ SINGLE ARC
CURRENT/POLARITY _____ DCEP
ROOT TREATMENT _____ REMOVE LOOSE/THICK SCALE, RUST & CONTAMINANTS. FOR CJP/PJP APPLICATIONS GRIND TO SOUND METAL.
PREHEAT/INTERPASS TEMPERATURE _____ *SEE PREHEAT CHART
ELECTRICAL STICK-OUT _____ 3/4"
SHIELDING GAS _____ 100% CO2
GAS FLOW _____ 40-50 CFH

PASS NO.	AMPS	WIRE FEED SPEED/ft/min	VOLTS	TRAVEL SPEED/in.min.	TYPICAL APPLICATION/DETAIL
1	225-250	285-335*	25-27	14.75-16.5*	3/16" TACK WELDS

SINGLE-PASS TACK WELDS FOR STIFFENERS, CONNECTION PLATES, CJP/PJP, AND MISC. DETAILS.

~ SPECIFIC CJP/PJP JOINT DETAILS SHALL BE DETAILED ON APPROVED SHOP DRAWINGS.
~ SHALL NOT BE USED FOR TACKING WEB TO FLANGE.
~ *PREHEAT IS NOT REQUIRED FOR 3/16" TACK WELDS REMELTED BY THE SUBMERGED ARC PROCESS.

QUALIFIED IN ACCORDANCE WITH 5.12.4
PROCEDURE QUALIFICATION RECORD AWS-13-59 (EXPIRES 7/16/18)

REVISED: 6/30/14
ORIGINAL ISSUE: 5/3/06

WELDING PROCEDURE FOR AWS PREQUALIFIED JOINTS
GMAW-P FILLETS

MATERIAL SPECIFICATION _____ ASTM A709 GRADE 36, 50, 50W
WELDING PROCESS _____ PULSED GAS METAL ARC WELDING
MANUAL OR MACHINE _____ SEMIAUTOMATIC OR MACHINE
POSITION OF WELDING _____ 2F (HORIZONTAL)
FILLER METAL SPECIFICATION _____ AWS A5.18
WELD METAL CLASSIFICATION _____ ER70S-6
WIRE/FLUX _____ LINCOLN SUPERARC L-56, L-59
WIRE DIAMETER _____ .045"/.052"
SINGLE OR MULTIPLE ARC _____ SINGLE ARC
CURRENT/POLARITY _____ DCEP
ROOT TREATMENT _____ REMOVE LOOSE/THICK SCALE, RUST & CONTAMINANTS.
PREHEAT TEMPERATURE _____ SEE PREHEAT CHART
ELECTRICAL STICK-OUT _____ 3/4"
SHIELDING GAS _____ 92% AR / 8% CO2
GAS FLOW _____ 32-40 CFH

PASS NO.	WIRE DIAMETER	WIRE FEED SPEED/ft/min	AMPS	VOLTS	TRAVEL SPEED/in.min.	JOINT DETAIL
1	.045"	360-440*	225-260	25.2-26.5	14-16.5*	
	.052"	275-325*				

USED FOR SINGLE-PASS FILLETS UP TO 5/16" AND 3/16" TACKS

STIFFENERS/CONNECTION PLATES TO WEB AND FLANGE, MISCELLANEOUS DETAILS

~ MILLER ACCESS 450 POWER SOURCE REQUIRED. WELDING PARAMETERS SHALL BE LOCKED VIA MILLER ACCESS FILE MANAGEMENT.
~ MULTIPLE-PASS FILLETS 3/8" AND GREATER MAY BE USED FOR PAINTED MEMBERS WITH L-56 WIRE.

FWST T-13-05, T-13-06
QUALIFIED IN ACCORDANCE WITH 5.12.4
WELDING PROCEDURE QUALIFICATION RECORD AWS-11-05 (EXPIRES 11/29/16)

REVISED: 10/14/14
ORIGINAL ISSUE: 8/6/08

WELDING PROCEDURE FOR AWS PREQUALIFIED JOINTS
W33

MATERIAL SPECIFICATION _____ ASTM A709 GRADE 36, 50, 50W
WELDING PROCESS _____ SUBMERGED ARC WELDING
SEMI-AUTOMATIC OR MACHINE _____ SEMIAUTOMATIC OR MACHINE
POSITION OF WELDING _____ 2F (HORIZONTAL)
FILLER METAL SPECIFICATION _____ AWS A5.17
CLASSIFICATION _____ F7A2-EM12K-H8
MANUFACTURER/PRODUCT _____ LINCOLN L-61/761
WIRE DIAMETER _____ 3/32"
SINGLE OR MULTIPLE ARC _____ SINGLE ARC
CURRENT/POLARITY _____ DCEN
ROOT TREATMENT _____ REMOVE LOOSE/THICK SCALE, RUST AND CONTAMINANTS
PREHEAT TEMPERATURE _____ SEE PREHEAT CHART
ELECTRICAL STICK-OUT _____ 1-INCH

PASS NO.	AMPS	WIRE FEED SPEED/ft/min	VOLTS	TRAVEL SPEED/in.min.	CURRENT-POLARITY	JOINT DETAIL
1	400-440	129-146*	29.4-34	14-16*	DCEN	

USED FOR STIFFENERS/CONNECTION PLATES TO WEB AND MISC. DETAILS

SINGLE-PASS FILLET WELDS UP TO 5/16"

QUALIFIED IN ACCORDANCE WITH 5.12.1
FWST T-14-23, PGR AWS-13-67 (EXP. 8/20/18)

REVISED: 7/02/14
ORIGINAL ISSUE: 2/01/00

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NO.	REVISION	BY	CHK'D DATE
HOLES			
BOLTS	WELDING PROCEDURES VT RT 108 OVER LITTLE RIVER VT RT 108 STA. 3+48.00 TO STA. 4+78.00 TOWN OF STOWE, LAMOILLE COUNTY, VERMONT		
COATING	STATE OF VERMONT		
CODE(S)	AGENCY OF TRANSPORTATION		
SCALE	BRF 0235 (11)	FED. AID PROJ. NO.	
N.T.S.	GENERAL CONTRACTOR CCS CONSTRUCTORS LLC	HSSL PROJ. MGR	KEN GLIDDEN
DRAWING MANAGER	DAVE PAINTER (IH)	MADE BY	PM
HSSL PROJECT NUMBER	S-1140166A-1	CHK'D BY	
		DATE	12/09/14
VT		DRAWING NUMBER	WP1